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ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM-SURFACE WATERS:

WESTERN PILOT STUDY
FIELD OPERATIONS MANUAL FOR
WADEABLE STREAMS

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SECTION 13
FISH TISSUE CONTAMINANTS

by
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In addition to gathering data on the aquatic vertebrate assemblage (Section 12), fish are retained for analysis of fish tissue contaminants. In general, the focus is on fish species that commonly occur throughout the region of interest, and that are sufficiently abundant within a sampling reach. The fish tissue contaminants indicator is used to evaluate the potential burden of toxic chemicals and fish pathogens at a site. EMAP focuses on whole fish because they present fewer logistical problems and integrate all fish parts. Three types of fish samples are prepared for each site (if possible). The small fish composite sample uses individuals <100 mm long. The big fish sample uses individuals that are >120 mm long. Additional specimens, using a range of fish sizes, are collected for a "Microbial" sample, which are subjected to internal examination for certain types of pathogens.

Only minor modifications have been made to procedures used in EMAP-WP in 2000. These modifications include clarifying the preparation, labeling, and tracking of "big" fish samples, and increasing the number of possible microbial samples to 6 individuals.

13.1 PREPARING SAMPLES FOR TISSUE CONTAMINANTS

Prepare tissue samples as described in Table 13-1.To determine the proper quantity for each sample, weight is used for the small fish sample and individual length is used for the large fish samples. In the small fish composite, use similar sized individuals if possible

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TABLE 13-1. PROCEDURE TO PREPARE FISH TISSUE SAMPLES

NOTE: Use your best judgement to collect some type of fish tissue sample.

SMALL FISH. After voucher specimens have been prepared, choose a small fish species that has enough similarly sized individuals (ideally small-large size difference < 25%) to equal 400 g(14 oz).

BIG FISH. After considering voucher specimens, select 3 individuals >120 mm total length with a wide size range for each of 3 species. Pacific preference order: bass, pikeminnow, trout, catfish, sucker; Atlantic preference order: bass, walleye/sauger, pike, trout, catfish, sucker).

MICROBIAL. After preparing vouchers and the above specimens, select 6 small adults or large juveniles (preferably with anomalies).

8. Anesthesize fish. Keep hands, foil, & bags clean and free of potential contaminants (mud, fuel, formalin, sun screen, insect repellant, soap, etc.)

9. Record standard common name of species (IN CAPITAL LETTERS) on Vertebrate Collection Form.

10. For **small** fish; record number of individuals for each species in comment line.

11. For **big** and **microbial** samples: Record total length of each individual in the appropriate box of the Vertebrate Collection Form.

12. Indicate sample type by placing an “X” in appropriate box on form.

13. Wrap all **small** fish together in a single piece of aluminum foil, with **dull side of foil in contact with fish**. Place sample in a self-sealing plastic bag.

14. **Wrap each big adult and microbial fish sample separately** in aluminum foil, with dull side of the foil in contact with fish. Place each individual in a single plastic bag.

15. Expel excess air and seal bag.

16. Prepare Fish Tissue sample label for each bag by filling in stream ID, sample type (big, small, microbe) and collection date on each label. Record sample ID for each bag on the Vertebrate Collection Form.

17. Attach appropriate label to bag. Cover label with a strip of clear tape. Place labeled bag into second plastic bag, and re-label and re-tape it.

18. Keep the double-bagged samples **on ice (or frozen if possible)** until shipment.

(size difference between smallest to largest < 25%), but getting a sufficient sample is a higher priority than getting similar-sized individuals. For the small fish composite, send as may fish as possible up to 400 g. If there is no single species with enough individuals available, prepare composite samples using individuals of multiple species. For the big fish sample, send as many fish as possible, up to 3 fish for each of 3 species. For the microbial sample, choose any large juveniles or small adults—especially those with external anomalies – and send as many fish as possible up to 6.

Note that voucher specimens have higher priority than tissue samples, and toxic contamination samples have higher priority than the microbial contamination sample.

Record information for the fish tissue and microbial samples on page 2 of the Vertebrate Collection Form (Figure 13-1). Examples of completed sample labels are presented in Figure 13-2. Use a permanent marker to complete labels. Each individual comprising the big adult and microbial samples is wrapped, labeled, and bagged separately, while the small fish composite is wrapped together. Thus, up to 16 different sample labels may be required (9 “big”, 1 “small”, and 6 “microbial”). Each sample is double-bagged. Tissue samples are stored in a cooler with several bags of ice (or ice substitute packs). Double bag the ice and tape the last bag shut to prevent contamination of samples by melting ice. Store tissue samples on ice (freeze them if possible) until they can be shipped (Section 3). Tissue samples can be stored and shipped with other samples requiring icing or freezing (water chemistry and periphyton samples).

13.2 EQUIPMENT AND SUPPLIES

Figure 13-3 is a checklist of equipment and supplies required to conduct protocols described in this section. This checklist may differ from the checklists presented in Appendix A, which are used at a base site to ensure that all equipment and supplies are brought to and are available at the stream site. Field teams are required to use the checklist presented in this section to ensure that equipment and supplies are organized and available to conduct the protocols efficiently.

