Appendix A - Equipment

How to Clean and Care for Equipment

Nets

To ensure that no contamination occurs between sampling sites, make sure that all nets and organism collection equipment have been cleaned of all organisms and matter. Be sure to rinse them thoroughly with hot water before transporting to another location.

Transparency Tube

(From Minnesota Citizen Stream Monitoring Program, "Stream Reader" Spring 2000)

If you monitor a stream that is on the murky side, chances are the walls of your transparency tube have clouded up. Try cleaning the inside of your tube by filling it three-quarters full with tap water, add a couple drops of dish soap, and push a clean, soft rag or washcloth down the tube with the end of a broom handle, scrubbing the sides. If you take the stopper out of the bottom, be sure to fit it back into the tube securely. If your tube has a release tube and valve, it may become crimped. Try moving the position of the clamp on your release valve from time to time, and fully release the clamp between uses. By doing this, the tube won't break down and get crimped in any one spot.

E. coli Testing Supplies

Store bottles of Coliscan Easygel in the freezer for up to one year. Thawed bottles can be refrozen. Do not freeze pre-treated petri dishes.

Store sealed Petrifilm plates in a refrigerator.

Chemical Testing Kits

Do not store kits in your car or anywhere they would experience extreme hot or cold temperatures. Bright light degrades the reagents in the CHEMetrics ampoules and color standards - do not leave them open in sunlight or indoors. Be sure to *triple* rinse bottles & tubes with distilled water immediately following tests to avoid staining and contamination, and always triple rinse with sample water before taking a stream sample.

Be sure your chemicals, test strips, and color standards are not expired! CHEMetrics color standards are good for 2 years, Water Works pH test strips are good for 2 years, and the Nitrate/Nitrite test strips expire after 20 months.

Equipment for Water Quality Monitoring

	oring the water quality of your local river or stream:
Site Assessment	
 □ Compass and survey tape for marking bou □ Clipboard, writing utensils, and laminated □ Tape measure or twine marked in one-met □ Stopwatch for measuring stream flow 	copies of chemical, biological, and habitat data sheets er/foot lengths ect that can be floated to measure stream flow
Biological Assessment	
 □ Sieve and trays for sorting biological sample □ Tweezers, hand lens, magnifying glass, and □ Glass vials or jars filled with isopropyl alco 	les (white ice cube trays work well for sorting organisms) les (white ice cube trays work well for sorting organisms) les possibly a microscope hol or white vinegar for storing insects (if so desired) ler or GREEN Leaf-pack bags to use in waterways too deep
Chemical Assessment	
the tests most commonly performed included total or ortho-phosphates, nitrates, turbidic sensitivity, and cost depending on the use of Handmade extension sampling rod (see particular Distilled water for rinsing sampling bottles). Secchi disk or handmade turbidity tube	ge 117) s and tubes (if using hazardous chemicals, need separate waste container)
Safety	
 □ Throw bag, life preserver or rope □ Rubber boots, hip boots or waders (WARN with dangerous amounts of water if submeter and protective eyewear □ First Aid kit that includes eyewash □ Washing water, antibacterial soap, and a total linsect repellent □ Life vest 	
Other Supplies	
 □ Drinking water □ Camera for documenting site □ Trash bags or other waste containers for a series □ Folding card table 	stream bank clean-up

☐ Calculator

 $\hfill\Box$ Computer and Internet access for entry of water quality data

How to Make Your Own Equipment

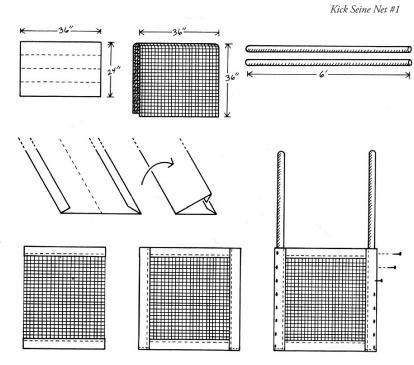
Not all of your water monitoring equipment has to be purchased through a catalog or at a store. Nets and other sampling supplies can be made at home.

Kick Seine Net #1

Materials: □ 3 foot by 6 foot piece of nylon or fiberglass screening (white, if you can find it) □ 4 strips of heavy canvas (6 inches by 36 inches) □ 2 broom handles or wooden dowels (6 feet long) □ finishing nails □ sewing machine and thread □ hammer □ iron and ironing board

Directions:

- 1. Fold screening in half (3 foot by 3 foot).
- 2. Fold edges of canvas strips under 1/2 inch and press with iron.
- 3. Sew 2 strips at top and bottom of screening, then use remaining 2 strips on the sides of the screening to make casings for handles. Sew bottom of casings shut.
- 4. Insert handles into casings and nail into place with finishing nails.



