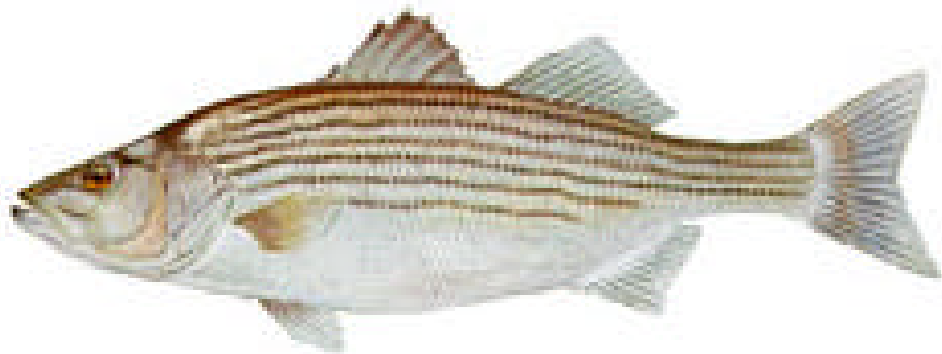




**2003 FISH TISSUE AND SEDIMENT
MONITORING PLAN
WATER QUALITY STANDARDS & BIOLOGICAL
MONITORING PROGRAMS**



April 11, 2003

Introduction

The Virginia Department of Environmental Quality (DEQ), Water Quality Standards and Biological Monitoring Programs, Central Office of Water Quality Programs, is responsible for the design and execution of the Statewide Fish Tissue and Sediment Monitoring Program. This document provides information concerning the proposed stations for monitoring fish tissue and sediment during 2003 and the rationale for the station selection.

Objective

The objective of the Statewide 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 with the potential to adversely affect human users of the resource. A second objective of the program is to determine the presence of toxic chemical contaminants in the aquatic environment which have the potential to adversely effect the aquatic biological community. Data collected will be used to quantify human health risks and ecological/environmental health conditions. In addition, follow-up studies are conducted when problems are found and/or when recommended by the Virginia Department of Health (VDH) through a memorandum of agreement between VDH and DEQ. VDH uses data generated by this program to assess the need for issuing or modifying fish consumption advisories. The DEQ employs the data to determine 305(b) and Total Maximum Daily Load (TMDL) water quality determinations.

Sampling Design

The water bodies of Virginia are separated into fourteen river basins or sub-basins (see Table 1). In the past, fish tissue and sediment were sampled in all fourteen of the river basins within a five-year cycle following procedures stated in the DEQ Quality Assurance/Quality Control Project Plan for the Fish Tissue and Sediment Monitoring Program (1998). In April 2000, the General Assembly amended section 62.1-44.19:5 of the code of Virginia which instructed the DEQ to sample all of the river basins within a three-year rotational cycle contingent upon available funding.

<u>Table 1. River Basins in Virginia</u>	<u>Basin Code</u>
1) Potomac River Subbasin	1A
2) Potomac River-Shenandoah River Subbasin	1B
3) James River	2-
4) Rappahannock	3-
5) Roanoke	4A
6) Yadkin	4B
7) Chowan-Chowan River Subbasin	5A
8) Chowan-Albemarle Sound Subbasin	5B
9) Tennessee and Big Sandy River-Big Sandy Subbasin	6A
10) Tennessee and Big Sandy River-Clinch Subbasin	6B
11) Tennessee and Big Sandy River-Holston Subbasin	6C
12) Chesapeake Bay, Atlantic Ocean, and Small Coastal	7-
13) York	8-
14) New River	9-

