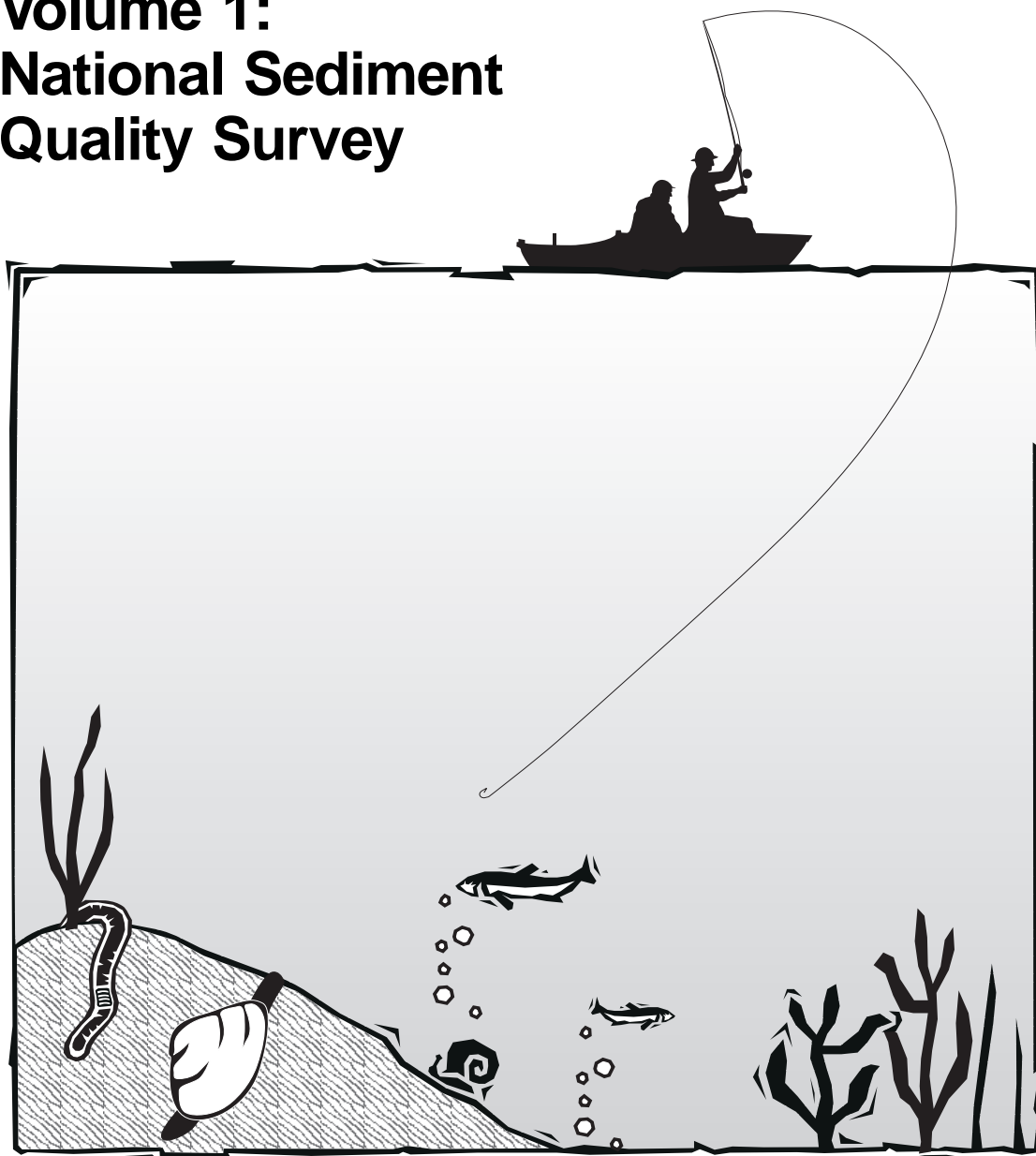




# The Incidence And Severity Of Sediment Contamination In Surface Waters Of The United States

## Volume 1: National Sediment Quality Survey





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 7 1997

THE ADMINISTRATOR

The Honorable Albert Gore, Jr.  
President of the Senate  
Washington, D.C. 20510

Dear Mr. President:

As required by the Water Resources Development Act of 1992 (WRDA), I am pleased to transmit the Environmental Protection Agency's (EPA) Report to Congress on the Incidence and Severity of Sediment Contamination in Surface Waters of the United States. This report describes the accumulation of chemical contaminants in river, lake, ocean, and estuary bottoms and includes a screening assessment of the potential for associated adverse effects to human and environmental health. It represents the first comprehensive EPA analysis of sediment chemistry and related biological data to assess what is known about the national incidence and severity of sediment contamination. As directed by WRDA, EPA consulted with the U.S. Army Corps of Engineers and the National Oceanic and Atmospheric Administration in compiling data and preparing the report.

