VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF WATER QUALITY STANDARDS
2000 FISH TISSUE AND SEDIMENT MONITORING STATIONS

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Introduction

The Virginia Department of Environmental Quality (VADEQ), Office of Water Quality Standards Programs (OWQS), is responsible for the design and execution of the Fish Tissue and Sediment Monitoring Program. This document provides information concerning the proposed stations for monitoring fish tissue and sediment during 2000 and the rationale for the station selection.

Objective

The objective of the Fish Tissue and Sediment Monitoring Program is to systematically assess and evaluate, using a multi-tier screening, water-bodies of Virginia in order to identify toxic contaminant accumulation adversely affecting the total biological community or human users of the resource. Data collected will be used to quantify human health risks and ecological/environmental health conditions.

Sampling Design

The water-bodies of Virginia are separated into fourteen river basins or sub-basins. The proposed strategy is to sample each basin on a rotational cycle. Two river basins have been selected for the 2000 sampling season: York and New River. In addition, several follow-up stations have been selected in the Tennessee and Big Sandy, Small Coastal and Chesapeake Bay, Potomac, and James River Basins based on Virginia Health Department (VDH) recommendations. A total of 67 stations have been selected within the basins. Some of the sample sites are brackish or saltwater locations. Extensive effort will be made to complete all of the stations; however, if equipment problems and/or severe weather impact(s) the sampling schedule, priority will be given to stations where water quality problems have been historically documented.

The samples that will be collected at each freshwater station include; one sediment sample and at least three tissue composite samples (5-10 individuals per composite) consisting of fish species that are typically consumed by humans. Samples will include a bottom feeder (e.g. catfish sp.), which may be highly exposed to contaminated sediments compared to other species, and two top trophic level feeders (e.g. bass and blue gill sp.), which may be exposed to contaminants via biomagnification. Collection of targeted species for tissue analysis at the brackish and saltwater sites may be problematic since only 10-15% of the fish and shellfish species at the stations are year-round residents and few of the resident species are typically consumed by humans (Murdy et. al. 1997). It is likely that sample collection techniques will yield several species of migratory fish and shellfish that are consumed by humans and a few resident fish species that are not consumed by humans. Contaminants found in migratory fishes may not reflect local pollution problems but may be used to calculate human health risks from consumption. Contaminants found in sediment and resident fishes may be used to identify local inputs of bioaccumulative contaminants. Therefore, the samples that will be collected at each brackish or saltwater station include;

one sediment sample and at least three composite samples (5-10 individuals per composite) consisting of an edible migratory, edible or non-edible resident, and an edible or non-edible bottom species. The entire data set should help determine if any human health risks are associated with fish consumption, and if local inputs of bioaccumulative contaminants are in tissue and/or sediment at levels of concern. For a detailed list of species that will be targeted at each brackish or saltwater station see Table 1. The samples will be analyzed for metal and organic contaminants by the College of William and Mary and the Virginia Institute of Marine Science (VIMS).

The stations in each basin have been selected to produce site specific conclusions and provide spatial coverage of the entire basin.

Station Selection Criteria

The following criteria were used to select the 2000 sampling stations:

1) Historical Data Review

2) Spatial Distribution

3) Specific Water Quality Problems

4) Major Tributary Status

5) External Request from other VADEQ offices, State Agencies, or citizen groups

6) Point Source

7) Nonpoint Source

8) Major Fishery

The attached references were used to select the sampling stations. The station number, river mile, latitude, longitude, criteria for selection, and corresponding USGS topographical survey map for each proposed sampling station was also determined (Table 2). Summary maps showing the location of all of the proposed stations (Figure. 1-5) are attached. Two separate proposed work plans (see appendix A and B, respectively) describes the special PCB projects at Levisa Fork in the Big Sandy and Tennessee Drainage, and the Potomac River tidal stations.

Table 1. Target species at each of the brackish water or saltwater stations.

Migratory Fish (Normally consumed by humans)	Resident Fish (May not be consumed by humans)	Benthic Fish/Shellfish (May not be consumed by humans)
Striped Bass	White Perch	Oyster spp.
Spot	Yellow Perch	Clam spp.
Atlantic Croaker	Killifish, Banded	Blue Crab
Weak Fish	Killifish, Striped	Summer Flounder
Black Sea Bass	Killifish,Rainwater	Smallmouth Flounder
Spotted Seatrout	Killifish, Marsh	Oyster Toadfish
Black Drum	Killifish, Spotfin	Hogchoker
Red Drum	Mummichogs	Tongue Fish
Silver Perch	Sheepshead Minnow	Channel Catfish
Northern Kingfish	Silverside, Inland	White Catfish
Southern Kingfish	Silverside, Rough	
Gulf Kingfish	Silverside, Atlantic	
Bluefish	Bay Anchovy	
	Gizzard Shad	

References

Department of Environmental Quality. 1998. Virginia Water Quality Assessment, 1998 305 (B) Report to EPA Administrator and Congress for the Period July 1, 1992 To June 30, 1997. Richmond, Virginia.

