Coastal and Estuarine

Hazardous Waste Site Reports

Editors
J. Gardiner[1], B. Azzato[2], M. Jacobi[1]

[1]NOAA/OR&R/Coastal Protection and Restoration Division
[2]Azzato Communications

Authors
M. Hilgart, S. Duncan

Ridolfi Engineers Inc.

NOAA
National Oceanic and Atmospheric Administration

NOS
NOAA's Ocean Service

OR&R
Office of Response and Restoration

CPRD
Coastal Protection and Restoration Division
7600 Sand Point Way NE
Seattle, Washington 98115

August 2005

Coastal and Estuarine

Hazardous Waste Site Reports

Reviewers

K. Finkelstein[1], M. Geddes[2], M. Gielazyn[1],
S. Hahn[1], R. Gouguet[1], R. Mehran[1], L. Rosman[1], M. Steinhoff[1]

[1]NOAA/OR&R/Coastal Protection and Restoration Division
[2]Genwest Systems

Graphics

K. Galimanis[3], Scott Corwin[4]

[3]4 Point Design
[4]Ridolfi Engineers Inc.

NOAA

National Oceanic and Atmospheric Administration

NOS

NOAA's Ocean Service

OR&R

Office of Response and Restoration

CPRD

Coastal Protection and Restoration Division
7600 Sand Point Way NE
Seattle, Washington 98115

August 2005

PLEASE CITE AS:

J. Gardiner, B. Azzato and M. Jacobi, editors. 2005. Coastal and Estuarine Hazardous Waste Site Reports, August 2005. Seattle: Coastal Protection and Restoration Division, Office of Response and Restoration, National Oceanic and Atmospheric Administration. 130 pp.

Contents

Acronyms and abbreviations

AST	Above-ground Storage Tank
AWQC	Ambient water quality criteria for the protection of aquatic life
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BHC	benzene hexachloride
BNA	base, neutral, and acid-extractable organic compounds
BOD	biological oxygen demand
BSL	brine sludge lagoon
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
cfs	cubic feet per second
cm	centimeter
COC	contaminant of concern
COD	chemical oxygen demand
COE	U.S. Army Corps of Engineers
CRC	Coastal Resource Coordinator
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DNAPL	dense non-aqueous phase liquid
DNT	dinitrotoluene
DOD	U.S. Department of Defense
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
ERL	Effects Range - Low
ERM	Effects Range - Median
ft	foot
ha	hectare
HMX	cyclotetramethylene tetranitramine
HRS	Hazard Ranking System
HUC	Hydrologic Unit Code
kg	kilogram
km	kilometer
L	liter
LNAPL	light, non-aqueous phase liquid
LOEL	lowest observed effects level
m	meter
mi	mile
m^3/second	cubic meter per second
µg/g	micrograms per gram (ppm)
µg/kg	micrograms per kilogram (ppb)
µg/L	micrograms per liter (ppb)
µR/hr	microroentgens per hour
MEK	methyl ethyl ketone a.k.a. 2-Butanone
mg	milligram
mg/kg	milligrams per kilogram (ppm)
mg/L	milligrams per liter (ppm)
mR/hr	milliroentgens per hour
NAPL	non-aqueous phase liquid
NFA	no further action
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	operable unit
PAH	polycyclic (or polynuclear) aromatic hydrocarbon
PA/SI	Preliminary Assessment/Site Investigation
PCB	polychlorinated biphenyl
PCE	perchloroethylene (aka tetrachloroethylene)
pCi/g	picocuries per gram
PCP	pentachlorophenol
PNRS	Preliminary Natural Resource Survey
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand or parts per trillion
PRP	Potentially Responsible Party

PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RDX	cyclonite
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOC	semi-volatile organic compound
TCA	1,1,1-trichloroethane
TCE	trichloroethylene
TCL	Target Compound List
TNT	trinitrotoluene
TPH	total petroleum hydrocarbons
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
<	less than
>	greater than

Introduction

The National Oceanic and Atmospheric Administration (NOAA) regularly evaluates hazardous waste sites that are proposed for addition to the National Priorities List (NPL), a U.S. Environmental Protection Agency (USEPA) listing of sites that have undergone preliminary assessment and site inspection to determine which locations pose the greatest threat. The NPL is compiled under authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (United States Code, Title 42, Chapter 103). This volume identifies hazardous waste sites that could impact natural resources for which NOAA acts as a federal trustee under the National Oil and Hazardous Substances Pollution Contingency Plan (commonly referred to as the National Contingency Plan or NCP) (Code of Federal Regulations, Title 40, Part 300).

Waste site reports (WSRs) of the type included in this volume often represent NOAA's first examination of a site. Following completion of a WSR, some sites may require a more in-depth assessment called a Preliminary Natural Resource Survey (PNRS). NOAA has published 367 coastal and estuarine hazardous WSRs, 155 PNRS', and three Air Force Reports (see Tables 1 and 2 in the appendix for a complete list).

Not all hazardous waste sites will affect NOAA trust resources; NOAA is concerned about sites located near trustee resources and their habitats in states along the Atlantic and Pacific oceans, the Gulf of Mexico, and the Great Lakes. NOAA works with the USEPA to identify and assess risks to natural resources and to develop strategies to minimize those risks. Trustee responsibilities also include evaluating cleanup alternatives and restoring habitats.

NOAA uses information from this volume to establish priorities for further site investigations. NOAA's regional Coastal Resource Coordinators (CRCs) will follow up on sites that appear to pose ongoing problems. The CRCs work with other agencies and trustees to communicate any concerns to the USEPA. The CRCs also review sampling and monitoring plans for the sites and help to plan and set objectives for site cleanups. This coordinated approach protects all natural resources, not just those for which NOAA is a steward. The USEPA can use the WSRs to help identify the types of information that may be needed to complete environmental assessments of the sites. Other federal and state trustees can use the reports to help evaluate the potential impacts to their resources.

Each WSR contains an executive summary and three distinct sections. The first section, Site Background, describes the site, previous site operations and disposal practices, and pathways by which contaminants could migrate to NOAA trust resources. The second section, NOAA Trust Resources, describes the species, habitats, and commercial and recreational fisheries near the site. The final section, Site-Related Contamination, identifies the contaminants of concern to NOAA and describes contaminant distribution at the site.

In addition to the WSRs, this volume contains a list of acronyms and abbreviations (p. vii) and a glossary of terms (p. 61) that commonly appear throughout the reports. Table 1 in the appendix lists the WSRs that NOAA has published to date, and Table 2 lists all of the sites as of September 2004 at which NOAA has been involved because of their potential to affect trust resources. Table 2 also lists the number and variety of hazardous waste reports that the Coastal Protection and Restoration Division has published since 1984, including PNRS's and Air Force Reports.

Chemical-Specific Screening Guidelines

Most WSRs contain a table that focuses on the contaminants in different media that have potential to degrade natural resources. These site-specific tables highlight only a few of the many contaminants often found at hazardous waste sites. We compare the chemical concentrations reported in the tables against published screening guidelines for surface water, groundwater, soil, and sediment. Because contaminant releases from hazardous waste sites to the environment can span many years, we are concerned about long-term effects to natural resources. This is why we compare site contaminant levels against screening guidelines for chronic effects rather than for short-term effects.

Contaminant levels at each site are compared to site-specific or regional-specific criteria (or guidelines) when available. In the absence of such data, the contaminant levels detected in surface water and groundwater are compared to the ambient water quality criteria (AWQC; USEPA 2002); contaminants detected in sediment are compared to the effects range-low (ERL) values (Long and Morgan (1991) and threshold effects concentrations (TECs; MacDonald et al. 2000a). Only when there is a soil pathway for the migration of contaminants to NOAA trust resources do we examine contaminant levels in soil samples. Chemical concentrations in soil that exceed screening guidelines can indicate a potential source of contamination. Contaminants detected in soil are compared to ecological soil screening levels (USEPA 2005) and values from the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs; Efroymson et al. 1997). Any exceptions to these guidelines are noted in the contaminant table.

There are no national criteria for sediment comparable to the AWQC established for water. In the absence of national criteria, we compare sediment concentrations to several published screening guidelines (Long and Morgan 1991; MacDonald et al. 1996; MacDonald et al. 2000a; MacDonald et al. 2000b). Studies that associate contaminant concentrations in sediment with biological effects provide guidance for evaluating contaminant concentrations that could harm sediment-dwelling aquatic organisms. These studies include Long and MacDonald 1992; Long et al. 1995; MacDonald et al. 1996; Smith et al. 1996; Long et al. 1998; and Kemble et al. 2000. However, screening guidelines are often based on effects from individual chemicals. Their application may be difficult when evaluating biological effects that could be attributed to combined effects from multiple chemicals, unrecognized chemicals, or physical parameters that were not measured.

NOAA's National Status and Trends Program has used chemical and toxicological evidence from a number of modeling, field, and laboratory studies to determine the ranges of chemical concentrations associated with toxic biological effects (Long and Morgan 1991; Long and MacDonald 1992):

- No Effects Range — the range of concentrations over which toxic effects are rarely observed;
- Possible Effects Range — the range of concentrations over which toxic effects are occasionally observed; and
- Probable Effects Range — the range of concentrations over which toxic effects are frequently observed.

Two slightly different methods (Long and Morgan 1991; MacDonald 1993) were used to determine these chemical ranges. Long and Morgan (1991; see also Long et al. 1995) compiled chemical data associated with adverse biological effects. The data were ranked to determine where a chemical concentration was associated with an adverse effect (the ERL)—the lower 10th percentile for the data set in which effects were observed or predicted. Sediment samples were not expected to be toxic when all chemical concentrations were below the ERL values.

MacDonald (1993) modified the approach used by Long and Morgan to include both the "effects" and "no effects" data, whereas Long and Morgan used only the "effects" data. TELs were derived by taking the geometric mean of the 15th percentile of the "effects" data and the 50th percentile of the "no effects" data.

Although different percentiles were used for these two methods, their results closely agree (Kemble et al. 2000). We do not advocate one method over the other, and we use both screening guidelines to help focus cleanup efforts in areas where natural resources may be at risk from site-related contaminants.

References

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed August 2005).

Kemble, N.E., D.G. Hardesty, C.G. Ingersoll, B.T. Johnson, F.J. Dwyer, and D.D. MacDonald. 2000. An evaluation of the toxicity of contaminated sediments from Waukegan Harbor, Illinois, following remediation. Archives of Environmental Contamination and Toxicology 39:452-461.

Long, E.R. and L.G. Morgan. 1991. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52. Seattle: Office of Oceanography and Marine Assessment, National Oceanic and Atmospheric Administration. 175 pp.

Long, E.R. and D.D. MacDonald. 1992. National Status and Trends Program approach [in] sediment classification methods compendium, EPA 823-R-92-006, September 1992. Washington, DC: Office of Water, U.S. Environmental Protection Agency.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environmental Management 19 (1):81-97.

Long, E.R., L.J. Field, and D.D. MacDonald. 1998. Predicting toxicity in marine sediments with numerical sediment quality guidelines. Environmental Toxicology and Chemistry 17(4): 714-727.

MacDonald, D.D. 1993. Development of an approach to the assessment of sediment quality in Florida coastal waters, January 1993. Tallahassee: Florida Department of Environmental Regulation. 133 pp.

MacDonald, D.D., R.S. Carr, F.D. Calder, E.R. Long, and C.G. Ingersoll. 1996. Development and evaluation of sediment quality guidelines for Florida coastal waters. Ecotoxicology 5(4):253-278.

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000a. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Archives of Environmental Contamination and Toxicology 39(1):20-31.

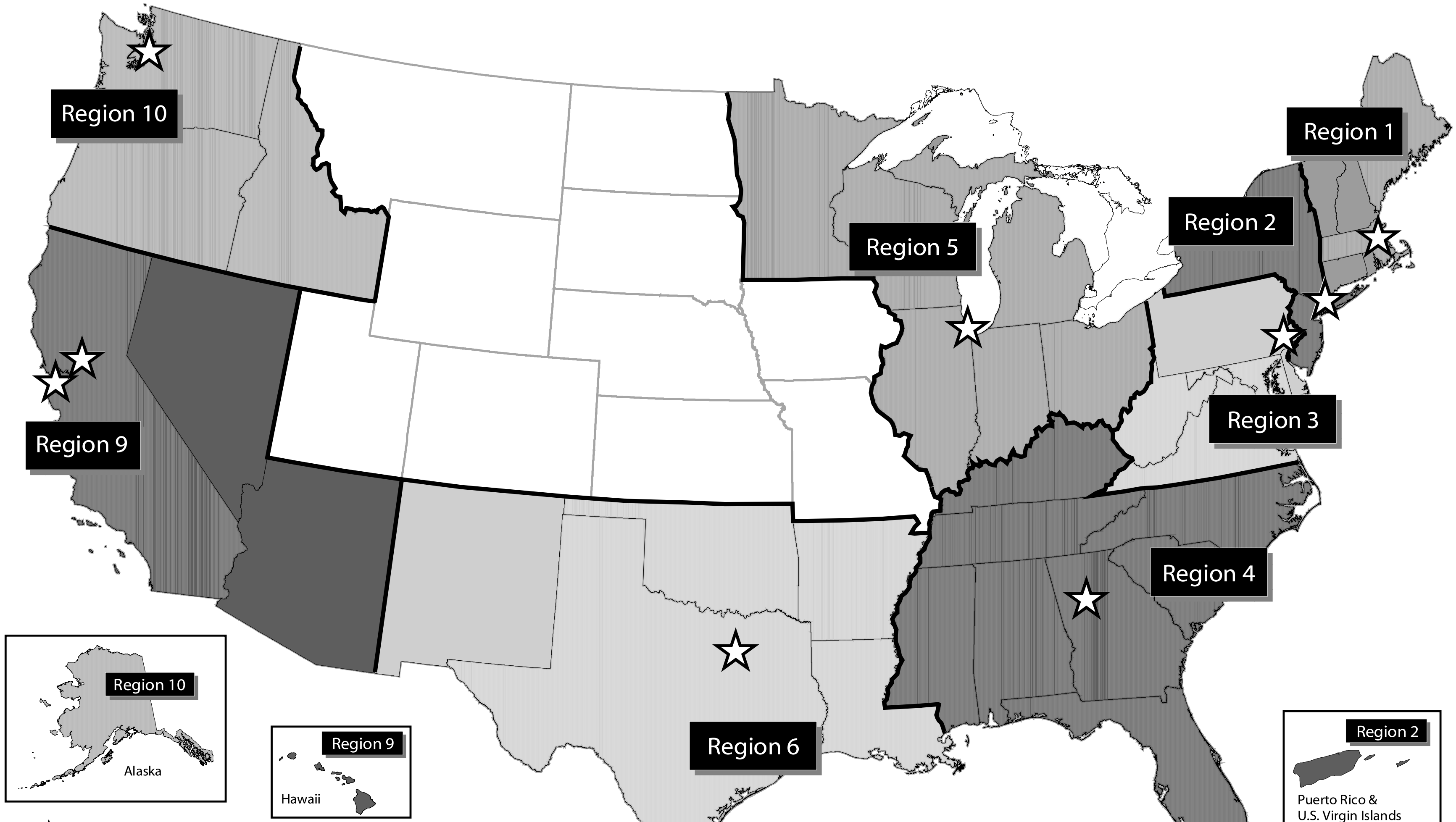
MacDonald, D.D., L.M. DiPinto, J. Field, C.G. Ingersoll, E.R. Long, and R.C. Swartz. 2000b. Development and evaluation of consensus-based sediment effect concentrations for polychlorinated biphenyls. Environmental Toxicology and Chemistry 19(5):1403-1413.

Smith, S.L., D.D. MacDonald, K.A. Keenleyside, C.G. Ingersoll, and L.J. Field. 1996. A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. Journal of Great Lakes Research 22 (3):624-638.

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington, DC: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening guidelines. March 2005. Available: http://www.epa.gov/ecotox/ecossl/ (accessed August 2005).

CPRD Coastal Resource Coordinators in EPA Regions



CPRD CRC Regional Office Locations

Region 1 - Boston
Region 2 - New York
Region 3 - Philadelphia
Region 4 - Atlanta
Region 5 - Chicago
Region 6 - Dallas
Region 9 - San Francisco and Sacramento
Region 10 - Seattle

Centredale Manor Restoration Project

North Providence, Rhode Island

EPA Facility ID: RID981203755

Basin: Narragansett

HUC: 01090004

Executive Summary

The Centredale Manor Restoration Project (Centredale Manor) site is in North Providence, Rhode Island. The site encompasses the Centredale Manor property and contaminated sediment downstream of the property. Past industrial operations at the Centredale Manor property include textile manufacturing, chemical manufacturing, and drum recycling. Soil, sediment, and surface water at the site are contaminated with dioxins, PCBs, PAHs, pesticides, and metals. The primary contaminants of concern at the Centredale Manor site are dioxins. The habitat of concern to NOAA is the Woonasquatucket River, where American eel are found adjacent to the Centredale Manor property. Surface water runoff and periodic flooding of the Woonasquatucket River are the primary pathways for contaminant migration from the Centredale Manor property to NOAA trust resources.

Site Background

The Centredale Manor Restoration Project (Centredale Manor) site is on the east bank of the Woonasquatucket River in North Providence, Rhode Island (Figure 1). The site encompasses both the Centredale Manor property itself and contaminated sediment in the Woonasquatucket River downstream of the property. The Centredale Manor property is approximately 3.6 ha (9 acres) in area. The property boundary could not be determined from the documents reviewed for this report. Contaminated sediment from the Woonasquatucket River that is associated with the Centredale Manor property has been documented in Allendale Pond and Lymansville Mill Pond (Figure 1) (Batelle 2003a).

From approximately 1921 to 1940, textiles were manufactured at the Centredale Manor property. Between 1943 and 1971, a chemical manufacturing facility and a drum recycling facility operated at the property. Chemical manufacturing records indicated that hexachlorophene was manufactured on the property and trichlorophenols were shipped to the property. In the early 1970s, a large fire destroyed most of the structures at the site. The only structures currently on the property are the Centredale Manor Apartments and the Brook Village Apartments, which were constructed after the fire. During excavation for construction of the apartment buildings, approximately 400 drums were removed from the property. Drums labels indicated that they might have contained halogenated solvents, polychlorinated biphenyls (PCBs), and inks (Tetra Tech 1999). No further details regarding past activities at the property were available for review at the time of this report.

Allendale Dam, which is on the Woonasquatucket River approximately 457 m (1,500 ft) downstream of the Centredale Manor property, creates Allendale Pond (Figures 1 and 2). In 1991, the Allendale Dam was breached as a result of poor maintenance and its age. The breach in the dam allowed contaminated sediment associated with the Centredale Manor property to migrate downstream into Lymansville Mill Pond (Figure 1).

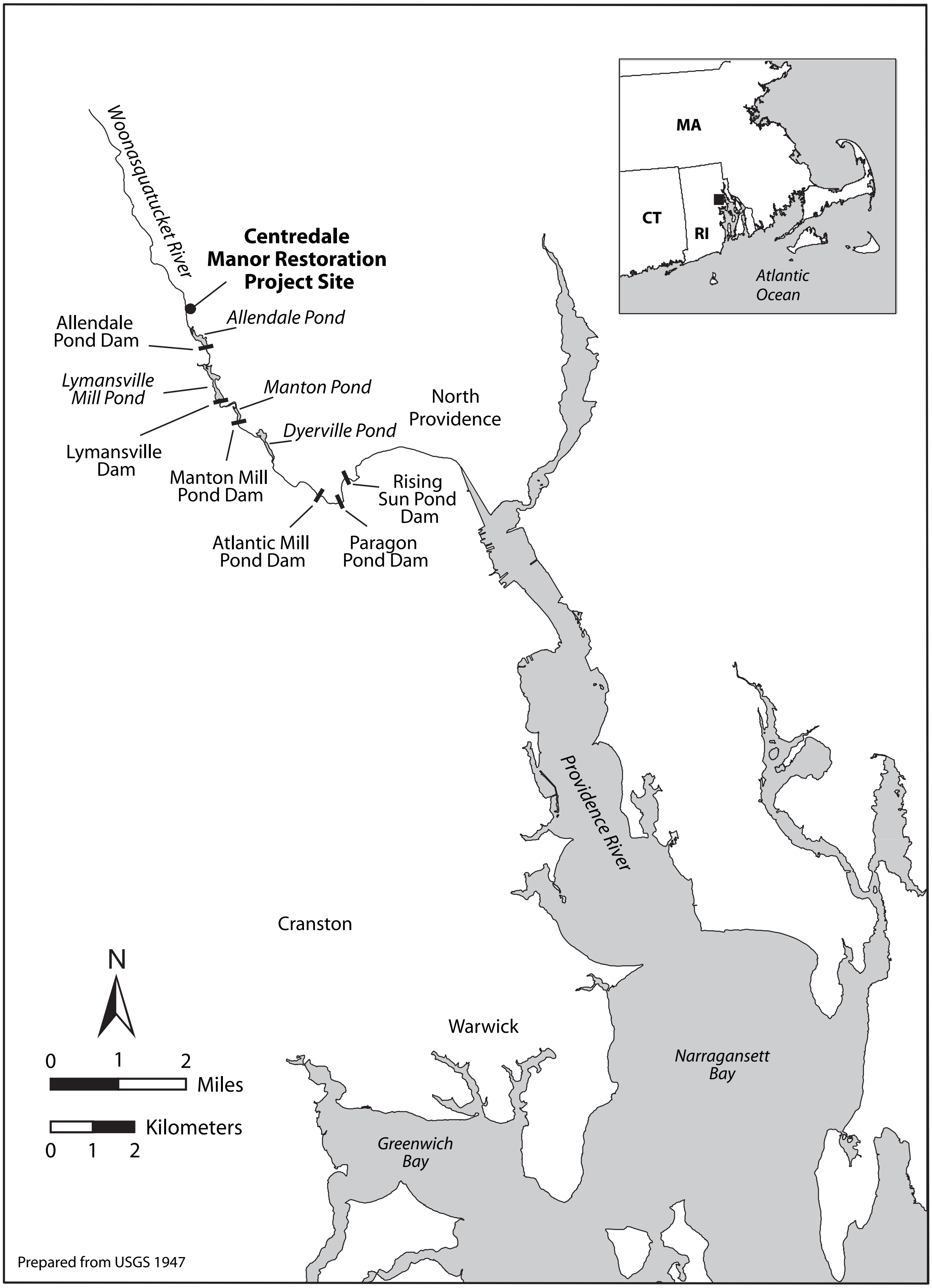


Figure 1. Location of the Centredale Manor Restoration Project site, North Providence, Rhode Island.

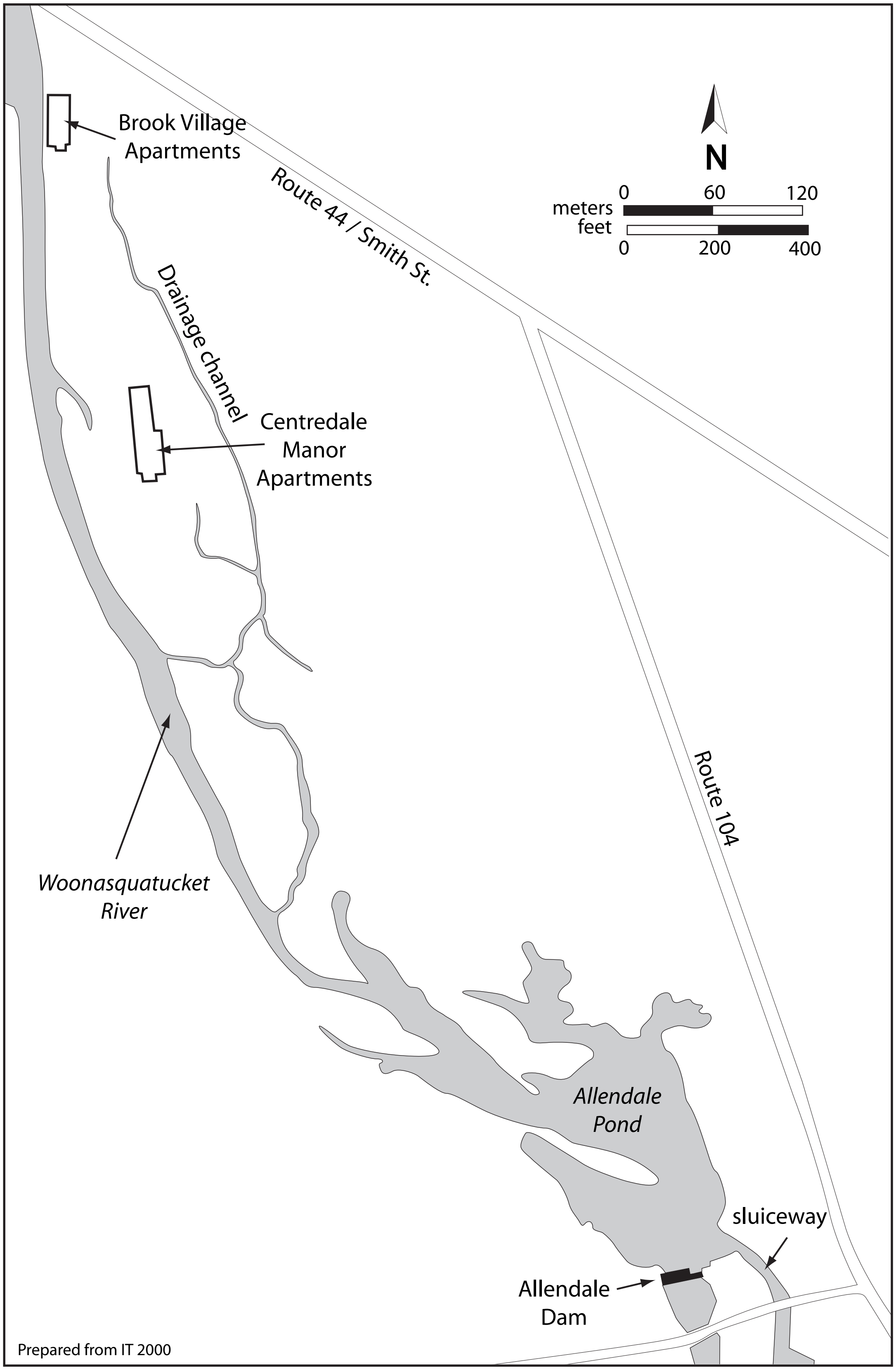


Figure 2. Detail of the Centredale Manor property.

Several investigations have been conducted to determine the extent of contamination at the site. The U.S. Environmental Protection Agency's (USEPA) collected surface soil samples from the site in February 1999 (Lockheed Martin 1999). Additional sediment and soil samples were collected as part of an expanded site inspection by the USEPA, which was completed in March 1999. In 1999, the USEPA also initiated a remedial investigation (RI). The RI is still in progress; activities completed by the time of this report include restoration of the Allendale Dam, removal of contaminated soil from residential and recreational areas in the floodplain of the Woonasquatucket River, and capping of contaminated soil at the Centredale Manor property (USEPA 2005a). A contractor working on behalf of the U.S. Army Corps of Engineers has completed draft human health and ecological risk assessments for the Centredale Manor site (Batelle 2003a). The USEPA placed the site on the National Priorities List in February 2000 (USEPA 2000).

Surface water runoff and periodic flooding of the Woonasquatucket River are the primary pathways for contaminant migration from the Centredale Manor property to NOAA trust resources. A large portion of the property is within the 10-year floodplain of the Woonasquatucket River. A drainage channel runs along the eastern side of the property and connects to the Woonasquatucket River approximately 0.5 km (0.3 mi) downstream (Figure 2). The property is generally flat with a slight slope to the east toward the drainage channel. Surface water from the property discharges into the Woonasquatucket River via the drainage channel and at several other points along the east bank of the river (Weston 1999a).

NOAA Trust Resources

The habitat of concern to NOAA is the Woonasquatucket River, which discharges into the Providence River estuary. In the general vicinity of the Centredale Manor property, the Woonasquatucket River is non-tidal and highly variable in width, riffle, run and pool habitats, and sediment substrate types. Six lowhead dams, which are impassable to anadromous fish, are present on the river downstream of the Centredale Manor property (Lapin 2000; Figure 1). These dams range in height from 2.9 m (9.5 ft) to 4.6 m (15 ft). The dams nearest the site are the Allendale Dam and Lymansville Mill Dam, which are 4.6 m (15 ft) and 4.0 m (13 ft) high, respectively. The Woonasquatucket River is relatively low gradient and typically contains a community of resident warm-water fish such as bluegill, bullhead catfish, chain pickerel, largemouth bass, pumpkinseed, and shiners. However, cold-water fish such as rainbow trout and white sucker have also been reported in the river (Weston 1999a).

The primary species of concern to NOAA is the catadromous American eel, which is present throughout the river, including areas adjacent to the site (Lapin 2000; Weston 1999a). Eel enter freshwater streams and lakes as juveniles and reside in these areas through adulthood. During their residence period, eel are capable of traversing lowhead dams and small waterfalls that act as obstructions to most anadromous fish. Anadromous fish are not present in the Woonasquatucket River because of the lowhead dams (Lapin 2000).

Recreational fishing for freshwater fish species occurs in the Woonasquatucket River (Weston 1999a). There is no commercial fishery on the river. In 1996, after the collection and chemical analysis of eel tissue from the river, the Rhode Island Department of Health (RIDOH) issued a fish consumption advisory (Weston 1999a). The advisory is still in effect and recommends against the consumption of all fish from the lower Woonasquatucket River because of elevated concentrations of dioxins, PCBs, and mercury (RIDOH 2005).

