

US EPA ARCHIVE DOCUMENT

**ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM-
SURFACE WATERS:**

**FIELD OPERATIONS AND METHODS FOR MEASURING THE
ECOLOGICAL CONDITION OF WADEABLE STREAMS**

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FIELD DATA FORMS AND SAMPLE LABELS

Number per site	Item	
1	Verification Form	
1	Sample Collection Form	
1	Field Measurement Form	
11 + extras	Channel/Riparian Cross-section and Thalweg Profile Forms	
1	Slope and Bearing Form	
1 + extras	Vertebrate Collection Form	
1 + extras	Vertebrate Length Recording Form	
1	Rapid Habitat Assessment Form for Riffle/run prevalent streams	
1	Rapid Habitat Assessment Form for Pool/glide prevalent streams	
1	Assessment Form for visual stream assessment	
3	Water chemistry labels (same ID number)	
4	Periphyton labels (same ID number)	
5	Sediment metabolism labels (different ID numbers)	
2	Sediment toxicity labels	
2	Composite Benthic sample labels, with preprinted ID numbers (barcodes)	
4	Composite Benthic sample labels without preprinted ID numbers	
6	Blank benthic sample labels on waterproof paper for inside of jars	
1	Sheet of pre-printed aquatic vertebrate jar labels (4) and voucher bag tags (36), all with same preprinted sample ID number (barcode)	
2 sets	Fish tissue sample labels (2 labels per set; each set with a different sample ID number [barcode])	
2 copies	Field operations and methods manual	
2 sets	Laminated sheets of procedure tables and/or quick reference guides	

OFFICE SUPPLIES AND TOOLS

Number per site	Item	
1	Dossier of access information for scheduled stream site	
1	Topographic map with "X-site" marked	
1	Site information sheet with map coordinates and elevation of X-site	
1	Sampling itinerary form or notebook	
1	Safety log and/or personal safety information for each team member	
4	Covered clipboards or forms holders	
1	Field notebook (optional)	
12	Soft (#2) lead pencils	
6	Fine-tip indelible markers	
2	Grease pencils	
1 pr	Scissors for cutting labels	
1	Pocket knife or multipurpose tool	
1	Battery charger (if needed for electrofishing unit)	
1	Toolbox with basic tools needed to maintain/repair sampling gear	

PERSONAL EQUIPMENT AND SUPPLIES

Number per site	Item	
1 pair per person	Chest waders with felt-soled boots for safety and speed if waders are the neoprene "stocking" type. Hip waders can be used in shallower streams (except for electrofishing).	
1 per person	Life vests	
3 pair	Polarized sunglasses	
1	First aid kit	
1 per person	Rain gear	
1 or 2	Fisherman's vest for physical habitat characterization.	

CHEMICALS

Number per site	Item	
1 pr	Safety glasses	
2 pr	Chemical-resistant gloves	
1	Laboratory apron, resistant to ethanol and formalin	
1	Cooler (with suitable absorbent material) for transporting ethanol and samples	
2 gal	95% ethanol	
1	Cooler (with suitable absorbent material) for transporting formaldehyde/formalin	
2 gal	10% (buffered) formalin solution OR 0.2 gal buffered formaldehyde solution	
	Gasoline for electrofishing unit in approved container	

PACKING AND SHIPPING SUPPLIES

Number per site	Item	
	Ice (also dry ice if it is used to ship frozen samples)	
1 box	1-gal heavy-duty self-sealing (e.g., with a zipper-type closure) plastic bags	
1-box	30-gal plastic garbage bags	
1 box	Heavy-duty plastic bags for sediment toxicity samples	
1 roll	Clear tape for sealing tissue sample bags	
2 pkg.	Clear tape strips for covering labels	
4 rolls	Plastic electrical tape	
3	Insulated shipping containers for samples	
1	Portable freezer, cooler with dry ice, or cooler with bags of ice to store frozen samples (special containers may be needed if dry ice is used)	
2	Containers and absorbent material suitable to transport and/or ship samples preserved in formalin or ethanol	
6	Shipping airbills and adhesive plastic sleeves	

SITE VERIFICATION AND SAMPLING REACH LAYOUT

Number per site	Item	
1	GPS receiver and operating manual	
	Extra batteries for GPS receiver	
1	Surveyor's telescoping leveling rod (round profile, metric scale, 7.5 m extended)	
1	50-m fiberglass measuring tape with reel	
2 rolls	Surveyor's flagging tape (2 colors)	
1	Waterproof camera and film	

WATER CHEMISTRY

Number per site	Item	
1	Dissolved oxygen/Temperature meter with probe and operating manual	
1	DO repair kit containing additional membranes and probe filling solution	
1	Conductivity meter with probe and operating manual	
	Extra batteries for dissolved oxygen and conductivity meters	
1	500-mL plastic bottle of conductivity QCCS labeled "Rinse" (in plastic bag)	
1	500-mL plastic bottle of conductivity QCCS labeled "Test" (in plastic bag)	
1	500-mL plastic bottle of deionized water to store conductivity probe	
1	Field thermometer	
1	500 mL plastic beaker with handle (in clean plastic bag)	
1	4-L cubitainer	
2	60 mL plastic syringes	
1	Plastic container with snap-on lid to hold filled syringes	
2	Syringe valves	

