

Chapter 7

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- Level 1 Volunteer Water Quality Monitoring Training Notebook -

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**IF YOU DISCOVER A SERIOUS
WATER POLLUTION PROBLEM
OR A FISH KILL, PLEASE
REPORT IT IMMEDIATELY TO:**

**MISSOURI DEPARTMENT OF
NATURAL RESOURCES (DNR)
EMERGENCY RESPONSE UNIT
(573) 634-2436
--24 hours a day--**

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All other Stream Team Staff
may be reached using the
STREAM TEAM 800 NUMBER (Voice Mail): (800) 781-1989

Stream Team Coordination Biologists
Missouri Department of Conservation
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Springfield Metro Area
Carl Romesburg
(Carl.Romesburg@mdc.mo.gov)

STREAM TEAM Website:
<http://www.mostreamteam.org>

STREAM TEAM email:
streamteam@mdc.mo.gov or streamteam@dnr.mo.gov



MISSOURI DEPARTMENT OF NATURAL RESOURCES REGIONAL AND SATELLITE OFFICES

Kansas City Area

- **Kansas City Regional Office**
500 NE Colbern Rd.
Lee's Summit, MO 64086-4710
816-622-7000
FAX: 816-622-7044
- **Northwest Missouri Satellite Office**
Northwest Missouri State University
Environmental Services Building,
800 University Dr.
Maryville, MO 64468-6015
660-562-1876 or 660-562-1877
FAX: 660-562-1878
- **Truman Lake Satellite Office**
Harry S Truman State Park
28761 State Park Road West
Warsaw, MO 65355
660-438-3039
FAX: 660-438-5271

Southwest Area

- **Southwest Regional Office**
2040 W. Woodland
Springfield, MO 65807-5912
417-891-4300
FAX: 417-891-4399
- **Lake of the Ozarks Satellite Office**
Camden County, 5570 Hwy. 54,
Osage Beach, MO 65065
2040 W. Woodland
Springfield, MO 65807-5912
573-348-2442
FAX: 573-348-2568
- **Newton County Satellite Office**
Crowder College
601 Laclede, Smith Hall, Room 201
Neosho, MO 64850
417-455-5180 or 417-455-5158
FAX: 417-455-5157

Northeast Area

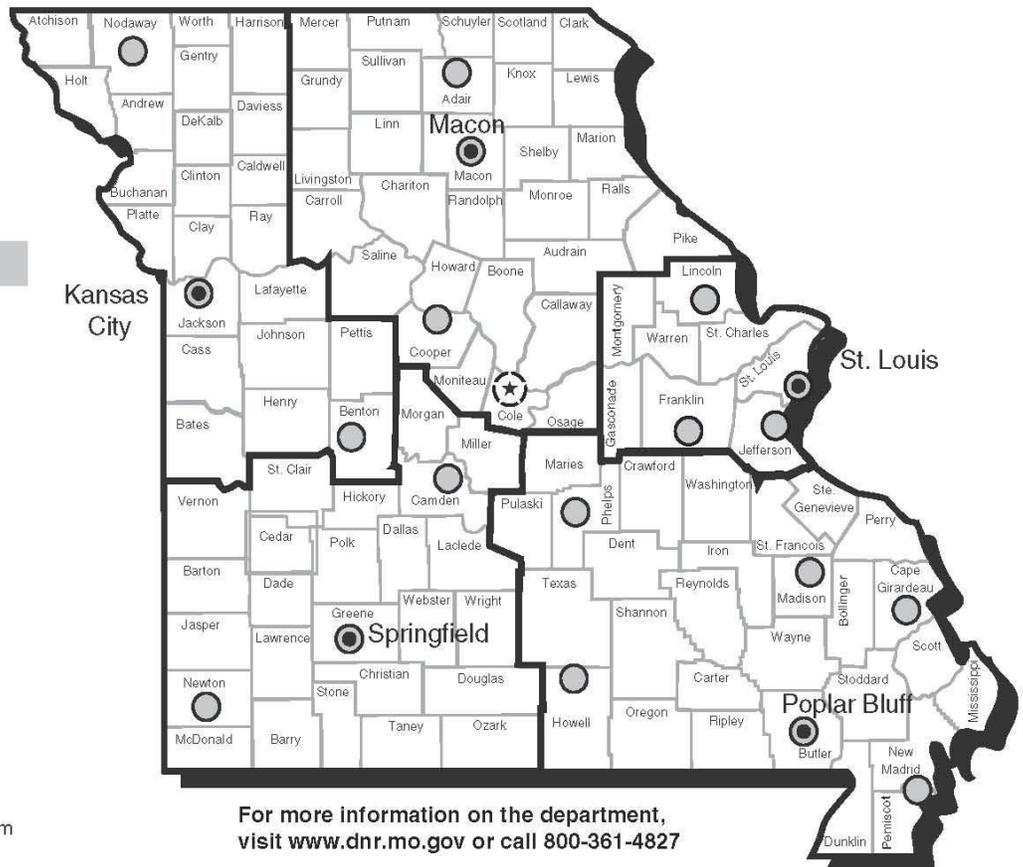
- **Northeast Regional Office**
1709 Prospect Drive
Macon, MO 63552-2602
660-385-8000
FAX: 660-385-8090
- **Boonville Satellite Office**
320 First St.
Boonville, MO 65233
660-882-1540
FAX: 660-882-1544
- **Kirksville Satellite Office**
Truman State University
Magruder Hall, Room 3068
100 E. Normal St.
Kirkville, MO 63501
660-785-4610
- ★ **Department Central Offices**
P.O. Box 176
Jefferson City, MO 65102-0176
573-751-3443
www.dnr.mo.gov/shared/map-jeffcity.htm

St. Louis Area

- **St. Louis Regional Office**
7545 S. Lindbergh, Ste 210
St. Louis, MO 63125
314-416-2960
FAX: 314-416-2970
- **Franklin County Satellite Office**
Meramec State Park
Hwy. 185 S.
Sullivan, MO 63080
573-860-4308
FAX: 573-468-5051
- **Jefferson County Satellite Office**
Eastern District Parks Office
Hwy. 61
Festus, MO 63028
636-931-5200
FAX: 636-931-5204
- **Lincoln County Satellite Office**
Cuivre River State Park
678 State Rt. 147
Troy, MO 63379
636-528-4779
FAX: 636-528-5817

Southeast Area

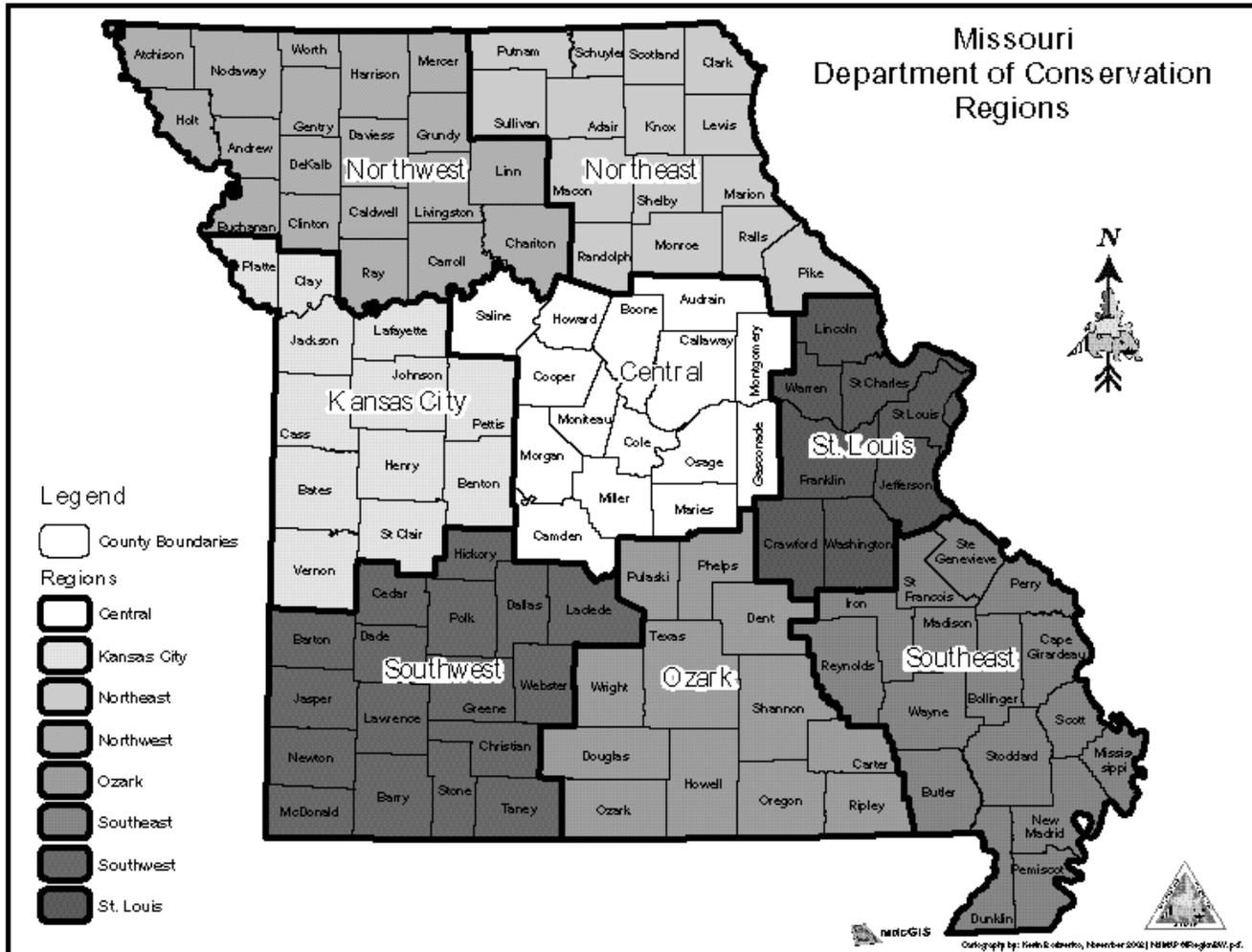
- **Southeast Regional Office**
2155 North Westwood Blvd.
Poplar Bluff, MO 63901
573-840-9750
FAX: 573-840-9754
- **Cape Girardeau County Satellite Office**
2007 Southern Expressway
Cape Girardeau, MO 63701
573-651-3008 (phone and FAX)
- **Delta Center Satellite Office**
P.O. Box 160
Portageville, MO 63873
573-379-5431
FAX: 573-379-5875
- **Howell County Satellite Office**
700 W. Main St.
Willow Springs, MO 65793
417-469-0025 (phone and FAX)
- **Madison County Satellite Office**
120 W. Main St.
Fredericktown, MO 63645
573-783-2385
FAX: 573-783-6294
- **Rolla Satellite Office**
111 Fairgrounds Rd.
Rolla, MO 65402
573-368-3625
FAX: 573-368-3912