VERTEBRATE COLLECTION FORM - STREAMS / RIVERS (continued)

Reviewed by (Initials): [illegible]

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SITE ID: WXXP99-9999 DATE: 07/01/2001 PAGE: ___ of ___

SPECIMEN COLLECTION (continued)

Tag No.	Common Name	Tally	Total Count	Vouch. Count	LENGTH (mm)* Minimum	LENGTH (mm)* Maximum	Anom. Count	Mortality Count	Flag	Transects
										A C E G I / B D F H J
										A C E G I / B D F H J
										A C E G I / B D F H J
										A C E G I / B D F H J
										A C E G I / B D F H J

FISH TISSUE SAMPLES

Sample ID	Common Name	Total Length (mm)	Number of Small	Sample Type
229001	CUTTHROAT TROUT	180		☐ Microbe ☒ Big ☐ Sm.
229002	CUTTHROAT TROUT	170		☐ Microbe ☒ Big ☐ Sm.
229003	CUTTHROAT TROUT	180		☐ Microbe ☒ Big ☐ Sm.
229004	NORTHERN PIKEMINNOW	130		☐ Microbe ☒ Big ☐ Sm.
229005	NORTHERN PIKEMINNOW	140		☐ Microbe ☒ Big ☐ Sm.
229006	NORTHERN PIKEMINNOW	140		☐ Microbe ☒ Big ☐ Sm.
229007	MOTTLED SCULPIN		15	☐ Microbe ☐ Big ☒ Sm.
229008	MOTTLED SCULPIN	80		☒ Microbe ☐ Big ☐ Sm.

Sample ID	Common Name	Total Length (mm)	Number of Small	Sample Type
229009	CUTTHROAT TROUT	90		☒ Microbe ☐ Big ☐ Sm.
229010	NORTHERN PIKEMINNOW	130		☒ Microbe ☐ Big ☐ Sm.
229011	NORTHERN PIKE MINNOW	180		☒ Microbe ☐ Big ☐ Sm.
229012	SPECKLED DACE	50		☒ Microbe ☐ Big ☐ Sm.
229013	SMALLMOUTH BASS	150		☐ Microbe ☒ Big ☐ Sm.
229014	SMALLMOUTH BASS	300		☐ Microbe ☒ Big ☐ Sm.
229015	SMALLMOUTH BASS	230		☐ Microbe ☒ Big ☐ Sm.
229016	RETICULATE SCULPIN	70		☒ Microbe ☐ Big ☐ Sm.

Comments

Flag Codes: F1, F2, etc. = Misc. flags assigned by crew. Explain all flags in comment section. LENGTH* - Enter single fish as minimum.

03/26/2001 2001 Vert. Coll. (continued)

Figure 13-1. Vertebrate Collection Form, showing information recorded for fish tissue samples.

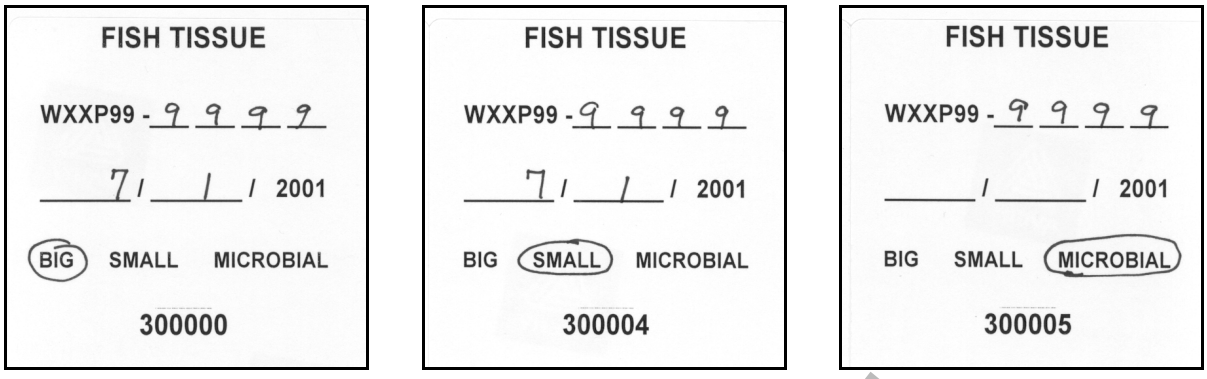

Figure 13-2. Completed sample labels for fish tissue contaminants. Note that a different label (i.e., ID number) is prepared for each individual used for the "big" and "microbial" samples, and up to 16 different ID numbers could be used at a site.

EQUIPMENT AND SUPPLIES FOR FISH TISSUE CONTAMINANTS

QTY.	ITEM	
1	Bucket for anesthetization	
4	Carbon dioxide tablets (Alka-Seltzer® or equivalent)	
1 roll	Aluminum foil (heavy duty) (or 16 18" x 11" rectangles) / (for wrapping fish)	
32	½ - 2 -gallon self-sealing plastic bags, or heavy duty garbage bags (rivers)	
2	Soft (#2) lead pencils or eversharps to record data	
2	Fine-point indelible markers to fill out labels	
1 pkg.	Clear tape strips	
16 pr,	Fish tissue labels (each pair with different ID numbers)	
2	Vertebrate Collection forms	
1 set	Laminated procedure tables for fish tissue contaminants	
1	Cooler with ice (double-bagged and taped)	

Figure 13-3. Equipment and supplies checklist for fish tissue contaminants.

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