EPA studied available data from sixty-five percent of the 2,111 watersheds in the continental United States and identified ninety-six watersheds that contain "areas of probable concern." In portions of these watersheds, environmental conditions may be unsuitable for bottom dwelling creatures, and fish that live in these waters may contain chemicals at levels unsafe for regular consumption. Areas of probable concern are located in regions affected by urban and agricultural runoff, municipal and industrial waste discharge, and other pollution sources. EPA recommends that resource managers fully examine the risks to human health and the environment in these watersheds. Authorities should take steps to ensure that major pollution sources are effectively controlled and that plans are in place to improve sediment conditions and to support long-term health goals. EPA's goals for managing the problem of contaminated sediment are provided as an enclosure to this letter.

The process to produce EPA's Report to Congress on the Incidence and Severity of Sediment Contamination in Surface Waters of the United States has been thorough and extensive, meeting WRDA requirements for Federal agency consultation, as well as EPA's own standards and policies regarding internal program and regional office review, external scientific peer review, and external stakeholder review. I would be pleased to further discuss the contents of this report at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Carol M. Browner". The signature is fluid and cursive, with the first name "Carol" being more prominent and the last name "Browner" following in a similar style.

Carol M. Browner

Enclosure



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460**

**JAN 7 1997**

THE ADMINISTRATOR

The Honorable Newt Gingrich  
Speaker of the House of Representatives  
Washington, D.C. 20515

Dear Mr. Speaker:

As required by the Water Resources Development Act of 1992 (WRDA), I am pleased to transmit the Environmental Protection Agency's (EPA) Report to Congress on the Incidence and Severity of Sediment Contamination in Surface Waters of the United States. This report describes the accumulation of chemical contaminants in river, lake, ocean, and estuary bottoms and includes a screening assessment of the potential for associated adverse effects to human and environmental health. It represents the first comprehensive EPA analysis of sediment chemistry and related biological data to assess what is known about the national incidence and severity of sediment contamination. As directed by WRDA, EPA consulted with the U.S. Army Corps of Engineers and the National Oceanic and Atmospheric Administration in compiling data and preparing the report.

EPA studied available data from sixty-five percent of the 2,111 watersheds in the continental United States and identified ninety-six watersheds that contain "areas of probable concern." In portions of these watersheds, environmental conditions may be unsuitable for bottom dwelling creatures, and fish that live in these waters may contain chemicals at levels unsafe for regular consumption. Areas of probable concern are located in regions affected by urban and agricultural runoff, municipal and industrial waste discharge, and other pollution sources. EPA recommends that resource managers fully examine the risks to human health and the environment in these watersheds. Authorities should take steps to ensure that major pollution sources are effectively controlled and that plans are in place to improve sediment conditions and to support long-term health goals. EPA's goals for managing the problem of contaminated sediment are provided as an enclosure to this letter.

The process to produce EPA's Report to Congress on the Incidence and Severity of Sediment Contamination in Surface Waters of the United States has been thorough and extensive, meeting WRDA requirements for Federal agency consultation, as well as EPA's own standards and policies regarding internal program and regional office review, external scientific peer review, and external stakeholder review. I would be pleased to further discuss the contents of this report at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Carol M. Browner". The signature is fluid and cursive, with the first name "Carol" being more prominent.

Carol M. Browner

Enclosure

# **Managing Contaminated Sediment in the United States**

## **Issue Background**

Many pollutants released to the environment settle and accumulate in the silt and mud called sediment on the bottoms of rivers, lakes, estuaries, and oceans. Much of the contaminated sediment in the U.S. was polluted years ago by such chemicals as DDT, PCBs, and mercury, which have since been banned or restricted. These contaminants are now found less frequently in overlying surface water than in the past. However, they can persist for many years in the sediment, where they can cause adverse effects to aquatic organisms and to human health. Some other chemicals released to surface waters from industrial and municipal discharges, and polluted runoff from urban and agricultural areas, continue to accumulate to environmentally harmful levels in sediment.