For more information on the department,
visit www.dnr.mo.gov or call 800-361-4827



Missouri Department of Conservation Regional Offices



Northwest Regional Office
701 James McCarthy Drive
St. Joseph, MO 64507-2298
(816) 271-3100
Fax: (816) 271-3107

Northeast Regional Office
2500 S. Halliburton
Kirksville, MO 63501
(660) 785-2420
Fax: (660) 785-2553

Kansas City Regional Office
12405 SE Ranson Road
Lee's Summit, MO 64082
(816) 622-0900
Fax: (816) 622-0205

**Central Regional Office and
Conservation Research
Center**
3500 E. Gans Rd
Columbia, MO 65201
(573) 815-7901
Fax: (573) 815-7902

**Southwest Regional
Office**
2630 N. Mayfair
Springfield, MO 65803
(417) 895-6880
Fax: (417) 895-6910

Ozark Regional Office
PO Box 138
551 Joe Jones Blvd
West Plains, MO 65775
(417) 256-7161
Fax: (417) 256-0429

**St. Louis Regional
Office/August A. Busch
Memorial Conservation Area**
2360 Hwy D
St. Charles, MO 63304
(636) 441-4554
Fax: (636) 926-9125

Southeast Regional Office
2302 County Park Drive
Cape Girardeau, MO 63701
(573) 290-5730
Fax: (573) 290-5736

• Dissolved Oxygen Test Kit

- 0.2–4 and 1–20 mg/L O₂
- Mod. OX-2P
- # 1469-00

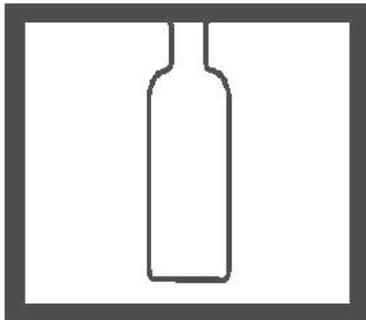
-
- To ensure accurate results, read carefully before proceeding.

WARNING

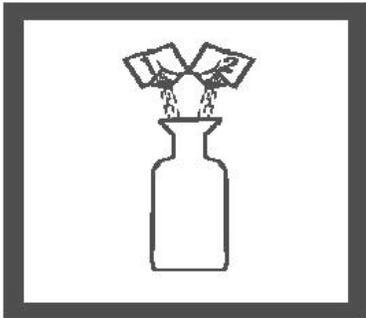
Handling chemical samples, standards, and reagents can be dangerous. Review the Material Safety Data Sheets before handling any chemicals.



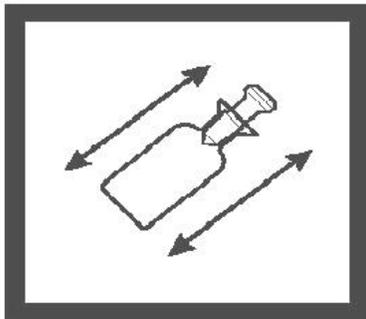
- **High Range Test (1–20 mg/L)**



1. Fill the Dissolved Oxygen bottle (round bottle with glass stopper) with sample water. Avoid turbulence and bubbles in the sample while filling.



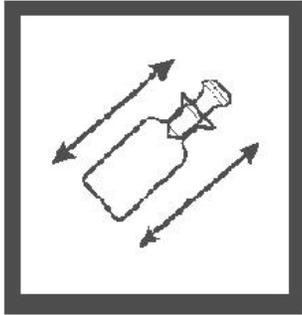
2. Add the contents of one Dissolved Oxygen 1 Reagent Powder Pillow and one Dissolved Oxygen 2 Powder Pillow. Stopper the bottle carefully to avoid trapping air bubbles. If bubbles become trapped, discard the sample and repeat the test.



3. Shake the bottle vigorously to mix. Flocculant (floc) precipitate will form. Brownish-orange precipitate indicates oxygen is present.



4. Wait for floc to settle below the white line on the Dissolved Oxygen bottle. Floc will not settle if high concentrations of chloride are present. In this case wait 4-5 minutes before proceeding.



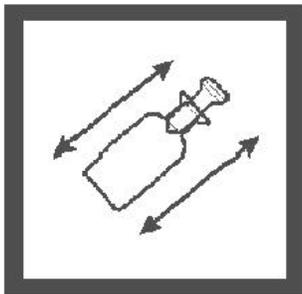
5. Shake the bottle vigorously again.



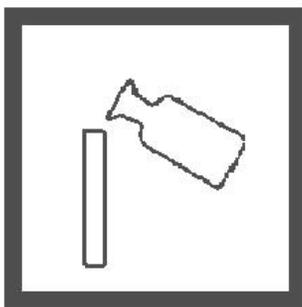
6. Wait for floc to settle halfway. Floc will not settle if high concentrations of chloride are present. In this case, wait 4-5 minutes before proceeding.



7. Remove the stopper and add the contents of one Dissolved Oxygen 3 Reagent Powder Pillow. Stopper the bottle carefully.



8. Shake the bottle vigorously to mix. Floc will dissolve and the sample will turn yellow if oxygen is present.



9. Fill plastic tube (to the top) with prepared sample.

Note: Save the rest of the prepared sample for the Low Range Test, if necessary.



10. Pour the contents of the tube into the square mixing bottle.



11. Add Sodium Thiosulfate Standard Solution one drop at a time to the mixing bottle. Count each drop. Swirl to mix after each drop. Add drops until the sample becomes colorless.



12. The total number of drops of titrant used in Step 11 equals the total mg/L Dissolved Oxygen.

$$\text{mg/L Dissolved Oxygen} = \# \text{ of drops}$$

REPLACEMENTS

Description	Unit	Cat. No.
Bottle, BOD, 60-mL w/ 30 mL mark, glass w/ stopper	each.....	1909-02
Bottle, square, glass.....	6/pkg.....	439-06
Clippers for medium powder pillows.....	each.....	968-00
Dissolved Oxygen 1 Reagent Powder Pillows.....	100/pkg.....	981-99
Dissolved Oxygen 2 Reagent Powder Pillows.....	100/pkg.....	982-99
Dissolved Oxygen 3 Reagent Powder Pillows.....	100/pkg.....	987-99
Instruction Card, OX-2P Test Kit.....	each.....	1469-88
Measuring Tube, plastic, 5.83 mL.....	each.....	438-00
Sodium Thiosulfate Standard Solution, stabilized, 0.0109 N	100 mL MDB*	24089-32



NITRATE TEST KIT

MODEL NCR • CODE 3110

QUANTITY	CONTENTS	CODE
2 x 60 mL	*Mixed Acid Reagent	*V-6278-H
5g	*Nitrate Reducing Reagent	*V-6279-C
1	Dispenser Cap	0692
1	Spoon, 0.1g, plastic	0699
2	Test Tubes, 2.5 & 5.0 mL, glass, w/caps	0820
1	Bottle, Water Sample	0688
1	Nitrate-N Comparator, 0.25-10.0 ppm	3109

*WARNING: Reagents marked with an * are considered to be potential health hazards. To view or print a Material Safety Data Sheet (MSDS) for these reagents see MSDS CD or our web site. To obtain a printed copy, contact us by e-mail, phone or fax.