Site-Related Contamination

The USEPA collected 209 surface soil samples from the site in February 1999 (Lockheed Martin 1999). In March 1999, 39 sediment samples and 28 soil samples were collected from the site as part of an expanded site inspection conducted by the USEPA. In addition, 581 soil and sediment samples were collected for the final site inspection report completed in March 2000 (IT 2000). Additional groundwater, surface water, and sediment samples were collected to support the ecological and human health risk assessments, although the exact numbers could not be determined from the documents reviewed for this report. Although the samples were analyzed for metals, polycyclic aromatic hydrocarbons (PAHs), pesticides, PCBs, and dioxins/furans, the test results for metals and pesticides in groundwater were not available in the documents reviewed for this report. The primary contaminants of concern to NOAA at the Centredale Manor site are dioxins. Contaminants of secondary concern are PAHs, PCBs, metals, and pesticides.

Table 1 summarizes the maximum concentrations of contaminants of concern to NOAA and compares them to appropriate screening guidelines. Site-specific or regionally specific screening guidelines are always used when available. In the absence of such guidance, the screening guidelines for water are the ambient water quality criteria (AWQC; USEPA 2002). The screening guidelines for sediment are the probable effects concentrations (PECs; MacDonald et al. 2000). The screening guidelines for soil are the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs; Efroymson et al. 1997), and the USEPA's ecological soil screening guidelines (USEPA 2005b). Any exceptions to these screening guidelines are noted in Table 1. Only concentrations that exceeded the screening guidelines are discussed below.

<u>Surface Water</u>

Ten metals were detected in surface water samples collected from the Centredale Manor site, five of them at concentrations that exceeded the AWQC (Table 1). The maximum concentrations of chromium, selenium, and zinc were detected in a sample collected from the north end of Allendale Pond (Figures 1 and 2). Concentrations of chromium, selenium, and zinc exceeded the AWQC by factors of four, four, and two, respectively (Table 1). The maximum concentrations of copper and lead were detected in a sample collected from the drainage channel east of the Centredale Manor Apartments (Figure 2). Concentrations of copper and lead exceeded the screening guideline by one order of magnitude.

Fifteen PAHs were detected in surface water samples collected at the site. The maximum PAH concentrations were all detected in one sample collected from the Woonasquatucket River west of the Centredale Manor Apartments (Figure 2). Acenaphthene and naphthalene concentrations were below the AWQC (Table 1). Screening guidelines are not currently available for comparison to the concentrations of the other 13 PAHs detected in the surface water samples (Table 1).

Five pesticides were detected in surface water samples collected at the site, two of them at concentrations that exceeded the screening guidelines (Table 1). The maximum concentration of 4,4'-DDT, which occurred in a sample of surface water from Lymansville Mill Pond (Figure 1), exceeded the AWQC by one order of magnitude (Table 1). The maximum concentration of endrin was detected in a sample collected from the drainage channel east of the Centredale Manor Apartments (Figure 2). Endrin concentrations exceeded the screening guidelines by a factor of six.

The maximum concentrations of PCBs and dioxins/furans were detected in surface water samples collected from the Woonasquatucket River west of the Centredale Manor Apartments (Figure 2). Concentrations of PCBs exceeded the screening guidelines by two orders of magnitude, while the concentrations of dioxins/furans exceeded the screening guideline by six orders of magnitude (Table 1).

Table 1. Maximum concentrations of contaminants of concern to NOAA at the Centredale Manor site (Lockheed Martin 1999; Weston 1999b; IT 2000; Batelle 2003a; Batelle 2003b; Batelle 2004). Contaminant values in bold exceed or are equal to screening guidelines.

	Soil (mg/kg)		Water (µg/L)			Sediment (mg/kg)	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	Surface Water	AWQC[b]	Sediment	PEC[c]
METALS/INORGANICS							
Arsenic	**49**	9.9	NAv	13	150	18	33
Cadmium	**180**	0.36[d]	NAv	0.029	0.25[e]	**24**	4.98
Chromium[f]	**470**	0.4	NAv	**42**	11	54	111
Copper	**930**	60	NAv	**91**	9[e]	**1100**	149
Lead	**3200**	40.5	NAv	**220**	2.5[e]	**1100**	128
Mercury	**7.4**	0.00051	NAv	0.0039	0.77[g]	**3.6**	1.06
Nickel	**31**	30	NAv	34	52[e]	4.5	48.6
Selenium	**10**	0.21	NAv	**11**	5.0[h]	3.8	NA
Silver	**36**	2	NAv	1.8	3.2[e,i]	**15**	4.5[j]
Zinc	**3300**	8.5	NAv	**500**	120[e]	**2100**	459
PAHs							
Acenaphthene	4.3	20	ND	0.0015	520[k]	**1.8**	0.290[j]
Acenaphthylene	4.4	NA	ND	0.0013	NA	**0.97**	0.160[j]
Anthracene	3.4	NA	ND	0.00097	NA	**1.8**	0.845
Benz(a)anthracene	7.3	NA	0.22	0.0025	NA	**8.4**	1.05
Benzo(a)pyrene	7.1	NA	ND	0.0025	NA	**9.2**	1.45
Benzo(b)fluoranthene	10	NA	0.17	0.0035	NA	13	NA
Benzo(k)flouranthene	7.1	NA	ND	0.0036	NA	9.2	13.4[j]
Chrysene	9.3	NA	0.28	0.0051	NA	**11**	1.29
Dibenz(a,h)anthracene	1.5	NA	ND	0.00046	NA	**2.6**	0.1[j]
Fluoranthene	22	NA	0.81	0.014	NA	**20**	2.23
Fluorene	2.8	NA	ND	ND	NA	**0.93**	0.536
Indeno(1,2,3-cd)pyrene	4.2	NA	ND	0.00225	NA	**6.8**	0.330[j]
2-Methylnaphthalene	1.6	NA	ND	0.0015	NA	0.14	NA
Naphthalene	84	NA	11	0.0077	620[k]	0.19	0.561
Phenanthrene	25	NA	0.77	0.0056	NA	**12**	1.17
Pyrene	17	NA	0.61	0.0096	NA	**16**	1.52
PESTICIDES/PCBs							
Aldrin	1.2	NA	NAv	0.069	3.0[i]	0.00058	0.040[j]
Chlordane	0.35	NA	NAv	ND	0.0043	**0.074**	0.0176
4,4′-DDD	1.2	NA	NAv	ND	0.6[i,k]	**0.052**	0.028
4,4′-DDE	2.2	NA	NAv	0.0043	1050[i,k]	**0.2**	0.0313
4,4′-DDT	0.41	NA	NAv	**0.01**	0.001[l]	0.022	0.0629
Dieldrin	**9.9**	0.000032[d]	NAv	ND	0.056	**0.11**	0.0618
Endrin	2.1	NA	NAv	**0.21**	0.036	0.028	0.207
Gamma-BHC (Lindane)	0.0028	NA	NAv	0.00083	0.95[i]	**0.006**	0.00499
Heptachlor	0.0034	NA	NAv	ND	0.0038	0.0044	0.010[j]
Heptachlor Epoxide	0.013	NA	NAv	ND	0.0038	0.006	0.016
Total PCBs	**1300**	0.371	NAv	**4.6**	0.014	**27**	0.676
DIOXINS/FURANS							
TEQ (Toxic Equivalent Value)[m]	**0.14**	3.15×10^{-6}	**0.0015**	**0.013**	1.0×10^{-8}[k]	**0.073**	8.8×10^{-6}[j]

Table 1 continued on next page

Table 1, *cont.*

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.

c: Probable Effects Concentration (PEC). Concentration above which adverse effects are likely to be frequently observed (MacDonald et al. 2000).

d: Ecological soil screening guidelines (USEPA 2005b).

e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.

f: Screening guidelines represent concentrations for Cr^{+6}.

g: Derived from inorganic, but applied to total mercury.

h: Criterion expressed as total recoverable metal.

i: Chronic criterion not available; acute criterion presented.

j: Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.

k: Lowest observable effects level (LOEL) (USEPA 1986).

l: Expressed as total DDT.

m: Maximum toxic equivalent value (TEQ) is provided. Each dioxin/furan is assigned a toxic equivalency factor (TEF) relative to 2,3,7,8-tetrachlorodibenzodioxin, which is the most toxic in this group of compounds. In order to determine the toxicity of a mixture of dioxin/furan compounds, the measured concentration of the individual dioxin/furans is multiplied by its assigned TEF. The results are summed to produce a TEQ.

NA: Screening guidelines not available.

NAv: Result not available from the information reviewed.

ND: Not detected.

Sediment

Ten metals were detected in sediment samples collected from the Centredale Manor site, eight of them at concentrations that exceeded the PECs (Table 1). The maximum concentrations of lead, mercury, and selenium were detected in sediment samples collected from Allendale Pond (Figures 1 and 2). Lead concentrations exceeded the PECs by a factor of eight and mercury exceeded by a factor of three (Table 1). No screening guideline is currently available for comparison to the selenium concentrations detected in the sediment samples collected (Table 1).

The maximum concentrations of zinc and silver were detected in sediment samples collected from Lymansville Mill Pond (Figure 1). Zinc concentrations exceeded the PEC by a factor of four; silver exceeded the upper effects threshold (UET) by a factor of three (Table 1).

The maximum concentrations of cadmium and copper were detected in a sample collected from the Woonasquatucket River between Lymansville Mill Pond and Manton Pond (Figure 2). Copper concentrations exceeded the PEC by a factor of seven; cadmium concentrations exceeded by a factor of five (Table 1).

Sixteen PAHs were detected in sediment samples collected from the Centredale Manor site, 13 of them at concentrations that exceeded the PECs (Table 1). The maximum concentrations of 12 of the 16 PAHs (anthracene, benz(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, acenaphthylene, and 2-methylnaphthalene) were detected in sediment samples collected from Allendale Pond (Figures 1 and 2). Concentrations of dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene exceeded the PECs by one order of magnitude; fluoranthene exceeded the PEC a factor of nine; benz(a)anthracene and chrysene exceeded the PECs by a factor of eight; acenaphthylene and benzo(a)pyrene exceeded the PECs by a factor of six; anthracene exceeded the PEC by a factor of two; fluorene just exceeded the PEC (Table 1). Screening guidelines are not currently available for comparison to the concentrations of 2-methylnaphthalene detected in sediment samples.

The maximum concentrations of acenaphthene and benzo(b)fluoranthene were detected in a sample collected from the Woonasquatucket River between Lymansville Mill Pond and Manton Pond (Figure 2). Acenaphthene concentrations exceeded the PEC by a factor of six; screening guidelines are not currently available for comparison to the concentrations of benzo(b)fluoranthene (Table 1).

Ten pesticides were detected in sediment samples collected from the Centredale Manor site, eight of them at concentrations that exceeded the PECs (Table 1). The maximum concentrations of chlordane, 4,4′-DDE, dieldrin, and endrin were detected in samples collected from Allendale Pond (Figures 1 and 2). Concentrations of endrin exceeded the PEC by one order of magnitude; 4,4′-DDE exceeded by a factor of six; chlordane exceeded the PEC by a factor of four; and dieldrin exceeded the PEC by a factor of two (Table 1).

The maximum concentration of gamma-BHC was detected in a sample collected from the Woonasquatucket River between Allendale Pond and Lymansville Mill Pond (Figure 1). Gamma-BHC concentrations just exceeded the PEC (Table 1).

The maximum concentration of 4,4′-DDD was detected in a sample collected from the Woonasquatucket River between Lymansville Mill Pond and Manton Pond (Figure 2). Concentrations of 4,4′-DDD exceeded the PEC by a factor of two (Table 1).

PCBs were detected in sediment at concentrations that exceeded the screening guidelines (Table 1). The maximum concentration of PCBs, which was detected in a sample collected from Allendale Pond (Figures 1 and 2), exceeded the PEC by one order of magnitude (Table 1).

Dioxins/furans were detected in sediment downstream of the Centredale Manor property as far south as Dyerville Pond, which is approximately 3.7 km (2.3 mi) downstream of the site (Figure 1). Dioxins/furans were detected at concentrations that exceeded the screening guidelines (Table 1). The maximum concentrations of dioxins/furans were detected in a sample collected from Allendale Pond, and exceeded the PEC by three orders of magnitude (Table 1). Dioxins/furans were detected in sediment collected near the Manton Dam (Figure 1), approximately 2.6 km (1.6 mi) downstream of the Centredale Manor property, at concentrations that exceeded the PEC by at least two orders of magnitude.

Groundwater

Seven PAHs were detected in groundwater samples collected at the Centredale Manor site. Maximum concentrations of benz(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in a groundwater sample collected from a monitoring well approximately 76 m (250 ft) south of the Brook Village Apartments (Figure 2). The maximum concentration of naphthalene was detected in a groundwater sample collected just north of the Centredale Manor Apartments. Naphthalene was detected at concentrations below the screening guideline (Table 1). No screening guidelines are currently available for comparison to the other PAHs that were detected in the groundwater samples (Table 1).

The maximum concentration of dioxins/furans in groundwater was detected in a sample collected 61 m (200 ft) south of the Brook Village Apartments, and exceeded the screening guideline by five orders of magnitude (Figure 2; Table 1).

Soil

Ten metals were detected in soil samples collected from the Centredale Manor site at concentrations that exceeded the screening guidelines. Maximum concentrations of cadmium, copper, mercury, and selenium were detected in soil samples collected between the Brook Village Apartments and the Centredale Manor Apartments (Figure 2). Mercury concentrations exceeded the screening guidelines by four orders of magnitude, cadmium by two orders of magnitude, and copper and selenium by one order of magnitude (Table 1).

Maximum concentrations of lead, silver, and zinc were detected in soil samples collected south of the Centredale Manor Apartments (Figure 2). Lead and silver concentrations exceeded the screening guidelines by one order of magnitude; zinc exceeded the screening guideline by two orders of magnitude (Table 1).

The maximum concentration of arsenic was detected in a soil sample collected between the Centredale Manor Apartments and the Woonasquatucket River (Figure 2). Arsenic concentrations exceeded the screening guideline by a factor of five (Table 1).

The maximum concentration of chromium was detected in a soil sample collected from the flood plain of the Woonasquatucket River approximately 229 m (750 ft) southeast of the Centredale Manor Apartments. Chromium concentrations exceeded the screening guidelines by three orders of magnitude (Table 1).

The maximum concentration of nickel was detected in a soil sample collected east of the Centredale Manor Apartments (Figure 2). Nickel concentrations just exceeded the screening guidelines (Table 1).

Sixteen PAHs were detected in soil samples collected at the Centredale Manor site. The maximum concentrations of acenaphthene and naphthalene were detected in soil samples collected between the Brook Village Apartments and the Centredale Manor Apartments (Figure 2). Acenaphthene concentrations were below the screening guideline (Table 1). No screening guidelines are currently available for comparison to the other 15 PAHs that were detected in the soil samples (Table 1).

The maximum concentrations of acenaphthylene, benzo(a)pyrene, and benzo(b)fluoranthene were detected in a soil sample collected south of the Centredale Manor Apartments (Figure 2).

The maximum concentrations of anthracene, benz(a)anthracene, fluoranthene, fluorene, phenanthrene, and pyrene were detected in soil samples collected from the Lymansville Mill Pond floodplain (Figure 2).

The maximum concentrations of benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and 2-methylnaphthalene were detected in a soil sample collected northeast of the Centredale Manor Apartments (Figure 2).

Ten pesticides were detected in soil samples collected at the Centredale Manor site. The maximum concentrations of aldrin, 4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, and endrin were detected in soil samples collected between the Centredale Manor Apartments and the Brook Village Apartments (Figure 2). Dieldrin concentrations exceeded the screening guideline by four orders of magnitude (Table 1). No screening guidelines are currently available for comparison to the other nine pesticides detected in soil (Table 1).

The maximum concentrations of chlordane and gamma-BHC were detected in soil samples collected north and east of the Centredale Manor Apartments, respectively (Figure 2).

The maximum concentrations of heptachlor and heptachlor epoxide were detected in soil samples collected within floodplain of the Lymansville Mill Pond (Figure 2).

PCBs and dioxins/furans were detected in soil samples collected throughout the property at concentrations that exceeded the screening guidelines (Table 1). The maximum concentrations of PCBs and dioxins/furans were detected in a sample collected approximately 90 m (300 ft) south of the Centredale Manor Apartments (Figure 2). PCBs concentrations exceeded the screening guidelines by three orders of magnitude; dioxins/furans exceeded the screening guideline by four orders of magnitude (Table 1).

References

Batelle Duxbury Operations (Batelle). 2003a. Draft baseline ecological risk assessment, Centredale Manor Restoration Project, North Providence, Rhode Island. Duxbury, Massachusetts: U.S. Army Corps of Engineers, New England District.

Batelle Duxbury Operations (Batelle). 2003b. Final data summary report, interim data collection remedial investigation and feasibility study, Centredale Manor Restoration Project, North Providence, Rhode Island. Duxbury, Massachusetts: U.S. Army Corps of Engineers, New England District.

Batelle Duxbury Operations (Batelle). 2004. Draft remedial investigation, Centredale Manor Restoration Project, North Providence, Rhode Island. Duxbury, Massachusetts: U.S. Army Corps of Engineers, New England District.

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed February 9, 2005).

IT Corporation (IT). 2000. Final site investigation report, Centredale Manor Restoration Project, North Providence, Rhode Island. Boston: U.S. Environmental Protection Agency, Region 1. 22 pp. plus attachments.

Lapin, B. Fisheries biologist, Rhode Island Department of Fish and Wildlife. Personal communication June 9, 2000.

Lockheed Martin. 1999. Final report: Centredale Manor (Woonasquatucket River), North Providence, Rhode Island. U.S. Environmental Protection Agency.

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

Rhode Island Department of Health (RIDOH). 2005. Mercury in fish: Advice for those who fish. 2005. Available at: RIDOH Office of Environmental Risk Assessment, http://www.health.ri.gov/environment/risk/fish.php (accessed February 7, 2005).

Roy F. Weston, Inc. (Weston). 1999a. Final hazard ranking system package. Centredale Manor Site, North Providence, Rhode Island. Boston, MA: U.S. Environmental Protection Agency, Region I, Office of Site Remediation and Restoration. 73 pp.

Roy F. Weston, Inc. (Weston). 1999b. Final summary report for expanded site inspection, Centredale Manor Site, North Providence, Rhode Island. Boston, MA: U.S. Environmental Protection Agency, Region I, Office of Site Remediation and Restoration. 36 pp.

Tetra Tech NUS, Inc. (Tetra Tech). 1999. Draft final work plan technical assistance, Centredale Manor, North Providence, Rhode Island, Response Action Contract (RAC), Region I. U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2000. NPL site narrative at listing for the Centredale Manor Restoration Project site. Available at: USEPA National Priorities List, http://www.epa.gov/superfund/sites/nplsnl/n0101388.pdf (accessed February 9, 2005).

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2005a. Centredale manor restoration project, North Providence, Rhode Island. February 2005. Available at: USEPA Waste Site Cleanup and Reuse in New England, http://yosemite.epa.gov/r1/npl_pad.nsf/f52fa5c31fa8f5c885256adc0050b631/CE2CFB58C8F034F38525692A00054D04?OpenDocument (accessed February 7, 2005).

U.S. Environmental Protection Agency (USEPA). 2005b. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed August 2005).

U.S. Geological Survey (USGS). 1947. Topographic map, Providence quadrangle, RI, 1:250,000. USGS. Denver, CO.

Mohawk Tannery

Nashua, New Hampshire

EPA Facility ID: NHD981889629

Basin: Nashua

HUC: 01070004

Executive Summary

The Mohawk Tannery site, also known as Granite State Leathers, is in Nashua, Hillsborough County, New Hampshire. The Mohawk Tannery operated along the Nashua River from 1924 to 1984, producing tanned hides for leather. It is assumed that effluent was discharged directly into the Nashua River before the settling lagoons were constructed in the 1960s. The primary contaminants of concern to NOAA at the site are metals and pentachlorophenol. The habitats of primary concern to NOAA are the Nashua River and associated wetlands. NOAA trust resources that use the Nashua River for spawning, nursery, and/or adult habitat are alewife, American shad, Atlantic salmon, blueback herring, white perch, yellow perch, and American eel. Surface water runoff and groundwater are the primary pathways for the migration of contaminants from the site to NOAA trust resources.

Site Background

The Mohawk Tannery site, also known as Granite State Leathers, is in Hillsborough County, New Hampshire, approximately 1.6 km (1 mi) west of Nashua (Figure 1). The site is approximately 12 ha (30 acres) in area. The tannery facilities are on the northern 6 ha (15 acres) of the site. Ten buildings and seven unlined settling lagoons remain at the site. The southern six ha (15 acres) of the site is undeveloped and characterized as woods, fields, and wetlands. The site is bordered to the north by a landfill, to the east by a residential area, and to the west by the Nashua River (Figure 2).

The Mohawk Tannery operated along the Nashua River from 1924 to 1984, producing tanned hides for leather (USEPA 2000). Numerous metals and organic chemicals are used in the tanning process including chromium, sodium chloride, sodium sulfate, chlorinated phenols, dyes, toluene, chlorobenzene, and trichloroethylene. The tannery operations produced approximately 567,812 L (150,000 gal) of effluent daily. The effluent was composed of approximately 189,271 L (50,000 gal) of alkaline waste and approximately 378,541 L (100,000 gal) of acidic waste. The alkaline waste was composed of undissolved lime and solids containing protein such as hair, flesh, and hide scraps. The acid waste was composed of chromium tanning materials as well as some hide residue, retanning materials, and alkaline water from pre-tanning processes (NHDES 1996).

Information on waste treatment between 1924 and 1960 is not available. It is assumed that before construction of the settling lagoons in the 1960s, effluent was discharged directly into the Nashua River. During the 1960s, the alkaline and acid effluent streams were combined and deposited into unlined settling lagoons known as Areas I and II (Figure 2). Areas I and II are approximately six to nine m (20 to 30 ft) east of the Nashua River, and overflow from Areas I and II was deposited into the Nashua River (NHDES 1996). Areas I and II lie within the 100-year flood zone.

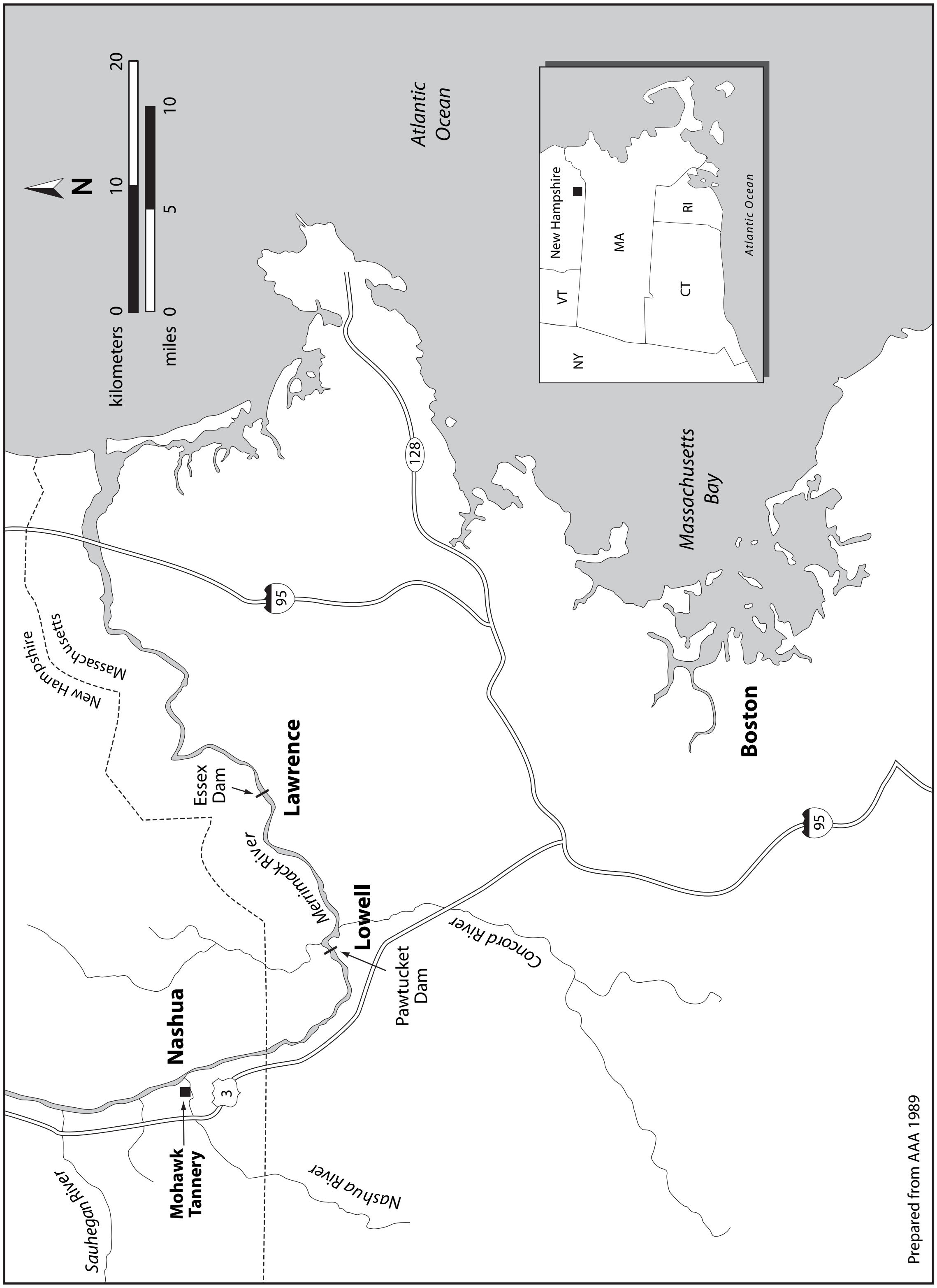


Figure 1. Location of the Mohawk Tannery site, Nashua, New Hampshire.

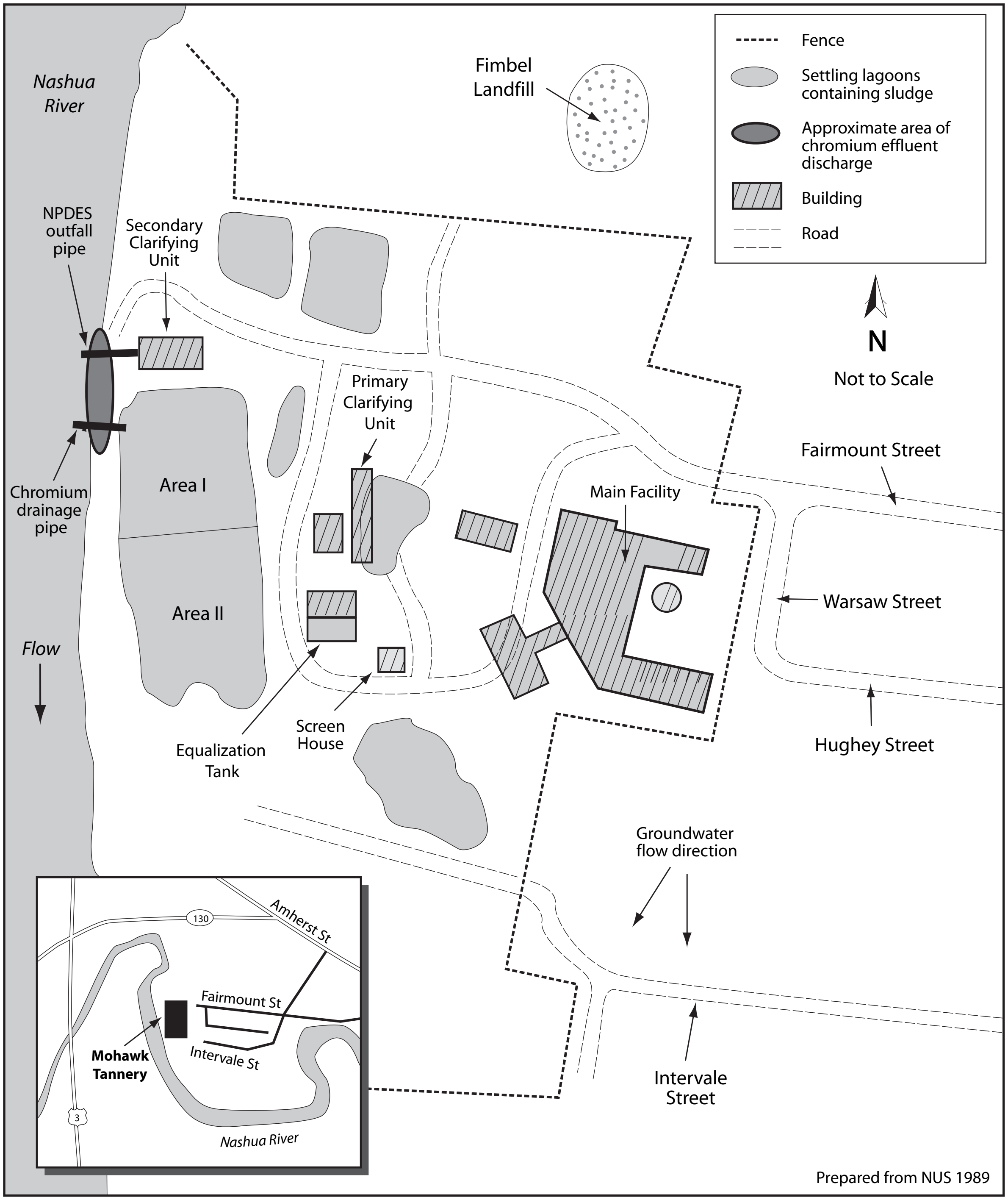


Figure 2. Detail of the Mohawk Tannery property, Nashua, New Hampshire.

During the early 1970s, separate treatment processes were installed for alkaline and acid effluents. The alkaline effluent was pumped underground from the main facility to an elevated wooden sluiceway, which transported the effluent to the screen house, where solids were removed. After the solids were removed the alkaline effluent was transported through a second wooden sluiceway to Areas I and II for long-term deposition, after which the remaining liquid was discharged into the Nashua River (NHDES 1996; Tyler 2000). The acid effluent was also pumped from the main facility in an underground pipe to an elevated sluiceway and passed through five unlined settling lagoons before discharging into the Nashua River via an open ditch. Sludge was periodically dredged from the ditch and placed in unlined settling lagoons to dry (NHDES 1996; Tyler 2000).