## **Costs of Sediment Contamination**

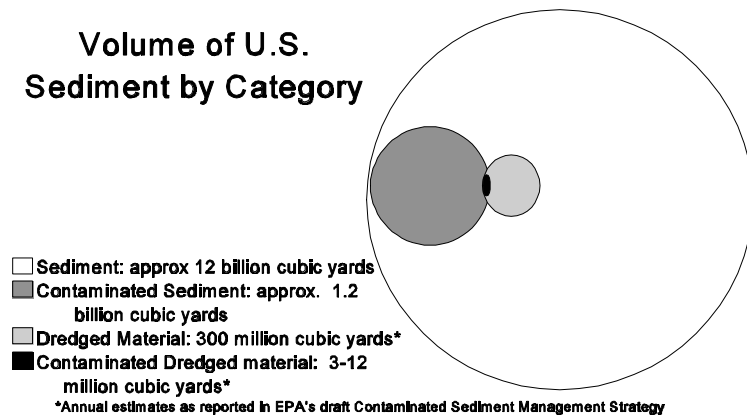
Ecological and human health impairment due to contaminated sediment imposes costs on society. Fish diseases causing tumors and fin rot and loss of species and communities that cannot tolerate sediment contamination can severely damage aquatic ecosystems. Contaminants in sediment can also poison the food chain. Fish and shellfish can become unsafe for human or wildlife consumption. Potential costs to society include lost recreational enjoyment and revenues or, worse, possible long-term adverse health effects such as cancer or children's neurological and IQ impairment if fish consumption warnings are not issued and heeded. The health and ecological risks posed by contaminated sediment dredged from harbors can lead to increased cost of disposal and lost opportunities for beneficial uses, such as habitat restoration.

## **Volume of Contaminated Sediments**

The U.S. Environmental Protection Agency estimates that approximately 10 percent of the sediment underlying our nation's surface water is sufficiently contaminated with toxic pollutants to pose potential risks to fish and to humans and wildlife who eat fish. This represents about 1.2 billion cubic yards of contaminated sediment out of the approximately 12 billion cubic yards of total surface sediments (upper five centimeters) where many bottom dwelling organisms live, and where the primary exchange processes between the sediment and overlying surface water occur. Approximately 300 million

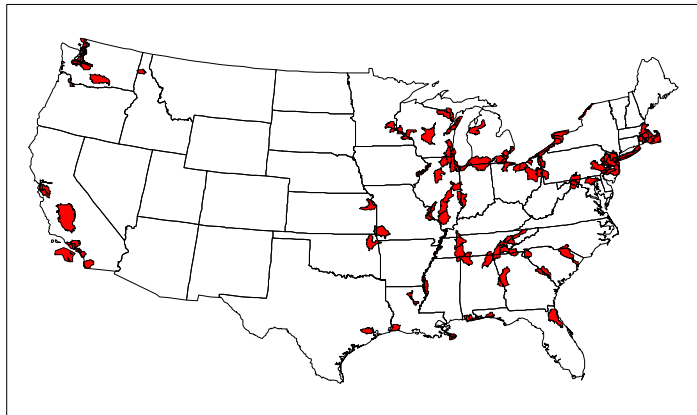
cubic yards of sediments are dredged from harbors and shipping channels annually to maintain commerce, and about 3-12 million cubic yards of those are sufficiently contaminated to require special handling and disposal. These amounts are graphically illustrated in the diagram below.

### Volume of U.S. Sediment by Category



### Where is contaminated sediment a potential concern?

EPA has studied data from 1,372 of the 2,111 watersheds in the continental U.S. Of these, EPA has identified 96 watersheds that contain “areas of probable concern” where potential adverse effects of sediment contamination are more likely to be found. These areas, identified in the figure below, are on the Atlantic, Gulf, Great Lakes, and Pacific coasts, as well as in inland waterways, in regions affected by urban and agricultural runoff, municipal and industrial waste discharges, and other pollution sources. Some of these areas have been studied extensively, and now have appropriate management actions in place. However, others may require further evaluation to confirm that environmental effects are occurring.