To order individual reagents or test kit components, use the specified code number.

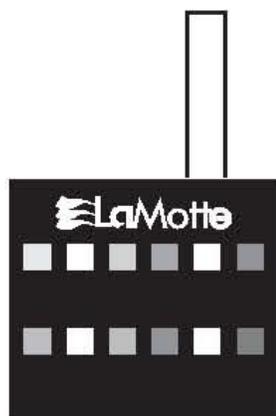
NOTES:

- Nitrite interferes at all levels. Use the following equation to compensate for nitrite interferences:

$$\text{Test result (ppm)} - (\text{Nitrite-N (ppm)} \times 5.5) = \text{true Nitrate-N reading}$$

- For best results keep all reagents around 23°C.
- Place Dispenser Cap (0692) on *Mixed Acid Reagent (V-6278-H). Save this cap for refill reagents.

USE OF THE OCTET COMPARATOR



The Octet Comparator contains eight permanent color standards. A test sample is inserted into the openings in the top of the comparator. The sample can then be compared to four color standards at once, and the value read off the comparator. For optimum color comparison, the comparator should be positioned between the operator and a light source, so that the light enters through the special light-diffusing screen in the back of the comparator. Avoid viewing the comparator against direct sunlight or an irregularly lighted background.

PROCEDURE

1. Fill sample bottle (0688) with sample water.
2. Fill one test tube (0820) to the 2.5 mL line with water from the sample bottle.
3. Dilute to 5 mL line with *Mixed Acid Reagent (V-6278). Cap and mix. Wait 2 minutes.
4. Use the 0.1g spoon (0699) to add one level measure (avoid any excess) of *Nitrate Reducing Reagent (V-6279). Cap and invert gently 60 times in one minute. Wait 10 minutes.
5. Insert test tube into Nitrate-N Comparator (3109). Match sample color to a color standard. Record as ppm Nitrate as Nitrate Nitrogen ($\text{NO}_3\text{-N}$).

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Operating Instructions EcoTestr pH 2 Waterproof Pocket Tester

Before First Use: Precipitation of the sensor electrolyte may cause white crystals to form around the cap. This is normal and does not affect the tester's performance.

Conditioning: Condition the tester before first use. Remove the transparent cap and fill with tap water to a height of 20 mm. Recap the tester and soak* sensor for one hour. This will activate the sensor and dissolve any crystals present. Rinse the cap after use.

Calibration: This tester allows up to 3-point calibration. Start with pH 7.0 buffer • Press **on/off** button to power on. Immerse sensor in about 20 mm of buffer and stir gently. Wait for displayed value to stabilize at or near pH 7.0 • Press **cal** button to enter calibration sequence. **CAL** will flash momentarily and then show a flashing default reading • To complete the first calibration point, press **hold/ent** button to confirm (**Ent**). If necessary, proceed to next buffer value (pH 4.0 or pH 10.0) and repeat the calibration procedure to obtain your second and third calibration point • To abort calibration, press **cal** button to escape (**ESC**). You have successfully calibrated the instrument.

Note: If no button is pressed for 15 seconds, tester will automatically confirm calibration.

pH Testing: Remove cap and press **on/off** button to turn on the tester • Dip the sensor in at least 20 mm of test solution • Stir once and let the reading stabilize. Note the pH value • Press **hold/ent** button to hold (**HO**) the reading. Annunciator will flash to indicate reading is in hold mode. Press **hold/ent** again to cancel (**HC**) the hold mode • Press the **on/off** button to shut tester off.

Note: Tester automatically shuts off after 8.5 minutes of non-use to conserve batteries.

Maintenance: Rinse the sensor in tap water after use. In harsh samples, take readings quickly, then rinse sensor immediately afterwards with de-ionized water to remove residues and prevent electrode contamination.

Useful Notes: • To avoid cross-contamination, rinse sensor between samples and buffer with de-ionized water • To maintain tester accuracy, use tester regularly or calibrate at regular intervals as required • For long-term storage, fill the cap with 20 mm of storage solution (NOT de-ionized water), and replace cap*. This will keep the sensor conditioned and ready for next use.

* The tester cap is not leak-proof. Please keep tester upright during soaking.

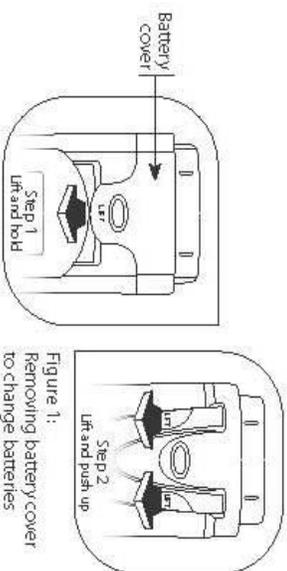


Figure 1:
Removing battery cover
to change batteries

Changing Batteries: To remove batteries, lift up front battery cover and hold in position before lifting two sides of the pocket clip (Figure 1). Remove old batteries and replace with fresh ones. Note polarity as shown in battery compartment. No re-calibration is required after battery change since tester's non-volatile memory function retains calibration.

Error Messages: **bat** – Batteries are weak and need replacement. **Err** – Wrong or bad buffer value (out of range) and/or the sensor is failing. Use fresh buffer. **Or/Ur** – Over or Under range signal or sensor is contaminated/damaged/not fully immersed.

Reset Option: Reset option allows you to restore the calibration back to factory default settings • Press **on/off** to turn off tester • Press and hold **hold/ent** button and then switch on using the **on/off** button. The display shows a flashing **1St** (reset) • Press **hold/ent** button again to confirm (**Ent**) reset or press the **cal** button to escape (**ESC**) reset option.

Warranty: This tester is supplied with a warranty against manufacturing defects for a period of ONE year from date of purchase.

Accessories:

Eutech Order Code	Oakton Order Code	Description
ECBU4BT	00654-00	pH 4.01 buffer solution, 480 ml bottle
ECBU7BT	00654-04	pH 7.00 buffer solution, 480 ml bottle
ECBU10BT	00654-08	pH 10.01 buffer solution, 480 ml bottle
ECRB05	00653-04	Storage solution for pH sensor, 480 ml bottle
ECPC8T	00653-06	Protein remover solution, 480 ml bottle

Operating Instructions EcoTestr EC Low Waterproof Pocket Tester

Conditioning Before First Use:

1. Remove the transparent cap and add 20 mm of tap water or calibration standard (approximately ½ full)
2. Recap the EcoTestr and soak* for at least 15 minutes
3. Rinse the cap after use
4. The sensor is now activated and ready for use

Measurement:

1. Remove cap and press **(L)** to turn on the tester
2. Dip sensor into the test solution
3. Stir once and let the reading stabilize. Note the measured value
4. To hold reading, press **(HOLD)**. Screen flashes **HD** once, then displays measurement with blinking unit (µS) to indicate that tester is in the hold mode. Press **(HOLD)** again to cancel hold mode (**HL**)
5. Press **(L)** to shut the tester off

Note: Tester automatically shuts off after 8.5 minutes of non-use to conserve batteries.

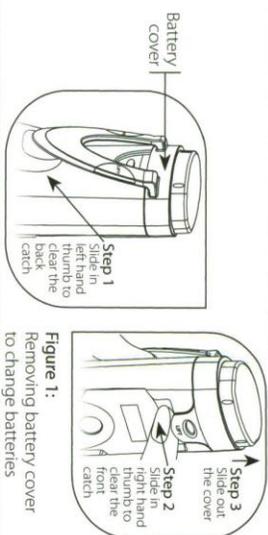
Calibration: The EcoTestr is factory calibrated. However, to ensure accuracy, calibration is recommended. **Note:** Calibration standard sold separately.

