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ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM-SURFACE WATERS:

WESTERN PILOT STUDY
FIELD OPERATIONS MANUAL FOR
WADEABLE STREAMS

Edited by

David V. Peck[1], James M. Lazorchak[2], and Donald J. Klemm[2]

[1] U.S. Environmental Protection Agency
Regional Ecology Branch
Western Ecology Division
National Health and Environmental Effects Research Laboratory
Corvallis, OR 97333

[2] U.S. Environmental Protection Agency
Ecosystems Research Branch
Ecological Exposure Research Division
National Exposure Research Laboratory
Cincinnati, OH 45268

NATIONAL HEALTH AND ENVIRONMENTAL EFFECTS RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

NATIONAL EXPOSURE RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

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FIELD DATA FORMS AND SAMPLE LABELS

Number per site	Item	
1	Verification Form	
1	Sample Collection Form	
11 + extras	Channel/Riparian Cross-section and Thalweg Profile Forms	
1	Slope and Bearing Form	
1	Legacy Tree/ Invasive Plant form	
1	Field Measurement and Channel Constraint Form	
1	Torrent Evidence Assessment Form	
2-3	Vertebrate Collection Form	
1	Rapid Habitat Assessment Form for Riffle/run prevalent streams (optional)	
1	Rapid Habitat Assessment Form for Pool/glide prevalent streams (optional)	
1	Assessment Form for visual stream assessment	
4 + extras	Sample Tracking Form	
3	Water chemistry labels (same ID number)	
3t	Periphyton labels (same ID number)	
1	Reachwide Benthic sample labels, with preprinted ID numbers	
1	Targeted Riffle Benthic sample labels with preprinted ID numbers	
1 sheet	Benthic labels for extra containers (no preprinted ID number)	
1 sheet	Blank benthic sample labels on waterproof paper for inside of jars	
1 sheet	Pre-printed aquatic vertebrate jar labels (4) and voucher bag tags (36), all with same preprinted sample ID number	
1 sheet	Fish tissue sample labels (up to 16 different sample ID number)	
2 copies	Field operations and methods manual	
2 sets	Laminated sheets of procedure tables and/or quick reference guides	

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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	
1 roll	Duct tape	
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	

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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.	
1 per person	Safety Whistles	
1 pr. per person	Earplugs (if gas-powered generators are used)	
1 per person	Day packs, backs, fanny packs, and/or dry bags for personal gear	
1 ea.	Insect repellent, sunscreen, Tec-nu (for poison oak), hand sanitizer, water purifier unit	
1	Patch kit for waders	

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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	
1 gal	Sparquat® disinfectant	
	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) or ice substitute packs	
1 box	1-gal heavy-duty self-sealing (e.g., with a zipper-type closure) plastic bags	
1-box	30-gal plastic garbage bags for lining shipping containers	
1 roll	Clear tape for sealing shipping containers	
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 (or substitute ice packs) 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	

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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 (or digital camera)	

WATER CHEMISTRY

Number per site	Item	
1	Dissolved oxygen/Conductivity/Temperature meter with probe and operating manual (optional)	
1	DO repair kit with additional membranes and probe filling solution (optional)	
1	Conductivity meter, probe, and operating manual (if not integrated with DO/ Temp meter (optional)	
	Extra batteries for dissolved oxygen and conductivity meters (optional)	
1	500-mL plastic bottle of conductivity QCCS labeled "Rinse" (in plastic bag) (optional)	
1	500-mL plastic bottle of conductivity QCCS labeled "Test" (in plastic bag) (optional)	
1	500-mL plastic bottle of deionized water to store conductivity probe (optional)	
1	Field thermometer	
1	500 mL plastic beaker with handle (in clean plastic bag)	
1	4-L cubitainer	
2	60 mL plastic syringes	
1	½ gal. size plastic container with snap-on lid to hold filled syringes	
2	Syringe valves	

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STREAM DISCHARGE

Number per site	Item	
1	Current velocity meter and probe, with operating manual (e.g. Marsh-McBirney Model 201, Swoffer 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 (optional)	
1	Plastic bucket (or similar container) with volume graduations	
1	Stopwatch	
1	Neutrally buoyant object (e.g., orange, small rubber ball, stick, bobber)	

PHYSICAL HABITAT

Number per site	Item	
1	Fisherman's vest with lots of pockets and snap fittings.	
1	50-m tape measure	
1	Clinometer with percent and degree scales.	
1	Lightweight telescoping camera tripod, (necessary only if slope measurements are being determined by only one person)	
1	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	

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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^o angle	
1	1-L wash bottle for stream water	
1	1-L wash bottle containing deionized water	
1	500-mL plastic bottle for composite index sample labeled “PERIPHYTON”	
1	35-60 mL plastic syringe (catheter-tip)	
3	50-mL screw-top centrifuge tubes (or similar sample vials)	
1 box	Glass-fiber filters for chlorophyll and biomass samples	
1 pair	Forceps for filter handling.	
1	25-mL or 50-mL graduated cylinder (or use a 50-mL centrifuge tube with volume graduations)	
1	Filtration unit, including filter funnel, cap, filter holder, and receiving chamber	
1	Hand-operated vacuum pump with length of flexible plastic tubing	
1	Small syringe or bulb pipette for dispensing formalin	
1	small, lightproof plastic bag for storing chlorophyll and biomass samples	

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BENTHIC MACROINVERTEBRATES

Number per site	Item	
1	Modified kick net (500 µm mesh) and 4-ft handle	
	Spare net(s) for the kick net sampler or extra sampler	
2	Buckets, plastic, 8- to 10-qt capacity, labeled “REACHWIDE” and “TARGETED RIFFLE”	
1	Sieve, U.S. Std. No. 35 (500 µm mesh), or Sieve bucket with 500-µm mesh openings	
2 pr. ea.	Watchmakers’ and curved tip forceps	
1	Small spatula, spoon, or scoop to transfer sample	
1	Funnel, with large bore spout	
4 to 6 ea.	Sample jars, HDPE plastic with leakproof screw caps, 500-mL and 1-L capacity, suitable for use with ethanol	
1 pkg.	Kim wipes in small self-sealing plastic bag	
1	Screw-top pail with absorbent material to transport preserved samples	

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AQUATIC VERTEBRATES AND FISH TISSUE CONTAMINANTS

Number per site	Item	
1	Gasoline or battery-powered backpack electrofishing unit with electrode wand	
	Extra battery (or gasoline)	
4 pr	heavy-duty rubber gloves for electrofishing	
2	Long-handled dip nets (0.6 cm mesh) with insulated handles	
1	Minnow seine (2m × 1.25 m, 0.6 cm mesh) with brailles	
1	Large seines (3 m × 2 m, 0.6 cm mesh) with brailles	
4	Collapsible buckets for holding and processing aquatic vertebrates	
1 set	Taxonomic reference books and keys for fishes and amphibians of the region	
1-2	Fish measuring board	
5-20	Small nylon mesh bags or nylon stockings for holding voucher specimens	
1	Jackknife for preparing larger voucher specimens for preservation	
1 ea.	1 and 2-L HDPE plastic jars with leakproof screw-top caps for voucher samples	
4	carbon dioxide tablets (Alka-Seltzer® or equivalent)	
1 roll	Aluminum foil to make 18" x 11" rectangles (10 per site)	
1-2 L	10% (buffered) formalin solution OR 0.2 gal buffered formaldehyde solution	
1	Cooler to hold preserved voucher sample jars	
1	Aquarium net	
1 ea.	All required collection permits (State, Federal, Tribal)	

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