## **EPA's Contaminated Sediment Goals**

EPA's Contaminated Sediment Management Strategy establishes four goals to manage the problem of contaminated sediment, and describes actions the Agency intends to take to accomplish those goals. The four goals are:

- 1. Prevent the volume of contaminated sediment from increasing.** To accomplish this, EPA will employ its pollution prevention and source control programs. Both the pesticides and toxic substances programs will use new and existing chemical registration programs to reduce the potential for release of sediment contaminants to surface waters. The water program will work with States and Tribes to identify waterbodies with contaminated sediment as impaired and target them for Total Maximum Daily Load evaluations. EPA will also work with the States and Tribes to enhance the implementation of point and nonpoint source controls in these watersheds.
- 2. Reduce the volume of existing contaminated sediment.** EPA will consider a range of risk management alternatives to reduce the volume and effects of existing contaminated sediment, including in-situ containment and contaminated sediment removal. In some cases, risk managers may select a combination of practicable alternatives as the remedy. Where natural attenuation is part of the selected alternative, EPA will accelerate pollution prevention and source control efforts, where appropriate, to ensure that clean sediments will bury contaminated ones within an acceptable recovery period. During the recovery period, EPA will work with the States to improve human health protection by establishing and maintaining appropriate fish consumption advisories. In all cases, environmental monitoring will be conducted to ensure that risk management goals are achieved.
- 3. Ensure that sediment dredging and dredged material disposal are managed in an environmentally sound manner.** EPA carefully evaluates the potential environmental effects of proposed dredged material disposal. In addition, EPA is initiating a national stakeholder review process to help the Agency review the ocean disposal testing requirements and ensure that any future revisions reflect both sound policy and sound science. EPA and the Army Corps of Engineers also will provide appropriate guidance to further encourage and promote beneficial uses of dredged material.



**4. Develop scientifically sound sediment management tools for use in pollution prevention, source control, remediation, and dredged material management.** Such tools include national inventories of sediment quality and environmental releases of contaminants, numerical assessment guidelines to evaluate contaminant concentrations, and standardized bioassay tests to evaluate the bioaccumulation and toxicity potential of specific sediment samples.

Working with States and Tribes through existing statutory authorities, EPA can identify impaired waterbodies and watersheds at risk from contaminated sediment, implement appropriate actions to accomplish the goals described above, and monitor the effectiveness of actions taken to accomplish the Agency's goals.

# **The Incidence And Severity Of Sediment Contamination In Surface Waters Of The United States:**

## **Volume 1: National Sediment Quality Survey**

September 1997

Office of Science and Technology  
United States Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460

**T**he *National Sediment Quality Survey* is a screening-level assessment of sediment quality that compiles and evaluates sediment chemistry data and related biological data taken from existing databases. The data and information contained in this document could be used in various EPA regulatory programs for priority setting or other purposes after further evaluation for program-specific criteria. However, this document has no immediate or direct regulatory consequence. It does not in itself establish any legally binding requirements, establish or affect legal rights or obligations, or represent a determination of any party's liability.

# Contents

	<i>Page</i>
<b>Tables .....</b>	<b>v</b>
<b>Figures .....</b>	<b>ix</b>
<b>Acknowledgments .....</b>	<b>xiii</b>
<b>Executive Summary .....</b>	<b>xv</b>
 <b>1 Introduction .....</b>	 <b>1-1</b>
What Is the National Sediment Quality Survey? .....	1-1
Why Is Contaminated Sediment an Important National Issue? .....	1-2
How Significant is the Problem? .....	1-3
What Are the Potential Sources of Sediment Contamination? .....	1-4
 <b>2 Methodology .....</b>	 <b>2-1</b>
Background .....	2-2
Description of NSI Data .....	2-3
NSI Data Evaluation Approach .....	2-4
Sediment Chemistry Data .....	2-12
Tissue Residue Data .....	2-15
Toxicity Data .....	2-15
Incorporation of Regional Comments on the Preliminary Evaluation of Sediment Chemistry Data .....	2-16
Evaluation Using EPA Wildlife Criteria .....	2-16
 <b>3 Findings .....</b>	 <b>3-1</b>
National Assessment .....	3-1
Watershed Analysis .....	3-12
Wildlife Assessment .....	3-17
Regional and State Assessment .....	3-17
EPA Region 1 .....	3-22
EPA Region 2 .....	3-27
EPA Region 3 .....	3-32
EPA Region 4 .....	3-37
EPA Region 5 .....	3-43
EPA Region 6 .....	3-49
EPA Region 7 .....	3-54
EPA Region 8 .....	3-59
EPA Region 9 .....	3-63
EPA Region 10 .....	3-68
Potentially Highly Contaminated Sites Not Identified by the NSI Evaluation .....	3-73