During the early 1980s, an on-site treatment facility was completed. The alkaline waste stream was screened and treated with manganese sulfate and then transported to the sulfide oxidation tank. The acid waste stream was treated with lime and then transported to the equalization tank. After treatment, the alkaline waste stream was combined with the acid waste stream in the equalization tank. The combined effluent was first sent to the primary clarifier, next to Area I for sedimentation, and then to a secondary clarifier. Liquid remaining in the secondary clarifier was pumped into the Nashua River under a National Pollutant Discharge Elimination System (NPDES) permit. Area I remains open and contains liquid and sludge. The secondary clarifier contains sludge, as do the remaining unlined settling lagoons, which have been covered with fill, logs, and sand (USEPA 2000). Sludge was also deposited in the Fimbel Landfill north of the site, which was leased by the Mohawk Tannery while it was in operation (GZA 1985).

Nine potential contaminant source areas have been identified in relation to the Mohawk Tannery site: seven unlined settling lagoons, Fimbel Landfill, and the location where chromium drainage pipes discharged effluent directly into the Nashua River (Tyler 2000). Several 208 L (55 gal) drums, originally from Amoskeag Leather Company, were transported to the Mohawk Tannery site and dumped into the lined Fimbel Landfill. Two accidental discharges of sodium hydrosulfate, the first approximately 379 L (100 gal) and the second approximately 4,921 L (1,300 gal), may also have contributed to contamination in the area (Tyler 2000).

In 1985, a site investigation found metals and volatile organic compounds (VOCs) in groundwater, surface water, and soil. During a 1993 expanded site inspection conducted by the New Hampshire Department of Environmental Services (NHDES), metals were found in sediment and soil samples taken from the Nashua River. Fieldwork for a remedial investigation/feasibility study of the site was completed in 2003; however, data from that investigation were not available for review at the time of this report (USEPA 2004). The Mohawk Tannery site was proposed for placement on the National Priorities List on May 11, 2000.

Surface water runoff and groundwater are the primary pathways for the migration of contaminants from the site to NOAA trust resources. Sediment transport is a secondary pathway. Surface water from the site generally flows west toward the Nashua River. There are numerous wetlands in the vicinity of the site and Areas I and II are classified as wetlands by the NHDES (NHDES 1996). Groundwater beneath the site is encountered at approximately four to seven m (13 to 23 ft) below ground surface and generally flows south to southwesterly to the Nashua River (GZA 1985).

NOAA Trust Resources

The habitats of primary concern to NOAA are the Nashua River and associated wetlands. The Merrimack River, which is farther downstream of the site, is a habitat of secondary concern. The Nashua River joins the Merrimack River approximately 5.6 km (3.5 mi) downstream of the site. The Merrimack River then flows approximately 84 km (52 mi) before draining into the Atlantic Ocean.

NOAA trust resources that use the Nashua River and Merrimack River for spawning, nursery, and/or adult habitat are the anadromous alewife, American shad, Atlantic salmon, blueback herring, white perch, and yellow perch and the catadromous American eel (Table 1; Greenwood 2004). There are two dams along the Merrimack River: Essex Dam in Lawrence, Massachusetts, and Pawtucket Dam in Lowell, Massachusetts (Figure 1). Historically, both dams blocked fish passage from the Atlantic Ocean upstream to the confluence of the Nashua and Merrimack Rivers. The dams now have fish lifts, allowing fish passage upstream of the dams into the Nashua River (USFWS 2004).

Table 1. NOAA trust species found in the Nashua and Merrimack Rivers in the vicinity of the Mohawk Tannery site (NHDES 1996; Greenwood 2004).

Species		**Habitat Use**			**Fisheries**	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
ANADROMOUS FISH						
Alewife	*Alosa pseudoharengus*	◆	◆			
American shad	*Alosa sapidissima*	◆	◆			◆
Atlantic salmon	*Salmo salar*		◆			◆
Blueback herring	*Alosa aestivalis*	◆	◆			
White perch	*Morone americana*	◆	◆	◆		◆
Yellow perch	*Perca flavescens*	◆	◆	◆		◆
CATADROMOUS FISH						
American eel	*Anguilla rostrata*			◆		

The New Hampshire Department of Fish and Game stocks the Nashua River annually with American shad and alewife. In 1993, the Department of Fish and Game and the U.S. Fish and Wildlife Service created the Merrimack River Anadromous Fish Restoration Program in an effort to restore Atlantic salmon to the Merrimack River basin (NHFG 2004). Fingerlings, raised in the National Fish Hatchery at Nashua, are stocked in several tributaries of the Merrimack River upstream of its confluence with the Nashua River. Although Atlantic salmon are not stocked in the Nashua River, the confluence of the Nashua and Merrimack Rivers is a migratory route for Atlantic salmon (Greenwood 2004).

No commercial fishing takes place on the Nashua River or the Merrimack River in New Hampshire. However, both rivers are fished recreationally for American shad, Atlantic salmon, white perch, and yellow perch takes place on the Nashua and Merrimack Rivers (Greenwood 2004). Both rivers were listed as recommended fishing waters by the New Hampshire Department of Fish and Game in 1994 (NHDES 1996).

A fish-consumption advisory is currently in effect for all species of fish from inland freshwater bodies in New Hampshire because of elevated mercury concentrations in fish tissue. The advisory suggests limiting fish consumption to one meal per month for all pregnant and nursing women, women who may become pregnant, and children under seven years of age, to four meals per month for all other individuals (NHDES 2004).

Site-Related Contamination

Groundwater, surface water, sediment, and soil samples were collected during sampling events conducted in 1985 and 1993. The samples were analyzed for metals, VOCs, and semivolatile organic compounds. Groundwater samples were collected from on-site monitoring wells. Surface water and sediment samples were collected from the Nashua River adjacent to the site. Soil samples were collected from throughout the site.

The primary contaminants of concern to NOAA are metals and pentachlorophenol. The maximum contaminant concentrations detected during the site investigations are summarized and compared to appropriate screening guidelines in Table 2. The screening guidelines used include the ambient water quality criteria (AWQC; USEPA 2002) for groundwater and surface water, the threshold effects concentrations (TECs; MacDonald et al. 2000) for sediment, and the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs; Efroymson et al. 1997) and the U.S. Environmental Protection Agency's ecological soil screening guidelines (USEPA 2005), with exceptions as noted on Table 2. Only maximum concentrations that exceeded relevant screening guidelines are discussed below.

Table 2. Maximum concentrations of contaminants of concern to NOAA detected in samples collected at the Mohawk Tannery site (GZA 1985; NHDES 1996; Tyler 2000). Contaminant values in bold exceeded screening guidelines.

	Soil (mg/kg)		**Water (µg/L)**			**Sediment (mg/kg)**	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	Surface Water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS							
Arsenic	ND	9.9	**1000**	2.0	150	ND	9.79
Cadmium	**3.5**	0.36[d]	ND	<1.0	0.25[e]	**19**	0.99
Chromium[f]	**3300**	0.4	4	<1.0	11	**310**	43.4
Lead	22	40.5	**100**	<1.0	2.5[e]	**160**	35.8
Mercury	**0.01**	0.00051	**0.9**	<0.20	0.77[g]	ND	0.18
Selenium	ND	0.21	**58**	<2.0	5.0[h]	ND	NA
Silver	0.04	2	**50**	**60**	3.2[e,i]	ND	4.5[j]
Zinc	ND	8.5	ND	**130**	120[e]	ND	121
PHENOLS							
Pentachlorophenol	**510**	3	ND	ND	15[k]	ND	NA

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.

c: Threshold Effects Concentration (TEC). Concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).

d: Ecological soil screening guidelines (USEPA 2005).

e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.

f: Screening guidelines represent concentrations for Cr^{+6}.

g: Derived from inorganic, but applied to total mercury.

h: Criterion expressed as total recoverable metal.

i: Chronic criterion not available; acute criterion presented.

j: Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.

k: Chronic criterion is pH dependent; concentration shown above corresponds to pH of 7.8.

NA: Screening guidelines not available.

ND: Not detected.

Groundwater

Metals were detected in groundwater samples taken from on-site monitoring wells. The maximum concentration of arsenic was detected in a sample taken from a monitoring well approximately 6 m (20 ft) from the Nashua River on the western border of Area I. Maximum concentrations of lead and selenium were detected in samples taken from a monitoring well approximately 6 m (20 ft) from the Nashua River on the western border of Area II. The maximum concentration of mercury was detected in a sample taken from a monitoring well approximately 10 m (33 ft) from the Nashua River in the southwestern portion of the site. The maximum concentration of silver was detected in a sample taken from a monitoring well on the northeastern border of the site. The maximum concentrations of lead, selenium, and silver exceeded the AWQC by one order of magnitude. The maximum concentration of arsenic exceeded the AWQC by a factor of approximately six, and the maximum concentration of mercury slightly exceeded the AWQC.

Surface Water

Metals were detected in surface water taken from the Nashua River adjacent to the site. The maximum concentration of silver, which exceeded the AWQC by one order of magnitude, was detected in a sample taken from the river along the northern border of the site. The maximum concentration of zinc slightly exceeded the AWQC; the exact sampling location was not reported in the documents reviewed for this report.

Sediment

Metals were detected in sediment samples taken from the Nashua River adjacent to the site. The maximum concentrations of cadmium, chromium, and lead were detected in samples taken from the area surrounding the NPDES outfall pipe. The maximum concentration of cadmium exceeded the TEC by one order of magnitude. The maximum concentrations of chromium and lead exceeded the TECs by factors of seven and approximately 4.5, respectively.

Soil

Metals and pentachlorophenol were detected in soil samples taken from the site. The maximum concentrations of cadmium and chromium were detected in samples taken from the area surrounding the NPDES outfall pipe. The maximum concentration of mercury was detected in a sample taken approximately 12 m (40 ft) east of Area I. The maximum concentrations of chromium and mercury exceeded the ORNL-PRGs by three orders of magnitude and one order of magnitude, respectively. The maximum concentration of cadmium exceeded the USEPA soil screening guideline by a factor of nine.

The maximum concentration of pentachlorophenol, which exceeded the ORNL-PRG by two orders of magnitude, was detected in a sample taken approximately 61 m (200 ft) east of Area II.

References

American Automobile Association (AAA). 1989. Road Atlas: United States, Canada, Mexico. AAA. Falls Church, VA.

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed August 2005).

Goldberg-Zoino & Associates Inc (GZA). 1985. Phase II hydrogeologic study and conceptual close-out plan, Granite State Leathers Facility, Nashua, New Hampshire. File No. D-5226C. Manchester, NH: Fairmount Height Associates.

Greenwood, J. Fisheries biologist for the New Hampshire Department of Fish and Game. Personal communication August 18, 2004.

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

New Hampshire Department of Environmental Services (NHDES). 1996. Final site inspection prioritization report for Mohawk Tannery, Nashua, New Hampshire. Concord, NH. New Hampshire Department of Environmental Services, Waste Management Division.

New Hampshire Department of Environmental Services (NHDES). 2004. Is it safe to eat the fish we catch? Mercury and other pollutants in fish. Available at: New Hampshire Department of Environmental Services, Environmental and Occupational Health, Health Risk Assessment Program, http://des.nh.gov/pdf/Mercury_Fish.pdf (accessed August 25, 2004).

New Hampshire Department of Fish and Game (NHFG). 2004. Atlantic salmon brood stock fishery and access opportunities along the Merrimack and Lower Pemigewasset Rivers. Available at: New Hampshire Department of Fish and Game, Atlantic Salmon Brood Stock Fishery, http://www.wildlife.state.nh.us/Fishing/atlantic_salmon.htm (accessed August 25, 2004).

Nuclear Utility Services Corporation (NUS). 1989. Screening site inspection at Mohawk Tannery. July.

Tyler, Patti L. 2000. Ecological screening of preliminary data and recommendations for additional sampling, Mohawk Tannery, Nashua, New Hampshire. Lexington, MA: U. S. Environmental Protection Agency.

U.S. Environmental Protection Agency (USEPA). 2000. NPL site narrative for Mohawk Tannery, Nashua, New Hampshire. May 2000. Available at: USEPA National Priorities List, http://www.epa.gov/superfund/sites/npl/nar1589.htm (accessed August 25, 2004).

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2004. Waste site cleanup and reuse in New England, Mohawk Tannery, Nashua, New Hampshire. August 2004. Available at: USEPA Region 1, New England, http://www.epa.gov/region1/superfund/sites/mohawk (accessed August 2005).

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed August 10, 2004).

U.S. Fish and Wildlife Service (USFWS). 2004. Fish passage data – returns: Essex, Pawtucket, Amoskeag Dams. July 2004. Available at: U.S. Fish and Wildlife Service, Central New England Fishery Resources Office, http://www.fws.gov/r5cneafp/links.htm (accessed August 25, 2004).

Scorpio Recycling, Inc.

Candelaria Ward, Puerto Rico

EPA Facility ID: PRD987376662

Basin: Eastern Puerto Rico

HUC: 21010005

Executive Summary

Scorpio Recycling, Inc., is a metal recycling company in Candelaria Ward, Puerto Rico. The Rio de la Plata, which flows north into the Atlantic Ocean, is approximately 1.9 km (1.2 mi) southwest of the Scorpio Recycling site. Metals were detected in soil, groundwater, and surface water at the site, and pesticides were detected in site soils. Metals are the primary contaminants of concern to NOAA. The NOAA habitat of primary concern is the Rio de la Plata. Several amphidromous fish and shrimp species are found in the Rio de la Plata, as is the catadromous American eel. Groundwater is the primary pathway for the migration of contaminants from the site to NOAA trust resources, although insufficient data is available to determine the extent of contaminant migration into the Rio de la Plata.

Site Background

The Scorpio Recycling, Inc., (Scorpio Recycling) site is in Candelaria Ward, Toa Baja Municipality, Puerto Rico (Figure 1). The site is approximately 4 ha (9 acres) in area and is bordered to the northeast by Route 2, to the southeast by a gun club, to the southwest by a sinkhole, and to the northwest by Acuna Street. A Pepsi Bottling Company plant is northeast of the site (Figure 2).

Scorpio Recycling, an active metal recycling company, has operated in Candelaria Ward since 1972. Until 1994, Scorpio recycled batteries as part of its operations. Two buildings, a transformer, two copper and brass sorting areas, numerous scrap metal piles, the former battery crushing area, and a sinkhole are present at the site (Figure 2).

Scorpio Recycling buys or acquires scrap metal and separates the reusable portions for resale to foundries in Brazil and the United States. Piles of ferrous scrap metal and scrap cars are found throughout the site in direct contact with the ground. When batteries were being recycled, the batteries were crushed on-site to remove the lead (Weston 1999a), and the sulfuric battery acid was dumped directly onto the ground. Batteries were also burned and the remains were buried at the site (PREQB 1994).

There are no containment systems, stormwater control systems, or liners on-site. Runoff from the battery crushing area flows to the south toward a sinkhole adjacent to the property (Figure 2). It has been alleged that Scorpio Recycling illegally dumped pails of acid, motor oil, and transmission oil into this sinkhole, causing stressed vegetation and stained soil in the surrounding area (PREQB 1994). In response to these allegations, the U.S. Environmental Protection Agency (USEPA) conducted a preliminary sampling event and a preliminary assessment at the site in 1991. Test results showed elevated concentrations of metals in soil samples from the site. In 1991, the Puerto Rico Environmental Quality Board conducted an on-site reconnaissance and noted stained soil, batteries on the ground, open lead battery cells, acidic runoff flowing into the sinkhole, and stressed

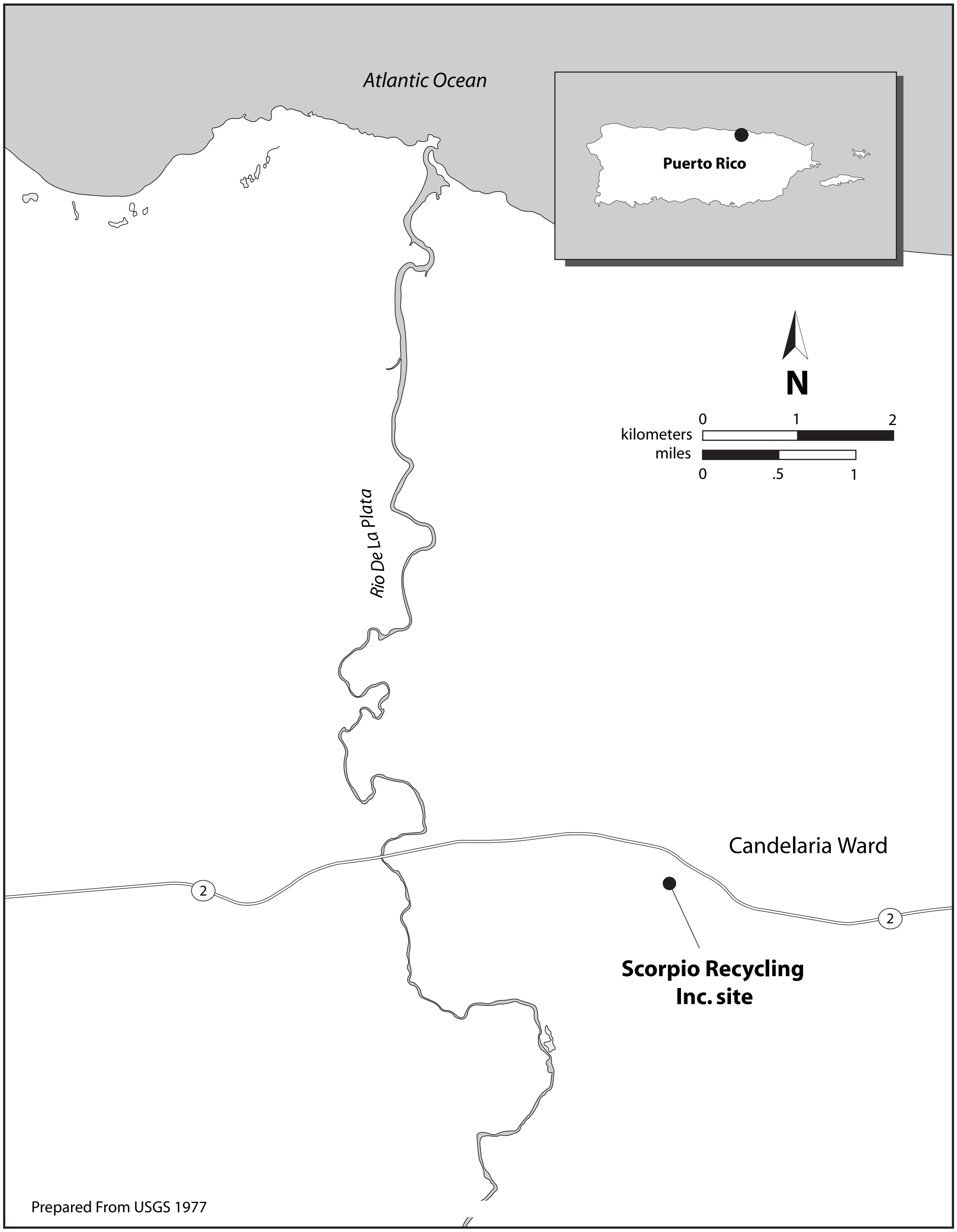


Figure 1. Location of the Scorpio Recycling, Inc. site, Candelaria Ward, Puerto Rico.

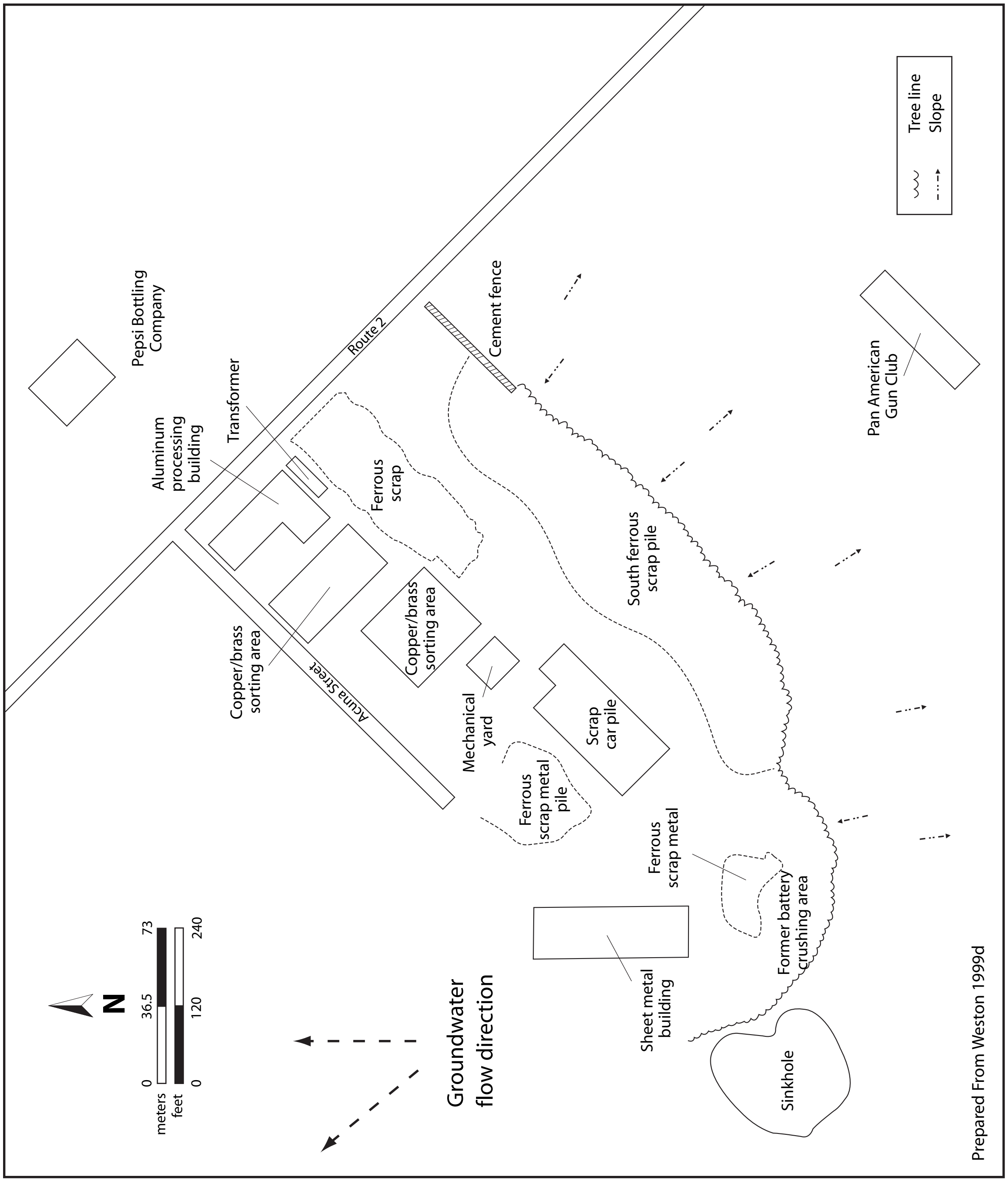


Figure 2. Detail of the Scorpio Recycling, Inc. property.

vegetation (USEPA 2000). In 1994, the Environmental Quality Board conducted a site inspection, which showed elevated concentrations of metals in soil and groundwater samples (USEPA 2000).

In 1999, a hazard ranking system package and an expanded site inspection (ESI) were prepared for the Scorpio Recycling site. The ESI showed elevated concentrations of metals in soils, as well as elevated concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) in groundwater samples taken down gradient from the site. The Scorpio Recycling site was proposed to the National Priorities List (NPL) on October 22, 1999 and placed on the NPL on February 4, 2000 (USEPA 2000). The USEPA initiated a remedial investigation/feasibility study (RI/FS) at the site in September 2000. In February 2001, the USEPA began a removal action (USEPA 2000). Information on the current status of the RI/FS and removal action was not available at the time this report was prepared.

Groundwater is the primary pathway for the migration of contaminants from the site to NOAA trust resources; surface water is a secondary pathway. Groundwater beneath the site is encountered at approximately 1.3 m (4.3 ft) below ground surface and flows north and northwest toward the Rio de la Plata and the Atlantic Ocean (PREQB 1994). The bedrock underlying the Scorpio Recycling site is partly composed of highly permeable limestone called karst, in which sinkholes are common. The exact flow and discharge of groundwater through a karst aquifer cannot be predicted unless detailed studies are conducted. Detailed studies of groundwater flow have not been conducted at the site and it is unknown if groundwater discharges to the Rio de la Plata (Modica 2004).

Rainfall seeps into the soil and through the limestone quickly, which means there is little surface water flow. Surface water runoff from the property flows south and drains into the sinkhole adjacent to the southwest corner of the site. The Scorpio Recycling site is considered a recharge area to the underlying aquifer (PREQB 1994).

NOAA Trust Resources

The habitat of primary concern to NOAA is the Rio de la Plata, which is approximately 1.9 km (1.2 mi) southwest of the site. The Rio de la Plata is a moderately large river basin covering approximately 622 km2 (240 mi2); the river flows from south central Puerto Rico to the north and discharges to the Atlantic Ocean (USACE 2004).

The freshwater fish and invertebrate species native to Puerto Rico are compulsory migrators that must spend a portion of their life cycles in estuarine or marine waters (Yoshioka 2000) and are best described as amphidromous and iteroparous. Following fertilization in fresh water, eggs and larvae are carried downstream to estuaries, and fish and shrimp larvae spend several months maturing in marine or estuarine waters. Shrimp larvae enter marine and estuarine waters as non-feeders; when salinity reaches 12 parts per thousand and above, the larvae molt and begin feeding before reentering freshwater systems as juveniles. These fish and shrimp spend the majority of their life cycles in the middle to upper reaches of natural freshwater rivers (Yoshioka 2000).

Native amphidromous and catadromous species dominate the freshwater ecosystem of the Rio de la Plata. No anadromous fish are present in the Rio de la Plata (Yoshioka 2000). Common amphidromous and catadromous species found in the Rio de la Plata are listed in Table 1.

Several amphidromous goby-like fish are present in the Rio de la Plata. The river goby, bigmouth and fat sleepers are found in the lower to middle reaches of streams, and would most likely inhabit stream reaches near the Scorpio Recycling site. The sirajo goby and mountain mullet generally occupy the upper reaches of streams, and would likely use stream reaches near the site as migratory corridors. The catadromous American eel spawns in the Atlantic Ocean and juveniles migrate to the Rio de la Plata, where they reside as adults. Because the American eel is found in the middle to upper reaches of rivers, it may occupy reaches near the site (Yoshioka 2000).

Table 1. NOAA trust resources found in the Rio de la Plata, Puerto Rico (Yoshioka 2000).

Species		**Habitat Use**			**Fisheries**	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
CATADROMOUS FISH						
American eel	*Anguilla rostrata*			◆		◆
AMPHIDROMOUS FISH						
Bigmouth sleeper	*Gobiomorus dormitor*	◆	◆	◆		◆
Fat sleeper	*Dormitator maculatus*	◆	◆	◆		
Mountain mullet	*Agonostomus monticola*			◆		◆
River goby	*Awaous tajasica*	◆	◆	◆		
Sirajo goby[a]	*Sicydium plumieri*					◆
AMPHIDROMOUS INVERTEBRATES						
Cinnamon river shrimp	*Macrobrachium acanthurus*	◆	◆	◆		◆
Bigclaw river shrimp	*Macrobrachium carcinus*			◆		◆
Unamed river prawn[b]	*Macrobrachium crenulatum*			◆		◆
Unamed river prawn[b]	*Macrobrachium faustinum*			◆		◆
Cascade river prawn	*Macrobrachium heterochirus*			◆		◆
Unnamed river shrimp[a,b]	*Atya innocous*			◆		◆
Unnamed river shrimp[a,b]	*Atya lanipes*			◆		◆
Unnamed river shrimp[a,b]	*Atya scabra*			◆		◆
Unnamed river shrimp[a,b]	*Jonga serrei*	◆	◆	◆		
Unnamed river shrimp[a,b]	*Micratya poeyi*	◆	◆	◆		
Unnamed river shrimp[a,b]	*Potimirrim americana*	◆	◆	◆		
Unnamed river shrimp[a,b]	*Potimirrim mexicana*	◆	◆	◆		
Unnamed river shrimp[a,b]	*Xiphocaris elongata*	◆	◆	◆		

a: Scientific names are from Yoshioka 2000.
b: No common names were available.

Several amphidromous shrimp species are found in the Rio de la Plata, including moderate to large-sized freshwater prawns in the genus *Macrobrachium* (Table 1). Cinnamon river shrimp are a lower-reach species that occupies habitats near the site, while bigclaw river shrimp and Cascade river prawns occupy the upper reaches of the river. Several moderate-sized freshwater shrimp in the genus *Atya* are common amphidromous residents, but generally occupy the upper reaches of the river. The smaller river shrimp species, including *Micratya poeyi*, *Xiphocaris elongata*, *Potimirrim americana*, *P. mexicana*, and *Jonga serrei*, occupy the lower reaches of the river and are more likely to be present near the site (Table 1; Yoshioka 2000).

There is no commercial fishery in the Rio de la Plata. Recreational and subsistence fishing occurs throughout the Rio de la Plata for the larger *Macrobrachium* prawns, *Atya* shrimp, American eel, mountain mullet, big-mouth sleeper, and sirajo goby. Fishing generally occurs in the upper watershed where these species reside but some fishing may occur downstream of the site (Yoshioka 2000).