Kick Seine Net #2

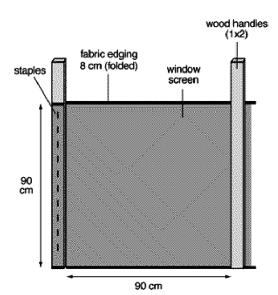
Materials:

- □ 3 foot by 4 foot piece of nylon or fiberglass screening (white, if you can find it)
- ☐ 2 strips of heavy canvas (6 inches by 36 inches)
- □ 2 broom handles or wooden dowels (6 feet long)
- ☐ Staple gun and staples
- □ sewing machine and thread

Directions:

- 1. Fold one strip of fabric over one of the long screen edges and sew, reinforcing the edge.
- 2. Repeat for the other long edge.
- 3. Attach screen to poles with staples, making the poles even with the bottom of the screen and extending to form handles at the top.
- 4. Wrap screen around poles several times and staple again to reinforce the edges.

Kick Seine Net #2



D-Net

Materials:

- □ 2 pieces of 12 inch by 18 inch nylon or fiberglass screening (white, if you can find it) ☐ Strip of heavy canvas or fabric ☐ Broom handle or wooden dowel (48+ inches long)
- ☐ Duct tape, pipe clamp, 2 wire clothes hangers
- ☐ Sewing machine w/thread
- ☐ Drill and wire cutters

Directions:

- 1. Cut a net shape from the 36 x 53 cm pieces of nylon screen and sew them together leaving an opening.
- 2. Edge the open end of the net with heavy fabric, leaving an opening to form a casing to insert the hangers.
- 3. Cut hooks from hangers and untwist the wires.
- 4. Use duct tape to tape the hangers together to make your frame heavier.
- 5. Insert wire through the casing and twist ends back together at opening.
- 6. Drill a hole in the tip of the wooden handle large enough to insert the ends of the hangers into the hole in the pole. Secure the net to the pole by using the hook you cut from the hanger and using the pipe clamp or duct tape to secure the hook to the pole.

Turbidity Tube

For instructions on how to correctly use the turbidity tube see Chapter 4 on Chemical Monitoring.

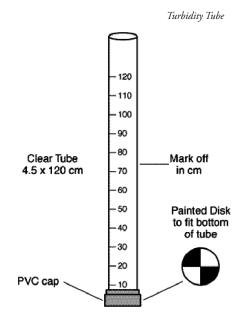
Materials:

- ☐ Clear tube 4.5 cm diameter x 120+ cm length
- ☐ Tight fitting PVC end cap for tube/rubber stopper
- ☐ 4.5 cm diameter wooden or plastic disk
- ☐ Paint, permanent marker
- ☐ Glue
- ☐ Measuring stick/meter stick

Directions:

- 1. Put a PVC cap over one end of a clear tube (a fluorescent light bulb tube cover works great). Cap should fit tightly so water cannot leak out. A rubber stopper also works.
- 2. Cut a disk from wood or plastic the same size as the tube diameter.
- 3. Divide the disk into four quadrants. Paint the alternating quadrants black and white. Seal the disk by laminating or painting with varnish to make it waterproof.
- 4. Glue the disk in the bottom of the tube, painted side facing up toward the open end of the tube.
- Use a marker and meter stick to make a scale on the side of the tube, beginning at the disk with 0 cm or mark on a piece of tape and stick it to the outside of the tube.





Underwater Viewer

The underwater viewer can be used in shallow and slow moving streams to view under the surface.

Materials:

- ☐ Large metal coffee can with both ends cut out
- ☐ Plastic food wrap
- Lg rubber bands

Directions:

- 1. Stretch the plastic food wrap tightly over one end so that it is tight and smooth.
- 2. Secure the wrap with a rubber band, tape the rubber band to hold it securely in place.

Hester-Dendy Artificial Substrate Sampler

Materials:

- ☐ Nine 3 x 3 inch Masonite plates (hardest and most water resistant grade)
- ☐ Nylon spacers
- ☐ Stainless steel eye-bolt, extra long with nut

Directions:

- 1. Drill a hole in the middle of each masonite plate, so that the eye bolt will slide through each plate.
- 2. Place a nylon spacer between masonite plates.
- 3. Insert the eye bolt through the plates and the spacers (see picture to right). The width between each masonite plates can be varied by adding more spacers.





Extension Sampler

(The following instructions were provided by John Rouch, Past-President of Water Watchers of Indiana.)
An extension sampler may be helpful for collecting stream water at monitoring locations where the water cannot be entered into directly (e.g., too deep, too fast, or too polluted).