1. If the sensor was stored dry, follow "Conditioning Before First Use" steps for best results
2. Press **(L)** to turn on the tester
3. Dip sensor into calibration standard solution and wait for the value to stabilize
4. Press **(CAL)** to begin the calibration. Display shows **CAL** momentarily and blinks the default reading
5. Press **(HOLD)** until the blinking value matches the value of your calibration standard at 25 °C. **Note:** to set a calibration standard value that is lower than the blinking value, continue to press **(HOLD)** past the maximum value to continue with the lowest adjustable value
6. Release **(HOLD)** to accept the calibration value. After a few seconds, (**Ent**) is shown and measurement is resumed
7. To abort calibration, press **(CAL)** to escape (**ESC**)

Maintenance: Clean the stainless steel sensors by periodically soaking them in alcohol for 10 - 15 minutes. Rinse sensor with clean water after each use.

Useful Notes: To avoid cross contamination, rinse between samples and calibration standards with clean water.

* The tester cap is not leak-proof. Please keep tester upright during soaking.



Changing Batteries:

1. To remove batteries, hold the tester on the left hand with the left thumb slide under the back clip of the cover. This will release the back catch
2. Next, hold the cover with your right hand, at the same time release the front catch with your right thumb. Slide up to remove the battery cover (Figure 1)
3. Replace old batteries with fresh ones. Note polarity as shown in battery compartment
4. No re-calibration is required after battery change. The tester's non-volatile memory function retains calibration settings

Your EcoTestr includes (4) pre-installed 1.5V alkaline batteries. LR44 or A76 battery types are suitable and commonly available. Replace all (4) batteries together. Waiting too long to replace the batteries can lead to inaccurate readings and is the most common cause of problems.

Error Messages:

1. **Err** – Batteries are weak and need replacement
2. **Er** – Calibration was attempted with a value that is <5 % of the full-scale range; use a calibration standard with a higher value
 - Use fresh calibration standard
 - Sensor is dirty or has not been soaked
 - Over Range: The measurement is above the range of the instrument (including temperature measurement)
3. **Dr** – (including temperature measurement)

Reset Option: Reset option allows you to restore the calibration back to factory default settings.

1. Press **(L)** to turn off tester
2. Press and hold **(HOLD)**, then press **(L)** to turn the tester on. The display shows a flashing **5t** (reset)
3. Press **(HOLD)** again to confirm reset (**Ent**) or press **(CAL)** to escape (**ESC**) reset option

Warranty: This instrument is supplied with a warranty against manufacturing defects for a period of one year from date of purchase.

Tester & Accessories Ordering Information:

Eutech Order Code	Oakton Order Code	Description
ECOECTESTLOW	35462-30	EcoTestr EC Low
ECPOUCH01	35624-45	Soft carrying case with belt-loop
ECCON100BT	100 µS KCl calibration solution	
–	00653-47	447 µS KCl calibration solution
ECCON1413BT	00653-18	1413 µS KCl calibration solution

WATER QUALITY MONITORING PROCEDURES

What, When and Where

What	When	Where
Watershed mapping	Once every 2-5 years	Whole watershed
Visual survey of site	Minimum 2x/year	Monitoring site
Biological monitoring	Minimum 2x/year (Max. 4x/year)	Monitoring site
Chemical monitoring	Minimum 4x/year	Monitoring site
Flow measurement	Each time you monitor	Monitoring site

1. Obtain maps of your stream's watershed (see the Maps section of this chapter). Ideally, make a **watershed use map** once every 5 years. If your watershed is being developed or is rapidly changing, then do this once every two years. Determine land use and locate point and nonpoint sources of pollution. Transfer this information onto the watershed map and keep this for your records. You do not have to submit your watershed maps to the Program, but if you see a change in the watershed that you feel has affected your sampling results, be sure to make a note of that fact on all your data sheets.
2. Conduct a **visual survey** of your stream at each of your sampling sites twice per year. Do one survey with foliage present and one with foliage absent. Use the *Visual Stream Survey Data Sheet* for this activity.
3. Conduct **biological monitoring** two to four times per year (not more than four because you can negatively impact the site). At least one sample (three net sets per sample) should be collected in later winter/early spring (February, March, or April, after snow melts) and the other in late summer/early autumn (before leaves fall). Collect three net sets at each site and report the results for each set. Each net set should be collected from a different part of the riffle, or a different type of habitat such as a leaf pack, root wad, root mats or old woody debris. Be sure to sample the same habitats each time you sample that site and make a note on your data sheet (e.g., 2 riffle sets and 1 root mat). Use the *Macroinvertebrate Data Sheet* for this activity.
4. Conduct **chemical monitoring** at each site four times per year (ideally once per season) and more often as needed. Chemical parameters to be tested include air and water temperature,

dissolved oxygen, pH, conductivity and nitrates. You may test for other parameters, such as ammonia or phosphate, depending on your monitoring site. Use the *Water Chemistry Data Sheet* for reporting the activity.

5. Measure **stream discharge** (in cubic feet per second) every time you conduct chemical or biological monitoring. Do not attempt to measure discharge if you cannot safely wade across the stream, e.g., a large river like the Missouri River or a small stream during high flow. Do not attempt to measure flow during periods of extremely low flow. If the float object (e.g., wiffle golf ball) becomes stalled or touches bottom, report the flow as “too low to measure” and proceed with chemical and biological monitoring. Use the *Stream Discharge Worksheet* to calculate and report flow.
6. **Maintain a file with copies of all of your field notes and data sheets.** Submit your data to the program *after* you have made copies for your own files.

Send Data to:

Attn: Volunteer Water Quality Coordinator
Missouri Department of Natural Resources
Water Protection Program/WQMA Section
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 526-3406

7. If you discover a serious water pollution problem or a fish kill, please report it **immediately** to:
Missouri Department of Natural Resources (DNR) – Jefferson City
Emergency Response Unit
(573) 634-2436 – 24 hours a day

CARE OF STANDARD SOLUTIONS

- Cap all solutions tightly. Evaporation can change the value of the standards and affect all subsequent readings. Do not re-use solutions used to calibrate a meter.
- To prevent contamination, meters should be rinsed with tap or deionized water before calibration procedures. This minimizes the problem of contamination by what may be on the meter from previous usage. Excess water from the rinsing process can also contaminate a solution by diluting it. Gently pat the bottom of the meter dry before inserting it in the standards.
- Do not store calibration solutions or any chemicals where they will be exposed to extreme heat or cold such as a car in the summer or an unheated storage shed in the winter. Extreme temperatures can denature (degrade) chemicals. It is best to store them in a temperature-controlled environment.

DISPOSAL OF STANDARD SOLUTIONS & CHEMICAL REAGENTS

(MSD Sheets can be found on the Stream Team Website: <http://www.mostreamteam.org/datasheets.asp>)

- All reagents should be placed in a container and disposed of after the monitoring event. Do not dispose of reagents by dumping them in the stream. Most, but not all, standards and reagents can be safely disposed of by pouring them down a sink drain and letting the tap run for several seconds to dilute the salts and acids.
- As previously stated, most of the reagents are harmless. The pH and conductivity standards are sodium chloride and potassium chloride solutions – both common salt solutions that can be poured down the drain. The solution resulting from your DO test may also be poured down the drain. **However, the nitrate reducing reagent in the nitrate kit contains cadmium, and the Nessler's reagent in the old ammonia kit contains mercury. If you have an old Hach NI8 ammonia kit please turn it in for a replacement kit.** This element is present in very small quantities, but it is a heavy metal and is listed as hazardous material. It is recommended that the solution resulting from the nitrate tests be kept separate from other VWQM waste for disposal in an appropriate facility. **Pour the nitrate waste in a "cubitainer" supplied by the program or a heavy plastic container, such as a well-rinsed bleach or antifreeze container.** A full year of testing will produce less than one half

gallon of liquids which can easily be stored in the bleach or antifreeze containers. **Do NOT put it in a milk jug or soda/water bottle, or leave out to evaporate.**

- Please label the container as “STREAM TEAM nitrate waste.” **It is critical that you mark waste containers with the tests that have been performed.** If you don’t, the lab at DNR’s Environmental Services Program (where waste returned to the VWQM Program is sent for processing) must treat the waste as if it contains a variety of chemicals, which is both time-consuming and expensive. So please label the container as containing cadmium (Cd), for nitrate-testing waste.
- Please DO NOT put any waste materials in your waste container other than those generated from chemical tests performed by volunteer monitors! Adding other unrelated wastes (e.g., petroleum products) can be dangerous and, as mentioned in the *Water Chemistry* chapter, will increase the time and handling costs for staff at DNR’s lab in order to properly dispose of the waste.
- For those volunteers living in an area with household hazardous waste pick-ups, you may use that program for reagent disposal. Many schools and colleges have systems set up for the disposal of chemicals. If your local school has such a mechanism, you may ask if they will allow you to use it.
- Please return your spent or expired nitrate reducing reagent and nitrate waste to the VWQM Program. You can do so by several means. You can take them to an Introductory, Level 1 or Level 2 workshop scheduled for your area (even if you aren’t attending) and turn the waste over to the coordinators.
- Expired or waste reagents may also be turned in to Department of Natural Resources or Missouri Department of Conservation regional offices (see maps earlier in this chapter). **BE SURE** to indicate to those at the front desk that you are with the STREAM TEAM Program or the offices may not accept your chemical waste. Again, be sure to label any waste reagents as directed above. You may also turn in STREAM TEAM equipment you no longer use at the regional offices. They will make sure any returned equipment gets back to the

program to recycle for future use.