At the time staff developed this monitoring plan the State was making budget reductions due to a short fall of revenue. As part of the agency's response to budget reductions, wage positions paid by state general funds were eliminated resulting in the loss of two staff members dedicated to the fish tissue and sediment contaminants monitoring program. Due to staff reductions, only two river basins have been selected for the 2003- routine sampling season: the York (last sampled in 2000), and the Chesapeake Bay and Small Coastal Basin (last sampled in 1998). A total of 79 fish tissue and sediment sampling stations have been selected. The sample station list includes; 5 follow-up or special request samples sites in the James Basin, 1 in the Potomac, 6 in the Tennessee and Big Sandy Basin, 3 to 5 in the Chesapeake Bay where striped bass samples are to be collected by the Virginia Institute of Marine Science for PCB analysis, and 8 private pond sites in Caroline County due to potential mercury contamination. The private pond sites will be sampled if permission is granted by the owners of the ponds. All of the sample sites are ranked from 1 to 2

with 1 being the highest priority and 2 the lower priority. A higher rank is based on known or potential water quality problems at the sample location, special requests by other DEQ units, VDH or citizen groups, and/or if the sample location is a relatively intensive resource for recreational or commercial fishing. Extensive effort will be made to complete all of the stations selected, but if equipment problems and/or severe weather impact(s) the sampling schedule, or if there are further budget reductions, priority will be given to higher ranked stations.

Most of the sample sites are freshwater; however, several are brackish or saltwater locations. The samples that will be collected at each freshwater station include one sediment sample and three to five tissue composite samples (5-10 individuals per composite) consisting of fish species that are typically consumed by humans. Samples will include at least one bottom feeder (e.g. catfish sp.), which may be highly exposed to chemically contaminated sediments compared to other species, and two to four upper and middle trophic level feeders (e.g. bass and sunfish species, respectively.), which may be exposed to chemical 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 three to five composite samples (5-10 individuals per composite) consisting of an edible migratory, an edible or non-edible resident, and an edible or non-edible bottom species. For a detailed list of species that will be targeted at each brackish or saltwater station (see Table 2).

The entire data set should help determine if any unacceptable 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. Samples collected will be analyzed for metal and/or organic contaminants by the College of William and Mary-Virginia Institute of Marine Science.

Station Selection Criteria

The stations in each basin have been selected to produce site specific conclusions and provide spatial coverage of the entire basin. The following criteria were used to select the 2003 sampling stations:

- Historical Data Review
- Spatial Distribution
- Specific Water Quality Problems
- Major Tributary Status
- External Request from other VADEQ offices, State Agencies, and Citizen Groups
- Point Source
- Nonpoint Source
- Major Fishery

The attached references were used in selecting the sampling stations. The water body ID number, station

number, priority rank, river mile, latitude, longitude, county, criteria for selection, and corresponding USGS topographical survey map name for each proposed sampling station are provided (see table 3). Summary maps showing the location of all of the proposed sample stations are attached (see figure 1-6).

Sample Collection and Reporting

Fish tissue and sediment samples will be collected in the early spring through late fall, 2003. Analytical data for all of the samples should be received from the laboratory by June 2004. The data will be tabulated as received and sent to VDH per an October 2000 Memorandum of Agreement between the VDH and DEQ. VDH will make an evaluation regarding potential human health impacts due to contaminated fish consumption and issue fish consumption advisories or bans as needed.

The tabulated data will also be sent to the water quality monitoring managers for 305(B) reporting and review and posted on the DEQ web site at: <http://www.deq.state.va.us/fishtissue/>

Table 2. Target species at each of the brackish water or saltwater stations.

Migratory Fish (Normally consumed by humans)	Resident Fish (Some may not be consumed by humans)	Benthic Fish/Shellfish (Some 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	

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Murdy, O.M., Ray S. Birgsong, J.A. Musick. 1997. Fishes of the Chesapeake Bay. Smithsonian Institute Press, Washington and London.