Site-Related Contamination

Groundwater, surface water, and soil samples were collected during numerous sampling events conducted from 1991 to 1999. The samples were analyzed for metals, VOCs, SVOCs, pesticides, and polychlorinated biphenyls (PCBs). Soil samples and surface water samples were taken from throughout the site, and groundwater samples were taken from an on-site monitoring well and an off-site well used for production at the nearby Pepsi Bottling Company (Figure 2). During a USEPA 1991 sampling event, two soil samples and four surface water samples were collected (Weston 1992). In 1994, the Puerto Rico Environmental Quality Board collected 10 soil samples and three groundwater samples from the site (PREQB 1994). During the ESI in 1999, 72 soil samples were collected from the site and two groundwater samples were collected from a well used for production at the Pepsi Bottling Company (Weston 1999b).

The primary contaminants of concern to NOAA are metals. Contaminants of secondary concern to NOAA are polycyclic aromatic hydrocarbons (PAHs), pesticides, and PCBs. Table 2 summarizes the maximum concentrations of contaminants of concern to NOAA and compares them to relevant screening guidelines. Only concentrations that exceeded the screening guidelines are discussed below. Site-specific or regionally specific screening guidelines are always used when available. In the absence of such guidance, the screening guidelines for soil are the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs) (Efroymson et al. 1997) and the USEPA ecological soil screening guidelines (USEPA 2005). The screening guidelines for groundwater and surface water are the ambient water quality criteria (AWQC) (USEPA 2002). Exceptions to these screening guidelines are noted in Table 2.

Groundwater

The maximum concentrations of metals were detected in groundwater samples taken from the Pepsi Bottling Company production well, which is 0.4 km (0.25 mi) northeast of the site (Figure 2). Lead concentrations exceeded the AWQC by more than a factor of two, while the mercury concentrations slightly exceeded the AWQC (Table 2).

Surface Water

The maximum concentrations of metals were detected in a surface water sample taken from the northeastern edge of the sinkhole (Figure 2). Copper, lead, and zinc concentrations exceeded the AWQC by two orders of magnitude (Table 2). Concentrations of chromium and nickel exceeded the AWQC by one order of magnitude and mercury concentrations exceeded the AWQC by a factor of six.

Table 2. Maximum concentrations of contaminants of concern to NOAA at the Scorpio Recycling, Inc. site (Weston 1992; PREQB 1994; Weston 1999c,d). Contaminant values in bold exceeded screening guidelines.

	Soil (mg/kg)		Water (µg/L)		
Contaminant	Soil	ORNL-PRG[a]	Groundwater	Surface Water	AWQC[b]
METALS/INORGANICS					
Arsenic	**70**	9.9	ND	ND	150
Cadmium	**46**	0.36[c]	ND	ND	0.25[d]
Chromium[e]	**260**	0.4	1.1	**450**	11
Copper	**570000**	60	8.6	**1000**	9[d]
Lead	**60000**	40.5	**7.1**	**1800**	2.5[d]
Mercury	**2.2**	0.00051	**1.4**	**5**	0.77[f]
Nickel	**180**	30	ND	**930**	52[d]
Silver	**26**	2	ND	ND	3.2[d,g]
Zinc	**4300**	8.5	78	**55000**	120[d]
PAHs					
Acenaphthene	0.39	20	ND	ND	520[h]
Anthracene	0.67	NA	ND	ND	NA
Benz(a)anthracene	2.5	NA	ND	ND	NA
Benzo(a)pyrene	2.5	NA	ND	ND	NA
Benzo(b)fluoranthene	2.8	NA	ND	ND	NA
Benzo(k)flouranthene	2.4	NA	ND	ND	NA
Chrysene	1.3	NA	ND	ND	NA
Dibenz(a,h)anthracene	0.73	NA	ND	ND	NA
Fluoranthene	5.7	NA	ND	ND	NA
Fluorene	1.6	NA	ND	ND	NA
Indeno(1,2,3-cd)pyrene	2.8	NA	ND	ND	NA
2-Methylnaphthalene	16	NA	ND	ND	NA
Naphthalene	7	NA	ND	ND	620[h]
Phenanthrene	3.6	NA	ND	ND	NA
Pyrene	4.2	NA	ND	ND	NA
PESTICIDES/PCBs					
alpha-Chlordane	0.011	NA	ND	ND	NA
gamma-Chlordane	0.012	NA	ND	ND	NA
4,4'-DDD	0.015	NA	ND	ND	0.6[g,h]
4,4'-DDE	0.034	NA	ND	ND	1050[g,h]
4,4'-DDT	0.00045	NA	ND	ND	0.001[i]
Dieldrin	**0.00028**	0.000032[c]	ND	ND	0.056
Endosulfan (alpha + beta)	0.012	NA	ND	ND	0.056
Heptachlor Epoxide	0.015	NA	ND	ND	0.0038
Total PCBs	**120**	0.371	ND	ND	0.014

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).
b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.
c: Ecological soil screening guidelines (USEPA 2005).
d: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.
e: Screening guidelines represent concentrations for Cr^{+6}.
f: Derived from inorganic, but applied to total mercury.
g: Chronic criterion not available; acute criterion presented.
h: Lowest observable effects level (LOEL) (USEPA 1986).
i: Expressed as total DDT.
NA: Screening guidelines not available.
ND: Not detected.

Soil

Metals, PAHs, pesticides, and PCBs were detected in soil samples collected from throughout the site. The maximum concentrations of cadmium and lead were detected in soil samples taken just south of the aluminum processing building (Figure 2). The maximum concentrations of mercury and zinc were detected in a sample taken southeast of the copper/brass sorting area. The maximum concentration of nickel was detected in a soil sample taken south of the sheet metal building. The maximum concentration of silver was detected in a soil sample taken) southwest of the scrap car pile. The locations of soil samples in which the maximum concentrations of arsenic, chromium, and copper were detected could not be determined from the information available at the time of this report.

Concentrations of copper, lead, and mercury exceeded the ORNL-PRGs by three orders of magnitude; concentrations of chromium and zinc exceeded the screening guidelines by two orders of magnitude (Table 2). Cadmium concentrations exceeded the USEPA ecological soil screening guideline by two orders of magnitude. Silver concentrations exceeded the ORNL-PRG by one order of magnitude, while arsenic and nickel concentrations exceeded the screening guidelines by factors of seven and six, respectively.

The maximum concentrations of PAHs ranged from 0.39 to 16 mg/kg and were detected in soil samples taken just southwest of the end of Acuna Street and south of the scrap car pile. No screening guidelines are currently available for comparison to the maximum concentrations of 14 of the 15 PAHs detected in soil samples collected at the site.

The maximum concentration of dieldrin, which was detected in a soil sample taken) south of the sheet metal building, equaled the USEPA ecological soil screening guideline (Table 1; Figure 2). No screening guidelines are currently available for comparison to the maximum concentrations of the other seven pesticides detected in soil samples collected from the site. The maximum concentration of total PCBs, which was detected in a soil sample taken southeast of the copper/brass sorting area, exceeded the ORNL-PRG by two orders of magnitude.

References

Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed August 2005).

Modica, E. Hydrologist for U.S. Environmental Protection Agency, Region 2. Personal communication July 26, 2004.

Puerto Rico Environmental Quality Board (PREQB). 1994. Site inspection narrative report, Scorpio Recycling, Candelaria Ward, Toa Baja, Puerto Rico. Hato Rey, Puerto Rico: Puerto Rico Environmental Quality Board, Superfund Program, PA/SI Section.

Roy F. Weston, Inc. (Weston). 1992. Data report, 8 October 1991 sampling, Scorpio Recycling, Inc., Toa Baja, Puerto Rico. Edison, New Jersey: U.S. Environmental Protection Agency, Caribbean Field Office.

Roy F. Weston, Inc. (Weston). 1999a. Revised sampling plan for the Scorpio Recycling site, Candelaria Ward, Toa Baja, Puerto Rico. New York, New York: U.S. Environmental Protection Agency.

Roy F. Weston, Inc. (Weston). 1999b. Sampling trip report - Scorpio Recycling site, Toa Baja, Puerto Rico. New York, New York: U.S. Environmental Protection Agency.

Roy F. Weston, Inc. (Weston). 1999c. Inorganic data for the Scorpio Recycling site, Toa Baja, Puerto Rico. New York, New York: U.S. Environmental Protection Agency.

Roy F. Weston, Inc. (Weston). 1999d. Organic data for the Scorpio Recycling site, Toa Baja, Puerto Rico. New York, New York: U.S. Environmental Protection Agency.

U.S. Army Corps of Engineers (USACE). 2004. Rio de la Plata, Puerto Rico CG flood control project. October 2004. Available at: U.S. Army Corps of Engineers, Jacksonville District, Programs and Project Management Division, Puerto Rico Home Page, http://www.saj.usace.army.mil/dp/puerto_rico/projects/rio_de_la_plata.htm (accessed December 2, 2004).

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2000. NPL site narrative at listing Scorpio Recycling, Inc., Candelaria Ward, Puerto Rico. December 2004. Available at: http://www.epa.gov/superfund/sites/npl/nar1575.htm (accessed December 2, 2004).

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed August 2005).

U.S. Geological Survey (USGS). 1977. Topographic map, Bayamon quadrangle, PR, 7.5 minutes series. 1:20,000. U.S. Geological Survey. Denver, CO.

Yoshioka, B. Marine biologist for the U.S. Fish and Wildlife Service, Boqueron, Puerto Rico. Personal communication June 12, 2000.

Woodbrook Road Dump

South Plainfield, New Jersey

EPA Facility ID: NJSFN0204260

Basin: Raritan

HUC: 02030105

Executive Summary

The Woodbrook Road Dump site, also known as the Dismal Swamp site, spans two heavily wooded properties in the Dismal Swamp wetland in Middlesex County, New Jersey. The site was a household and industrial waste dump during the 1940s and 1950s. Metals, PAHs, and PCBs are the primary contaminants of concern to NOAA at the site. The U.S. Fish and Wildlife Service and the U.S. Environmental Protection Agency have designated the Dismal Swamp as "priority wetlands." This area serves as key habitat for fish and wildlife and provides flood control for Bound Brook, which bisects the site. The habitat of primary concern to NOAA is Bound Brook. The catadromous American eel has been observed throughout Bound Brook and is present in the vicinity of the site. Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. Groundwater is another pathway of contaminant migration from the site.

Site Background

The Woodbrook Road Dump (Woodbrook) site, also known as the Dismal Swamp site, is in a mixed residential and industrial area in South Plainfield, Middlesex County, New Jersey (Figure 1). The site is approximately 28 ha (70 acres) in area and encompasses two heavily wooded properties northwest of Woodbrook Road. The site is bisected by Bound Brook and is situated within the Dismal Swamp wetland (Figure 2). The Dismal Swamp provides flood control for Bound Brook (Charters et al. 2001).

The Woodbrook site operated as a non-permitted dump during the 1940s and 1950s, accepting household and industrial wastes until it was closed in 1958. Potential sources of contamination found during site investigations included leaking capacitors, automotive parts, household refuse, building debris, and large quantities of bottles.

During September 1999, members of the Edison Wetlands Association discovered leaking capacitors in the Dismal Swamp wetlands. Some of the capacitors were partially buried and had leaked what was later determined to be polychlorinated biphenyls (PCBs) into the surrounding soil. In October 1999, the U.S. Environmental Protection Agency (USEPA) further investigated the leaking capacitors and found that they were in a swampy meadow area adjacent to a small, unnamed stream in the northwest corner of the site (USEPA 2001). The location of the unnamed stream could not be determined from the documents reviewed to prepare this report. In April and March 2000, the capacitors containing the PCBs were removed from the site, and fencing was installed around the areas where they had been. During an integrated assessment (IA) conducted by the USEPA in July 2000, additional buried capacitors and their associated parts were discovered at the site. The capacitors were removed during the IA (Charters et al. 2001).

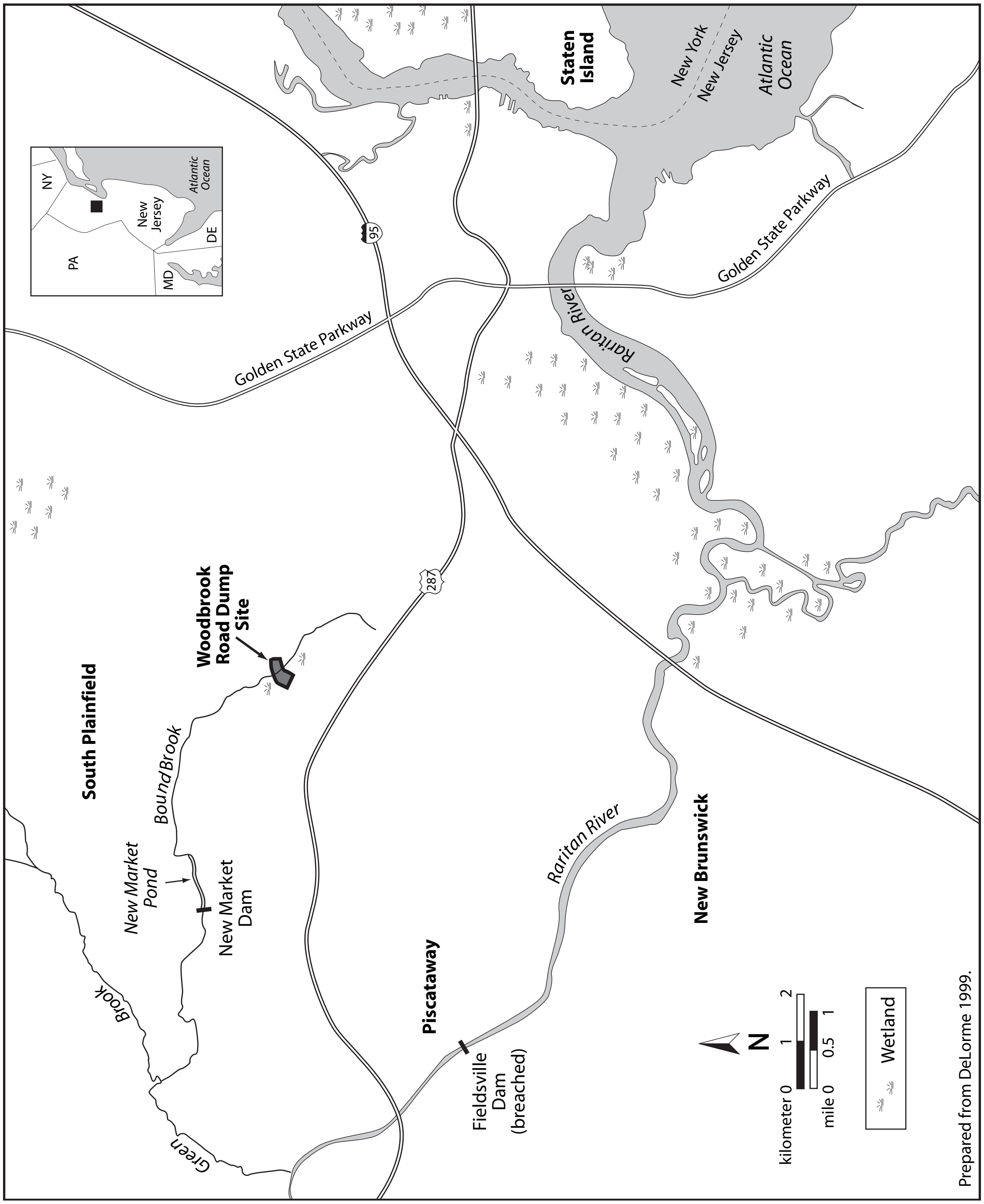


Figure 1. Location of Woodbrook Road Dump site, South Plainfield, New Jersey.

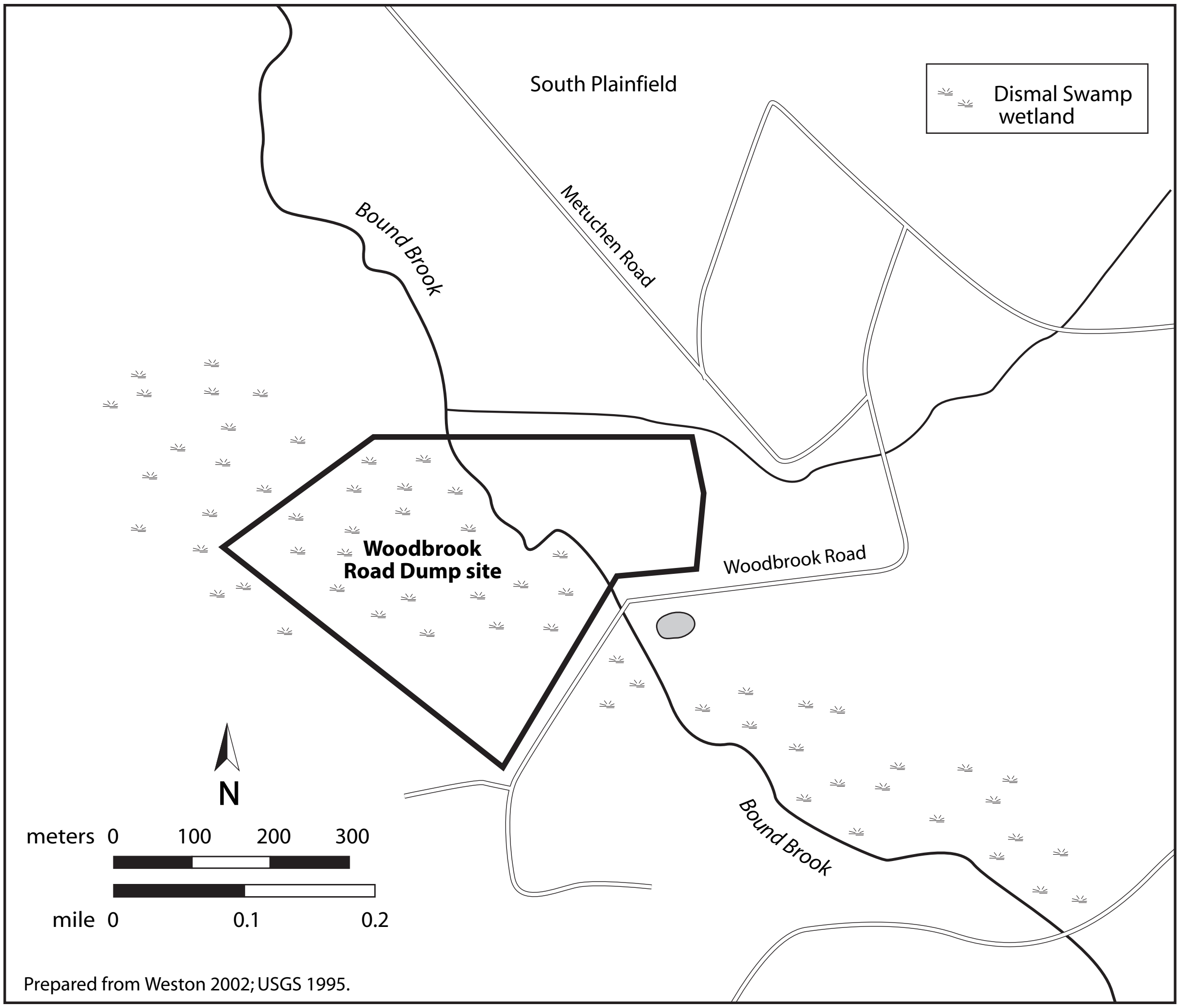


Figure 2. Detail of Woodbrook Road Dump property.

A Hazard Ranking System Package was completed for the Woodbrook site on September 10, 2001. In April 2003, the site was placed on the National Priorities List (USEPA 2004). A remedial investigation (RI) was scheduled to begin in the summer of 2004. Proposed activities for the RI include soil, sediment, and groundwater sampling (USEPA 2004). Information regarding the status of the RI was not available at the time of this report.

Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. The surface water pathway includes the Dismal Swamp wetland, which connects to Bound Brook, a secondary tributary to the Raritan River. Groundwater is another pathway for the migration of contaminants from the site. Groundwater is encountered at approximately 0.9 to 1.5 m (3 to 5 ft) below ground surface at the site. Areas in Dismal Swamp are considered recharge zones for groundwater (USACE 1993).

NOAA Trust Resources

The habitats of primary concern to NOAA are the surface water and sediments of Bound Brook. Contaminated wetlands within Dismal Swamp discharge into a small, unnamed stream approximately 290 m (950 ft) from where the leaking capacitors were found. The unnamed stream flows approximately 0.8 km (0.5 mi) before emptying into Bound Brook. The location of the unnamed stream could not be determined from the documents reviewed to prepare this report. Bound Brook flows approximately 12 km (7.5 mi) before converging with Green Brook, which continues to flow approximately 4.7 km (2.9 mi) to the Raritan River. The Raritan River flows approximately 32 km (20 mi) before discharging into the Atlantic Ocean (Figure 1).

The Dismal Swamp wetland is designated as "priority wetlands" by the U.S. Fish and Wildlife Service and the USEPA. In addition, the wetland represents a "highly valued resource," because it is one of the few wetland ecosystems remaining in the highly urbanized area of northern Middlesex County, and it is the largest natural wildlife refuge in this area (USEPA 2001).

Bound Brook is a low-gradient stream that supports a variety of warm water resident fish. Bass, bluegill, brown bullhead, goldfish, pumpkinseed, redbreast sunfish, shiner, tessellated darter, and white sucker are all commonly found in Bound Brook (Barno 2002). The New Market Dam on Bound Brook forms New Market Pond (Figure 1). The dam is approximately 6 km (3.7 mi) downstream of the Woodbrook site. New Market Dam lacks fish passage facilities and so is impassable to anadromous fish. Bound Brook and the small, unnamed stream are suitable habitats for alewife and blueback herring runs, but the New Market Dam impedes their migration (Barno 2002). During September 1999, Tropical Storm Floyd, and the floodwaters brought on by the storm, caused damage to the New Market Dam. The Township of Piscataway was awarded a grant for rehabilitation of the dam; however, it is currently unknown whether this rehabilitation will include installing fish passage facilities (Ritchey 2003). The catadromous American eel is able to traverse the dam and has been documented throughout Bound Brook (Barno 2002). The Fieldsville Dam on the Raritan River near the Township of Piscataway has been breached so Bound Brook, Green Brook, and the Raritan River now flow freely below the New Market Dam.

Although there are no plans to restore Bound Brook for use by anadromous fish species, active restoration is occurring in the Raritan River. NOAA trust resources in the Raritan River basin are listed in Table 1. American shad from the Delaware River basin have been transplanted to the Raritan River in efforts to reestablish a spawning population. Historically, anadromous alewife and blueback herring have also used the Raritan River basin. These species are not being actively restored, but it is possible with continued water quality improvement that they will reestablish themselves (Barno 2002). The American eel is found in Bound Brook and the Raritan River.

Recreational fishing of freshwater species takes place in Bound Brook, especially at New Market Pond. Recreational fishing of American shad and striped bass occurs in sections of the Raritan River downstream of the site. No commercial fishing takes place within the Raritan River (Barno 2002).

Table 1. NOAA trust resources found in the Raritan River Basin (Barno 2002). The migration of anadromous fish into Bound Brook is impeded by the New Market Dam.

Species		**Habitat Use**			**Fisheries**	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
ANADROMOUS FISH						
Alewife	*Alosa pseudoharengus*	◆	◆			
American shad	*Alosa sapidissma*	◆	◆			◆
Blueback herring	*Alosa aestivalis*	◆	◆			
Striped bass	*Morone saxitilis*	◆	◆			◆
CATADROMOUS FISH						
American eel	*Anguilla rostrata*			◆		

A fish consumption advisory is in effect for the entire length of Bound Brook, including New Market Pond, because of elevated levels of PCBs and dioxins detected in fish tissue. The New Jersey Department of Environmental Protection (NJDEP) recommends that people not eat fish taken from Bound Brook (NJDEP 2004). A fish-consumption advisory is also in effect for American eel, American lobster, blue crab, bluefish, striped bass, white catfish, and white perch within the lower portion of the Raritan River, downstream of New Brunswick (Figure 1). The advisory is in place because of elevated levels of PCBs and dioxins in fish tissues. The NJDEP further recommends:

- that the general public consume no more than one meal of American eel per year and that high-risk populations avoid consuming American eel from the lower portion of the Raritan River;
- that the general public consume no more than four meals of white perch and white catfish per year and that high-risk populations avoid consuming white perch and white catfish;
- that the general public consume no more than four meals per year of bluefish over 2.7 kg/61 cm (6 lb/24 in) and no more than one meal per month of bluefish under 2.7 kg/61cm (6 lb/24 in) and that high-risk populations avoid consuming bluefish of any size;
- that the general public consume no more than one meal per month of striped bass and that high-risk populations avoid consuming striped bass;
- that the general public consume no more than six blue crabs per week and that high-risk populations consume no more than three blue crabs per month; and
- that all populations avoid consuming the hepatopancreas of blue crab and discard the cooking liquid and that all populations avoid consuming the hepatopancreas of American lobster (NJDEP 2004).

Site-Related Contamination

During July and August 2000, the USEPA Region II Superfund Technical Assistance and Response Team (START) collected surface water, sediment, groundwater, and soil samples from the Woodbrook site. The samples were analyzed for metals, polycyclic aromatic hydrocarbons (PAHs), pesticides, and PCBs (Charters et al. 2001). Based on the results of these analyses, the primary contaminants of concern to NOAA are metals, PAHs, and PCBs. Surface water and sediment samples were taken from the wetland, Bound Brook, and the small, unnamed stream near the area where the leaking capacitors were found. Groundwater samples were taken from temporary monitoring wells throughout the site and from off-site domestic water spigots. Soil samples were taken from throughout the site. Table 2 summarizes the maximum concentrations of contaminants of concern to NOAA and compares them to relevant screening guidelines. Only concentrations that exceeded the screening guidelines are discussed below. Site-specific or regionally specific screening guidelines are always used when available. In the absence of such guidance, the screening guidelines for soil are the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs; Efroymson et al. 1997). The screening guidelines for surface water and groundwater are the ambient water quality criteria (AWQC; USEPA 2002). The screening guidelines for sediment are the threshold effects concentrations (TECs; MacDonald et al. 2000). Exceptions to these screening guidelines are noted in Table 2.

Surface Water

Metals, pesticides, and PCBs were detected in surface water samples taken from Bound Brook and the small, unnamed stream. The maximum concentration of cadmium was detected in a sample taken from Bound Brook downstream of the site, while the maximum concentrations of copper and lead were detected in samples taken from the small, unnamed stream. Cadmium and lead maximum concentrations exceeded the AWQC by one order of magnitude (Table 2). Copper concentrations exceeded the AWQC by a factor of two.

The PCB Aroclor 1254 was detected in a sample taken from the small stream and exceeded the AWQC by one order of magnitude (Table 2). The pesticide 4,4'-DDT was detected in a sample taken from Bound Brook downstream of the site at a concentration that exceeded the AWQC by a factor of three.

Sediment

Metals, PAHs, pesticides, and PCBs were detected in sediment samples taken from Bound Brook and the small, unnamed stream. The maximum concentration of cadmium was detected in a sample taken from Bound Brook downstream of the site. Arsenic, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc were detected at maximum concentrations in samples taken from the small, unnamed stream. Cadmium, lead, and mercury concentrations exceeded the TECs by one order of magnitude (Table 2). Concentrations of copper, zinc, nickel, and chromium exceeded the TECs by factors of approximately nine, six, two, and 1.5, respectively. Concentrations of arsenic and silver slightly exceeded the TECs. No TEC is available for comparison to the maximum concentration of selenium found in the sediment samples.

Maximum concentrations of PAHs detected in sediment samples ranged from 0.3 mg/kg to 5.4 mg/kg (Table 2). The maximum concentrations of seven of the eight detected PAHs (Table 2) exceeded the TECs by one order of magnitude. The maximum concentration of one PAH (fluorene) exceeded the TEC by a factor of four.

Table 2. Maximum concentrations of contaminants of concern to NOAA detected at the Woodbrook Road Dump site, South Plainfield, New Jersey (Charters et al. 2001; Weston 2002). Contaminant values in bold exceeded screening guidelines.

	Soil (mg/kg)		Water (µg/L)			Sediment (mg/kg)	
Contaminant	Soil	ORNL-PRG[a]	Surface Water	Ground Water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS							
Arsenic	**110**	9.9	7.8	34	150	**17**	9.79
Cadmium	**230**	0.38[d]	**6.8**	ND	0.25[e]	**16**	0.99
Chromium[f]	**550**	0.4	6.3	**42**	11	**70**	43.4
Copper	**6,400**	60	**23**	**62**	9[e]	**310**	31.6
Lead	**3,800**	40.5	**33**	**153**	2.5[e]	**570**	35.8
Mercury	**5.7**	0.00051	0.14	ND	0.77[g]	**2**	0.18
Nickel	**140**	30	7.5	42	52[e]	**57**	22.7
Selenium	**31**	0.21	ND	**7**	5.0[h]	11	NA
Silver	**67**	2	ND	**4**	3.2[e,i]	**7**	4.5[j]
Zinc	**6,000**	8.5	20	**144**	120[e]	**840**	121
PAHs							
Anthracene	0.24	NA	ND	ND	NA	**0.81**	0.0572
Benz(a)anthracene	**1.4**	0.1[k]	ND	ND	NA	**1.8**	0.108
Chrysene	1.5	NA	ND	ND	NA	**1.9**	0.166
Dibenz(a,h)anthracene	**0.43**	0.1[k]	ND	ND	NA	**0.48**	0.033
Fluoranthene	2.2	NA	ND	ND	NA	**4.3**	0.423
Fluorene	0.1	NA	ND	ND	NA	**0.3**	0.0774
Phenanthrene	**1.1**	0.1[k]	ND	ND	NA	**3.4**	0.204
Pyrene	**2.3**	0.1[k]	ND	ND	NA	**5.4**	0.195
PESTICIDES/PCBs							
4,4′-DDE	0.6	NA	0.0013	ND	1,050[i,l]	**0.16**	0.00316
4,4′-DDT	0.17	NA	**0.0038**	ND	0.001[m]	**0.59**	0.00416
Dieldrin	**0.0089**	0.000032[d]	0.022	ND	0.056	**0.013**	0.0019
Endrin	ND	NA	ND	ND	0.036	**0.009**	0.00222
Aroclor 1242[n]	**19,000**	0.371	ND	ND	NA	ND	0.0598
Aroclor 1248[n]	**980**	0.371	ND	ND	NA	ND	0.0598
Aroclor 1254[n]	**250**	0.371	**1.2**	**1.2**	0.014	**1.9**	0.0598
Aroclor 1260[n]	**55**	0.371	ND	ND	NA	**6.2**	0.0598

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).
b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.
c: Threshold Effects Concentration (TEC). Concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).
d: Ecological soil screening guidelines (USEPA 2005).
e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.
f: Screening guidelines represent concentrations for Cr^{+6}.
g: Derived from inorganic, but applied to total mercury.
h: Criterion expressed as total recoverable metal.
i: Chronic criterion not available; acute criterion presented.
j: Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.
k: Soil screening guidelines for protection of agricultural land uses (CCME 2003).
l: Lowest observable effects level (LOEL) (USEPA 1986).
m: Expressed as total DDT.
n: Screening guidelines expressed as Total PCBs for Aroclors.
NA: Screening guidelines not available.
N/A: Contaminant not analyzed for.
ND: Not detected

The maximum concentrations of pesticides 4,4′-DDE and 4,4′-DDT and PCB Aroclors 1254 and 1260 were detected in samples taken from the small, unnamed stream. Concentrations of 4,4′-DDT and PCB Aroclor 1260 exceeded the TECs by two orders of magnitude; concentrations of 4,4′-DDE and PCB Aroclor 1254 exceeded the TECs by one order of magnitude. The maximum concentrations of dieldrin and endrin were detected in samples taken from Bound Brook downstream of the site and exceeded the TECs by factors of six and four, respectively.