## Contents (continued)

<b>4</b>	<b>Pollutant Sources .....</b>	<b>4-1</b>
	Extent of Sediment Contamination by Chemical Class .....	4-2
	Major Sediment Contaminant Source Categories .....	4-3
	Land Use Patterns and Sediment Contamination .....	4-8
	EPA's Point and Nonpoint Source Sediment Contaminant Inventories .....	4-14
<b>5</b>	<b>Conclusions and Discussion .....</b>	<b>5-1</b>
	Extent of Sediment Contamination .....	5-2
	Sources of Sediment Contamination .....	5-4
	Comparison of NSI Evaluation Results to Results of Previous Sediment Contamination Studies .....	5-4
	Comparison of NSI Evaluation Results to Fish Consumption Advisories .....	5-5
	Sensitivity of Selected PCB Evaluation Parameters .....	5-7
	Strengths of the NSI Data Evaluation .....	5-8
	Limitations of the NSI Data Evaluation .....	5-10
	Limitations of Data .....	5-10
	Limitations of Approach .....	5-12
<b>6</b>	<b>Recommendations .....</b>	<b>6-1</b>
	Recommendation 1: Further Investigate Conditions in the 96 Targeted Watersheds ..	6-1
	Recommendation 2: Coordinate Efforts to Address Sediment Quality Through Watershed Management Programs .....	6-2
	Recommendation 3: Incorporate a Weight-of-Evidence Approach and Measures of Chemical Bioavailability into Sediment Monitoring Programs .....	6-2
	Recommendation 4: Evaluate the NSI's Coverage and Capabilities and Provide Better Access to Information in the NSI .....	6-3
	Recommendation 5: Develop Better Monitoring and Assessment Tools .....	6-4
	<b>Glossary .....</b>	<b>Glossary-1</b>
	<b>Acronyms .....</b>	<b>Acronyms-1</b>
	<b>References .....</b>	<b>References-1</b>
	<b>Appendices</b>	
	A. Detailed Description of NSI Data .....	A-1
	B. Description of Evaluation Parameters Used in the NSI Data Evaluation .....	B-1
	C. Method for Selecting Biota-Sediment Accumulation Factors and Percent Lipids in Fish Tissue Used for Deriving Theoretical Bioaccumulation Potentials .....	C-1
	D. Screening Values for Chemicals Evaluated .....	D-1
	E. Cancer Slope Factors and Noncancer Reference Doses Used to Develop EPA Risk Levels .....	E-1
	F. Species Characteristics Related to NSI Bioaccumulation Data .....	F-1
	G. Notes on the Methodology for Evaluating Sediment Toxicity Tests .....	G-1
	H. Additional Analyses for PCBs and Mercury .....	H-1
	I. NSI Data Evaluation Approach Recommended at the National Sediment Inventory Workshop, April 26-27, 1994 .....	I-1

## Tables

<i>Table</i>	<i>Page</i>
<b>2-1</b> Number of Stations Evaluated in the NSI by State .....	2-5
<b>2-2</b> NSI Data Evaluation Approach .....	2-9
<b>3-1</b> National Assessment: Evalutaion of Results for Sampling Stations and River Reaches by EPA Region .....	3-3
<b>3-2</b> Chemicals or Chemical Groups Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-7
<b>3-3</b> Number of Sampling Stations Classified as Tier 1 and Tier 2 Based on Each Component of the Evaluation Approach .....	3-11
<b>3-4</b> USGS Cataloging Unit Numbers and Names for Watersheds Containing APCs .....	3-14
<b>3-5</b> River Reaches With 10 or More Tier 1 Sampling Stations Located in Watershed Containing APCs .....	3-17
<b>3-6</b> Increased Number of Sampling Stations Classified as Tier 1 and Tier 2 by Including Wildlife Criteria in the National Assessment .....	3-20
<b>3-7</b> Region 1: Evaluation Results for Sampling Stations and River Reaches by State .....	3-23
<b>3-8</b> Region 1: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-25
<b>3-9</b> Region 1: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-25
<b>3-10</b> Region 1: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-26
<b>3-11</b> Region 2: Evaluation Results for Sampling Stations and River Reaches by State .....	3-28
<b>3-12</b> Region 2: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-30
<b>3-13</b> Region 2: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-30
<b>3-14</b> Region 2: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-31
<b>3-15</b> Region 3: Evaluation Results for Sampling Stations and River Reaches by State .....	3-33
<b>3-16</b> Region 3: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-35
<b>3-17</b> Region 3: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-35