- You may also request a pre-paid shipping label to return your waste and expired nitrate reducing reagent, as well as any kits you no longer wish to use. To request a shipping label, contact Stream Team staff at Streamteam@mdc.mo.gov or at 1-800-781-1989 and provide your name and address where the label will be sent.

SAMPLING PROCEDURES

1. **Do not collect chemical or invertebrate samples from disturbed areas.** Do not collect chemical samples downstream from someone kicking up the sediment to monitor for invertebrates. Likewise, do not collect invertebrates from a riffle that others have just used to wade across the stream.
2. **Collect macroinvertebrate net sets by progressing in an upstream direction from one net set to the next.** Sample areas with different current speeds, substrate types or varying amounts of aquatic plants or woody debris. This helps ensure that several different types of habitats are assessed. Collect each net set from an undisturbed portion of the riffle.
3. **Always use clean sample containers and equipment.** Containers and equipment can be washed using non-phosphate soap and rinsing with tap water or deionized water (can be purchased from most grocery stores). Allow to air dry or dry with paper towels. Follow this procedure after each monitoring event.
4. **Rinse sample containers three times with water to be tested.** This helps to assure an unaltered sample by rinsing out any residues that may be present from a previous sampling event or from the washing procedure.
5. **Face upstream (into the stream flow) when collecting samples for chemical testing.** This prevents substances stirred up by your activities in the stream from altering the sample. The goal is to measure the impacts of land uses throughout the watershed, not the impact caused by the sampler wading into the stream.
6. **Collect samples upstream from bridge structures when possible.** Bridges can have a variety of impacts on a stream, because people throw trash off them. Also, petroleum or metal compounds from cars, or salt put on roads in the winter, can wash off bridges and skew monitoring results. Collecting samples upstream of the bridge gives more accurate data regarding watershed impacts as opposed to bridge-related impacts.

7. **Collect samples in the same manner and in the same place each time you monitor.** One of the uses of the data is to evaluate trends over time. This requires data that can be compared from one sampling event to another. For instance, volunteers frequently ask if dissolved oxygen samples should be collected above or below a riffle, as this could impact the amount of oxygen present. The more critical factor is to collect the samples in the same place each sampling event and document the site information to ensure consistency.

8. **Collect water samples just below the surface of the water.** Surface samples may not always be most representative of what is present in the water column. This is, however, the easiest way to collect a sample and helps ensure uniform sampling methods throughout the program. When comparing data from several volunteers within one watershed, uniform methods are essential if the comparisons are to be meaningful.

9. **When sampling at point source discharges, samples should be collected at least 100 yards to ¼ mile downstream of the facilities outfall.** Discharge permits contain allowances for mixing zones below discharge pipes. This is an area where some parameters may exceed the permit limits due to the fact that they have not yet been evenly diluted by the stream flow. To obtain accurate information, samples should be collected below the mixing zone.

10. **Follow all sampling procedures recommended by the manufacturer of the sampling equipment.**

Volunteer Water Quality Monitoring

FIELD CHECKLIST

- _____ *Volunteer Water Quality Monitoring* training notebook (Intro, Level 1, etc.)
- _____ Appropriate footwear (boots, waders, athletic shoes)

Biological Monitoring

- _____ *Macroinvertebrate Data Sheet*
- _____ Kick-seine net (500-micron mesh)
- _____ Forceps or tweezers
- _____ Sample vials and *70% ethyl alcohol for sample preservation (optional)
- _____ Hand lens or magnifying glass
- _____ *Clipboard or other writing surface
- _____ *Paper/pen/pencil
- _____ *White ice cube trays and/or large white tray
- _____ *Squirt bottle(s)
- _____ *(optional) 3-prong garden trowel (for digging into streambed in front of kick net)

Visual Survey and Chemical Monitoring

- _____ *Visual Stream Survey Data Sheet*
- _____ *Water Chemistry Data Sheet*
- _____ Thermometer
- _____ Nitrate test kit (*electrical tape to replace tape on nitrogen-reducing agent when necessary)
- _____ Dissolved oxygen test kit
- _____ Conductivity meter (“pen” calibrated prior to field use)
- _____ pH meter (“pen” calibrated prior to field use)
- _____ Turbidity Tube
- _____ Other test kits (such as ammonia or phosphate, if available)
- _____ Vinyl or disposable gloves
- _____ Eye protection (safety glasses)
- _____ Hard plastic container with cap for liquid waste (e.g., cubitainer, rinsed bleach bottle)
- _____ *Small pair of scissors for use with chemical packets in kits
- _____ *Small screwdriver for calibrating pen meters
- _____ *Spare batteries for meters
- _____ *Stop watch or wristwatch with second hand
- _____ *Bucket, cooler, or tray for transporting equipment
- _____ *Container for solid waste (trash)
- _____ *Container of deionized water (optional – can be used for equipment rinsing between sites, eye washing, dilutions, etc.)
- _____ *Topographic map and/or county highway map of area to be monitored
- _____ *Clipboard or other writing surface
- _____ *Paper/pen/pencil

Flow Measurements

- _____ *Stream Discharge Worksheet*
- _____ Float (practice, wiffle golf ball)
- _____ 100-foot long Measuring tape (marked in tenths of a foot, NOT inches!)
- _____ *Clipboard or other writing surface
- _____ *Paper/pen/pencil
- _____ *Yardstick or calibrated depth measuring device (e.g., dowel rod)
- _____ *Metal pins or sticks
- _____ *Stopwatch or wristwatch with second hand

*Not provided by the program. Volunteer provides.

Suggested Order of Monitoring Procedures

1. Biological Monitoring –

- a. Conduct your biological monitoring first. This will prevent disturbing the sampling area with the other monitoring activities.
- b. Remember to work downstream to upstream

2. Chemical Monitoring –

- a. Put your thermometer in the shade.
- b. Start your nitrate test.
- c. Take your air temperature reading in the shade.
- d. Put the thermometer in the water to acclimate.
- e. While it is sitting for the specified 10 minutes, take your pH, conductivity, and turbidity readings.
- f. At 10 minutes, read your nitrate color comparator.
- g. Begin your dissolved oxygen test
- h. As you wait for the flock to settle, take your water temperature readings.
- i. After you finish titrating the dissolved oxygen and use the DO and water temperature readings to determine the dissolved oxygen saturation on the pink DO Saturation Chart

3. Conduct Stream Discharge

4. Conduct your Visual Survey

Weather/Rainfall Information

When we ask for rainfall data on Volunteer Water Quality Monitoring data sheets, we want the rainfall in that area the 7 days preceding your sampling event. There are various ways to obtain this information:

Possible sources on Internet:

<http://www.intellicast.com>

<http://www.weather.com>

<http://www.weatherunderground.com>

<http://www.noaa.gov>

<http://www.kait8.com>

<http://www.kfvs12.com>

<http://www.tamu.edu>

<http://www.weatherbug.com>

NOTE: For some weather sites you may have to provide the zip code of the town closest to your sampling site. If possible, use the zip code of a town in the same watershed as the stream you are sampling!