Groundwater

Metals and PCBs were detected in groundwater samples taken from temporary monitoring wells throughout the site. The maximum concentration of lead was detected in a sample taken in the northwest portion of the site just east of Bound Brook, and exceeded the AWQC by one order of magnitude. Copper and chromium were detected in samples taken from the wetlands in the northwest portion of the site at concentrations that exceeded the AWQC by factors of seven and four, respectively. Maximum concentrations of selenium, silver, and zinc were detected in samples taken from the wetlands in the northwest portion of the site and slightly exceeded the AWQC.

The maximum concentration of PCB Aroclor 1254 was detected in a sample taken from the wetlands in the northwest portion of the site and exceeded the AWQC by one order of magnitude.

Soil

Metals, PAHs, pesticides, and PCBs were detected in soil samples taken from the site. Mercury was detected in a sample taken from the southeast portion of the site at a concentration that exceeded the ORNL-PRG by four orders of magnitude. Chromium was detected in a sample taken from the wetlands in the center of the site at a concentration that exceeded the ORNL-PRG by three orders of magnitude. The maximum concentrations of cadmium, copper, selenium, and zinc were detected in samples taken from the southeast corner of the site, the southwest portion of the site, the center portion of the site east of Bound Brook, and the northwest portion of the site just east of Bound Brook, respectively. The maximum concentration of cadmium exceeded the soil screening guideline by two orders of magnitude (Table 2). Concentrations of copper, selenium, and zinc exceeded the ORNL-PRGs by two orders of magnitude. The maximum concentrations of arsenic, lead, and silver were detected in samples taken from the southeast portion of site, the wetlands in the southwest corner of the site, and the center of the site just west of Bound Brook, respectively. Maximum concentrations of arsenic, lead, and silver exceeded the ORNL-PRGs by one order of magnitude. The maximum concentration of nickel, which exceeded the ORNL-PRG by a factor of four, was detected in a sample taken from the wetlands in the northwest portion of the site just west of Bound Brook.

PAHs were detected in soil samples taken throughout the site at maximum concentrations that ranged from 0.1 mg/kg to 2.3 mg/kg. Maximum concentrations of benz(a)anthracene, phenanthrene, and pyrene exceeded the CCME screening guidelines by one order of magnitude. The maximum concentration of dibenz(a,h)anthracene exceeded the CCME by a factor of four. There are no ORNL-PRGs, USEPA ecological soil screening guidelines, or CCME screening guidelines available for comparison to the maximum concentrations of four of the eight detected PAHs.

The maximum concentrations of PCB Aroclors 1242, 1248, and 1254 were detected in soil samples taken from the wetlands in the northwest portion of the site, while the maximum concentration of Aroclor 1260 was detected in a sample taken from the wetlands near the center of the site west of Bound Brook. Maximum concentrations of PCB Aroclors 1242 and 1248 exceeded the ORNL-PRGs by four and three orders of magnitude, respectively. The maximum concentrations of PCB Aroclors 1254 and 1260 exceeded the ORNL-PRGs by two orders of magnitude. The maximum concentration of dieldrin, which exceeded the USEPA ecological soil screening guideline by one order of magnitude, was detected in a sample taken from the southeast portion of the site west of Bound Brook. The pesticides 4,4′-DDE and 4,4′-DDT were detected at maximum concentrations in samples taken from the northwest portion of the site. No ORNL-PRGs, USEPA ecological soil screening guidelines, or CCME screening guidelines are available for comparison to the maximum concentrations of 4,4′-DDE and 4,4′-DDT.

References

Barno, L. Fisheries biologist for the Bureau of Freshwater Fisheries, New Jersey Department of Environmental Protection. Personal communication May 14, 2002.

Canadian Council of Ministers of the Environment (CCME). 2003. Summary of existing Canadian environmental quality guidelines. December 2003. Available at: CCME Publications, http://www.ccme.ca/assets/pdf/e1_06.pdf (accessed September 2, 2004).

Charters, D.W., K.R. Seeley, and M. Hutson. 2001. Screening level ecological risk assessment (SLERA) for the Woodbrook Road Dumpsite (formerly the Dismal Swamp), Edison, New Jersey. U.S. Environmental Protection Agency & U.S. Fish and Wildlife Service, Edison, New Jersey.

DeLorme. 1999. *New Jersey Atlas and Gazetteer*. DeLorme. Yarmouth, ME.

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed August 2005).

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

New Jersey Department of Environmental Protection (NJDEP). 2004. A guide to health advisories for eating fish and crabs caught in New Jersey waters. September 2004. Available at: NJDEP Division of Science, Research, and Technology, http://www.state.nj.us/dep/dsr/fishadvisorybrochure-final.pdf (accessed October 8, 2004).

Ritchey, J. Supervising engineer, Dam Safety Section, New Jersey Department of Environmental Protection. Personal communication May 6, 2003.

Roy F. Weston Inc. (Weston). 2002. Removal site assessment report Woodbrook Road Dump site. South Plainfield, Middlesex County, New Jersey. Edison, New Jersey: U.S. Environmental Protection Agency.

U.S. Army Corps of Engineers (USACE). 1993. Reconnaissance report, Raritan River basin Dismal Swamp. New York: U.S. Army Corps of Engineers. February.

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2001. Hazard ranking system documentation package, Woodbrook Road Dump, South Plainfield, Middlesex County, New Jersey. CERCLIS ID No. NJSFN0204260, New York, NY.

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2004. Woodbrook Road Dump, Middlesex County, South Plainfield, New Jersey. January 2004. Available at: U.S. Environmental Protection Agency, Superfund Region 2: Congressional Dist. 12, http://www.epa.gov/region02/superfund/npl/0204260c.pdf (accessed October 11, 2004).

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed August 2005).

U.S. Geological Survey (USGS). 1995. Topographic map, Plainfield quadrangle, NJ, 7.5 minute series. 1:24,000. Denver, CO.

Palmer Barge Line

Port Arthur, TX

EPA Facility ID: TXD068104561

Basin: Sabine Lake

HUC: 12040201

Executive Summary

The Palmer Barge Line site is on an islet in Sabine Lake, near Port Arthur, Texas, approximately 0.8 km (0.5 mi) southwest of the Neches River. The Palmer Barge Line property was the site of marine vessel service and associated maintenance activities from 1982 to 1996. Metals, PAHs, PCBs, and pesticides have been detected in groundwater, sediment, and soil at the site. Metals are the primary contaminants of concern to NOAA. The habitats of concern to NOAA are the estuarine surface waters, associated wetlands, and sediments of the lower Neches River and Sabine Lake, which provide valuable spawning, rearing, and foraging habitat for several species of anadromous and estuarine fish and shellfish. Surface water runoff and groundwater discharge are the primary pathways for the migration of contaminants from the site to NOAA trust resources.

Site Background

The Palmer Barge Line (Palmer) site is in an industrial area of Port Arthur, Texas, on the Southeast Industrial Islet in Sabine Lake. The islet is approximately 0.8 km (0.5 mi) southwest of the confluence of the Neches River and Sabine Lake. The site is approximately 7 ha (17 acres) in area and is bordered to the north by the mouth of the Neches River and to the east, south, and west by Sabine Lake (Figure 1).

In 1982, Palmer Barge Line, Inc., purchased the property from the City of Port Arthur. From 1982 to 1996, the Palmer site operated as a marine vessel service and maintenance facility. In 1997, the property changed ownership and marine vessel service and maintenance activities ceased. Currently, marine salvage operations and vehicle parking are the only activities that occur at the site (USEPA 2000).

While in operation, the Palmer facility performed cleaning, degassing, maintenance, and inspection of barges and marine equipment. Cleaning operations included the removal of sludge and other residuals from holds, engines, and boilers by pressure-steaming them. Engines were also degreased and slop tanks were vacuumed to remove residuals of oil spilled during the loading and unloading of barges. Degassing also took place, involving the removal of explosive vapors from barge holds using nitrogen or boiler exhaust (USEPA 2000).

During a reconnaissance visit to the Palmer site, several potential sources of contamination were identified. Aboveground storage tanks (ASTs) were observed at several locations on the site. It is speculated that the ASTs were used to store bulk waste, petroleum products, and fresh water. Stained soils were observed in the vicinity of several of the ASTs. Several other types of storage containers, including open-top slop tanks and roll-off boxes, were also found at the site (Figure 2). Used oil was stored in the open-top slop tanks. Stained soils were also observed surrounding a flare used to burn excess gasses. In addition, several 210-liter (55-gallon) drums, compressed gas cylinders, and paint cans and buckets were observed on the Palmer site (USEPA 2000).

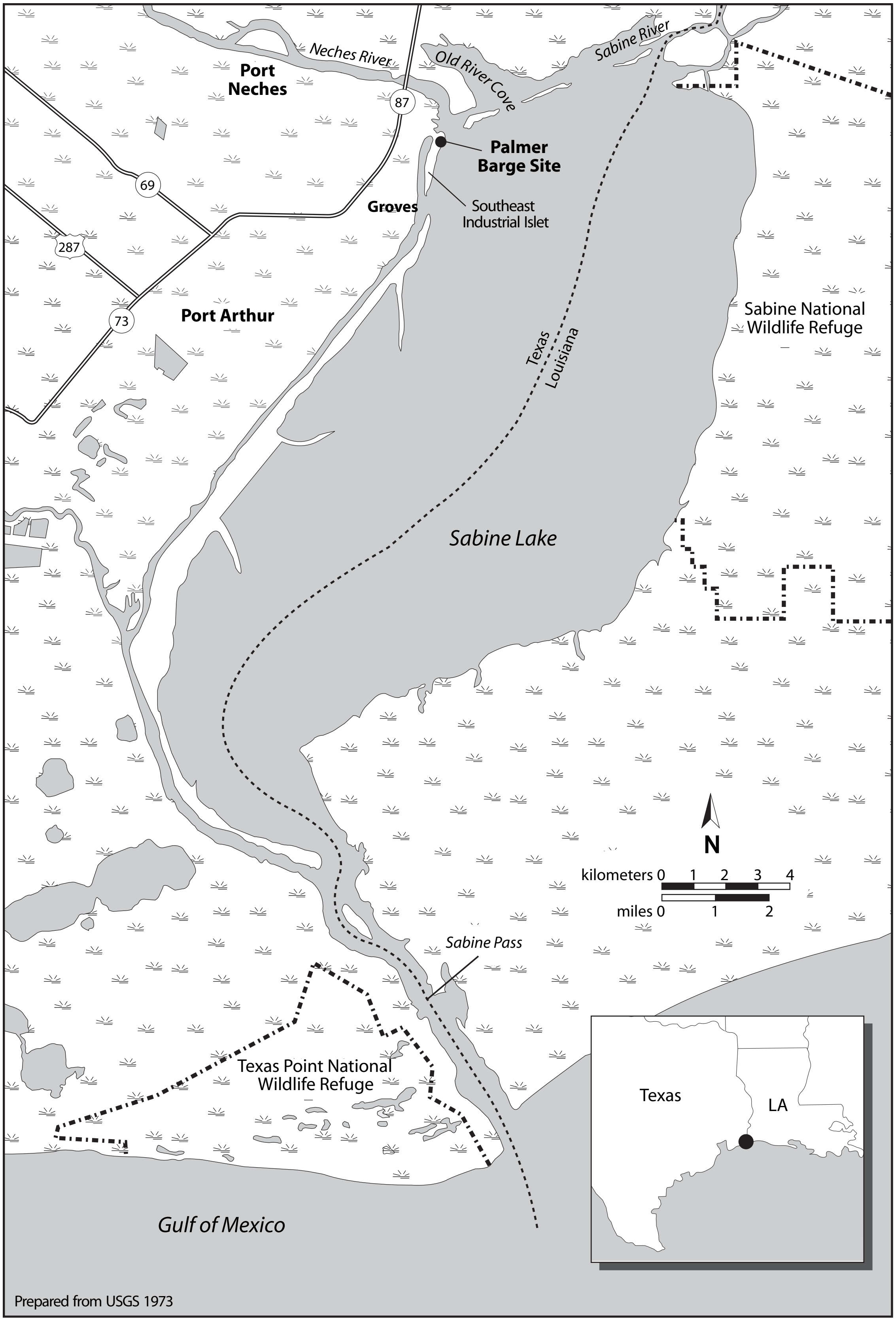


Figure 1. Location of the Palmer Barge Line, Inc. site, Port Arthur, Texas.

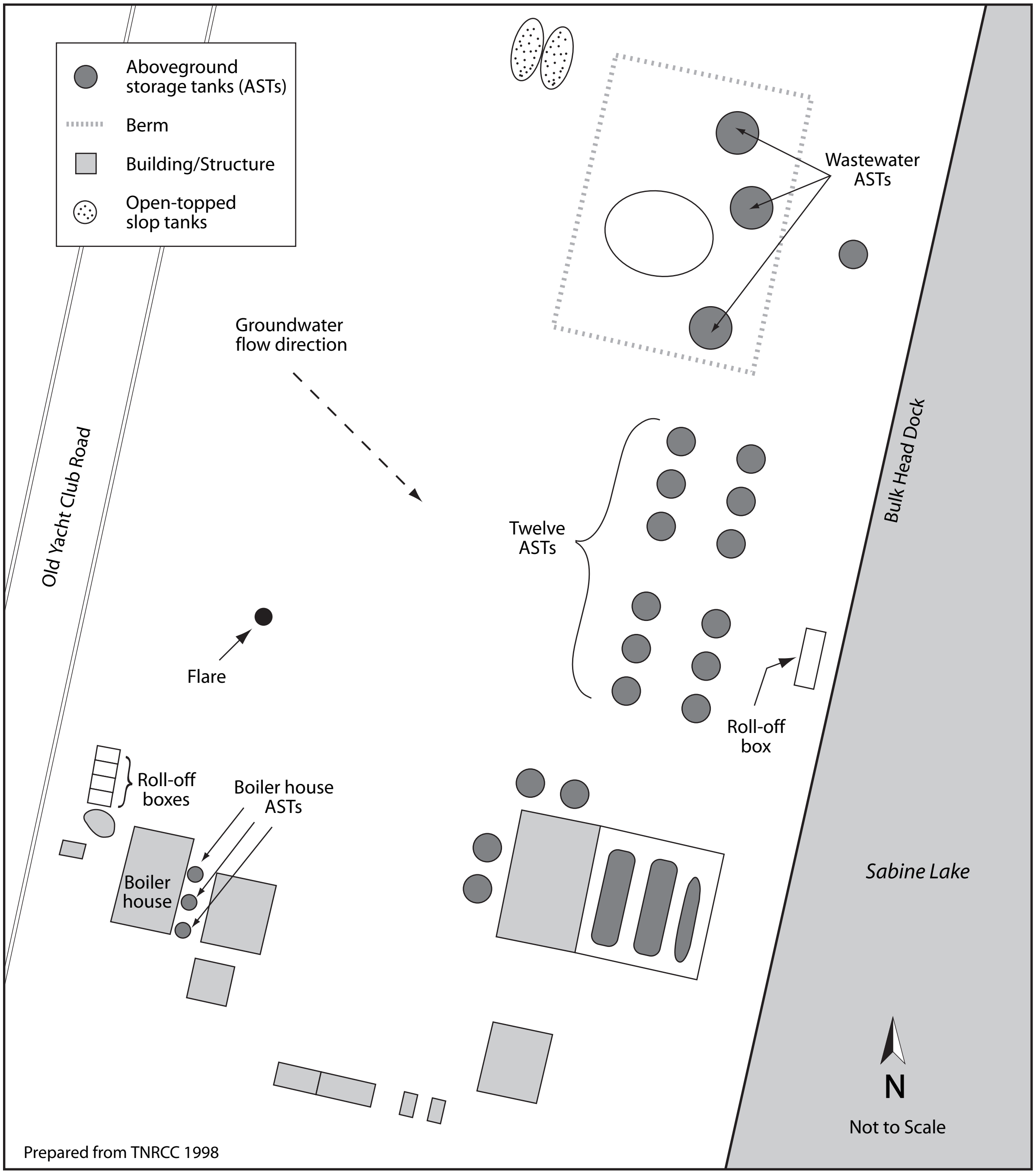


Figure 2. Detail of the Palmer Barge Line, Inc. property.

Contamination at the Palmer site was documented through the completion of a preliminary assessment/screening site inspection in 1998 and an expanded site investigation in 2000. In July 2000, the site was placed on the National Priorities List (USEPA 2004) based on evidence that metals had migrated from the site into Sabine Lake (USEPA 2000). Site work for a remedial investigation/feasibility study (RI/FS) began in fall 2002. Information on the current status of the RI/FS was not available at the time this report was prepared (USEPA 2004).

Surface water runoff and groundwater discharge are the primary pathways for the migration of contaminants from the site to NOAA trust resources. The Palmer site lies within the 100-year floodplain of the tidally influenced Sabine Lake. Runoff at the site drains in an easterly direction and discharges directly into Sabine Lake. On a regional scale, the groundwater below the site moves southeast toward the Gulf of Mexico. The depth to groundwater at the site is approximately 1 m (3 ft) below ground surface (USEPA 2000).

NOAA Trust Resources

The NOAA habitats of concern are the estuarine surface waters, associated wetlands, and sediments of the lower Neches River and Sabine Lake. Sabine Lake is connected to the Gulf of Mexico by a 10 km (6.2 mi) channel called Sabine Pass. Numerous NOAA trust resources, both fish and invertebrate species (Table 1), use the estuary for spawning, rearing, and foraging (Nelson et al. 1991). Of the major estuaries in Texas, Sabine Lake has the largest freshwater inflow. Combined inflow from the Sabine and Neches Rivers results in a low average salinity of 2.3 parts per thousand in Sabine Lake (Stelly 2000).

Nearly 14,000 ha (35,000 acres) of vegetated wetlands dominated by saltgrass (*Distichlis spicata*) and cordgrass (*Spartina* spp.) border the estuary. The Texas Point National Wildlife Refuge, the largest salt marsh bordering the estuary, is to the west of the Sabine Pass Ship Channel (Stelly 2000). Smaller marshes occur along the Sabine and Neches Rivers at the head of the estuary (Armstrong 1987). Most of the salt marsh to the east of the estuary has been designated a National Wildlife Refuge (USFWS 1998).

Sabine Lake and the lower Neches River provide adult foraging, juvenile nursery, migratory, and spawning habitat to numerous fish species. The anadromous gizzard shad uses Sabine Lake as a migratory corridor to the Sabine and Neches Rivers during spring spawning runs. Small estuarine fish such as bay anchovy, gulf killifish, hardhead catfish, sheepshead minnow, and silversides spend their entire lives within the estuary. Adult Atlantic croaker, sheepshead, southern flounder, spot, and striped mullet are present in the estuary seasonally. Many other species spawn in more saline waters, but use the estuary as a juvenile nursery (Patillo et al. 1997).

Blue crab are abundant in Sabine Lake and the lower Neches River as both adults and juveniles. Adult males remain in the estuary after mating, while females usually return to more saline water to brood eggs. Larvae are released offshore and are subsequently transported back into estuaries, where they settle to the bottom. Grass shrimp are common in Sabine Lake, typically spending their entire lives in the estuary, where they prefer salt marsh and oyster reef habitats. Brown and white shrimp are also abundant in Sabine Lake and the lower Neches River, although spawning occurs offshore. The most abundant bivalve species is the common rangia, followed by eastern oyster. All oyster and rangia life stages are present within the estuary (Nelson et al. 1991; Patillo et al. 1997).

Both recreational and commercial fisheries occur in Sabine Lake and the lower Neches River (Table 1). Commercial fisheries in Sabine Lake and the lower Neches River include blue crab and white shrimp. Recreational fisheries include blue crab, spotted sea trout, southern flounder, and red and black drum. No health advisories or restrictions on fishing or consumption have been issued for the lower Neches River or Sabine Lake (TDSHS 2002).

Table 1. NOAA trust resources present in Sabine Lake and the Lower Neches River (Stelly 2000).

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
ANADROMOUS FISH						
Gizzard shad	*Dorosoma cepedianum*		◆			
MARINE/ESTUARINE FISH						
Atlantic croaker	*Micropogonias undulatus*		◆	◆		◆
Bay anchovy	*Anchoa mitchilli*	◆	◆	◆		
Black drum	*Pogonias cromis*		◆	◆		◆
Gulf killifish	*Fundulus grandis*	◆	◆	◆		
Gulf menhaden	*Brevoortia patronus*		◆			
Hardhead catfish	*Arius felis*	◆	◆	◆		
Pinfish	*Lagodon rhomboides*		◆	◆		
Red drum	*Sciaenops ocellatus*		◆			◆
Sheepshead	*Archosargus probatocephalus*		◆	◆		◆
Sheepshead minnow	*Cyprinodon variegatus*	◆	◆	◆		
Silver perch	*Bairdiella chrysoura*		◆	◆		
Silversides	*Menidia spp.*	◆	◆	◆		
Southern flounder	*Paralichthys lethostigma*		◆	◆		◆
Spot	*Leiostomus xanthurus*		◆	◆		◆
Spotted seatrout	*Cynoscion nebulosus*		◆	◆		◆
Striped mullet	*Mugil cephalus*		◆	◆		◆
INVERTEBRATES						
Blue crab	*Callinectes sapidus*	◆	◆	◆	◆	◆
Brown shrimp	*Farfante penaeus aztecus*		◆	◆	◆	◆
Eastern oyster	*Crassostrea virginica*	◆	◆	◆		◆
Grass shrimp	*Palaemonetes pugio*	◆	◆	◆		
Rangia	*Rangia cuneata*	◆	◆	◆		◆
White shrimp	*Litopenaeus setiferus*		◆	◆	◆	◆

Site-Related Contamination

The primary contaminants of concern to NOAA are metals. Groundwater, sediment, and soil samples were collected during the 2000 expanded site investigation. The samples were analyzed for metals; semivolatile organic compounds, including polycyclic aromatic hydrocarbons (PAHs) and phenols; volatile organic compounds; and pesticides and polychlorinated biphenyls (PCBs). Thirty-eight soil samples were collected from areas surrounding several groups of ASTs, the open-top slop tanks, and the flare (Figure 2). Sediment samples were collected from 17 sampling locations in Sabine Lake. Two groundwater samples were collected, one downgradient of the wastewater ASTs and one downgradient of the 12 ASTs (Figure 2).

Table 2 summarizes maximum contaminant concentrations detected during the site investigations and compares them to appropriate screening guidelines. The screening guidelines are the ambient water quality criteria (AWQC) for groundwater, the effects range-low (ERL) for sediment, and the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs) and the U.S. Environmental Protection Agency's (USEPA) ecological soil screening guidelines for soil, with exceptions as noted on Table 2. Only maximum concentrations that exceeded relevant screening guidelines are discussed below.

<u>Groundwater</u>
Metals were detected in groundwater samples collected from a monitoring well downgradient of the 12 ASTs at maximum concentrations in excess of the AWQC. The maximum concentration of lead exceeded the AWQC by two orders of magnitude. Maximum concentrations of mercury and zinc exceeded the AWQCs by one order of magnitude, while the maximum concentration of nickel exceeded the AWQC by a factor of approximately eight. The maximum concentrations of arsenic and chromium slightly exceeded the AWQC. Cadmium and the pesticide 4,4'-DDD were also detected, but at concentrations below the AWQCs.

<u>Sediment</u>
Metals, anthracene (a PAH compound), and PCBs were detected in sediment samples taken from Sabine Lake at maximum concentrations in excess of the ERLs. Maximum concentrations of arsenic, lead, nickel, selenium, and zinc slightly exceeded the ERLs. Chromium and silver were also detected, but at concentrations below the AWQCs. Anthracene and PCBs were detected at maximum concentrations that exceeded the ERLs by one order of magnitude. The pesticide heptachlor epoxide was also detected, but no ERL is available for comparison to the maximum concentration of heptachlor epoxide.

<u>Soil</u>
Metals, PAHs, pentachlorophenol (PCP), pesticides, and PCBs were detected in soil samples collected from throughout the site at maximum concentrations in excess of screening guidelines. The maximum concentrations of metals were detected in soil samples taken in the vicinity of the boiler house ASTs. The maximum concentration of mercury exceeded the ORNL-PRG by three orders of magnitude, while the maximum concentrations of chromium, lead, and zinc exceeded the ORNL-PRGs by two orders of magnitude. The maximum concentration of cadmium exceeded the USEPA ecological soil screening guideline by one order of magnitude, and the maximum concentrations of copper and selenium exceeded the ORNL-PRGs by one order of magnitude. The maximum concentration of arsenic exceeded the ORNL-PRG by a factor of approximately eight. Maximum concentrations of nickel and silver exceeded the ORNL-PRGs by a factor of four.

PAHs were detected in soil samples taken near the open-top slop tanks and the wastewater ASTs at maximum concentrations that ranged from 110 mg/kg to 1,300 mg/kg. The maximum concentration of acenaphthene exceeded the ORNL-PRG by a factor of eight. No ORNL-PRGs or USEPA ecological soil screening guidelines are available for comparison to the maximum concentrations of other detected PAHs. The maximum concentration of PCP exceeded the ORNL-PRG by two orders of magnitude.

Pesticides were detected in soil samples taken throughout the site. The maximum concentration of dieldrin, which exceeded the USEPA ecological soil screening guideline by two orders of magnitude, was detected in a sample collected near the boiler house ASTs. No ORNL-PRGs or USEPA ecological soil screening guidelines are available for comparison to the maximum concentrations of other detected pesticides. PCBs were detected in a sample collected in the vicinity of the flare at a maximum concentration that exceeded the ORNL-PRG by less than a factor of two.

Table 2. Maximum concentrations of contaminants of concern to NOAA detected in samples at the Palmer Barge Line site, Port Arthur, Texas (Weston 2000). Contaminant values in bold exceeded screening guidelines.

	Soil (mg/kg)		**Water (µg/L)**		**Sediment (mg/kg)**	
Contaminant	Soil	ORNL-PRG[a]	Groundwater	AWQC[b]	Sediment	ERL[c]
METALS/INORGANICS						
Arsenic	**87**	9.9	**46**	36	**12**	8.2
Cadmium	**13**	0.38[d]	1.9	8.8	ND	1.2
Chromium[e]	**150**	0.4	**70**	50	31	81
Copper	**4,300**	60	ND	3.1	ND	34
Lead	**5,100**	40.5	**1,000**	8.1	**61**	46.7
Mercury	**3.3**	0.00051	**1.1**	0.094[f]	ND	0.15
Nickel	**130**	30	**71**	8.2	**28**	20.9
Selenium	**3.3**	0.21	ND	71	**1.2**	1.0[g]
Silver	**8**	2	ND	1.9[h]	0.75	1
Zinc	**7,100**	8.5	**2,500**	81	**210**	150
PAHs						
Acenaphthene	**170**	20	ND	710[i]	ND	0.016
Acenaphthylene	140	NA	ND	300[h,i,j]	ND	0.044
Anthracene	240	NA	ND	300[h,i,j]	**0.96**	0.0853
Benz(a)anthracene	280	NA	ND	300[h,i,j]	ND	0.261
Chrysene	330	NA	ND	300[h,i,j]	ND	0.384
Dibenz(a,h)anthracene	110	NA	ND	300[h,i,j]	ND	0.0634
Fluoranthene	520	NA	ND	16[i]	ND	0.6
Fluorene	360	NA	ND	300[h,i,j]	ND	0.019
2-Methylnaphthalene	1,300	NA	ND	300[h,i,j]	ND	0.07
Naphthalene	530	NA	ND	2350[h,i]	ND	0.16
Phenanthrene	1,300	NA	ND	NA	ND	0.24
Pyrene	480	NA	ND	300[h,i,j]	ND	0.665
PHENOLS						
Pentachlorophenol	**570**	3	ND	7.9	ND	0.017[g]
PESTICIDES/PCBs						
Aldrin	0.03	NA	ND	1.3[h]	ND	0.0095[g]
4,4′-DDD	0.12	NA	0.14	3.6[h,i]	ND	0.002
Dieldrin	**0.03**	0.000032[d]	ND	0.0019	ND	0.00002
Endrin	0.04	NA	ND	0.0023	ND	NA
Heptachlor	1	NA	ND	0.0036	ND	0.0003[g]
Heptachlor Epoxide	0.04	NA	ND	0.0036	0.01	NA
Total PCBs	**0.64**	0.371	ND	0.03	**0.27**	0.0227

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).
b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Marine chronic criteria presented.
c: Effects range-low (ERL) represents the 10th percentile for the dataset in which effects were observed or predicted in studies compiled by Long et al. (1998).
d: Ecological soil screening guidelines (USEPA 2005).
e: Screening guidelines represent concentrations for Cr^{+6}.
f: Derived from inorganic, but applied to total mercury.
g: Marine apparent effects threshold (AET) for bioassays. The AET represents the concentration above which adverse biological impacts would be expected.
h: Chronic criterion not available; acute criterion presented.
i: Lowest Observable Effect Level (LOEL) (USEPA 1986).
j: Value for chemical class.
NA: Screening guidelines not available.
ND: Not detected.