Materials:

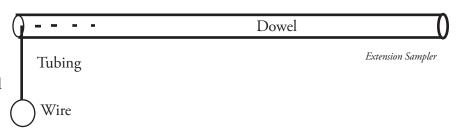
- ☐ 4-6 foot dowel rod, 1/2 inch or more in diameter
- Rubber inner tube, cut into 12 inch by 3 inch strips
- ☐ 6-inch length of picture framing wire (or other flexible wire)
- ☐ 6 small nails

Directions:

- 1. Nail the rubber tubing to the end of the dowel.
- 2. Hook the wire onto the end of the tube so that the wire forms a circle (see diagram below).
- 3. Nail the remaining four nails along the dowel so that the rubber tubing can secure different sizes of bottles for water collection.

For use:

Secure the sampling container against the dowel rod by wrapping the tube around the container and hooking the wire loop around one of the nails.



Where to Purchase Equipment

Product	Vendor	Website	Item Number	Price
	Chemical Mon	itoring Supplies		•
Dissolved Oxygen Test Kit	CHEMetrics	chemetrics.com	K-7512	\$57.84
Dissolved Oxygen Ampoules	CHEMetrics	chemetrics.com	R-7512	\$29.00
Dissolved Oxygen Comparator	CHEMetrics	chemetrics.com	C-7512	\$20.75
OrthoPhosphate Test Kit	CHEMetrics	chemetrics.com	K-8510	\$67.72
OrthoPhosphate Ampoules	CHEMetrics	chemetrics.com	R-8510	\$27.58
OrthoPhosphate Color Comparator	CHEMetrics	chemetrics.com	C-8501 (0-1)	\$14.36
			C-8510 (1-12)	\$20.78
WaterWorks Nitrate strips (bottle of 50)	Industrial Test Systems	sensafe.com	480009	\$19.99
WaterWorks pH strips (bottle of 50)	Industrial Test Systems	sensafe.com	481104	\$10.49
BOD Bottle with stopper	Forestry Suppliers	forestry-suppliers.com	53868	\$20.75
Thermometer	Forestry Suppliers	forestry-suppliers.com	89108	\$10.25
Transparency Tube (60cm)	Forestry Suppliers	forestry-suppliers.com	77107 (60 cm)	\$42.95
	Biological Mon	nitoring Supplies	<u> </u>	
Dish pan for bug sorting	Retail store	-	-	\$3.00
Set of large & small bug magnifiers	Forestry Suppliers	forestry-suppliers.com	53744 (small)	\$2.30
			53745 (large)	\$4.50
Elenco 2-way bug viewer	Amazon	amazon.com	-	\$9.99
Yellow kick net (no poles)	Forestry Suppliers	forestry-suppliers.com	78012	\$40.75
Aquatic D-nets (500 micron mesh)	Forestry Suppliers	nicholsnetandtwine.com	53755	\$80.95
Golden Guide <i>Pond Life</i> book	Amazon	amazon.com	ISBN 1582381305	\$6.95
Insect Identification Cards	Foresty Suppliers	forestry-suppliers.com	76609	\$54.25
Life Cycle and Habitat Flash Cards	Foresty Suppliers	forestry-suppliers.com	76619	\$63.95
	E. coli	Supplies	·	
Coliscan EasyGel/Petri Dishes (10 tests)	Micrology Labs	micrologylabs.com	25001	\$31.89
Sterile Pipettes 1 mL (500)	Thomas Scientific	thomassci.com	1216H32	\$118.00
Sterile Pipettes 3 mL (500)	Thomas Scientific	thomassci.com	1216H38	\$119.00
3M™ Petrifilm™ E. coli/Coliform Count Plates (25 tests)	Carolina Biological	3M.com	6404	\$81.10
Thermal Air Hova-Bator	G.Q.F. Manufacturing	gqfmfg.com	1602N	\$48.95
	Other R	esources		
Stream Survey Kit	Hach Company	hach.com	27120-00	\$426.00
500mL wash bottle	Hach Company	hach.com	620-11	\$8.30
Nitrate Standard, 1 mg/L (500 mL)	Hach Company	hach.com	2046-49	\$25.99
Phosphate Standard, 1 mg/L (500 mL)	Hach Company	hach.com	2569-49	\$26.65
A Guide to Common Freshwater Invertebrates of North America (Voshell)	Barnes & Noble	barnesandnoble.com	ISBN 939923874	\$28.61
Aquatic Entomology (McCafferty)	Barnes & Noble	barnesandnoble.com	ISBN 867200170	\$221.16
Field Guide for Water Quality Monitoring (Stapp and Mitchell)	Amazon	amazon.com	ISBN 757555462	\$70.62
Volunteer Stream Monitoring: A Methods Manual	US EPA	epa.gov	EPA 841-B-97-003	Free Download
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This list contains just a few of the many science equipment vendors available. It is not intended to be an endorsement of any product or company. Prices are as of March 2019 and subject to change.

Notes:	