If you know the town's name, you can get the zip code from: <http://www.usps.gov>

Other possible sources:

Local airports

Television or radio stations

Local newspapers

Local college or university

Use a rain gauge

EQUIPMENT SOURCES

Missouri Volunteer Water Quality Monitoring Program

NOTE: Items marked with an asterisk () on the next 2 pages indicate the basic equipment provided to all volunteers who have completed both the Introduction and Level 1 VWQM workshops. Prices cannot be kept current.*

Companies

LaMotte Company	Ben Meadows Co.	Aquatic Research Instruments	Capitol Scientific, Inc.	Hach Company	Lawrence Enterprises, Inc.	ToolMark, Inc
P.O. Box 329 Chesterfield, MD 21620 1-800-344-3100	3589 Broad Street Atlanta, GA 30341 1-800-241-6401	P.O. Box 98 Hope, ID 83836 1-800-320-9482 Fax: [208] 264-5263	2500 Rutland Drive Austin, TX 78758 1-800-580-1167	P.O. Box 608 Loveland, CO 80539 1-800-227-4224	PO Box 344 – Rt 3 Seal Harbor, ME 04675 207-276-5746 Fax: 207- 276-4058	6S 221 Cape Naperville, IL 1-800-371-4513 Fax (866-630-6923
www.lamotte.com	www.benmeadows.com	www.aquaticresearch.com	www.capitolscientific.com	www.hach.com	www.watermonitoringequip.com	www.toolmark.net

Chemical Analysis

Item	Company	Catalog No.	Description	Price
* Dissolved Oxygen	Hach Company	1469-00	Test Kit, OX-2P Dissolved Oxygen	\$76.45
* Conductivity	Hach Company	25202-20	Oakton Conductivity ECO Tester	\$66.25
* pH	Hach Company	25202-20	Oakton pH ECO Tester 2	\$68.89
* Thermometer	Hach Company	26763-00	Pocket Celsius Thermometer (0° to 50°)	\$28.05
	Ben Meadows Company	5JB-111052	Pocket Thermometer 0° to 50°	\$8.10
* Nitrate	LaMotte Company	3110	Nitrate Kit, NCR	\$69.95
	Hach Company	1468-03	Test Kit, NI-11 Nitrate	\$76.15
Ammonia	Hach Company	5870040	Pocket Colorimeter Ammonia II	\$427.00
Phosphorus	Hach Company	5870006	Pocket Colorimeter Phosphate II	\$427.00
Hardness	Hach Company	1454-01	Test Kit 5-EP Hardness	\$28.29
Alkalinity	Hach Company	24443-01	Test Kit AL-AP Alkalinity	\$43.75

Replacement Reagents

Item	Company	Catalog No.	Description	Price
Dissolved Oxygen	Hach Company	981-99	DO 1 Reagent Powder pillows pk/100	\$ 17.35
	Hach Company	982-99	DO 2 Reagent Powder Pillows pk/100	\$ 17.35
	Hach Company	987-99	DO 3 Reagent Powder Pillows pk/100	\$ 25.55
	Hach Company	24089-32	Sodium Thiosulfate STD, 0.0109N	\$ 14.65
Conductivity Standard	Hach Company	14400-42	Sodium Chloride, 1000 µS/cm	\$ 15.45
pH 7.0 Buffer	Hach Company	22835-49	Yellow pH Buffer Solution	\$ 11.45
pH 10.0 Buffer	Hach Company	22836-49	Blue pH 10 Buffer Solution	\$ 11.45
Nitrates	LaMotte Company	V-6278-H	Mixed Acid Reagent	\$ 9.70
	LaMotte Company	V-6279-C	Nitrate Reducing Reagent (5g)	\$ 9.15

Additional Equipment and Resources Used by the Volunteer Water Quality Monitoring Program

Item	Company	Price
* Turbidity/Transparency Tube – NTU – 60 cm length	Lawrence Enterprises, Inc.	\$ 38.50 + S&H
Tape Measure (100 ft, marked in TENTHS, not inches)	Ben Meadows Company (Cat. #122386)	\$ 18.30 + S&H
	ToolMark (Cat. #OTR10100)	\$ 24.99 + S&H
* Kick Net (without poles; 1 square meter; 500-micron mesh; hemmed sides to accept 1 1/8"-diameter poles; reinforced bottom seam)	LaMotte Company (Cat. #3-0021 through Ben Meadows) OR	\$ 79.70
	Aquatic Research Instruments (500-micron mesh, flat)	\$ 75.00 + \$5 S&H
Long-Handled Nets (EPA Standard "D" Net; 500-micron mesh)	Aquatic Research Instrument: Discount, if mention for Mo.Stream Teams:	\$ 99.00 + \$16 S&H
Scintillation Vial Support Racks (24 place, 30 mm)	Capitol Scientific, Inc. (Cat. #S7300)	\$ 33.00/ea; \$132.00case/4

The white pans used for sorting invertebrates can be purchased from photographic equipment suppliers. Ask for "development pans."

Aquatic Entomology. The Fishermen's and Ecologist's Illustrated Guide to Insects and Their Relatives. 1998. W. Patrick McCafferty. Jones and Bartlett Publishers, 40 Tall Pine Drive, Sudbury, MA 01776. Tel: 1-800-832-0034. \$119.95 (\$96.00 if purchase 10 or more); OR check local bookstores or commercial Web sites (e.g., Barnes & Noble, Amazon.com, Borders, etc.)

The Streamkeeper's Field Guide. 1999. Murdoch, T. and Martha Cheo with Kate O'Laughlin. The Adopt-A-Stream Foundation, 600 128th St. SE, Everett, WA 98208. Tel: (425) 316-8592. e-mail: aasf@streamkeeper.org; Web site: www.streamkeeper.org; \$29.95 + shipping (cheaper if order 10 or more)

“Watershed View” Chapter Information

The agencies listed below can provide you with:

Maps & Map Information

Topographic and other Maps

United States Geological Survey
Missouri Water Science Center
Independence Road, MS-100
Rolla, MO 65401
(573) 308-3500
Denver Customer Service (303) 202-4700
(\$8.00 + \$5.00 S&H out of Denver)
<http://www.usgs.gov/>

State and County Road Maps

Missouri Atlas Gazatteer
DeLorme
P.O. Box 298
Yarmouth, Maine 04096
(207) 846-7000
Check local library, books stores, or internet book sellers.
If road names/numbers are wrong on the map, let us know.

Missouri Department of Transportation
General Services Division/Mapping & Graphics Section
P.O. Box 270
Jefferson City, MO 65102-0270
(573) 751-2825
Printable County maps:
<http://www.modot.mo.gov/newsandinfo/CountyMaps.htm>

Online Maps and Map Info
<http://www.cares.missouri.edu/>
<http://www.digital-topo-maps.com>
<http://www.mapspport.com>
<http://www.landvoyage.com>
<http://www.nrcs.usda.gov>

<http://www.esri.com>
<http://www.terraserver.com/>
<http://www.dnr.mo.gov/env/wpp/wpp-map-gallery.htm>
<http://store.usgs.gov>

Land use maps and aerial photos
U.S. Department of Agriculture’s Natural Resources
Conservation Service (NRCS) office in each county

Land ownership

Contact your city or county assessor’s office to discover who owns land within your watershed. If your watershed contains publicly owned lands, like National Forests or state or local parks, you can contact the following agencies for more information.

Public Lands

Missouri Department of Conservation
Contact the Regional Office
(See map on page 5 of this Appendix)
<http://www.mdc.mo.gov>

Missouri Department of Natural Resources
Division of State Parks
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-2479
1-800-334-6946
<http://www.mostateparks.com/>

U.S. Forest Service (USFS – Mark Twain National Forest)
401 Fairgrounds Road
Rolla, MO 65401
(573) 364-4621
<http://www.fs.fed.us/>

Contact your local parks department for information about city and county parks.

Physical and Biological Information

Physical and biological information can include data about climate, soils, geology and any fish or wildlife that occurs in your watershed.

National

United States Geological Survey

Missouri Water Science Center

1400 Independence Road, MS-100

Rolla, MO 65401-2602

(573) 308-3664

<http://mo.water.usgs.gov/>

<http://www.usgs.gov/>

The United States Geological Survey measures flow and tests water quality at nearly 100 locations in Missouri. They also collect water-use data throughout the state and have all types of mapping information.

For Real-Time Water Data, Stage & Streamflow Data go to:

<http://water.usgs.gov/waterwatch/>

Weather Information

For local weather information, including daily rainfall:

<http://www.noaa.gov>

<http://www.weatherbug.com>

<http://www.weather.com>

<http://www.weatherunderground.com>

<http://www.kait8.com>

<http://www.kfvs12.com>

<http://www.tamu.edu>

Natural Resources Conservation Service of the U.S.

Department of Agriculture

State Conservationist

601 Business Loop 70 West

Parkade Center, Suite 250

Columbia, MO 65203

(573) 876-0900

Missouri website:

<http://www.mo.nrcs.usda.gov/contact/>

National website:

<http://www.nrcs.usda.gov/>

The NRCS supplies soil maps and aerial photograph maps of your watershed. They can also provide information on geology, land use and other topics of interest.

NOTE: For some weather sites you will need the zip code of the town closest to your sampling site. If you know the town name, get zip code from <http://www.usps.gov>.

More weather sites:

<http://intelligcast.com>

State

Missouri Department of Conservation

2901 West Truman Blvd.

P.O. Box 180

Jefferson City, MO 65102-0180

(573) 751-4115

<http://mdc.mo.gov/>

Missouri Department of Natural Resources

Lewis and Clark Bldg.