References

Armstrong, N.E. 1987. The ecology of open-bay bottoms of Texas: A community profile. Biological Report 85(7.12). U.S. Fish and Wildlife Service.

Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed November 17, 2004).

Long, E.R., L.J. Field, and D.D. MacDonald. 1998. Predicting toxicity in marine sediments with numerical sediment quality guidelines. Environ. Tox. Chem. 17(4): 714-727.

Nelson, D.M., E.A. Irlandi, L.R. Settle, M.E. Monaco, and L. Coston-Clements. 1991. Distribution and abundance of fishes and invertebrates in southeast estuaries. NOAA/NOS Strategic Environmental Assessments Division, Rockville, MD.

Patillo, M.E., T.E. Czapla, D.M. Nelson, and M.E Monaco. 1997. Distribution and abundance of fishes and invertebrates in Gulf of Mexico estuaries. Volume II: Species Life History Summaries. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD.

Roy F. Weston Inc. (Weston). 2000. Expanded site inspection report, Palmer Barge Line site, Port Arthur, Jefferson County, Texas. Weston W.O. No. 03886.190.005.0500. Prepared for U.S. Environmental Protection Agency (USEPA), Dallas, TX.

Stelly, T. Fisheries biologist, Texas Parks and Wildlife Department, Division of Coastal Fisheries. Personal communication August 22, 2000.

Texas Department of State Health Services (TDSHS). 2002. Areas sampled by the Texas Department of Health where no fish advisories or bans were issued. November 2004. Available at: TDSHS Bureau of Food and Drug Safety, Seafood Safety Division, http://www.tdh.state.tx.us/bfds/ssd/fiscount.html (accessed November 24, 2004).

Texas Natural Resource Conservation Commission (TNRCC). 1998. Preliminary assessment/screening site inspection report. Palmer Barge Line Inc., Port Arthur, Jefferson County, Texas: TNRCC in cooperation with USEPA, Region 6, Dallas, Texas.

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2000. NPL site narrative at listing Palmer Barge Line, Port Arthur, Texas. Available at: http://www.epa.gov/superfund/sites/npl/nar1600.htm (accessed December 9, 2004).

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2004. USEPA CERCLIS Database. October 2004. Available at: USEPA Superfund Information Systems, http://cfpub.epa.gov/supercpad/cursites/cactinfo.cfm?id=0605212 (accessed November 24, 2004).

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed November 16, 2004).

U.S. Fish and Wildlife Service (USFWS). 1998. Sabine National Wildlife Refuge brochure. U.S. Fish and Wildlife Service, Slidell, Louisiana.

U.S. Geological Survey (USGS). 1973. Topographic map, Gulf Coast ecological inventory, Port Arthur, TX-LA. 7.5 minute series. 1:25,000. U.S. Geological Survey.

Taylor Lumber and Treating

Sheridan, Oregon

EPA Facility ID: ORD009042532

Basin: Yamhill

HUC: 17090008

Executive Summary

The Taylor Lumber and Treating site is a former wood-processing and wood-treating facility near Sheridan, Oregon, along the South Yamhill River. From 1966 to 2001, the facility treated wood products with petroleum-based creosote and pentachlorophenol solutions, as well as with ammoniacal copper zinc arsenate. The primary contaminants of concern to NOAA are metals, PAHs, dioxins, furans, and pentachlorophenol, which have been detected in surface water, groundwater, sediment, and soil at the site. The surface water and sediments of the South Yamhill River, which provides migratory and spawning habitat for steelhead and coho salmon, are the primary NOAA habitats of concern. Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. The steelhead present in the South Yamhill River are listed by NOAA Fisheries as federally threatened.

Site Background

The Taylor Lumber and Treating (Taylor) site is a former wood-processing and wood-treating facility approximately 1.6 km (1 mi) west of Sheridan, Oregon, and approximately 100 m (330 ft) north of the South Yamhill River (Figure 1). The Taylor property encompasses approximately 95 ha (235 acres), of which one-quarter was used for the wood-treating facility, one-quarter was used as a sawmill and planing facility, and the remainder was used for agricultural purposes (CH2M Hill 2002). Operations began in 1966 under the ownership of John Taylor. The sawmill ceased operations on May 7, 2001, and the wood-treating operations were stopped on July 20, 2001.

During the time operations were active at the site, wood products such as lumber, poles, pilings, posts, railroad ties, and plywood were conditioned and pressure-treated with preservatives to prolong their useful life. Wood-preserving chemicals such as petroleum-based creosote and pentachlorophenol (PCP) solutions and ammoniacal copper zinc arsenate (ACZA) were used (USEPA 2002a).

Rock Creek Road runs through the portion of the property dedicated to wood-treating operations, dividing it into what were called the West Facility and the East Facility (Figure 2). Primary operations within the East Facility included the peeling, milling, planing, and chipping of raw wood. Both finished and unfinished wood products were stored in the East Facility. Between the 1960s and the 1980s, wood waste and debris were deposited in a waste pile known as Moe's Mountain. Moe's Mountain, which is currently covered in vegetation, measures approximately 200 m by 110 m (660 ft by 360 ft) and is approximately 4.6 m (15 ft) high.

Operations in the West Facility included the treatment of wood products and the drying and storing of treated wood. Petroleum products used at the site were stored at the West Facility in two aboveground storage tank farms. Creosote was stored in the ABC tank farm, and oil was stored in the P-9 oil tank farm (CH2M Hill 2002) (Figure 2).

Figure 1. Location of the Taylor Lumber and Treating site, Sheridan, Oregon.

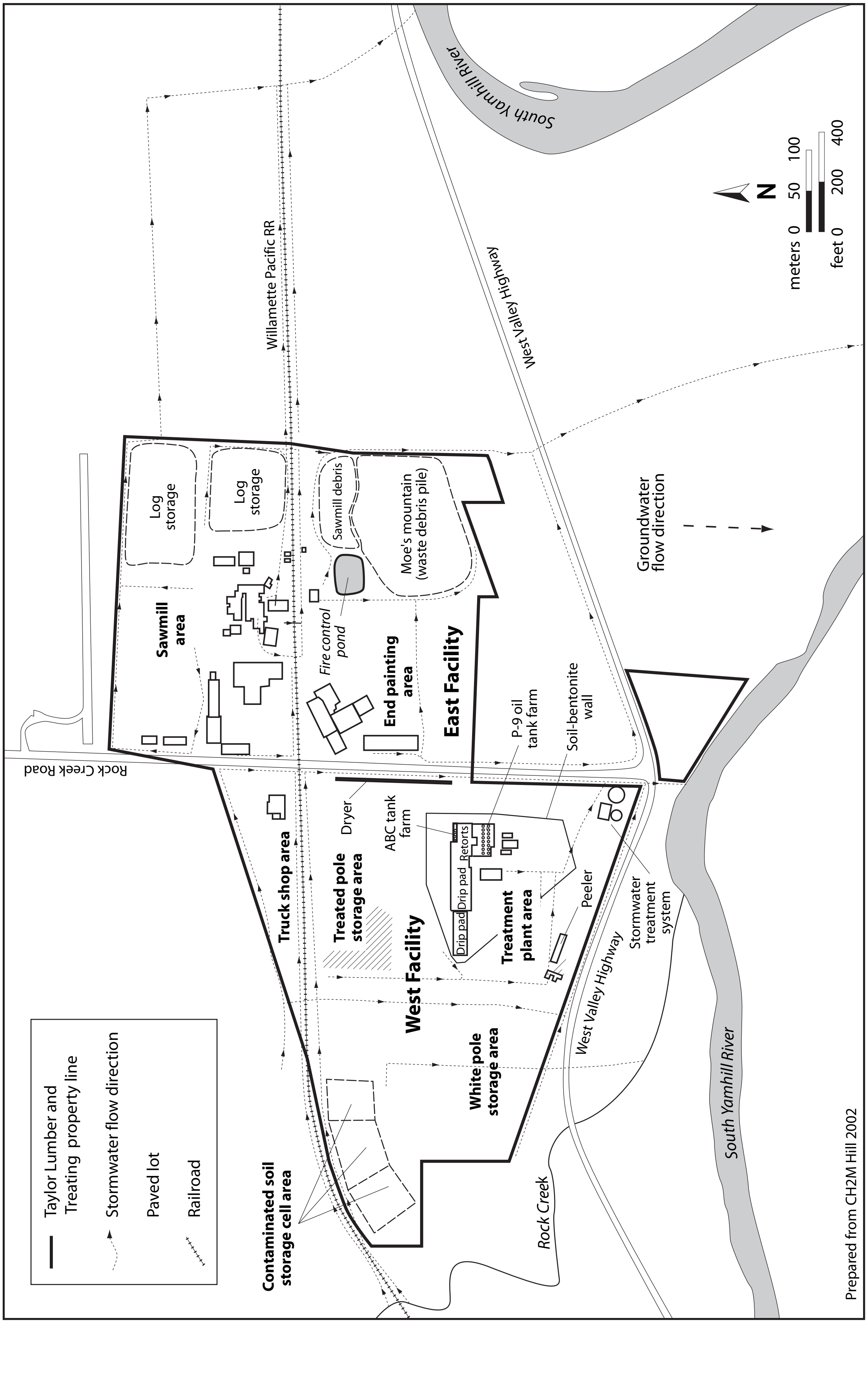


Figure 2. Detail of the Taylor Lumber and Treating property.

Two documented spills have occurred at the Taylor site. In February 1999, the U.S. Environmental Protection Agency (USEPA) responded to a discharge of approximately 13,000 L (3,400 gal) of 5-percent PCP-enriched oil from the P-9 oil tank farm. In September 1999, approximately 104,000 L (27,500 gal) of reclaimed creosote wastewater spilled from the P-9 oil tank farm. The majority of this spill was contained within the tank farm's secondary containment structure. Creosote-stained soils observed in the Rock Creek Road ditch indicate a potential breach in the secondary containment structures (USEPA 2002a).

In 1988, a preliminary assessment and a site inspection were performed to evaluate the site's potential for inclusion on the National Priorities List (NPL) (USEPA 2002a). In June and August 1999, the USEPA conducted an integrated assessment of the Taylor facility that documented the presence of contaminants, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCP, metals, and dioxins/furans. Many of these substances were detected in surface water, soil, and air. In addition, a plume of dense nonaqueous-phase liquid (DNAPL) was identified in the groundwater in the vicinity of the treatment plant area. A removal action conducted in 2000 included the installation of a bentonite barrier wall to contain the DNAPL. In addition, a portion of the treated pole storage area was capped during the removal action (USEPA 2002a). The Taylor site was proposed to the NPL on December 1, 2000, and was placed on the NPL on June 14, 2001.

Surface water runoff is the primary pathway for the migration of contaminants from the site to NOAA trust resources. Surface water runoff is channeled from the site into ditches that drain to the south and discharge into the South Yamhill River (USEPA 2000). Stormwater runoff from the Taylor site is collected in a series of catch basins, storm drains, and ditches and is channeled to four outfalls under a National Pollutant Discharge Elimination System (NPDES) permit that regulates concentrations of oil, grease, arsenic, copper, zinc, and PCP. All of the outfalls at the site discharge to drainage ditches that empty into the South Yamhill River. Between 1994 and 1996, allowable contaminant discharge concentrations were violated several times. In 1999, several contaminants were detected at elevated concentrations in sediment samples collected from each of the four outfalls. SVOCs, including PCP and pyrene, and metals, including arsenic, copper, lead, and zinc, were detected at all four outfalls at concentrations that exceeded the criteria specified under the NPDES permit (USEPA 2002a).

Groundwater also provides a pathway for the migration of contaminants to the South Yamhill River. Groundwater in the vicinity of the Taylor site generally flows south toward the South Yamhill River, and groundwater beneath the site is hydraulically connected to the South Yamhill River (CH2M Hill 2002).

NOAA Trust Resources

The habitats of primary concern to NOAA are the surface water and sediments of the South Yamhill River. The river flows generally to the east, past the Taylor site and the city of Sheridan, and joins the North Yamhill River to form the Yamhill River approximately 64 river km (40 mi) northeast of the Taylor site near McMinnville (CH2M Hill 2002). From McMinnville, the Yamhill River flows approximately 19 km (12 mi) to its confluence with the Willamette River near Dayton, Oregon (USEPA 2000). The Willamette River flows northward through Portland and joins the Columbia River, which drains into the Pacific Ocean (Figure 1).

NOAA trust resources present in the South Yamhill, Yamhill, Willamette, and Columbia Rivers are listed in Table 1. The South Yamhill River provides a migratory route for both winter run steelhead and fall run coho salmon. These species spawn in the tributaries of the South Yamhill River, including Mill and Willamina Creeks just upstream of the Taylor site. Occasionally, spring and fall run chinook and summer steelhead runs have also been documented in the Yamhill River. These species are strays from other river systems, are not native to the Yamhill River, and do not use the Yamhill River or South Yamhill River as regular migratory routes or for spawning habitat (Caldwell 2002).

Table 1. NOAA trust resources present in the South Yamhill, Yamhill, Willamette and Columbia Rivers (Caldwell 2002, Kostow 2002).

Species		**Habitat Use**			**Fisheries**		
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Rec. Fishery	Comm. Fishery	Subsistence Fishery
ANADROMOUS FISH							
American shad[a]	*Alosa sapidissima*	◆	◆		◆		
Coho salmon (fall run)	*Oncorhynchus kisutch*	◆	◆		◆	◆	
Pacific lamprey[a]	*Lampetra tridentata*	◆	◆		◆	◆	◆
Steelhead (winter run)[b]	*Oncorhynchus mykiss*	◆	◆				
White sturgeon[a]	*Acipenser transmontanus*	◆	◆		◆	◆[c]	

a: Presence not confirmed in South Yamhill or Yamhill Rivers

b: Listed as federally threatened

c: Commercial fishery in the Columbia River only

Historically, anadromous fish passage into the Willamette River was blocked at Willamette Falls in Oregon City. In 1971, however, a fish ladder was constructed that allows steelhead and salmon to access the Willamette River and its tributaries upstream of the falls. A historical park in McMinnville includes a relic set of locks that have also been provided with fish passage, allowing fish to migrate into the South Yamhill River. There are no other blockages along the migratory route to the South Yamhill River (Caldwell 2002).

American shad and white sturgeon are present in the lower and main stem Willamette River, but it is unknown whether either species is present in the Yamhill River or South Yamhill River because those rivers have not been sampled for these fish species (Caldwell 2002). The Pacific lamprey is also present in the Willamette River, where it is fished commercially, recreationally, and for subsistence (Kostow 2002).

Both recreational and commercial fishing of fall run coho salmon occur on the South Yamhill River. The winter run steelhead are listed by NOAA Fisheries as federally threatened and are therefore protected from recreational or commercial fishing. White sturgeon are fished commercially in the Columbia River and recreationally in the Columbia and Willamette Rivers. American shad are fished recreationally in the Willamette River (Caldwell 2002).

A fish advisory is currently in effect for the main stem Willamette River. The advisory recommends that all species of resident fish in the main stem Willamette River be eaten in only moderate amounts because of elevated levels of mercury in the fish tissue. This advisory also includes migrating ocean fish such as salmon, steelhead, shad, and lamprey (ODHS 2004).

Site-Related Contamination

The primary contaminants of concern to NOAA at the Taylor site are metals, polycyclic aromatic hydrocarbons (PAHs), dioxins, furans, and PCP. One hundred and three soil samples, 22 groundwater samples, 16 surface water samples, and 68 sediment samples have been collected at the Taylor site for analysis. The sediment and surface water samples were collected from stormwater ditches that drain the site, the South Yamhill River, and Rock Creek. All the sampled media were analyzed for metals, VOCs, pesticides and polychlorinated biphenyls (PCBs), and dioxins and furans. Soil, groundwater, and sediment samples were also analyzed for SVOCs, including PAHs and PCP.

Table 2 summarizes maximum contaminant concentrations detected during the site investigations and compares them to appropriate screening guidelines. The screening guidelines are the ambient water quality criteria (AWQC) for groundwater and surface water, the threshold effects concentrations (TECs) for sediment, and the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs) and the USEPA's ecological soil screening guidelines for soil, with exceptions as noted on Table 2. Only maximum concentrations that exceeded relevant screening guidelines are discussed below.

<u>Surface Water</u>

Metals, the pesticide DDT, dioxins, and furans were detected in surface water samples collected at the site. PCP detected in surface water samples did not exceed the AWQC and so are not discussed below. The maximum concentration of cadmium exceeded the AWQC by a factor of approximately 2.5. The maximum concentrations of copper and lead exceeded the AWQC by a factor of approximately seven in samples collected from a drainage ditch adjacent to the stormwater treatment plant and from the South Yamhill River, respectively. The maximum concentration of mercury, which was detected in a sample from the Yamhill River, exceeded the AWQC by one order of magnitude.

Dioxins, furans, and DDT were also detected in surface water samples. The dioxin detected at the greatest concentration was octachlorodibenzo-p-dioxin (OCDD) and the furan detected at the greatest concentration was octachlorodibenzo-p-furan (OCDF). AWQCs are not available for comparison to the maximum concentrations of OCDD and OCDF. The maximum concentration of DDT, which occurred in a sample taken from the South Yamhill River downstream of the site, exceeded the AWQC by two orders of magnitude.

<u>Groundwater</u>

Metals, PAHs, PCP, dioxins, and furans were detected in groundwater samples at the site; pesticides detected in groundwater samples did not exceed AWQC and so are not discussed below. Sample collection was focused on the soil-bentonite wall installed to contain DNAPL in the treatment plant area. Samples were collected both from inside the barrier wall and outside or downgradient of the wall. Maximum concentrations of chromium, copper, and lead exceeded the AWQC by one order of magnitude. The majority of maximum metals concentrations were detected in samples collected from inside the bentonite wall; however, maximum concentrations of cadmium, nickel, and zinc were detected outside the bentonite wall in the treatment plant area. The maximum concentrations of cadmium, mercury, zinc, and nickel exceeded the AWQCs by factors of seven, six, five, and slightly less than four, respectively. The maximum concentration of selenium slightly exceeded the AWQC.

All maximum concentrations of PAHs in groundwater were detected in samples collected from inside the bentonite wall. The maximum concentrations of acenaphthene and naphthalene exceeded the AWQC by one order of magnitude. AWQCs are not available for comparison to the

Table 2. Maximum concentrations of contaminants of concern to NOAA detected in samples collected at the Taylor Lumber and Treating site (CH2M HILL 2002; 2003). Contaminant concentrations in bold exceed screening guidelines.

	Soil (mg/kg)		**Water (µg/L)**			**Sediment (mg/kg)**	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	Surface Water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS							
Arsenic	**1400**	9.9	51	73	150	**450**	9.79
Cadmium	**15**	0.38[d]	**1.8**	**0.7**	0.25[e]	**2.9**	0.99
Chromium[f]	**160**	0.4	**300**	3.3	11	**88**	43.4
Copper	**1600**	60	**560**	**68**	9[e]	**1700**	31.6
Lead	**2900**	40.5	**41**	**18**	2.5[e]	**140**	35.8
Mercury	**0.41**	0.00051	**4.8**	**9.2**	0.77[g]	**8.5**	0.18
Nickel	**340**	30	**200**	4.6	52[e]	**270**	22.7
Selenium	**3**	0.21	**5.1**	3.3	5.0[h]	3.4	NA
Silver	**18**	2	1.2	N/A	3.2[e,i]	3.7	4.5[j]
Zinc	**430**	8.5	**600**	120	120[e]	**1900**	121
PAHs							
Acenaphthene	**310**	20	**8900**	N/A	520[k]	**3.7**	0.29[j]
Acenaphthylene	2.8	NA	75	N/A	NA	**0.4**	0.160[j]
Anthracene	47	NA	1600	N/A	NA	**16**	0.0572
Benz(a)anthracene	39	NA	1300	N/A	NA	**9**	0.108
Chrysene	34	NA	1400	N/A	NA	**13**	0.166
Dibenz(a,h)anthracene	1.3	NA	N/A	N/A	NA	**0.47**	0.033
Fluoranthene	120	NA	3800	N/A	NA	**20**	0.423
Fluorene	260	NA	7700	N/A	NA	**5**	0.0774
2-Methylnaphthalene	590	NA	19000	N/A	NA	11	NA
Naphthalene	1200	NA	**49000**	N/A	620[k]	**7.3**	0.176
Phenanthrene	270	NA	9100	N/A	NA	**17**	0.204
Pyrene	67	NA	2100	N/A	NA	**18**	0.195
PHENOLs							
Pentachlorophenol	**960**	3	950	3	15[i]	11	NA
PESTICIDES/PCBs							
Aldrin	0.000076	NA	0.093	N/A	3.0[i]	0.0087	0.040[j]
4,4'-DDE	0.021	NA	ND	N/A	1050[i,k]	**0.033**	0.00316
4,4'-DDT	0.17	NA	ND	**0.32**	0.001	0.0041	0.00416
Dieldrin	**0.079**	0.000032[d]	ND	N/A	0.056	N/A	0.0019
Endosulfan (alpha + beta)	0.0014	NA	ND	N/A	0.056	N/A	NA
Endrin	0.0089	NA	ND	N/A	0.036	N/A	0.00222
Gamma-BHC (Lindane)	0.0042	NA	0.1	N/A	0.95[i]	N/A	0.00237
Heptachlor	0.0002	NA	ND	N/A	0.0038	0.0033	0.010[j]
Heptachlor Epoxide	0.0026	NA	ND	N/A	0.0038	N/A	0.00247
Total PCBs	0.25	0.371	ND	N/A	0.014	N/A	0.0598
DIOXINS/FURANS							
2,3,7,8-TCDD	0.0013	NA	ND	ND	0.00001[k]	1.2×10^{-5}	0.0088[j]
2,3,7,8-TCDF	3.78×10^{-4}	NA	ND	ND	NA	3.9×10^{-5}	NA
OCDD	8.6	NA	0.11	0.061	NA	1.2	NA
OCDF	0.64	NA	0.0024	0.42	NA	0.069	NA

Table 2 continued on next page.

Table 2, *cont.*

a Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002b). Freshwater chronic criteria presented.

c: Threshold Effects Concentration (TEC). Concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).

d: Ecological soil screening guidelines (USEPA 2005).

e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.

f: Screening guidelines represent concentrations for Cr^{+6}.

g: Derived from inorganic, but applied to total mercury.

h: Criterion expressed as total recoverable metal.

i: Chronic criterion not available; acute criterion presented.

j: Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.

k: Lowest Observable Effects Level (LOEL) (USEPA 1986).

NA: Screening guidelines not available..

N/A: Contaminant not analyzed for.

ND: Not detected

maximum concentrations of other detected PAHs. PCP was detected in samples taken from wells both inside and outside the bentonite wall. The maximum concentration of PCP exceeded the AWQC by one order of magnitude. The dioxin detected at the greatest concentration was OCDD, and the furan detected at the greatest concentration was OCDF. AWQCs are not available for comparison to the maximum concentrations of OCDD and OCDF.

Sediment

Metals, PAHs, pesticides, PCP, dioxins, and furans were detected in sediment samples collected from the Taylor site. Arsenic was the contaminant of major concern in the stormwater ditch sediments (CH2M Hill 2002). Maximum concentrations of arsenic, copper, mercury, nickel, and zinc exceeded TECs by one order of magnitude. The maximum concentration of arsenic was detected in the treatment plant area, and the maximum concentrations of mercury, nickel, and zinc were detected in the white pole storage area.

Eleven PAHs were detected in sediment samples at concentrations exceeding the TECs: one exceeded the TEC by two orders of magnitude; nine exceeded TECs by one order of magnitude; and one exceeded the TEC by a factor of 2.5. Another PAH compound was also detected, but no TEC is available for comparison to that maximum concentration. The majority of the maximum PAH concentrations occurred in samples from the West Facility.

PCP was detected, but no TEC is available for comparison to that maximum concentration. The maximum concentration of DDE exceeded the TEC by one order of magnitude and was detected in a site stormwater ditch sample. The dioxin detected at the greatest concentration was OCDD, and the furan detected at the greatest concentration was OCDF. TECs are not available for comparison to the maximum concentrations of OCDD and OCDF.

Soil

Metals, PAHs, pesticides, PCBs, PCP, dioxins, and furans were detected in soil samples from the Taylor site; the maximum PCB concentration did not exceed the ORNL-PRG and so is not discussed below. All maximum concentrations of metals were detected in samples from the West Facility excluding the maximum concentration of lead, which was detected in a sample taken at a residence west of the Taylor site. Maximum concentrations of arsenic, chromium, and mercury exceeded the ORNL-PRGs by two orders of magnitude. Maximum concentrations of cadmium, copper, lead, nickel, selenium, and zinc exceeded the ORNL-PRGs or USEPA ecological soil screening guidelines by one order of magnitude. The maximum concentration of silver exceeded the ORNL-PRG by a factor of nine.

Several PAHs were detected at the Taylor site; the majority of the maximum concentrations of PAHs were detected in soil samples collected from the treatment plant area. The maximum concentration of acenaphthene exceeded the ORNL-PRG by one order of magnitude. Screening guidelines are not available for the other detected PAHs. Several pesticides were also detected in the soil samples. All maximum concentrations of pesticides were detected in samples from the West Facility. The maximum concentration of the pesticide dieldrin exceeded the USEPA ecological soil screening guideline by two orders of magnitude; screening guidelines are not available for the other detected pesticides. PCP was detected in a sample collected from the West Facility at a maximum concentration that exceeded the ORNL-PRG by two orders of magnitude. The dioxin detected at the greatest concentration was OCDD and the furan detected at the greatest concentration was OCDF; the maximum concentrations of OCDD and OCDF occurred in a sample collected from the West Facility. Soil screening guidelines are not available for comparison to the maximum concentrations of OCDD and OCDF.

References

Caldwell, D. Fisheries biologist for the Northwest Regional Office of the Oregon Department of Fish and Wildlife (ODFW). Personal communication June 27, 2002.

CH2M Hill. 2002. Phase 1 remedial investigation, Taylor Lumber and Treating Superfund Site. Prepared for the U.S. Environmental Protection Agency (USEPA), Corvallis, OR.

CH2M Hill. 2003. Baseline risk assessment, Taylor Lumber and Treating Superfund Site. Prepared for the U.S. Envrionmental Protection Agency (USEPA), Corvallis, OR.

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. August 1997. Prepared for U.S. Department of Energy, Oak Ridge, TN. Available at: Environmental Sciences Division, Oak Ridge National Laboratory, http://www.esd.ornl.gov/programs/ecorisk/documents/tm162r2.pdf (accessed August 2005).

Kostow, K. 2002. Oregon lampreys: Natural history status and analysis of management issues. Oregon Department of Fish and Wildlife (ODFW), Portland, OR.

MacDonald, D., C. Ingersoll, and T. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. *Archives of Environmental Contamination and Toxicology* 39:20-31.

Oregon Department of Human Services (ODHS). 2004. State-wide fish consumption advisories. Available at: ODHS Envrionmental toxicology, Oregon fish advisories, http://www.ohd.hr.state.or.us/fishadv/index.cfm (accessed November 22, 2004).

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2000. Hazard ranking system documentation record: Taylor Lumber and Treating. NPL-U34-2-13-R10. U.S. Environmental Protection Agency (USEPA), Seattle, WA.

U.S. Environmental Protection Agency (USEPA). 2002a. NPL site narrative at listing Taylor Lumber and Treating, Sheridan, Oregon. October 2004. Available at: USEPA National Priorities List, http://www.epa.gov/superfund/sites/npl/nar1623.htm (accessed November 22, 2004).

U.S. Environmental Protection Agency (USEPA). 2002b. National recommended water quality criteria: 2002. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2005. Ecological soil screening levels. March 2005. Available at: USEPA, ECOTOX Database, http://www.epa.gov/ecotox/ecossl/ (accessed August 2005).

U.S. Geological Survey (USGS). 1980. Topographic map, Sheridan quadrangle, OR, 7.5 minute series. 1:24,000. Denver, CO.

Glossary of terms

Adit Horizontal entrance to a mine.

Adult habitat The environment where an aquatic resource lives after reaching physical and sexual maturity.

Aestivation The dormant or sluggish state that some animals enter to cope with periods of hot and dry conditions.

Ambient water quality criteria (AWQC) The U.S. Environmental Protection Agency's (USEPA) compilation of nationally recommended water quality criteria, based on data and scientific judgments on pollutant concentrations and how they affect the environment or human health.[1]

Amphidromous refers to predominately freshwater species that require estuarine or marine waters for completion of larval phases.

Anadromous Migrating from marine waters to breed in freshwater. Examples of anadromous fish include salmon, river herring (alewife), and striped bass.

Aquifer An underground geological formation, or group of formations, containing water. Are sources of groundwater for wells and springs.

Aroclor A trade name for a group of polychlorinated biphenyls (PCBs).

Artesian aquifer An aquifer in which groundwater is confined under pressure by impermeable rock layers.

Baghouse dust Particles collected from the air by an air pollution system.

Bioavailable The fraction of the total chemical in the surrounding environment that is available for uptake by organisms. The environment may include water, sediment, suspended particles, and food items.

Biotransformation Chemical alteration of a substance within the body.