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Figure 1. Chesapeake Bay, Atlantic Ocean, & Small Coastal Basin (1"=13 Miles)

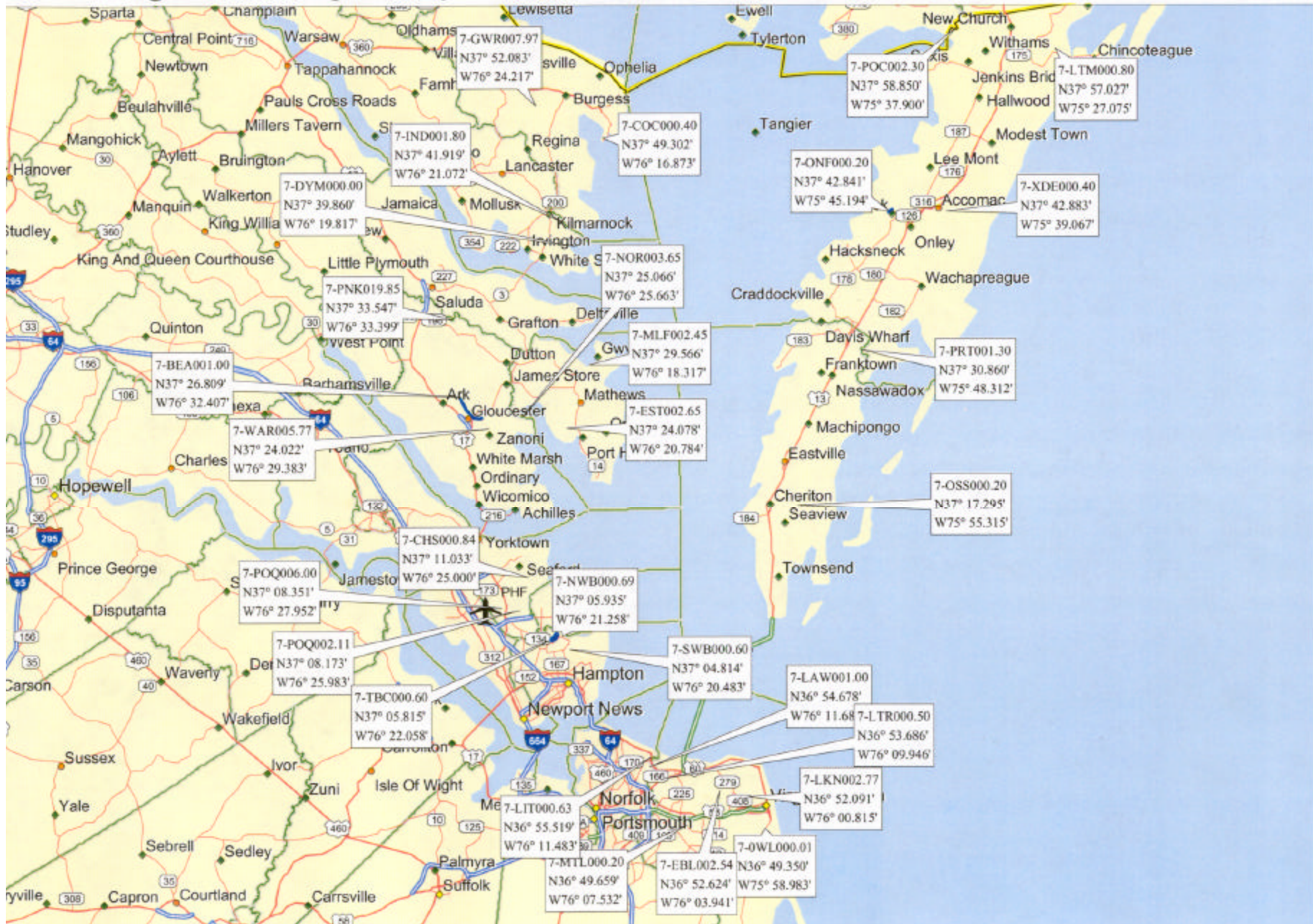


Figure 2. York River Basin (1"=13 Miles)



Figure 3. Ches. Bay Striped Bass Collection Areas (1" = 11 Miles)



Figure 4. James River Basin (1"=2.0 Miles)