1101 Riverside Drive

P.O. Box 176

Jefferson City, MO 65102-0176

1-800-361-4827

<http://www.dnr.mo.gov/>

Local

- Electric utility companies, especially those that provide hydroelectric power, often have information on fish and wildlife populations.
 - Sewage treatment plant operators typically monitor water quality downstream of their discharges.
 - City or county public works departments can provide information about water quality, domestic water use, storm drains and sewage treatment systems.
-

Political, Regulatory and Other Information

Government agencies can tell you which laws, policies and regulations are working to protect watersheds and their inhabitants

National

U.S. Environmental Protection Agency Office of Wetlands, Oceans and Watersheds

1200 Pennsylvania Ave., NW (4501T)
Washington, DC 20460
(202) 566-1300

<http://www.epa.gov/OWOW>

The EPA Office of Wetlands, Oceans and Watersheds (OWOW) provides a wealth of information on watershed partnerships, water quality monitoring and the watershed approach to resource management.

U.S. Environmental Protection Agency, Region 7

901 N. 5th Street
Kansas City, KS 66101
(913) 551-7003 or 1-800-223-0425

<http://www.epa.gov/region7/>

The Water Quality Protection Division of the EPA issues National Pollutant Discharge Elimination System (NPDES) permits, and the Water Enforcement Branch ensures that all discharges are in compliance with NPDES permits. To learn more about federal NPDES permits in general, call the EPA Region 7 office. To learn about these permits in Missouri (where they are called “State Operating Permits”) contact the Department of Natural Resources’ Water Protection and Soil Conservation Division (address on next page) or the DNR Regional Office for your area (see map on Page 4 of this Appendix). Knowing the location of State Operating Permit sites within your watershed will help you better assess water quality and potential point source pollution.

U.S. Environmental Protection Agency

Surf Your Watershed Site and other watershed-related sites

<http://www.epa.gov/surf> AND www.epa.gov/water/waterplan provides information on NPDES discharge permits nationwide.

For information on environmental justice, see the EPA website,

<http://www.epa.gov/environmentaljustice/>

http://www.epa.gov/environmentaljustice/resources/reports/annual-project-reports/citizen_guide_ej.pdf

Know Your Watershed

Conservation Technology Information Center (CTIC)

1220 Potter Drive, Suite 170
West Lafayette, IN 47906
(765) 494-9555; FAX: (765) 494-5969

Email: ctic@ctic.purdue.edu

<http://www.ctic.purdue.edu>

CTIC publishes several brochures and videos about building watershed partnerships and understanding watersheds. They also have a website with links to the National Watershed Network and the National Watershed Library.

U.S. Fish and Wildlife Service

101 Park DeVillie Drive, Suite A
Columbia, MO 65203-0007
(573) 234-2132; FAX: (573) 234-2181

Region 3 Web page: <http://midwest.fws.gov/> -- Click on the State of Missouri on the map to get Missouri information.

Have authority over federally “listed” species (e.g., endangered); manage federal refuges (e.g., Squaw Creek) and fish hatcheries (e.g., Neosho); and more.

Political, Regulatory and Other Information

(continued)

State

Missouri Department of Natural Resources

P.O. Box 176

Jefferson City, MO 65102-0176

(573) 751-3443 or toll-free 1-800-361-4827

Website: <http://www.dnr.mo.gov>

Regulatory agency in Missouri with authority over water, air, solid waste, environmental hazardous waste, and mining. DNR also has responsibility for parks, energy, and geology & land survey.

Water Protection Program

(573) 751-1300

Website:

<http://www.dnr.mo.gov/env/wpp/index.html>

Division of State Parks

1-800-334-6946

Email: moparks@dnr.mo.gov

Website: <http://www.mostateparks.com/>

Missouri Department of Conservation

2901 West Truman Blvd.

P.O. Box 180

Jefferson City, MO 65102-0180

(573) 751-4115 (if you know the person's extension number, use 573-522-4115 and the 4-digit extension)

Website: <http://mdc.mo.gov/>

Agency mandated to protect and manage the fish, forest and wildlife resources of the state.

Conservation Federation of Missouri (the MO Chapter of the National Wildlife Federation)

728 West Main

Jefferson City, Missouri 65101

(573) 634-2322 or toll-free 1-800-575-2322; FAX: 573-634-8205

Email: confedmo@socket.net

Website: <http://www.confedmo.org>

Missouri Watershed Information Network (MoWIN)

205 Agricultural Engineering Building

Columbia, MO 65211-5200

(573) 882-0085 or toll-free (in Missouri only) 1-877- H2O-SHED (426-7433); FAX: (573) 884-5650

Email: mowin@missouri.edu

Website: <http://www.mowin.org/>

Political, Regulatory and Other Information

(continued)

Local

County Soil and Water Conservation Districts (SWCDs) can provide information on local efforts to reduce both soil erosion and agriculture-related water pollution. The Soil and Water Conservation Program within DNR can provide contact information on local SWCDs.

Call (573) 751-4932, or click on the individual county in the map available at:

<http://www.swcd.mo.gov/>

City and county planning/zoning departments will provide information on zoning ordinances. They can tell you which areas within your watershed are zoned for commercial, industrial or residential development.

Local environmental and civic organizations may already be working in your area to protect aquatic habitats. They can assist you in forming watershed partnerships.

MISSOURI
VOLUNTEER WATER QUALITY MONITORING PROGRAM

SUMMARY OF PARTICIPANT EXPECTATIONS

- 1) Monitors will make safety a first priority when engaging in data collection activities.
- 2) Volunteers will enter private property only with the landowner's permission.
- 3) Participants will submit monitoring data and *Missouri STREAM TEAM Activity Reports* in a timely fashion. If a monitor chooses not to submit data, they will at least submit *Activity Reports* to indicate they are using the information and equipment to benefit the resource.
- 4) If a monitor chooses to no longer participate in the program, they will return all equipment and supplies to the program so they may be put to use by another volunteer.
- 5) Participants will foster cooperative partnerships within watersheds to resolve resource issues not carelessly place blame or "point fingers" at others. The program's goal is to create *alliances* in local communities, *not* adversarial relationships.
- 6) Participants will try to see all points of view on water resource issues and recognize that waters in Missouri serve many purposes, some of which may appear to conflict.
- 7) Volunteers will continue to educate themselves about water resources and share the knowledge they gain with others.
- 8) Monitors will gather information as accurately as possible, whether they are collecting water quality data or researching a water issue.
- 9) Participants will examine their own behavior and minimize negative impacts on water resources.
- 10) All program participants will continue to enjoy and appreciate the extraordinary water resources of the State of Missouri!

**LEVEL 1 VWQM
TRAINING RECORD FORM**

Please print legibly

Location of Training: _____ Date: _____

Instructors' Names: _____

Your Name: _____

Mailing Address: _____

City, State, and Zip Code: _____

Shipping Address, *if different from above (No P.O. Box)*: _____

Home Telephone: _____ Work Telephone: _____

E-mail: _____ County of Residence: _____

<p><u>If you are <i>already</i> in a Stream Team</u>, list Team Number and/or Name: _____</p> <p><u>If you are <i>NOT</i> already a Stream Team and do not wish to be a Stream Team</u>, check this box: <input type="checkbox"/></p> <p><i>(If you do not check this box, you will automatically become a Stream Team, be assigned a Stream Team Number, and a membership card will be mailed to you. If you are already a Stream Team member, please disregard.)</i></p> <p><u>If you will be a <i>NEW</i> Stream Team</u>, please list the other people who will be members of your team. <i>(This is especially important if some of them are also present at this workshop. Note that it's okay to add or subtract members later.)</i></p> <p>_____</p> <p>_____</p>
--

Are you leading this Stream Team as a teacher? Yes No
If yes, name of the school: _____

Are you leading this Stream Team as a youth group leader? Yes No
If yes, the name of the youth group: _____

Stream you are interested in (**if chosen**): _____ County of _____ stream: _____

Location(s) to be monitored (**if chosen**): _____

If you've listed a stream above, would you like a list of other Stream Team volunteer monitors working in your watershed? Yes No

(continued on back of page)

LETTER OF AGREEMENT

Please ***print*** legibly

NOTE: Please fill this form out even if you don't plan to pick up equipment today. If you intend to share equipment with someone else, it would help us a lot if you would write that fact on the bottom of the form (e.g., "I'll share equipment with my wife, Sue V. Olunteer," or "I will use equipment my other Team members, [list a person's name or Team number], already have."). Thank you so much!