Body burden The amount of a chemical stored in the body at a given time, especially a potential toxin in the body as the result of exposure.

Borehole A hole made with drilling equipment.

Brood To hatch eggs.

Capacitor An electric circuit element used to store charge temporarily.

Catadromous Living in fresh water but migrating to marine waters to breed. An example is the American eel.

Chemical affinity An attraction or force between particles that causes them to combine.

Coal tar A material obtained from the destructive distillation of coal in the production of coal gas. The crude tar contains a large number of organic compounds (e.g., benzene, naphthalene, methylbenzene, etc.), and is used as roofing, waterfproofing, and insulating compounds. It is also used as a raw material for dyes, drugs, and paints.

Confined aquifer An aquifer that is bounded above and below by impermeable rock layers.

Confluence The point where two or more streams meet or flow together.

Contaminants of concern Chemicals at a hazardous waste site that are likely to have an adverse effect on NOAA trust resources.

Contaminant partitioning In general, it is the tendency of a contaminant to be in the air, water, soil, or sediment based on the relative chemical affinities of that contaminant.

Decant To pour off without disturbing the sediment.

Demersal Dwelling at or near, sinking to, or deposited near the bottom of a body of water.

Depurate Elimination of a chemical from an organism by desorption, diffusion, excretion, egestion, biotransformation, or another route.

Desorption To remove an absorbed substance from.

Diadromous Fishes that migrate between fresh and salt water (e.g., salmon and American eel).

Effects range–low (ERL) NOAA sediment quality guidelines derived from the examination of a large number of individual contamination studies, all in salt water. The ERLs are indicative of contaminant concentrations below which adverse effects rarely occur.[2]

Egestion To discharge or excrete from the body.

Emergency Removal Action Steps taken to remove contaminated materials that pose imminent threats to local residents (e.g., removal of leaking drums or the excavation of explosive waste).[3]

Emergent plants/vegetation Rooted aquatic plants with some herbaceous vegetative parts that project above the water surface. Also referred to as emersed vegetation.

Emergent wetlands Class of wetland habitat characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens, that are present for most of the growing season.

Emergent wetland, subclass: non-persistent No obvious signs of emergent vegetation at certain seasons.

Emergent wetland, subclass: persistent Erect, rooted, herbaceous aquatic plants. Species that normally remain standing until the beginning of the next growing season.

Endangered species Animals, birds, fish, plants, or other living organisms threatened with extinction by anthropogenic (human-caused) or other natural changes in their environment.[3]

Endangered Species Act A 1973 act of Congress mandating that endangered and threatened species of fish, wildlife, and plants be protected and restored.

Environmental medium/media External conditions affecting the life, development, and survival of an organism, including air, water, and soil, which are the subject of regulatory concern and activities.

Ephemeral Short-lived or transitory.

Estuary, estuarine Region of interaction between rivers and nearshore marine waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife. *See wetlands.*

Fish passage Features of a dam that enable fish to move around, through, or over without harm. Generally an upstream fish ladder or a downstream bypass system.

Flue A tunnel or conduit that connects a furnace to a chimney stack.

Forage To search for food.

Groundwater The supply of fresh water found beneath the earth's surface, which supplies wells and springs.[3]

Groundwater monitoring well See monitoring well.

Groundwater plume A visible or measurable discharge of a contaminant from a given point of origin into groundwater.

Habitat The place where a plant or animal species naturally lives and grows or characteristics of the soil, water, and biologic community (other plants and animals) that make this possible.

Habitat of concern The habitat that will be or is being affected by contaminants of concern from a hazardous waste site.

Hazardous ranking system/hazard ranking system package The principal screening tool used by the USEPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites.[3]

Heavy metals Metallic elements with high atomic weights (e.g., mercury, chromium, cadmium, arsenic, and lead).

Hectare 2.471 acres or 10,000 square meters (m^2).

Heterogeneous Consisting of dissimilar parts or elements.

Hydrologic Unit Code (HUC) The United States is divided into hydrologic units for water resource planning and data management. Hydrologic units represent natural and human-imposed areas. Each HUC is a unique eight-digit number. The first two digits indicate the major geographic area or region, the second two digits indicate the sub-region, the third two digits indicate the accounting units, and the fourth two digits indicate the cataloging units. Cataloging units are also called "watersheds."

Hydrophyte (1) Plants that grow in water or saturated soils. (2) Any macrophyte that grows in wetlands or aquatic habitats on a substrate that is at least periodically deficient in oxygen because of excessive water content.

Ingot A mass of metal that is cast in a standard shape for convenient storage or transportation.

Inorganic compounds Chemical substances of mineral origin, not of basically carbon structure.

Intertidal That area of the shore between the high and low water marks; the intertidal zone of oceans and estuaries is regularly covered and exposed by the tides.

Invertebrate An animal without a spinal column or backbone.

Isomers Different substances that have the same formula.

Iteroparous Animals that do not die after spawning.

Juvenile habitat The environment in which an organism lives from one year of age until sexual maturity.

Karst A type of topography that results from dissolution and collapse of carbonate rocks such as limestone and dolomite and characterized by closed depressions or sinkholes, caves, and underground drainage.[4]

Leachate Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.[3]

Lowhead dam Dams that range from a six-inch drop off to a 25- foot drop off.

Macrophyte A plant that can be seen without the aid of optics.

Mainstem The principal channel of a drainage system into which other smaller streams or rivers flow.

Marine Of or relating to the sea.

Marsh A type of wetland that does not accumulate appreciable peat deposits (partially decomposed plants and other organic materials that can build up in poorly drained wetland habitats) and is dominated by plants with little or no woody tissue. *See wetland.*

Materiel The equipment, apparatus, and supplies of a military force.

Mean U.S. soil screening guidelines Average concentrations of inorganic compounds found in natural soils of the United States.

Metals Chemical elements with particular properties that include being good conductors of electricity and heat; in these reports, generally synonymous with inorganic compounds.

Migratory corridor, migratory route A body of water that adult fish travel through but do not remain in for any significant time.

Monitoring well (1) A well used to obtain water quality samples or measure groundwater levels. (2) A well drilled to collect groundwater samples for the purpose of physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants beneath a site.

National Priorities List A list of hazardous waste sites, compiled by the USEPA, where hazardous wastes have been found and the initial evaluation shows a significant risk to human health or the environment. NPL sites are often called "Superfund sites" because Superfund money can be used by the USEPA to investigate and clean up these sites.

Neutralization Decreasing the acidity or alkalinity of a substance by adding alkaline or acidic materials, respectively.

NOAA trust resources Natural resources in coastal and marine areas, including the anadromous and catadromous fish that migrate between freshwater and coastal and marine areas.

Nursery habitat The habitat where larvae or juveniles settle, seek shelter, feed, and mature.

Oligohaline A low salinity region of an estuary, typically 0.5 to 5.0 parts per thousand salinity.

Order of magnitude A change in the value of a quantity or unit by a factor of 10.

Ordnance Military materiel, such as weapons, ammunition, artillery, combat vehicles, and equipment.

Organic compounds/chemicals/substances/materials Naturally occurring (animal- or plant-produced) or synthetic substances containing mainly carbon, hydrogen, nitrogen, and oxygen.[3]

Outfall The point where wastewater or drainage discharges from a sewer pipe, ditch, or other conveyance to a receiving body of water.[5]

Palustrine wetland a wetland beyond the influence of tidal brackish waters and typically dominated by persistent vegetation that remain standing into the next growing season; most inland wetlands fall into this classification; located in upland areas.

Pathway (for migration of contaminants) The physical course a chemical or pollutant takes from its source to the exposed organism.[3]

Pelagic Living or occurring in the open sea.

Pentachlorophenol (PCP) A manufactured chemical that is not found naturally in the environment. It was used as a biocide and wood preservative, and was one of the most heavily used pesticides in the United States. Now, only certified applicators can purchase and use this chemical. It is still used in industry as a wood preservative for power line poles, railroad ties, cross arms, and fence posts.[6]

Pesticides Substances or mixtures thereof intended for preventing, destroying, repelling, or mitigating any pest.[3]

Polychlorinated biphenyls (PCBs) A group of synthetic organic compounds that can cause a number of different harmful effects. There are no known natural sources of PCBs in the environment. PCBs are either oily liquids or solids and are colorless to light yellow.[6]

Polycyclic aromatic hydrocarbons (PAHs) A group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. Also referred to as polycyclic aromatic hydrocarbons (PAHs).[6]

Rearing habitat *See nursery habitat.*

Remediation Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site.[3]

Rinsate The solution remaining after something is rinsed.

Rock flour Very finely powdered rock, produced when rocks are ground together.

Runoff That part of precipitation, snowmelt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

Salinity A measurement of the amount (usually in parts per thousand) of salt in water.

Salmonid Fish of the family Salmonidae, which includes salmon and steelhead.

Sediment The organic material that is transported and deposited by wind and water.

Semivolatile organic compounds (SVOCs) Organic compounds that volatilize slowly at standard temperature (20°C and 1 atm pressure).

Slag The glassy waste product created during the smelting of metal ores.

Spawning habitat The habitat where fish reproduce.

Steam (or boiler) blowdown To control solids in the boiler water

Stormwater Precipitation that accumulates in natural and/or constructed storage and stormwater systems during and immediately following a storm event.

Storm sewer A system of pipes (separate from sanitary sewers) that carries water runoff from buildings and land surfaces.[3]

Substrate The composition of a streambed, including either mineral or organic materials.[7]

Sump A low-lying place such as a pit, that receives drainage.

Superfund Money collected from a special tax on chemicals and raw petroleum that is appropriated by Congress. These funds are used to investigate, evaluate, and clean up the worst hazardous waste sites in the U.S. These sites are listed on the NPL.

Supratidal The area of the shore above the normal high-tide line.

Surface water All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

Surface water runoff Precipitation, snow melt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions.[3]

Tailings Residue of raw material or waste separated out during the processing of crops or mineral ores.[3]

Threatened species Plants and animals whose numbers are very low or decreasing rapidly. Threatened species are not endangered species yet, but are likely to become endangered in the future.[8]

Threshold Effects Concentration (TEC) Concentration below which harmful effects are unlikely to be observed.

Threshold effect level (TEL) The concentration of a contaminant below which negative biological effects are expected to occur only rarely.

Trace elements In these reports, generally synonymous with inorganic compounds.

Trust resources *See NOAA trust resources.*

Trustee (for natural resources) The party responsible for maintaining the original characteristics of our land, water, and the plants and animals that live there. NOAA is a federal trustee for natural resources that spend any portion of their life cycle in a marine or estuarine environment; and their habitats.

Unconfined aquifer An aquifer that is not confined under pressure and is bounded by permeable layers.

Uptake The transfer of a chemical into or onto an aquatic organism.

Volatile organic compounds (VOCs) Organic compounds that evaporate readily.[6]

Wastewater The spent or used water from a home, community, farm, or industry, which contains dissolved or suspended matter.

Water Quality Criteria Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water table The level of groundwater.

Watershed The region draining into a river, river system, or other body of water.

Wetland An area that is saturated by surface or groundwater with vegetation adapted for life under those soil conditions including marshes, estuaries, swamps, bogs, and fens.

---

[1] http://www.epa.gov/waterscience/criteria/ (accessed August 2005).

[2] http://response.restoration.noaa.gov/cpr/sediment/SPQ.pdf (accessed August 2005).

[3] http://www.epa.gov/OCEPAterms/ (accessed August 2005).

[4] http://water.usgs.gov/pubs/circ/circ1166/nawqa91.e.html (accessed August 2005).

[5] http://www.forester.net/sw_glossary.html (accessed August 2005).

[6] http://www.atsdr.cdc.gov/toxprofiles/ (accessed August 2005).

[7] http://www.streamnet.org/pub-ed/ff/Glossary/ (accessed August 2005).

[8] http://www.epa.gov/espp/coloring/especies.htm (accessed August 2005).

Appendix

Appendix

Table 1. List of the 367 hazardous Waste Site Reports published by NOAA to date. Sites in bold italics are included in this volume.

Region 1

Connecticut	Date	EPA Facility ID
Barkhamsted-New Hartford Landfill	1989	CTD980732333
Beacon Heights Landfill	1984	CTD072122062
Broad Brook Mill	2003	CT0002055887
Gallup's Quarry	1989	CTD108960972
Kellogg-Deering Well Field	1987	CTD980670814
New London Submarine Base	1990	CTD980906515
O'Sullivans Island	1984	CTD980667992
Raymark Industries, Inc.	1996	CTD001186618
Yaworski Waste Lagoon	1985	CTD009774969

Massachusetts		
Atlas Tack Corp.	1989	MAD001026319
Blackburn and Union Privileges	1993	MAD982191363
Charles-George Reclamation Landfill	1987	MAD003809266
GE - Housatonic River	1999	MAD002084093
Groveland Wells	1987	MAD980732317
Hanscom Field/Hanscom Air Force Base	1995	MA8570024424
Haverhill Municipal Landfill	1985	MAD980523336
Industri-Plex	1987	MAD076580950
Materials Technology Laboratory (USArmy)	1995	MA0213820939
Natick Laboratory Army Research, D&E Center	1995	MA1210020631
Naval Weapons Industrial Reserve Plant	1995	MA6170023570
New Bedford Site (Acushnet Estuary)	1984	MAD980731335
Nyanza Chemical Waste Dump	1987	MAD990685422
Plymouth Harbor/Cannon Engineering Corp.	1984	MAD980525232

Region 1 *cont.*

Massachusetts *cont.*	**Date**	**EPA Facility ID**
South Weymouth Naval Air Station	1995	MA2170022022
Sullivan's Ledge	1987	MAD980731343

Maine		
Brunswick Naval Air Station	1987	ME8170022018
Callahan Mining Corp	2004	MED980524128
Eastland Woolen Mill	2002	MED980915474
McKin Company	1984	MED980524078
O'Connor Company	1984	MED980731475
Portsmouth Naval Shipyard	1995	ME7170022019
Saco Municipal Landfill	1989	MED980504393

New Hampshire		
Beede Waste Oil	1997	NHD018958140
Coakley Landfill	1985	NHD064424153
Dover Municipal Landfill	1987	NHD980520191
Fletcher's Paint Works & Storage	1989	NHD001079649
Grugnale Waste Disposal Site	1985	NHD069911030
Mohawk Tannery	***2005***	***NHD981889629***
New Hampshire Plating Co.	1992	NHD001091453
Pease Air Force Base	1990	NH7570024847
Savage Municipal Water Supply	1985	NHD980671002
Sylvester	1985	NHD099363541

Rhode Island		
Centredale Manor Restoration Project	***2005***	***RID981203755***
Davis Liquid Waste	1987	RID980523070
Davisville Naval Construction Battalion Center	1990	RI6170022036
Newport Naval Education & Training Center	1990	RI6170085470
Peterson/Puritan, Inc.	1987	RID055176283
Picillo Farm	1987	RID980579056
Rose Hill Regional Landfill	1989	RID980521025
Stamina Mills, Inc.	1987	RID980731442
West Kingston Town Dump/URI Disposal	1992	RID981063993
Western Sand & Gravel	1987	RID009764929

Region 1 *cont.*

Vermont	Date	EPA Facility ID
BFI Sanitary Landfill (Rockingham)	1989	VTD980520092
Elizabeth Mine	2003	VTD988366621
Ely Copper Mine	2003	VTD988366571
Old Springfield Landfill	1987	VTD000860239

Region 2

New Jersey	Date	EPA Facility ID
Albert Steel Drum	1984	NJD000525154
American Cyanamid Co.	1985	NJD002173276
Atlantic Resources	2004	NJD981558430
Bog Creek Farm	1984	NJD063157150
Brick Township Landfill	1984	NJD980505176
Brook Industrial Park	1989	NJD078251675
Chemical Control	1984	NJD000607481
Chemical Insecticide Corp.	1990	NJD980484653
Chipman Chemical Co.	1985	NJD980528897
Ciba-Geigy Corp. (Toms River Chemical Company)	1984	NJD001502517
Cornell Dubilier Electronics, Inc.	1999	NJD981557879
Cosden Chemical Coatings Corp.	1987	NJD000565531
Curcio Scrap Metal, Inc.	1987	NJD011717584
De Rewal Chemical Co.	1985	NJD980761373
Denzer & Schafer X-Ray Co.	1984	NJD046644407
Diamond Alkali Co.	1984	NJD980528996
Diamond Head Oil Refinery Div.	2004	NJD092226000
Emmell's Septic Landfill	2002	NJD980772727
Federal Aviation Admin. Tech. Center	1990	NJ9690510020
Garden State Cleaners Co.	1989	NJD053280160
Global Sanitary Landfill	1989	NJD063160667
Hercules, Inc. (Gibbstown Plant)	1984	NJD002349058
Higgins Disposal	1989	NJD053102232
Higgins Farm	1989	NJD981490261
Horseshoe Road (Atlantic Development Facility)	1984	NJD980663678

Region 2 *cont.*

New Jersey *cont.*	**Date**	**EPA Facility ID**
Horseshoe Road (Horseshoe Road Dump)	1984	NJD980663678
Horseshoe Road (Horseshoe Road Industrial Complex)	1995	NJD980663678
Ideal Cooperage Inc.	1984	NJD980532907
Industrial Latex Corp.	1989	NJD981178411
Jackson Township Landfill	1984	NJD980505283
Kauffman & Minteer, Inc.	1989	NJD002493054
Kin-Buc Landfill	1984	NJD049860836
Koppers Co Inc/Seaboard Plant	1984	NJD002445112
Krysowaty Farm	1985	NJD980529838
LCP Chemicals, Inc.	1999	NJD079303020
Martin Aaron, Inc.	2003	NJD014623854
Middlesex Sampling Plant (DOE)	2002	NJ0890090012
Mobil Chemical Co.	1984	NJD000606756
NL Industries	1984	NJD061843249
Perth Amboy PCB's	1984	NJD980653901
PJP Landfill	1984	NJD980505648
Price Landfill	1984	NJD070281175
Puchack Well Field	1999	NJD981084767
PVSC Sanitary Landfill (T. Fiore Demolition, Inc. Site)	1984	NJD980529671
Quanta Resources	2004	NJD000606442
Roebling Steel Co.	1984	NJD073732257
Roosevelt Drive-In	1984	NJD030250484
Route 561 Dump	2002	NJ0000453514
Sayreville Landfill	1984	NJD980505754
Scientific Chemical Processing	1984	NJD070565403
South Jersey Clothing Co.	1989	NJD980766828
Syncon Resins	1984	NJD064263817
United States Avenue Burn	2002	NJ0001120799
Universal Oil Products (Chemical Division)	1984	NJD002005106
Ventron/Velsicol	1984	NJD980529879
White Chemical Corp	1984	NJD001239185
Williams Property	1984	NJD980529945
Woodbrook Road Dump	***2005***	***NJSFN0204260***
Zschiegner Refining Company	1999	NJD986643153

Region 2 *cont.*

New York	Date	EPA Facility ID
Action Anodizing, Plating, & Polishing Corp.	1989	NYD072366453
Applied Environmental Services	1985	NYD980535652
Brookhaven National Laboratory (USDOE)	1990	NY7890008975
C & J Disposal Leasing Co. Dump	1989	NYD981561954
Carroll & Dubies Sewage Disposal	1989	NYD010968014
Computer Circuits	2002	NYD125499673
Consolidated Iron and Metal	2004	NY0002455756
Ellenville Scrap Iron and Metal	2003	NYSFN0204190
Jones Sanitation	1987	NYD980534556
Li Tungsten Corp.	1992	NYD986882660
Liberty Industrial Finishing	1985	NYD000337295
Mackenzie Chemical Works	2004	NYD980753420
Marathon Battery Corp.	1984	NYD010959757
Mattiace Petrochemical Co., Inc.	1989	NYD000512459
North Sea Municipal Landfill	1985	NYD980762520
Old Roosevelt Field Contaminated Groundwater Area	2003	NYSFN0204234
Peter Cooper	1999	NYD980530265
Port Washington Landfill	1984	NYD980654206
Rowe Industries Groundwater Contamination	1987	NYD981486954
Sidney Landfill	1989	NYD980507677
Smithtown Groundwater Contamination	2003	NY0002318889
Stanton Cleaners Area Groundwater Contamination	2002	NYD047650197

Puerto Rico		
Clear Ambient Services Co.	1984	PRD090416132
Frontera Creek	1984	PRD980640965
Naval Security Group Activity	1989	PR4170027383
Pesticide Warehouse III	2004	PRD987367299
Scorpio Recycling, Inc.	***2005***	***PRD987376662***
V&M/Albaladejo Farms	1997	PRD987366101
Vega Baja Solid Waste Disposal	2002	PRD980512669

Virgin Islands		
Island Chemical Corp./V.I. Chemical Corp.	1996	VID980651095
Tutu Wellfield	1993	VID982272569

Region 3

Washington, D.C.	Date	EPA Facility ID
Washington Navy Yard	1999	DC9170024310

Delaware		
Army Creek Landfill	1984	DED980494496
Coker's Sanitation Service Landfills	1986	DED980704860
Delaware City PVC Plant	1984	DE0001912757
Delaware Sand & Gravel	1984	DED000605972
Dover Air Force Base	1987	DE8570024010
Dover Gas Light Co.	1987	DED980693550
E.I. Du Pont Newport Landfill	1987	DED980555122
Halby Chemical	1986	DED980830954
Kent County Landfill	1989	DED980705727
Koppers Co. Facilities Site	1990	DED980552244
NCR Corp., Millsboro	1986	DED043958388
New Castle Spill Site	1984	DED058980442
New Castle Steel	1984	DED980705255
Old Brine Sludge Landfill	1984	DED980704894
Pigeon Point Landfill	1987	DED980494603
Sealand Limited	1989	DED981035520
Standard Chlorine Co.	1986	DED041212473
Sussex Co. Landfill #5	1989	DED980494637
Tybouts Corner Landfill	1984	DED000606079
Wildcat Landfill	1984	DED980704951

Maryland		
68th Street Dump/Industrial Enterprises	2002	MDD980918387
Andrews Air Force Base	2003	MD0570024000
Anne Arundel County Landfill	1989	MDD980705057
Brandywine DRMO	2003	MD9570024803
Bush Valley Landfill	1989	MDD980504195
Central Chemical Corporation	1999	MDD003061447
Joy Reclamation Co	1984	MDD030321178
Ordnance Products, Inc.	1995	MDD982364341
Sand, Gravel & Stone Site	1984	MDD980705164

Region 3 *cont.*

Maryland *cont.*	**Date**	**EPA Facility ID**
Southern Maryland Wood Treating	1987	MDD980704852
U.S. Agricultural Center Beltsville (2 Tenants)	1995	MD0120508940
USA Aberdeen - Edgewood	1986	MD2210020036
USA Aberdeen - Michaelsville	1986	MD3210021355
USA Fort George Meade	1997	MD9210020567
USN Patuxent Naval Air Station	1996	MD7170024536
Woodlawn Co. Landfill	1987	MDD980504344

Pennsylvania		
Austin Avenue Radiation Site	1993	PAD987341716
Boarhead Farms	1989	PAD047726161
Bridesburg Dump	1984	PAD980508402
Butler Mine Tunnel	1987	PAD980508451
Crater Resources, Inc./Keystone Coke Co./Alan Wood	1993	PAD980419097
Croydon TCE Spill	1986	PAD981035009
Douglassville Disposal	1987	PAD002384865
Elizabethtown Landfill	1989	PAD980539712
Enterprise Avenue	1984	PAD980552913
FMC Marcus Hook	1996	PAD987323458
Foote Mineral Co.	1993	PAD077087989
Hellertown Manufacturing Co.	1987	PAD002390748
Jack's Creek/Sitkin Smelting & Refining, Inc.	1989	PAD980829493
Keyser Ave. Borehole	1989	PAD981036049
Lower Darby Creek Area	2003	PASFN0305521
Metal Bank of America	1984	PAD046557096
Occidental Chemical Corp./Firestone Tire and Rubber Co.	1989	PAD980229298
Paoli Rail Yard	1987	PAD980692594
Publicker/Cuyahoga Wrecking Plant	1990	PAD981939200
Recticon/Allied Steel	1989	PAD002353969
Revere Chemical Co.	1986	PAD051395499
Rohm and Haas Landfill	1986	PAD091637975
Salford Quarry	1997	PAD980693204
Tinicum National Environmental Center	1986	PA6143515447

Region 3 *cont.*

Pennsylvania *cont.*	**Date**	**EPA Facility ID**
Tysons Dump #1	1985	PAD980692024
UGI Corp. Gas Manufacturing Plant	1995	PAD980539126
USN Ships Parts Control Center	1996	PA3170022104
Wade (ABM)	1984	PAD980539407

Virginia		
Abex Corp.	1989	VAD980551683
Arrowhead Associates Inc./Scovill Corp.	1989	VAD042916361
Atlantic Wood Industries, Inc.	1987	VAD990710410
C & R Battery Co., Inc.	1987	VAD049957913
Chisman Creek	1984	VAD980712913
Former Nansemond Ordnance Depot	2002	VAD123933426
Kim-Stan Landfill	2002	VAD077923449
Langley Air Force Base/NASA Langley Research Center	1995	VA2800005033
Marine Corps Combat and Development Command	1995	VA1170024722
Naval Amphibious Base Little Creek	2002	VA5170022482
Naval Surface Warfare Center - Dahlgren	1993	VA7170024684
Naval Weapons Station - Yorktown	1993	VA8170024170
NWS Yorktown - Cheatham Annex	2004	VA3170024605
Saunders Supply Co.	1987	VAD003117389
USA Fort Eustis	1996	VA6210020321
USN Naval Shipyard Norfolk	1999	VA1170024813
USN Norfolk Naval Base	1997	VA6170061463

Region 4

Alabama	**Date**	**EPA Facility ID**
American Brass Inc.	2002	ALD981868466
Ciba-Geigy Corp. (McIntosh Plant)	1990	ALD001221902
Olin Corp. (McIntosh Plant)	1990	ALD008188708
Redwing Carriers, Inc. (Saraland)	1989	ALD980844385

Region 4 *cont.*

Florida	Date	EPA Facility ID
Agrico Chemical Co.	1989	FLD980221857
American Creosote Works (Pensacola Plant)	1984	FLD008161994
Broward County-21st Manor Dump	1992	FLD981930506
Chemform, Inc.	1990	FLD080174402
Harris Corp. (Palm Bay Plant)	1986	FLD000602334
Helena Chemical Co. (Tampa Plant)	1993	FLD053502696
MRI Corporation	1997	FLD088787585
Munisport Landfill	1984	FLD084535442
Pensacola Naval Air Station	1990	FL9170024567
Pickettville Road Landfill	1984	FLD980556351
Sixty-Second Street Dump	1984	FLD980728877
Solitron Microwave	2002	FLD045459526
Standard Auto Bumper Corp.	1989	FLD004126520
Stauffer Chemical Co. (Tampa Plant)	1993	FLD004092532
Stauffer Chemical Co. (Tarpon Springs)	1993	FLD010596013
United Metals, Inc.	2004	FLD098924038
USAF Tyndall Air Force Base	1997	FL1570024124
USN Air Station Cecil Field	1990	FL5170022474
USN NAS Jacksonville	1990	FL6170024412
USN Naval Air Station Whiting Field Site 5	1996	FL2170023244
Woodbury Chemical Co. (Princeton Plant)	1989	FLD004146346

Georgia		
Brunswick Wood Preserving	1997	GAD981024466
Camilla Wood Preserving Company	1999	GAD008212409
Terry Creek Dredge Spoil Areas/Hercules Outfall	1997	GAD982112658

Mississippi		
Chemfax, Inc.	1995	MSD008154486
Davis Timber Company	2004	MSD046497012
Gautier Oil Co., Inc.	1989	MSD098596489

Region 4 *cont.*

North Carolina	Date	EPA Facility ID
ABC One Hour Cleaners	1989	NCD024644494
Camp Lejeune Military Res. (USNAVY)	1989	NC6170022580
FCX, Inc. (Washington Plant)	1989	NCD981475932
New Hanover County Airport Burn Pit	1989	NCD981021157
Potter's Septic Tank Service Pits	1989	NCD981023260
Reasor Chemical Company	2004	NCD986187094

South Carolina		
Geiger (C&M Oil)	1984	SCD980711279
Helena Chemical Co. Landfill	1989	SCD058753971
Koppers Co., Inc. (Charleston Plant)	1993	SCD980310239
Macalloy Corporation	2004	SCD003360476
Savannah River Site (USDOE)	1990	SC1890008989
Wamchem, Inc.	1984	SCD037405362

Wisconsin		
Fox River NRDA/PCB Releases	2003	WI0001954841

Region 6

Louisiana	Date	EPA Facility ID
Bayou Sorrel Site	1984	LAD980745541
Delatte Metals	2002	LAD052510344
Madisonville Creosote Works	1997	LAD981522998
Mallard Bay Landing Bulk Plant	2004	LA0000187518

Texas		
ALCOA (Point Comfort)/Lavaca Bay	1995	TXD008123168
Bailey Waste Disposal	1985	TXD980864649
Brine Service Company	2004	TX0000605264
Brio Refining, Inc.	1989	TXD980625453
Crystal Chemical Co.	1989	TXD990707010
Dixie Oil Processors, Inc.	1989	TXD089793046

Region 6 *cont.*

Texas *cont.*	**Date**	**EPA Facility ID**
French, Ltd.	1989	TXD980514814
Highlands Acid Pit	1989	TXD980514996
Malone Service Company, Inc.	2003	TXD980864789
Motco, Inc.	1984	TXD980629851
Palmer Barge Line	***2005***	***TXD068104561***
Patrick Bayou	2003	TX0000605329
Sikes Disposal Pits	1989	TXD980513956
State Marine	1999	TXD099801102
Tex-Tin Corp.	1989	TXD062113329