## Tables (continued)

<b>3-18</b>	Region 3: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-36
<b>3-19</b>	Region 4: Evaluation Results for Sampling Stations and River Reaches by State .....	3-38
<b>3-20</b>	Region 4: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-40
<b>3-21</b>	Region 4: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-41
<b>3-22</b>	Region 4: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-42
<b>3-23</b>	Region 5: Evaluation Results for Sampling Stations and River Reaches by State .....	3-44
<b>3-24</b>	Region 5: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-46
<b>3-25</b>	Region 5: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-47
<b>3-26</b>	Region 5: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-48
<b>3-27</b>	Region 6: Evaluation Results for Sampling Stations and River Reaches by State .....	3-50
<b>3-28</b>	Region 6: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-52
<b>3-29</b>	Region 6: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-52
<b>3-30</b>	Region 6: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-53
<b>3-31</b>	Region 7: Evaluation Results for Sampling Stations and River Reaches by State .....	3-55
<b>3-32</b>	Region 7: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-57
<b>3-33</b>	Region 7: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-57
<b>3-34</b>	Region 7: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-58
<b>3-35</b>	Region 8: Evaluation Results for Sampling Stations and River Reaches by State .....	3-60
<b>3-36</b>	Region 8: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-62

## Tables (continued)

<b>3-37</b>	Region 9: Evaluation Results for Sampling Stations and River Reaches by State .....	3-64
<b>3-38</b>	Region 9: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-66
<b>3-39</b>	Region 9: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-66
<b>3-40</b>	Region 9: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-67
<b>3-41</b>	Region 10: Evaluation Results for Sampling Stations and River Reaches by State .....	3-69
<b>3-42</b>	Region 10: Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-71
<b>3-43</b>	Region 10: Water Bodies With Sampling Stations Classified as Tier 1 Located in Watersheds Containing APCs .....	3-71
<b>3-44</b>	Region 10: Chemicals Most Often Associated With Tier 1 or Tier 2 Sampling Station Classifications .....	3-72
<b>3-45</b>	Potentially Highly Contaminated Sites Not Identified in the NSI Evaluation .....	3-73
<b>4-1</b>	Correlations of Sources to Chemical Classes of Sediment Contaminants .....	4-4
<b>4-2</b>	Tier 1 and Tier 2 Station Classification by Chemical Class and Land Uses in Watersheds Containing APCs .....	4-9
<b>4-3</b>	Comparison of Percent Agricultural Land Use in Watersheds Containing APCs to Percent of Tier 1 and Tier 2 Stations by Chemical Class .....	4-13
<b>4-4</b>	Comparison of Percent Urban Land Use in Watersheds Containing APCs to Percent of Tier 1 and Tier 2 Stations by Chemical Class .....	4-14
<b>5-1</b>	Comparison of Contaminants Most Often Associated With Fish Consumption Advisories and Those Which Most Often Cause Stations To Be Placed in Tier 1 or Tier 2 Based on the NSI Data Evaluation .....	5-5
<b>5-2</b>	National Sediment Inventory Database: Summary of QA/QC Information .....	5-11



