Executive Summary

During the past two decades, the U.S. Environmental Protection Agency (EPA) has focused its water pollution control efforts on protecting water quality within the water column. This has been accomplished primarily by controlling municipal and industrial point sources. More recently, EPA has begun to direct its efforts toward identifying and controlling other threats to the aquatic environment, including the accumulation of toxic chemicals in sediment. EPA's Office of Science and Technology (OST) has led the Agency's efforts to compile and analyze data for the National Sediment Contaminant Point Source Inventory. The screening-level sediment hazard analysis developed for and applied to this study cannot be used alone to predict sediment contamination or to indicate where contaminated sediment problems have occurred or who is responsible. The major objectives of the inventory and the analysis presented in this report are as follows:

- Generate a relative ranking of chemicals and industrial categories based on 1993 Toxic Release Inventory (TRI) and 1994 Permit Compliance System (PCS) chemical release data.

- Prioritize watersheds for collection of additional information that might lead to the identification of additional monitoring needs or pollution prevention opportunities.

- Establish a baseline to which additional or future inventories can be compared.

The inventory includes more than 25,500 individual TRI and PCS records of point source pollutant releases of 111 different chemicals. Approximately 1,020 individual watersheds and 31 distinct industrial categories are represented. In general, areas that are population centers and are associated with industrial activity receive the greatest amount of potential sediment contaminants from point sources. Direct releases of potential sediment contaminants from 4,869 facilities in PCS totaled nearly 19 million lb/yr in 1994. From 1993 TRI data, direct releases and transfers to POTWs of potential sediment contaminants from 3,432 manufacturing facilities totaled 7.3 million lb/yr. The inventory is limited by the quality, quantity, coverage, and bias of the release data in TRI and PCS.

EPA developed and employed a screening-level hazard analysis procedure to achieve the objectives of this study. The HAZREL (short for hazard analysis of releases) score is a unitless index of the magnitude of potential sediment contamination based on chemical/facility-specific releases, physical and chemical properties, and potential environmental risk. The hazard analysis is limited by the lack of consideration of site-specific information, the lack of pollutant transport analysis, and the uncertainty associated with the components of the chemical-specific sediment hazard scores. For these reasons, the results of the hazard assessment should be used for screening purposes only, not as a definitive judgment regarding the most significant sediment contaminants, the most affected watersheds, or the most important industrial categories.

This analysis indicates that metals and organic chemicals other than pesticides, PAHs, and PCBs constitute the most widespread potential sediment hazard from point sources. Although important in some instances, releases of PAHs, pesticides, and PCBs appear to be less prevalent. The hazard analysis relies on correlative, statistically based threshold values to evaluate the potential adverse effects of metals in sediment. Although these correlative thresholds are useful, they are limited in their application because they do not directly address the bioavailability of metals in sediment. This report further emphasizes the need for the development of practical assessment tools to evaluate the bioavailability and toxicity of metals in sediment.

The data analysis based on release data from TRI and PCS indicates that certain industrial categories have a high potential for contributing to sediment contamination. Sewerage systems, with nearly 2,000 facilities in PCS, represent more than one-half of the total HAZREL score of all the data analyzed in PCS and TRI together. Sixty-one percent of the HAZREL score for sewerage systems is from the five divalent metals. The Metal Products and Finishing, Primary Metal Industries, and Industrial Organic Chemicals categories were ranked in the top five industrial categories in terms of HAZREL score for both PCS and TRI. Other industrial categories ranked in the top five for either TRI or PCS include Public Utilities (other than sewerage systems), Petroleum Refining, and Other Chemical Products. Although TRI and PCS contain extensive records from most of the large dischargers, these data represent a limited, and somewhat biased, segment of the overall discharger community. Some industrial categories are not well represented in either PCS or TRI. Thus, these results reflect data availability as much as relative sediment hazard potential.

Total HAZREL scores at the watershed level ranged from 0 to 312. Of the 1,020 watersheds evaluated, 17 watersheds were placed in priority group 1 (HAZREL score greater than 80), 19 watersheds were placed in priority group 2 (HAZREL score range 61-80), 29 watersheds were placed in priority group 3 (HAZREL score range 41-60), 87 watersheds were placed in priority group 4 (HAZREL score range 21-40), and 672 watersheds were placed in priority group 5 (HAZREL score range 1-20). One hundred ninety-six watersheds had a HAZREL score of zero and were not assigned to a priority group. Figure ES-1 shows the location of watersheds in priority groups 1, 2 , 3, and 4.

The watersheds identified in this analysis represent areas where sediment contaminants are discharged; they do not necessarily represent locations where sediment contamination has occurred or will occur. As defined by the U.S. Geological Survey 8-digit cataloging unit, watersheds can represent large areas that vary greatly in size, shape, and physical/chemical characteristics encompassing large mainstem rivers and small tributary streams. Transport, sediment partitioning, and sediment accumulation—whether in locations very close to the point of discharge or far downstream—depend on many factors, including streamflow, stream velocity, geomorphology, particle size distribution, organic carbon content, suspended sediment load, temperature, pH, and salinity. However, comparison with existing sediment monitoring data provides further means of screening watersheds where point sources are more likely to contribute to contamination.