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State Water Control Board. 1990. Virginia Water Quality Assessment, 1990-305 (B) Report to EPA Administrator and Congress for the Period July 1, 1987 To June 30, 1989. Richmond, Virginia.

Tingler , J.N. et. al. 1990. Comprehensive Review of Selected Toxic Substances-Environmental Samples In Virginia-Bulletin 583. Richmond, Virginia.

Figure 1. York Basin Sites- Scale 1:700,000 (1'=11 MILES)

Figure 2. New River Basin Sites- Scale 1:500,000 (1'=7.9 MILES)

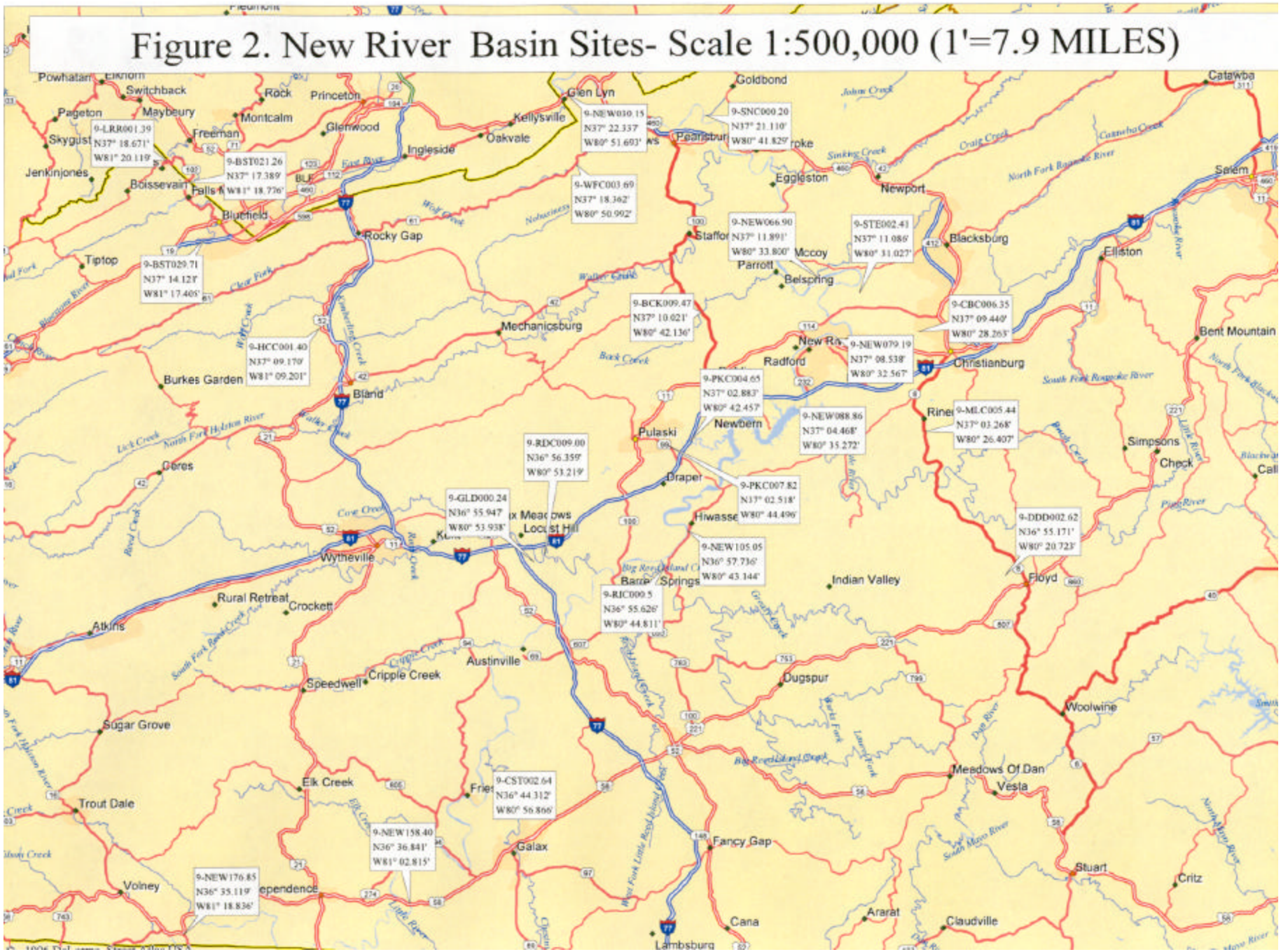

Figure 3. Tennesse-Big Sandy Basin Sites Scale 1:175,000 (1'=2.8 MILES)