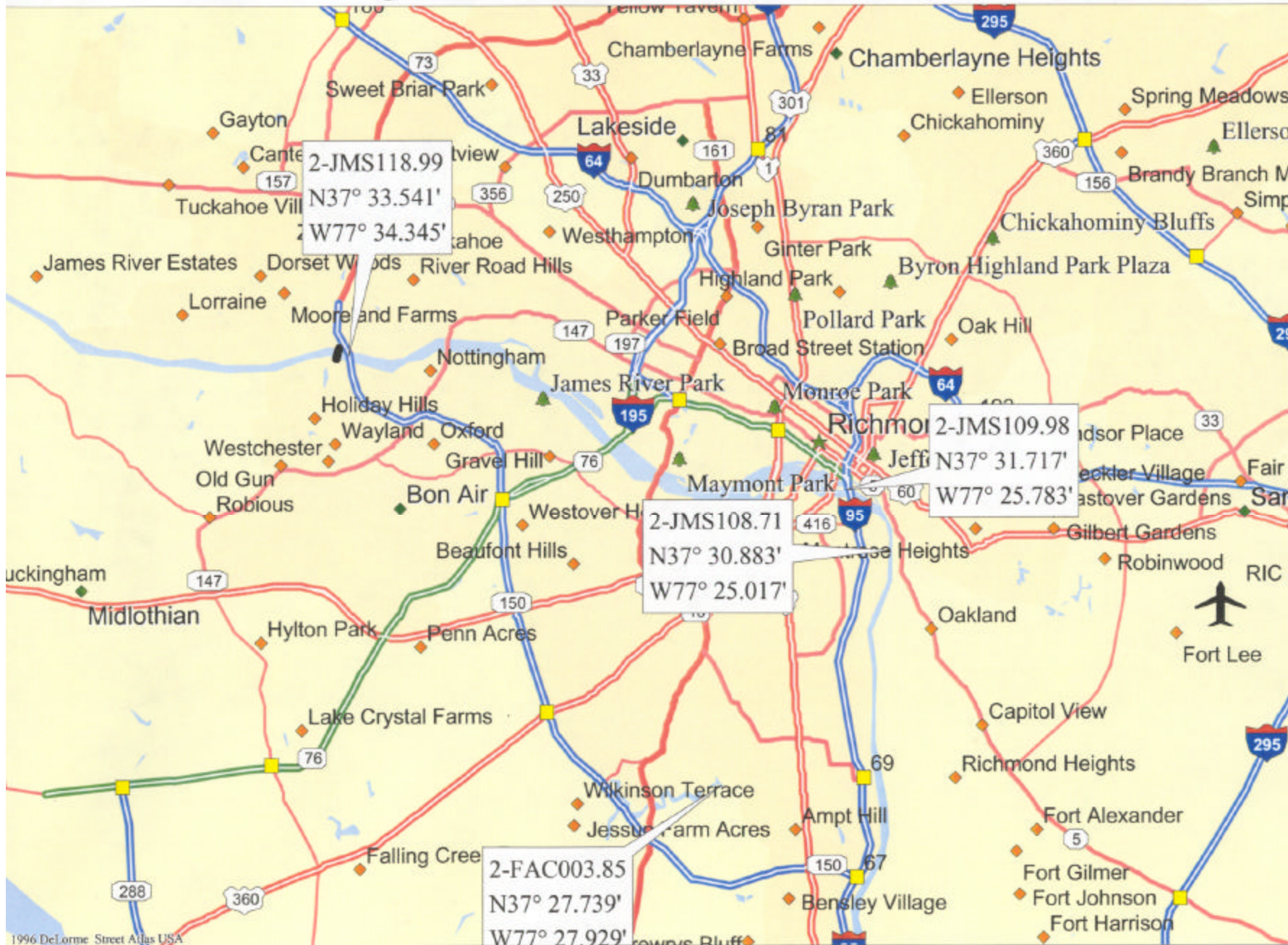


Figure 5. Potomac River Basin (1"=1Mile)



Figure 6. Tennessee and Big Sandy River Basin (1"=2 Miles)