The individual named on the front will receive the equipment listed below. In exchange for the equipment and training, the named agrees to:

1. Become familiar with the monitoring equipment and learn the sampling techniques.
2. Share information received during training with other members of their STREAM TEAM or group who did not attend the workshop. (Note, in order for team members to submit data under their name, they must have attended the appropriate VWQM workshop.)
3. Survey on a periodic basis the reach and/or watershed of the adopted stream and identify land use, riparian corridor conditions and point sources and nonpoint sources of pollution.
4. Conduct visual stream survey twice per year and biological monitoring twice per year (early spring and early fall), and chemical and physical monitoring on a quarterly basis, weather permitting.
5. Submit data to the Mo. Dept. of Natural Resources, Water Protection Program, WQMA Section, P.O. Box 176, Jefferson City, MO 65102-0176.
6. **Return the equipment to the Volunteer Water Quality Monitoring Program if the individual, STREAM TEAM, or group stops monitoring or participating in the program.**

Signature _____ Date _____

STUDENTS, PLEASE DO NOT WRITE BELOW THIS LINE.

TO INSTRUCTOR: Please check below if you provided to this volunteer

Turbidity Tube _____

Volunteer Water Quality Monitoring Workshop

EVALUATION FORM

Name of this course: **Level 1 Volunteer Water Quality Monitoring Training (Stream Team)**

Workshop Location: _____ Date: _____

Instructors' Names: _____

1. Was the workshop beneficial? Yes No

If not, please explain. _____

2. Did we answer all of your questions concerning water quality monitoring? Yes No

If not, please explain. _____

3. Was the information easily understood? Yes No Somewhat

4. Was the amount of material: Too much Just right Too little

5. Was there any topic which needed more explanation? Yes No

If yes, please explain. _____

6. What additional information would you like to see included in the future? _____

7. General comments: _____

Missouri Stream Team Activity Report

Stay active -- you make a difference for Missouri streams!

This form can be turned in after only one activity

Stream Team Identification:

Team Number: _____

Team Name: _____

Reporter Name: _____

Business/School: (if applicable) _____

Shipping Address: (no P.O. Box, please) _____

City, State, Zip: _____

Home Phone: () - - Work Phone: () - -

Updated E-mail: _____

Contact Person for Team: _____

Is there a change in Contact Person? Yes No

Is there a change in Contact Person address? Yes No

If yes, new address: _____

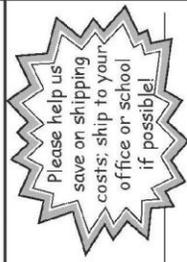
Please provide details about your activities to the right.

Mail this Activity Report to:
 MISSOURI STREAM TEAM
 PO BOX 180
 JEFFERSON CITY MO 65102-0180

For more information, contact us at:
 Phone: 1-800-781-1989 (voice mail)
 E-mail: streamteam@mdc.mo.gov
 Website: www.mostreamteam.org
 Fax: 573/526-0990

11/14/2012

Instructions and "Thank You" and Supply Item order form on back



Please check one:

Commercial

Residential



Stream Team Activity 1	Stream Team Activity 2
Type of activity: (see code list on back) _____	Type of activity: (see code list on back) _____
Activity date: _____	Activity date: _____
Stream name: _____	Stream name: _____
Activity county: _____	Activity county: _____
Activity basin: _____	Activity basin: _____
Miles of river covered: _____	Miles of river covered: _____
Number of volunteers involved: _____	Number of volunteers involved: _____
Hours spent on project: _____	Hours spent on project: _____
Measurement : Please list number of monitoring trips, bags of trash collected, letters written, trees planted, events held, etc. See code list on back.	Measurement : Please list number of monitoring trips, bags of trash collected, letters written, trees planted, events held, etc. See code list on back.
Location Description: Please provide a detailed location for your activity. (Example: 100 yds. upstream from Hwy. 63 bridge.) Include township, range, and section if possible. A good source for maps can be found at www.usgs.gov .	Location Description: Please provide a detailed location for your activity. (Example: 100 yds. upstream from Hwy. 63 bridge.) Include township, range, and section if possible. A good source for maps can be found at www.usgs.gov .
Project Description: Please include as much information as you can about your activity. Include facts about the project not covered above. (Example: "Held 4th Annual litter pickup and picnic at Dry Fork Creek.")	Project Description: Please include as much information as you can about your activity. Include facts about the project not covered above. (Example: "Held 4th Annual litter pickup and picnic at Dry Fork Creek.")

Stream Team Activity Code List		Code	Measurement
Activity			
Adopt-Ar-Access	AAA	New access adopted	
Advocacy on stream issue	ADV	Number of events	
Article written for newspaper, etc.	ART	Number of articles	
Assisted MDC fish stocking	FIS	Number of events	
Award received	AWA	Number of awards	
Education project	EDU	Number of events	
Forestkeepers monitoring	FOR	Number of trips	
GPS reading	TRP	Number of trips	
Grant applied/received	GRT	Number of projects	
Greenway development	GRE	Number of projects	
Habitat improvement	HAI	Number of projects	
Letter written on stream issue	LET	Number of letters	
Litter pickup	LPU	Number of litter bags	
Media contact/interview	MED	Number of interviews	
Monofilament recycling project	MRP	Weight of line recycled	
Other: please describe	OTH	Number of projects	
Photo point monitoring	PPM	Number of photos	
Pre-activity planning	PLN	Number of events	
Presentation to groups	PRE	Number of presentations	
Rain gardens/bareils, green roofs, etc.	NPS	Number of projects	New Activity
Recruited new w/ Team/members	REC	Number of people recruited	
ST Association activity	ASC	Number of events	
ST display at school, fair, etc.	DIS	Number of events	
ST Inventory Guide submitted	INV	Number of inventories	
Storm drain stenciling	SDS	Number of drains stenciled	
Stream access maintenance	SAM	Number of litter bags/events	
Stream Team meeting	MTG	Number of attendees	
Stream Team mentoring	MEN	Team mentored & events	
Stream workshop attended	WKS	Number of attendees	
Streambank stabilization project	SSP	Number of events	
Tree planting	PLT	Number of trees	
Water quality monitoring	WQM	Number of trips	
Watershed mapping	WAT	Number of trips	
Zebra mussel monitoring form	ZEB	Number of trips	

How to fill out your Activity Report

Please fill out as much information as possible.

Stream Team Identification: Please provide your most up-to-date contact information in this section. Stream Team number may be left blank if not known.

Stream Team Activity:

Type of Activity: Select a code from the list to the right that matches your activity.

Activity Date: Date your activity took place.

Stream Name: Name of the stream where your activity took place if applicable.

Activity County: County in which your activity took place.

Activity Basin: River basin in which your activity took place. May be left blank if not known.

Number of volunteers involved: List the number of volunteers that participated in your activity.

Hours spent on project: List the total number of hours you spent on this activity. You may include planning and drive time.

Measurement: Please provide a measurement for each activity as listed to the right (i.e., LPU equals number of litter bags, WQM equals number of trips, SDS equals number of drains stenciled).

Location Description: Please provide a detailed description of where your activity occurred. Consider these driving directions to your location to help us find where you are.

Project Description: Please provide any additional information about your activity that you would like to share and please feel free to brag.

ACTIVITY PRIZE DRAWING
Activity Prize items will change every three months.

If you would like to be included in our "Activity Prize Drawing," please check box at right and attach a list of participant names. Please print clearly. The more activities you submit, the better your chances! New prizes will be drawn every three months.

Attention teachers and youth group leaders: For a youth group prize, please check the box at right, but you do not need to include a participant list for group prizes. New prizes will be available and drawn every three months.

THANK YOU ITEMS
You may request these free items in any combination.

ITEM: _____ **Number requested:** _____

Bandannas (Stream Team) _____

Bookmarks (dragonfly) _____

Bookmarks (spring peeper) _____

Bumper Stickers (Quality Water, 3 1/2" x 9 1/4") _____

Buttons (Stream Team mini-buttons 1 1/2" pins) _____

Carabiners (Stream Team Key Chain) _____

Colorbook (Stream Team Most Wanted, Grades 4-6) _____

Colorbook (Stream Team Superstars, Grades K-3) _____

Koozies (Stream Team) _____

Mood Cups (Stream Team, 17 oz. plastic) _____

Patches (Stream Team, 3" round, embroidered) _____

Pencils (Get Into Missouri Streams, blue sparkle) _____

Post-it Notes (Stream Team, 3" x 4") _____

Scratch Pads (Stream Team, 5 1/2" x 8") _____

Stickers (Get Into Missouri Streams, 3" round) _____

Stickers (I Love Missouri Streams, 3" round) _____

T-Shirts (Stream Team, adult sizes only) _____

S _____ M _____ L _____
XL _____ XXL _____

ACTIVITY SUPPLIES
These free supplies are available for your activities.

ITEM: _____ **Number requested:** _____

First Aid Kits (limited one per 10-15 participants) _____

Litter Pickup Bags (green mesh 24" x 36") for larger trash _____

Litter Pickup Bags (red mesh 14" x 26") _____

Work Gloves (adult size) _____

Work Gloves (youth size) _____



Don't forget to order your supplies to the right!