## Figures

<i>Figure</i>	<i>Page</i>
<b>2-1</b> NSI Sediment Sampling Stations Evaluated .....	2-6
<b>2-2</b> NSI Tissue Residue Sampling Stations Evaluated .....	2-7
<b>2-3</b> NSI Toxicity Test Stations Evaluated .....	2-8
<b>2-4</b> Aquatic Life Assessments: Sediment Chemistry Analysis for Organic Chemicals and Metals Not Included in the AVS Analysis .....	2-9
<b>2-5</b> Aquatic Life Assessments: Sediment Chemistry Analysis for Divalent Metals .....	2-10
<b>2-6</b> Aquatic Life Assessments: Sediment Toxicity Analysis .....	2-10
<b>2-7</b> Human Health Assessments: Sediment Chemistry and Fish Tissue Residue Analysis (excluding dioxins and PCBs) .....	2-11
<b>2-8</b> Human Health Assessments: PCBs and Dioxin in Fish Tissue Analysis .....	2-11
<b>3-1</b> Location of All NSI Sampling Stations .....	3-2
<b>3-2</b> Sampling Stations Classified as Tier 1 (Associated Adverse Effects Probable) .....	3-4
<b>3-3</b> National Assessment: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-5
<b>3-4</b> National Assessment: Percent of NSI Measurements That Indicate Potential Risk .....	3-6
<b>3-5</b> Sampling Stations Classified as Tier 1 or Tier 2 for Potential Risk to Aquatic Life ..	3-9
<b>3-6</b> Sampling Stations Classified as Tier 1 or Tier 2 for Potential Risk to Human Health .....	3-10
<b>3-7</b> Watersheds Identified as Containing APCs .....	3-13
<b>3-8</b> National Assessment: Watershed Classifications .....	3-16
<b>3-9</b> Sampling Stations Classified as Tier 1 or Tier 2 Based on Wildlife Criteria .....	3-19
<b>3-10</b> Region 1: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-22
<b>3-11</b> Region 1: Watershed Classifications .....	3-22
<b>3-12</b> Region 1: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-24
<b>3-13</b> Region 2: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-27
<b>3-14</b> Region 2: Watershed Classifications .....	3-27
<b>3-15</b> Region 2: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination ...	3-29
<b>3-16</b> Region 2: Percent of River Reaches That Include Tier 1, and Tier 3 Sampling Stations .....	3-32

**Figures (continued)**

<b>3-17</b>	Region 3: Watershed Classifications .....	3-32
<b>3-18</b>	Region 3: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-34
<b>3-19</b>	Region 4: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-37
<b>3-20</b>	Region 4: Watershed Classifications .....	3-37
<b>3-21</b>	Region 4: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-39
<b>3-22</b>	Region 5: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-43
<b>3-23</b>	Region 5: Watershed Classifications .....	3-43
<b>3-24</b>	Region 5: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-45
<b>3-25</b>	Region 6: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-49
<b>3-26</b>	Region 6: Watershed Classifications .....	3-49
<b>3-27</b>	Region 6: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-51
<b>3-28</b>	Region 7: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-54
<b>3-29</b>	Region 7: Watershed Classifications .....	3-54
<b>3-30</b>	Region 7: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-56
<b>3-31</b>	Region 8: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-59
<b>3-32</b>	Region 8: Watershed Classifications .....	3-59
<b>3-33</b>	Region 8: Location of Sampling Stations Classified as Tier 1 or Tier 2 .....	3-61
<b>3-34</b>	Region 9: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-63
<b>3-35</b>	Region 9: Watershed Classifications .....	3-63
<b>3-36</b>	Region 9: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-65
<b>3-37</b>	Region 10: Percent of River Reaches That Include Tier 1, Tier 2, and Tier 3 Sampling Stations .....	3-68

**Figures (continued)**

<b>3-38</b>	Region 10: Watershed Classifications .....	3-68
<b>3-39</b>	Region 10: Location of Sampling Stations Classified as Tier 1 or Tier 2 and Watersheds Containing Areas of Probable Concern for Sediment Contamination .....	3-70
<b>3-40</b>	Location of Potentially Highly Contaminated Water Bodies Not Identified in the NSI Evaluation .....	3-74
<b>4-1</b>	Average Percent Contamination in Watersheds Containing APCs by Chemical Class .....	4-3
<b>4-2</b>	Percent Tier 1 and Tier 2 Stations vs. Agricultural Land Use in APCs .....	4-13
<b>4-3</b>	Percent Tier 1 and Tier 2 Stations vs. Total Urban Land Use in APCs .....	4-14
<b>5-1</b>	Tier 1 and Tier 2 Sampling Stations for Potential Risk to Human Health Located Within Water Bodies With Fish Consumption Advisories in Place for the Same Chemical Responsible for the Tier 1 or Tier 2 Classification .....	5-6
<b>5-2</b>	Sampling Stations Classified as Tier 1 or Tier 2 for Potential Risk to Human Health Excluding PCBs .....	5-9