STREAM DISCHARGE

Number per site	Item	
1	Current velocity meter and probe, with operating manual (e.g. Marsh-McBirney Model 201, Swiffer Model 2100, or equivalent)	
1	Top-set wading rod (metric scale) for use with current velocity meter	
1	Portable Weir with 60/ "V" notch (optional)	
1	Plastic sheeting to use with weir	
1	Plastic bucket (or similar container) with volume graduations	
1	Stopwatch	
1	Neutrally buoyant object (e.g., orange, small rubber ball, stick)	

PHYSICAL HABITAT

Number per site	Item	
1	Fisherman's vest with lots of pockets and snap fittings.	
1	Hip chain (metric) for measuring reach lengths (<u>Optional</u>)	
1	Clinometer (or Abney level) with percent and degree scales.	
1	Lightweight telescoping camera tripod, (necessary only if slope measurements are being determined by only one person)	
2	½-inch diameter PVC pipe, 2-3 m long, each marked at the same height (for use in slope determinations involving two persons)	
1	Spherical convex canopy densiometer, modified with taped "V"	
1	Bearing compass (Backpacking type)	
1	Meter stick. Alternatively, a short (1-2 m) rod or pole (e.g., a ski pole) with cm markings for thalweg measurements	

PERIPHYTON

Number per site	Item	
1	Large funnel (15-20 cm diameter)	
1	12-cm ² area delimiter (3.8 cm diameter pipe, 3 cm tall)	
1	Stiff-bristle Toothbrush with handle bent at 90° angle	
1	1-L wash bottle for stream water	
1	1-L wash bottle containing deionized water	
2	500-mL plastic bottles for composite index samples, labeled "EROSIONAL" and "DEPOSITIONAL"	
1	60 mL plastic syringe with a 3/8" hole bored into the end	
4	50-mL screw-top centrifuge tubes (or similar sample vials)	
1 box	Glass-fiber filters for chlorophyll sample	
1 pair	Forceps for filter handling.	
1	25-mL or 50-mL graduated cylinder	
1	Filtration unit, including filter funnel, cap, filter holder, and receiving chamber	
1	Hand-operated vacuum pump with length of flexible plastic tubing	
2	Pre-leached, pre-ashed, weighed glass-fiber filters in numbered containers for biomass sample	
2	Aluminum foil squares (3" x 6")	
1	Small syringe or bulb pipette for dispensing formalin	

SEDIMENT METABOLISM AND SEDIMENT TOXICITY

Number per site	Item	
1	Small scoop sampler for sediments	
1	Wide-mouthed plastic jar labeled "COMPOSITE SEDIMENT SAMPLE". If sediment is only being collected for metabolism samples, use a 250-mL jar is sufficient. If metabolism and toxicity samples are being prepared, use a 1-gallon jar	
1	YSI Model 58 Dissolved Oxygen meter with Model 5730 Stirring BOD probe and operating manual	
1 set	Spare batteries for DO meter	
1	Small plastic spoon or spatula to transfer sediment from the composite sample container to respiration tubes	
5	50-mL, screw-top, centrifuge tubes	
1	50-ML screw-cap centrifuge tube labeled "BLANK"	
1	Small cooler used as incubation chamber	
1	1,000-mL plastic beaker to holding centrifuge tubes during incubation	
1	Plastic container with snap-on lid to hold the sediment toxicity sample	

BENTHIC MACROINVERTEBRATES

Number per site	Item	
1	Modified kick net (closed bag with 595/600 : m mesh) and 4-ft handle (Wildco #425-C50)	
	Spare net(s) for the kick net sampler or extra sampler	
2	Buckets, plastic, 8- to 10-qt capacity, labeled "RIFFLE" and "POOL"	
1	Sieve, U.S. Standard #30 mesh	
1	Sieve bucket, 595-: m mesh openings	
2 pr.	Watchmakers' forceps	
1	Small spatula, spoon, or scoop to transfer sample	
1	Funnel, with large bore spout	
4 to 6 ea.	Sample jars, plastic with screw caps, ½ and 1 gallon capacity, suitable for use with ethanol	
1	Field checklist sheet	
1 pkg.	Kim wipes in small self-sealing plastic bag	

AQUATIC VERTEBRATES AND FISH TISSUE CONTAMINANTS

Number per site	Item	
1	Gasoline or battery-powered backpack electrofishing unit with electrode wand	
	Extra battery	
3 pr	heavy-duty rubber gloves for electrofishing	
2	Long-handled dip nets (0.6 cm mesh) with insulated handles	
1	Minnow seine (2m x 1.25 m, 0.6 cm mesh) with brailles	
2	Large seines (3 m x 2 m, 0.6 cm mesh) with brailles	
2	larger sized seines for block nets (if necessary)	
10	Collapsible buckets for holding and processing aquatic vertebrates	
1 set	Taxonomic reference books and keys for fishes and amphibians of the region	
1	Fish measuring board	
1	List of vertebrate species codes and common names	
1	List of external anomaly codes	
15-20	Small nylon mesh bags for holding voucher specimens (bags can also be constructed from sections of nylon stockings or panty hose)	
1	Small fillet knife or scalpel for preparing larger voucher specimens for preservation	
2 ea.	½ or 1-gal screw-top plastic jars for voucher samples	
1	Plastic bucket for anesthetization	
4	carbon dioxide tablets (Alka-Seltzer® or equivalent)	
1	Teflon beaker for weighing primary tissue sample	
1	Portable scale, precision ±5g	
1 roll	Aluminum foil	
2 gal	10% (buffered) formalin solution OR 0.2 gal buffered formaldehyde solution	
1	Container to hold preserved voucher sample jars	