The general relationship between annual point source releases and results reported in EPA's *National Sediment Quality Survey* (USEPA, 1996b) demonstrates a co-occurrence of active discharge of sediment contaminants and evidence of sediment contamination. A watershed with a high HAZREL score is more likely to contain one of the 96 areas of widespread potential sediment contamination (APCs) in the *National Sediment Quality Survey*. For priority

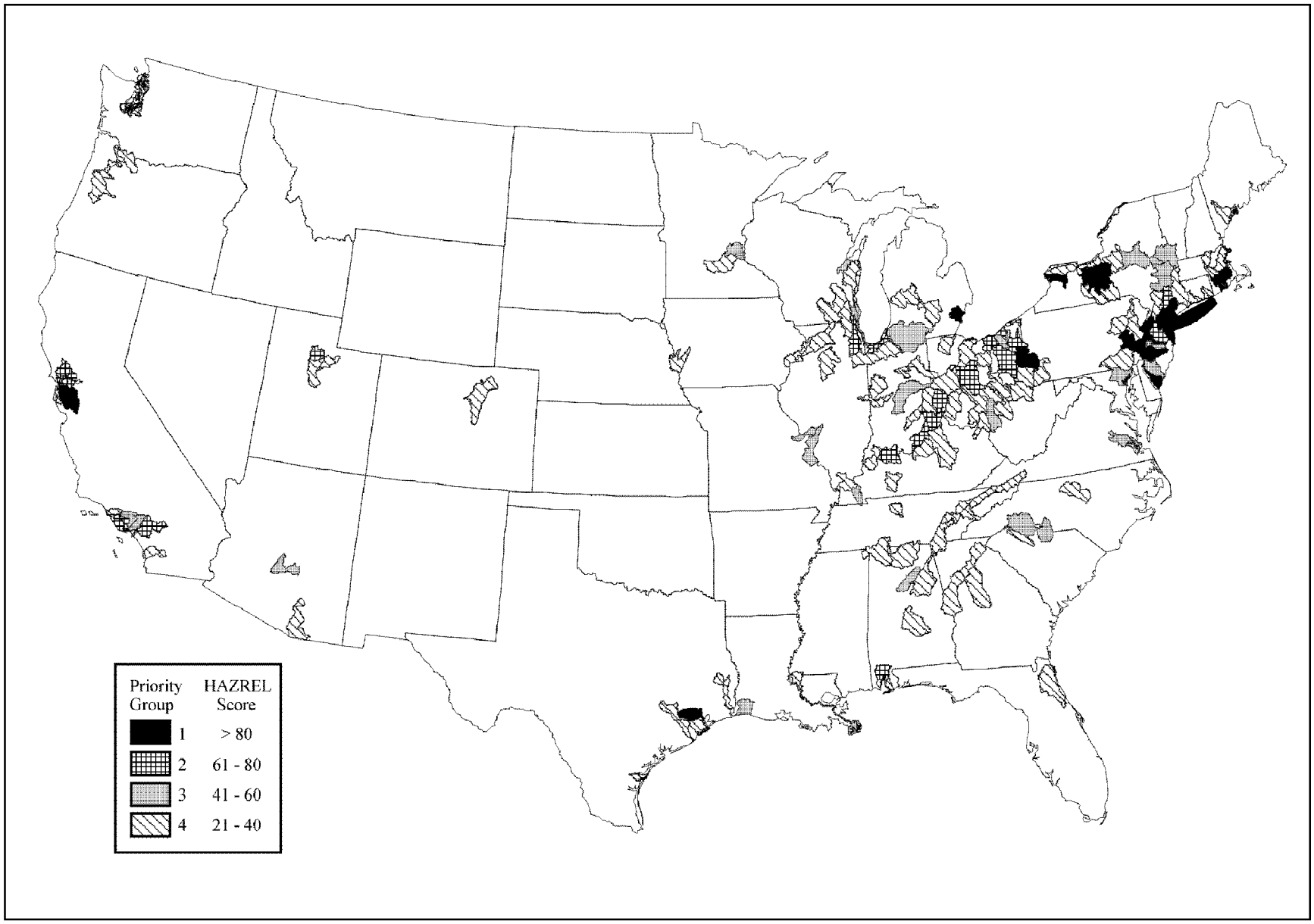

Figure ES-1. HAZREL score by watershed.

group 1, 75 percent of the watersheds contain APCs. For priority groups 2 and 3, 37 and 35 percent of the watersheds contain APCs, respectively. For priority group 4, 21 percent of the watersheds contain APCs. Finally, for priority group 5, 8 percent of the watersheds contain APCs. Less than 1 percent of the watersheds with a zero HAZREL score contain APCs.

While this analysis does not imply that point sources caused the in-place contamination, it emphasizes the potential significance of contaminant releases in areas already contaminated. There are many sources of sediment contaminants in watersheds, both active and historical, point and nonpoint. This assessment identifies specific watersheds where active point sources might play an important role. To promote natural recovery of contaminated areas, active dischargers must be adequately controlled to ensure that their releases do not perpetuate contamination problems.

The EPA report *Environmental Goals for America With Milestones for 2005* (USEPA, 1996a) proposes that the Agency, together with its state partners, adequately control point sources of contamination over the next 10 years in 10 percent of the watersheds where sediment contamination is widespread. Specifically, major facility discharge limits need to be evaluated and appropriately revised in watersheds at greatest risk from active discharges. The objective of these evaluations should be to determine whether existing technology-based controls or water quality-based discharge limits protect downstream sediment quality to the degree necessary for natural recovery of contaminated sites. EPA is currently developing the methodology to relate point source contributions to sediment contaminant concentrations. This methodology is needed before developing permit limits protective of sediment quality. This report identifies 29 watersheds that are both contain APCs based on the *National Sediment Quality Survey* and are in HAZREL priority group 1, 2, or 3 based on this analysis. These watersheds should be considered for further evaluation and necessary action to achieve the milestone in EPA's Goals Report.