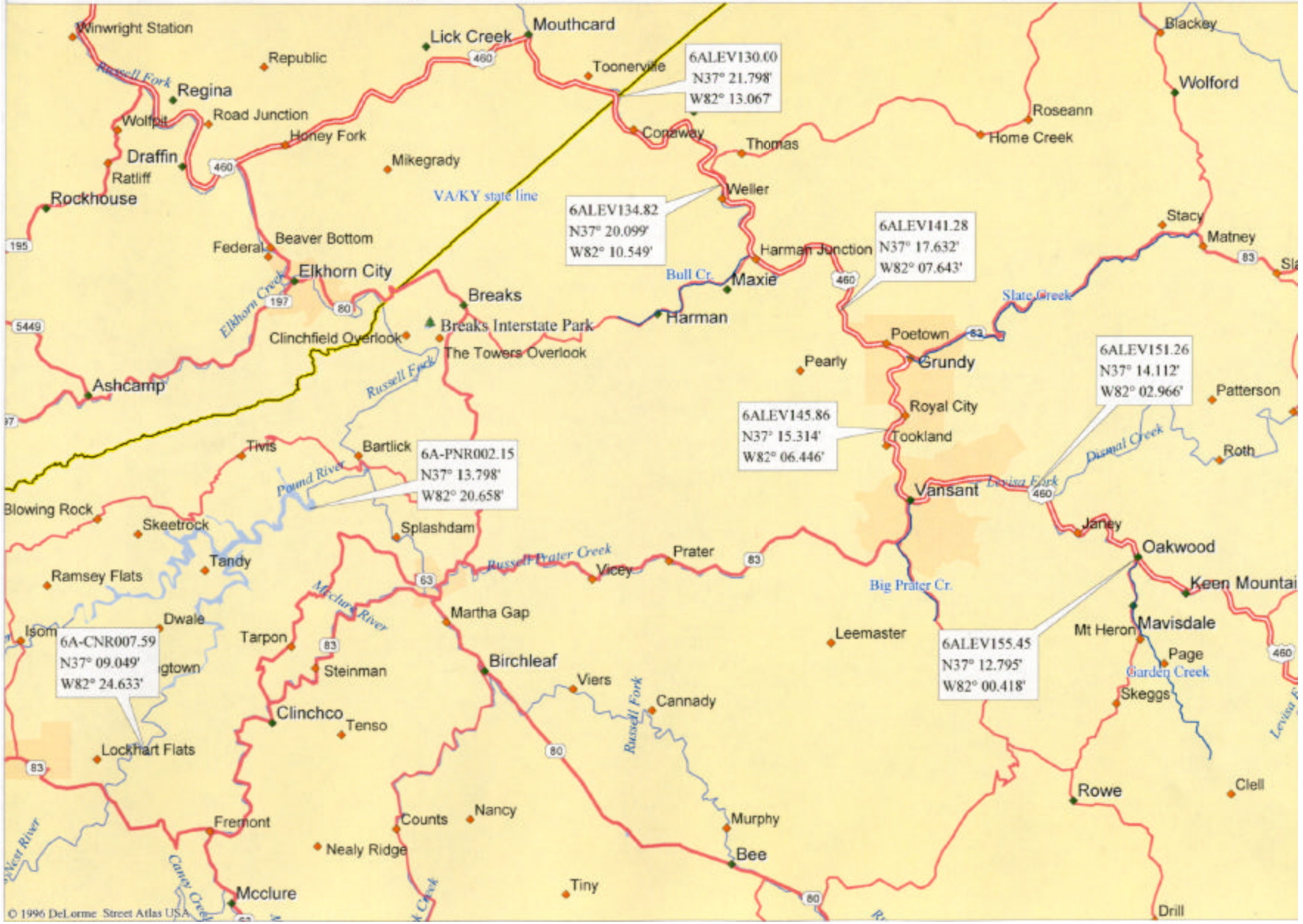

Fig. 4. James R. & Ches. Bay, Sm. Coast. Bas. Sites Scale 1:700000 (1" =11mi.)

Figure 5. Potomac River Basin Sites-Scale 1:250000 (1"=3.9 MILES)