Region 9

American Samoa	**Date**	**EPA Facility ID**
Taputimu Farm	1984	ASD980637656

California		
Alameda Naval Air Station	1989	CA2170023236
Camp Pendleton Marine Corps Base	1990	CA2170023533
Coast Wood Preserving	1984	CAD063015887
Concord Naval Weapons Station (Naval Weapons Station Concord)	1993	CA7170024528
Concord Naval Weapons Station (Naval Weapons Station)	1989	CA7170024528
Cooper Drum Co.	1993	CAD055753370
CTS Printex, Inc.	1989	CAD009212838
Del Amo Facility	2004	CAD029544731
Del Amo Facility (Del Amo)	1992	CAD029544731
Del Norte Pesticide Storage	1984	CAD000626176
El Toro Marine Corps Air Station	1989	CA6170023208
Fort Ord	1990	CA7210020676
GBF, Inc. Dump	1989	CAD980498562
GBF, Inc. Dump (GBF/Pittsburg Landfill)	1993	CAD980498562
Hewlett-Packard (620-640 Page Mill Road)	1989	CAD980884209
Hunters Point Naval Shipyard	1989	CA1170090087

Region 9 *cont.*

California *cont.*	**Date**	**EPA Facility ID**
Intersil Inc./Siemens Components	1989	CAD041472341
Iron Mountain Mine	1989	CAD980498612
Jasco Chemical Corp.	1989	CAD009103318
Liquid Gold Oil Corp.	1984	CAT000646208
McCormick & Baxter Creosoting Co.	1993	CAD009106527
MGM Brakes	1984	CAD000074120
Moffett Naval Air Station	1986	CA2170090078
Montrose Chemical Corp.	1985	CAD008242711
Pacific Coast Pipe Lines	1989	CAD980636781
Rhone-Poulenc, Inc./Zoecon Corp.	1985	CAT000611350
Riverbank Army Ammunition Plant	1989	CA7210020759
Sola Optical USA, Inc.	1989	CAD981171523
South Bay Asbestos Area (Alviso Dumping Areas)	1985	CAD980894885
Travis Air Force Base	1990	CA5570024575

Guam		
Andersen Air Force Base	1993	GU6571999519

Hawaii		
Del Monte Corp. (Oahu Plantation)	1995	HID980637631
Pearl City Landfill	1984	HID980585178
Pearl Harbor Naval Station	1992	HI2170024341

Region 10

Alaska	**Date**	**EPA Facility ID**
Adak Naval Air Station	1993	AK4170024323
Elmendorf Air Force Base	1990	AK8570028649
Fort Richardson (US Army)	1995	AK6214522157
Klag Bay Site	2002	AK0002364768
Standard Steel & Metal Salvage Yard (USDOT)	1990	AKD980978787

Region 10 *cont.*

Idaho	Date	EPA Facility ID
Blackbird Mine	1995	IDD980725832
Stibnite/Yellow Pine Mining Area	2003	IDD980665459

Oregon		
Allied Plating, Inc.	1987	ORD009051442
Gould, Inc.	1984	ORD095003687
Harbor Oil Inc.	2004	ORD071803985
Martin-Marietta Aluminum Co.	1987	ORD052221025
McCormick & Baxter Superfund Site	1995	ORD009020603
Northwest Pipe & Casing Co.	1993	ORD980988307
Portland Harbor (Lower Willamette River)	2003	ORSFN1002155
Rhone Poulenc, Inc.(Stauffer Chemical)	1984	ORD990659492
Taylor Lumber and Treating	***2005***	***ORD009042532***
Teledyne Wah Chang	1985	ORD050955848
Union Pacific Railroad	1990	ORD009049412

Washington		
ALCOA (Vancouver Smelter)	1989	WAD009045279
American Crossarm & Conduit Co.	1989	WAD057311094
Bangor Naval Submarine Base	1990	WA5170027291
Bonneville Power Administration Ross Complex (USDOE)	1990	WA1891406349
Centralia Municipal Landfill	1989	WAD980836662
Commencement Bay, Near Shore/ Tide Flats & South Tacoma Channel	1984	WAD980726368;WAD 980726301
Hamilton Island Landfill (USA/COE)	1992	WA5210890096
Hanford 100-Area (USDOE)	1989	WA3890090076
Harbor Island (Lead)	1984	WAD980722839
Jackson Park Housing Complex (USNavy)	1995	WA3170090044
Lower Duwamish Waterway	2003	WA0002329803
Naval Air Station, Whidbey Island (Ault Field)	1986	WA5170090059
Naval Air Station, Whidbey Island (Seaplane Base)	1986	WA6170090058
Northwest Transformer (South Harkness Street)	1989	WAD027315621
Oeser Company	1997	WAD008957243
Old Navy Dump/Manchester Lab (USEPA/NOAA)	1996	WA8680030931

Region 10 *cont.*

Washington *cont.*	**Date**	**EPA Facility ID**
Pacific Sound Resources	1995	WAD009248287
Puget Sound Naval Shipyard	1995	WA2170023418
Quendall Terminals	1985	WAD980639215
Seattle Municipal Landfill (Kent Highlands)	1989	WAD980639462
Tulalip Landfill	1992	WAD980639256
Western Processing Co., Inc.	1984	WAD009487513
Wyckoff Co./Eagle Harbor (ferry dock & wood treatment facility)	1986	WAD009248295

Table 2. List of sites (1076) and published reports, including Hazardous Waste Site Reports (WSR), Preliminary Natural Resource Surveys (PNRS'), U.S. Air Force reports (USAF), and hazardous waste sites that have been evaluated at the time of publication. Sites in bold italic are included in this volume.

Region 1

Connecticut	WSR	PNRS	USAF	EPA FACILITY ID
29 Pomperaug Road				CTD983884412
Army Engine Plant/Stratford				CT3213822924
Barkhamsted-New Hartford Landfill	1989			CTD980732333
Beacon Heights Landfill	1984			CTD072122062
Black Rock Shipyard				CT0001407865
Broad Brook Mill	2003			CT0002055887
Connecticut Yankee				NA
Dexter Corp.				CTD001155761
Fairfield Municipal Landfill				CTD983870296
Gallup's Quarry	1989			CTD108960972
Hamilton Standard				CTD001145341
Hollyhock Island Landfill				CTD983870403
Kellogg-Deering Well Field	1987			CTD980670814
Laurel Park, Inc.		1988		CTD980521165
Linemaster Switch Corp.				CTD001153923
Lordship Point				NA
New London Submarine Base	1990			CTD980906515
Nutmeg Valley Road				CTD980669261
Old Southington Landfill				CTD980670806
O'Sullivans Island	1984			CTD980667992
Pfizer Waste Disposal Area				CTD980521066
Pharmacia & Upjohn Company				CTD001168533
Precision Plating Corp.				CTD051316313
Raymark Industries, Inc.	1996			CTD001186618
Remington Arms Company Incorporated				CTD001453216
Revere Textile Prints Corp.				CTD004532610
Sikorsky Aircraft Division UTC				CTD001449784
Solvents Recovery Service of New England				CTD009717604
Yaworski Waste Lagoon	1985	1989		CTD009774969

Region 1 *cont.*

Massachusetts	WSR	PNRS	USAF	EPA FACILITY ID
Atlas Tack Corp.	1989			MAD001026319
Baird & McGuire				MAD001041987
Blackburn and Union Privileges	1993			MAD982191363
Boston Gas Co. LNG Plt				MAD087137329
Buzzards Bay				NA
Cannon Engineering Corp. (CEC)		1988		MAD079510780
Charles-George Reclamation Landfill	1987	1988		MAD003809266
Eastern Gas & Fuel				MAD981063142
Fort Devens				MA7210025154
Fort Devens-Sudbury Training Annex				MAD980520670
GE - Housatonic River	1999			MAD002084093
Groveland Wells	1987	1988		MAD980732317
Hanscom Field/Hanscom Air Force Base	1995			MA8570024424
Haverhill Municipal Landfill	1985			MAD980523336
Hocomonco Pond				MAD980732341
Holyoke Gas Works (Former)				MAD985298108
Industri-Plex	1987	1988		MAD076580950
Iron Horse Park				MAD051787323
Mass Bay				NA
Materials Technology Laboratory (USArmy)	1995			MA0213820939
Natick Laboratory Army Research, D&E Center	1995			MA1210020631
Naval Weapons Industrial Reserve Plant	1995			MA6170023570
New Bedford Harbor				MA2690390024
New Bedford Site (Acushnet Estuary)	1984			MAD980731335
Norwood PCB's				MAD980670566
Nuclear Metals				MAD062166335
Nyanza Chemical Waste Dump	1987	1993		MAD990685422
Otis Air National Guard Base/Camp Edwards				MA2570024487
Plymouth Harbor/Cannon Engineering Corp.	1984	1990		MAD980525232
PSC Resources				MAD980731483
Re-Solve, Inc.				MAD980520621
Rose Disposal Pit				MAD980524169
Salem Acres		1991		MAD980525240
Shpack Landfill				MAD980503973
Silresim Chemical Corp				MAD000192393
South Weymouth Naval Air Station	1995			MA2170022022
Sullivan's Ledge	1987	1989		MAD980731343

Region 1 *cont.*

Massachusetts *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Sutton Brook Disposal Area				MAD980520696
W. R. Grace and Co., Inc. (Acton Plant)				MAD001002252
Wells G&H		1990		MAD980732168
Zeneca Specialties				MAD051505477

Maine				
Brunswick Naval Air Station	1987	1991		ME8170022018
Callahan Mining Corp	2004			MED980524128
Eastern Surplus Co.				MED981073711
Eastland Woolen Mill	2002			MED980915474
Holtrachem				MED000242701
Lincoln Pulp & Paper				MESFN0102987
Loring Air Force Base				ME9570024522
Maine Yankee Atomic Power Company				MED071749329
Maine Yankee Nuclear Power plant				NA
Maine Yankee Nuclear Site				NA
McKin Company	1984			MED980524078
O'Connor Company	1984			MED980731475
O'Connor Company Main Office				MED018980227
Pinette's Salvage Yard				MED980732291
Portland Gas Wks				MED980520928
Portsmouth Naval Shipyard	1995			ME7170022019
Saco Municipal Landfill	1989			MED980504393
Saco Tannery Waste Pits				MED980520241
Union Chemical Co., Inc				MED042143883
Winthrop Landfill				MED980504435

New Hampshire				
Auburn Road Landfill		1989		NHD980524086
Beede Waste Oil	1997			NHD018958140
Coakley Landfill	1985	1989		NHD064424153
Dover Municipal Landfill	1987	1990		NHD980520191
Fletcher's Paint Works & Storage	1989			NHD001079649
Gilson Road Tar Pit				NHD980503304
Grugnale Waste Disposal Site	1985			NHD069911030
Kearsarge Metallurgical Corp				NHD062002001
Keefe Environmental Services				NHD092059112

Region 1 *cont.*

New Hampshire	WSR	PNRS	USAF	EPA FACILITY ID
Mohawk Tannery	***2005***			***NHD981889629***
Mottolo Pig Farm				NHD980503361
New Hampshire Plating Co.	1992			NHD001091453
Ottati & Goss/Kingston Steel Drum				NHD990717647
Pease Air Force Base	1990			NH7570024847
Savage Municipal Water Supply	1985	1991		NHD980671002
Somersworth Sanitary Landfill				NHD980520225
South Municipal Water Supply Well				NHD980671069
Sylvester	1985			NHD099363541
Tibbetts Road				NHD989090469
Tinkham Garage				NHD062004569
Town Garage/Radio Beacon				NHD981063860

Rhode Island				
Central Landfill				RID980520183
Centredale Manor Restoration Project	***2005***			***RID981203755***
Davis (GSR) Landfill				RID980731459
Davis Liquid Waste	1987			RID980523070
Davisville Naval Construction Battalion Center	1990	1994		RI6170022036
Landfill & Resource Recovery, Inc. (L&RR)				RID093212439
Newport Naval Education & Training Center	1990	1994		RI6170085470
Peterson/Puritan, Inc.	1987	1990		RID055176283
Picillo Farm	1987	1988		RID980579056
Rose Hill Regional Landfill	1989	1994		RID980521025
Stamina Mills, Inc.	1987	1990		RID980731442
West Kingston Town Dump/URI Disposal	1992			RID981063993
Western Sand & Gravel	1987			RID009764929

Vermont				
Bennington Municipal Sanitary Landfill				VTD981064223
BFI Sanitary Landfill (Rockingham)	1989			VTD980520092
Burgess Brothers Landfill				VTD003965415
Darling Hill Dump				VTD980520118
Elizabeth Mine	2003			VTD988366621
Ely Copper Mine	2003			VTD988366571
Old Springfield Landfill	1987	1988		VTD000860239
Parker Sanitary Landfill				VTD981062441

Region 1 *cont.*

Vermont *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Pine Street Canal				VTD980523062
Tansitor Electronics, Inc				VTD000509174

Region 2

New Jersey	WSR	PNRS	USAF	EPA FACILITY ID
A.O. Polymer				NJD030253355
Albert Steel Drum	1984			NJD000525154
Allied Corp				NJD980530604
American Cyanamid Co.	1985			NJD002173276
Asbestos Dump				NJD980654149
Atlantic Aviation Corp.				NJD011308988
Atlantic Resources	2004			NJD981558430
Bog Creek Farm	1984	1992		NJD063157150
Brick Township Landfill	1984			NJD980505176
Bridgeport Rental & Oil Services		1990		NJD053292652
Brook Industrial Park	1989			NJD078251675
Burnt Fly Bog		1992		NJD980504997
Celotex				NA
Chemical Control	1984			NJD000607481
Chemical Insecticide Corp.	1990	1992		NJD980484653
Chemical Leaman Tank Lines, Inc		1989		NJD047321443
Chemsol, Inc				NJD980528889
Chipman Chemical Co.	1985			NJD980528897
Ciba-Geigy Corp.	1984	1989;1992		NJD001502517
Cinnaminson Ground Water Contamination				NJD980785638
Combe Landfill South				NJD094966611
Cornell Dubilier Electronics, Inc.	1999			NJD981557879
Cosden Chemical Coatings Corp.	1987			NJD000565531
CPS/Madison Industries		1990		NJD002141190
Curcio Scrap Metal, Inc.	1987			NJD011717584
Custom Distribution Services				NJD097408439
Dayco/LE Carpenter				NA
De Rewal Chemical Co.	1985			NJD980761373
Delilah Road				NJD980529002
Denzer & Schafer X-Ray Co.	1984	1992		NJD046644407

Region 2 *cont.*

New Jersey *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Diamond Alkali Co.	1984			NJD980528996
Diamond Head Oil Refinery Div.	2004			NJD092226000
Diamond Shamrock Corp				NJD002442408
D'Imperio Property				NJD980529416
Duane Marine Corporation				NJD054526553
E.I. Du Pont de Nemours				NJD002385730
Ellis Property				NJD980529085
Emmell's Septic Landfill	2002			NJD980772727
Evor Phillips Leasing		1992		NJD980654222
Ewan Property				NJD980761365
Exxon Mobil-LAIL Property				NJD982178790
Federal Aviation Admin. Tech. Center	1990			NJ9690510020
Federal Creosote				NJ0001900281
Fort Dix (Landfill Site)				NJ2210020275
Franklin Burn Site				NJD986570992
Fried Industries				NJD041828906
GAF Corp				NJD980771638
GAF Corp - Gloucester City				NJD043292606
Garden State Cleaners Co.	1989			NJD053280160
Gateway National Recreational Area				NJ0141790006
Global Sanitary Landfill	1989	1991		NJD063160667
Goose Farm				NJD980530109
Grand Street Mercury				NJ0001327733
Helen Kramer Landfill		1990		NJD980505366
Hercules, Inc. (Gibbstown Plant)	1984	1993		NJD002349058
Higgins Disposal	1989			NJD053102232
Higgins Farm	1989			NJD981490261
Hopkins Farm				NJD980532840
Horseshoe Road (Atlantic Development Facility)	1984			NJD980663678
Horseshoe Road (Horseshoe Road Dump)	1984			NJD980663678
Horseshoe Road (Horseshoe Road Industrial Complex)	1995			NJD980663678
Iceland Coin Laundry and Dry Cleaning				NJ0001360882
Ideal Cooperage Inc.	1984			NJD980532907
Imperial Oil Co., Inc./Champion Chemical				NJD980654099
Industrial Latex Corp.	1989			NJD981178411
ISP Environmental Services, Inc.				NJD002185973

Region 2 *cont.*

New Jersey *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Jackson Township Landfill	1984			NJD980505283
JIS Landfill				NJD097400998
Kauffman & Minteer, Inc.	1989			NJD002493054
Kin-Buc Landfill	1984	1990		NJD049860836
King of Prussia				NJD980505341
Koppers Co Inc/Seaboard Plant	1984			NJD002445112
Krysowaty Farm	1985			NJD980529838
Landfill & Development Co.				NJD048044325
LCP Chemicals, Inc.	1999			NJD079303020
Lightman Drum Company				NJD014743678
Lipari Landfill				NJD980505416
Lone Pine Landfill		1992		NJD980505424
Lustrelon Inc.				NJD008388951
M&T Delisa Landfill				NJD085632164
Magic Marker/Exide Bankruptcy				NA
Mannheim Avenue Dump				NJD980654180
Martin Aaron, Inc.	2003			NJD014623854
Matteo Brothers				NJD011770013
Maywood Chemical Co				NJD980529762
McGuire Air Force Base				NJ0570024018
Metaltec/Aerosystems				NJD002517472
Middlesex Sampling Plant (DOE)	2002			NJ0890090012
Military Ocean Terminal (Landfill)				NJ0210022752
Mobil Chemical Co.	1984			NJD000606756
Monitoring Devices				NA
Monroe Township Landfill				NJD980505671
Myers Property				NJD980654198
Nascolite Corp.				NJD002362705
Naval Air Engineering Center				NJ7170023744
Naval Weapons Station Earle (Site A)				NJ0170022172
Newark Bay				NA
NL Industries	1984	1992		NJD061843249
Passaic River				NA
Pepe Field				NJD980529598
Perth Amboy PCB's	1984			NJD980653901
PJP Landfill	1984	1990		NJD980505648
Pohatcong Valley Groundwater Contamination				NJD981179047

Region 2 *cont.*

New Jersey *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Pomona Oaks Residential Wells				NJD980769350
Price Landfill	1984	1993		NJD070281175
Puchack Well Field	1999			NJD981084767
Pulverizing Services				NJD980582142
PVSC Sanitary Landfill	1984			NJD980529671
Quanta Resources	2004			NJD000606442
Raritan Arsenal				NJD986589190
Reich Farms				NJD980529713
Renora, Inc.				NJD070415005
Rhone-Poulenc Chemical Co				NJD099293326
Ringwood Mines/Landfill				NJD980529739
Rocky Hill Municipal Well				NJD980654156
Roebling Steel Co.	1984	1990		NJD073732257
Roosevelt Drive-In	1984			NJD030250484
Route 561 Dump	2002			NJ0000453514
Safety-Kleen (Rollins Environmental)				NJD053288239
Sayreville Landfill	1984	1990		NJD980505754
Scientific Chemical Processing	1984	1989		NJD070565403
SCP/Berry's Creek				NJD054050703
Sharkey Landfill		1990		NJD980505762
Shield Alloy Corp				NJD002365930
South Jersey Clothing Co.	1989			NJD980766828
Standard Chlorine Chemical Comapany, Inc.				NJD002175057
Swope Oil & Chemical Co.				NJD041743220
Syncon Resins	1984	1992		NJD064263817
Tabernacle Drum Dump				NJD980761357
Trenton Brownfields				NA
Troy Chemical				NJD002144517
United States Avenue Burn	2002			NJ0001120799
Universal Oil Products (Chemical Division)	1984			NJD002005106
Upper Deerfield Township Sanitary Landfill				NJD980761399
Ventron/Velsicol	1984			NJD980529879
Vineland Chemical Co., Inc		1990		NJD002385664
W.R. Grace/Wayne Interim Storage (USDOE)				NJ1891837980
Waldick Aerospace Devices, Inc.		1990		NJD054981337
Welsbach & General Gas Mantle (Camden Radiation)				NJD986620995
White Chemical Corp	1984			NJD001239185

Region 2 *cont.*

New Jersey *cont.*	**WSR**	**PNRS**	**USAF**	**EPA FACILITY ID**
White Chemical Corp.				NJD980755623
Williams Property	1984	1992		NJD980529945
Wilson Farm				NJD980532824
Witco Chemical Corp. (Oakland Plant)				NJD045653854
Woodbrook Road Dump	***2005***			***NJSFN0204260***
Woodland Route 532 Dump				NJD980505887
Woodland Route 72 Dump				NJD980505879
Zschiegner Refining Company	1999			NJD986643153

New York				
93rd Street School				NYD980780829
Action Anodizing, Plating, & Polishing Corp.	1989			NYD072366453
ALCOA Aggregation Site				NYD980506232
American Thermostat Co. Superfund Site				NYD002066330
Anchor Chemicals				NYD001485226
Applied Environmental Services	1985	1991		NYD980535652
BEC Trucking		1990		NYD980768675
Bioclinical Laboratories, Inc.				NYD980768683
Brewster Well Field				NYD980652275
Brookhaven National Laboratory (USDOE)	1990			NY7890008975
Byron Barrel & Drum				NYD980780670
C & J Disposal Leasing Co. Dump	1989			NYD981561954
Captain's Cove				NY0000069377
Carroll & Dubies Sewage Disposal	1989			NYD010968014
Circuitron Corp.				NYD981184229
Claremont Polychemical				NYD002044584
Clothier Disposal				NYD000511576
Colesville Municipal Landfill				NYD980768691
Computer Circuits	2002			NYD125499673
Conklin Dumps				NA
Consolidated Iron and Metal	2004			NY0002455756
Cornwall Lf.				NYD982276933
Croton Point Sanitary Landfill				NYD980508048
Dupont/Necco Park				NYD980532162
Ellenville Scrap Iron and Metal	2003			NYSFN0204190
Endicott Village Well Field				NYD980780746
Facet Enterprises				NA

Region 2 *cont.*

New York *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
FMC Corp.				NYD000511857
Forest Glen Mobile Home Subdivision				NYD981560923
Fort Totten				NY2213720897
Fulton Terminals				NYD980593099
G.E. Moreau				NYD980528335
GCL Tie & Treating, Inc.				NA
General Motors (Central Foundry Division)		1989		NYD091972554
Genzale Plating Co.				NYD002050110
Glen Cove/Hempstead Harbor				NA
Goldisc Recordings, Inc.				NYD980768717
Grasse River				NA
Griffiss Air Force Base (Former)-AFBCA/OL-X				NY4571924451
Harbor at Hastings Associates				NY0001817097
Haviland Complex				NYD980785661
Hertel Landfill				NYD980780779
Hiteman Leather				NA
Hooker (102nd Street)				NYD980506810
Hooker Chemical/Ruco Polymer Corp.				NYD002920312
Hooker Hyde Park				NYD000831644
Hooker S Area				NYD980651087
Hudson Coal Tar				NYD987039104
Hudson River PCB's		1989		NYD980763841
Jackson Steel				NYD001344456
Johnstown City Landfill				NYD980506927
Jones Chemicals, Inc.				NYD000813428
Jones Sanitation	1987			NYD980534556
Lawrence Aviation Industries Inc				NYD002041531
Lehigh Valley				NA
Li Tungsten Corp.	1992	1993		NYD986882660
Liberty Heat Treating Co. Inc.				NYD053169694
Liberty Industrial Finishing	1985	1993		NYD000337295
Little Valley				NA
Love Canal				NYD000606947
Ludlow Sand & Gravel				NYD013468939
Mackenzie Chemical Works	2004			NYD980753420
Malta Rocket Fuel Area				NYD980535124
Marathon Battery Corp.	1984	1989		NYD010959757

Region 2 *cont.*

New York *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Mattiace Petrochemical Co., Inc.	1989	1990		NYD000512459
Mercury Refining Inc.				NYD048148175
Mohonk Road Industrial Plant				NA
Nepera Chemical Co., Inc.				NYD002014595
Newstead Site				NYD986883387
Newtown				NA
Newtown Creek Water Pollution Control Plant				NYD980779730
Niagara County Refuse				NYD000514257
Niagara Mohawk Power Co. (Saratoga Springs)				NYD980664361
North Sea Municipal Landfill	1985	1989		NYD980762520
Old Bethpage Landfill				NYD980531727
Old Roosevelt Field Contaminated Groundwater Area	2003			NYSFN0204234
Onondaga Lake				NYD986913580
Pasley Solvents & Chemicals, Inc.				NYD991292004
Pennsylvania Ave. Municipal Landfill				NY6141790018
Peter Cooper	1999			NYD980530265
Pfohl Brothers Landfill				NYD986875979
Pollution Abatement Services				NYD000511659
Port Washington Landfill	1984	1989		NYD980654206
Preferred Plating Corp				NYD980768774
Reynolds Metals Co		1996		NYD002245967
Richardson Hill Road Landfill/Pond				NYD980507735
Robintech, Inc./International Pipe Co.				NA
Rosen Brothers Scrap Yard				NA
Rowe Industries Groundwater Contamination	1987	1991		NYD981486954
Sealand Restoration, Inc.				NA
Sidney Landfill	1989			NYD980507677
Sinclair Refinery				NYD980535215
Smithtown Groundwater Contamination	2003			NY0002318889
Solvent Savers				NYD980421176
Stanton Cleaners Area Groundwater Contamination	2002			NYD047650197
Suffern Village Well Field				NYD980780878
Syosset Landfill				NYD000511360
Tri-Cities Barrel Co., Inc.				NYD980509285
Tronic Plating Co., Inc.				NYD002059517
Volney Municipal Landfill				NYD980509376

Region 2 *cont.*

New York *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Wallkill Landfill				NYD980535496
Warwick Landfill				NYD980506679
Wide Beach Development				NYD980652259
York Oil Co.				NYD000511733
Port Authority of NY/NJ				NA

Puerto Rico				
Atlantic Fleet Weapons Training Area (Vieques)				NA
Clear Ambient Services Co.	1984			PRD090416132
Culebra				NA
Fibers Public Supply Wells				PRD980763783
Frontera Creek	1984	1991		PRD980640965
GE Wiring Devices				PRD090282757
Jobos Bay Preserve				NA
Juncos Landfill				PRD980512362
Naval Security Group Activity	1989	1991		PR4170027383
Pesticide Warehouse III	2004			PRD987367299
PREPA Palo Seco General Depot				PRD987377538
RCA Del Caribe				NA
Scorpio Recycling, Inc.	***2005***			***PRD987376662***
Upjohn Facility				PRD980301154
V&M/Albaladejo Farms	1997			PRD987366101
Vega Alta Public Supply Wells				PRD980763775
Vega Baja Solid Waste Disposal	2002			PRD980512669

Virgin Islands				
Island Chemical Corp./V.I. Chemical Corp.	1996			VID980651095
Tutu Wellfield	1993			VID982272569

Region 3

Washington, D.C.	WSR	PNRS	USAF	EPA FACILITY ID
Poplar Point Nursery				DCN000305662
Washington Gas Light Co				DCD077797793
Washington Navy Yard	1999			DC9170024310

Region 3 *cont.*

Delaware	WSR	PNRS	USAF	EPA FACILITY ID
ANA-11				NA
Anacostia River				NA
12th Street Landfill				DESFN0305510
Army Creek Landfill	1984			DED980494496
Chem-Solv, Inc				DED980714141
Christina River				NA
Coker's Sanitation Service Landfills	1986	1990		DED980704860
Connectiv				NA
Delaware City PVC Plant	1984			DED980551667
Delaware Sand & Gravel	1984			DED000605972
Dover Air Force Base	1987	1989		DE8570024010
Dover Gas Light Co.	1987			DED980693550
E.I. Du Pont Newport Landfill	1987	1991;1992		DED980555122
Halby Chemical	1986	1990		DED980830954
Harvey & Knott Drum, Inc				DED980713093
Kent County Landfill	1989			DED980705727
Koppers Co. Facilities Site	1990			DED980552244
NCR Corp., Millsboro	1986			DED043958388
New Castle Spill Site	1984	1989		DED058980442
New Castle Steel	1984			DED980705255
NVF (Yorklyn)				DE0002014975
Old Brine Sludge Landfill	1984			DED980704894
Pigeon Point Landfill	1987			DED980494603
Sealand Limited	1989			DED981035520
Standard Chlorine Co.	1986			DED041212473
Sussex Co. Landfill #5	1989			DED980494637
Tybouts Corner Landfill	1984			DED000606079
Tyler Refrigeration Pit				DED980705545
Wildcat Landfill	1984			DED980704951

Maryland				
68th Street Dump/Industrial Enterprises	2002			MDD980918387
Allied Chemical				MDD069396711
Andrews Air Force Base	2003		1994	MD0570024000
Anne Arundel County Landfill	1989			MDD980705057
Bethlehem Steel Sparrows Point Plant				MDD053945432
Brandywine DRMO	2003			MD9570024803

Region 3 *cont.*

Maryland *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Bush Valley Landfill	1989	1993		MDD980504195
Central Chemical Corporation	1999			MDD003061447
Chemical Metals Industries, Inc.				MDD980555478
Curtis Bay Coast Guard Yard				MD4690307844
Hawkins Pt / MD. Port Admin.				MDD000731356
Indian Head Naval Surface Warfare Center		1997		MD7170024684
Joy Reclamation Co	1984			MDD030321178
Kane & Lombard Street Drums				MDD980923783
Maryland Port Admin.				MDD030324073
Mid-Atlantic Wood Preservers, Inc				MDD064882889
Naval Surface Warfare Center - White Oak				MD0170023444
Naval Training Center Bainbridge				MDD985397256
Ordnance Products, Inc.	1995			MDD982364341
Sand, Gravel & Stone Site	1984	1990		MDD980705164
Southern Maryland Wood Treating	1987			MDD980704852
Spectron, Inc		1997		MDD000218008
U.S. Agricultural Center Beltsville (2 Tenants)	1995			MD0120508940
USA Aberdeen - Edgewood	1986			MD2210020036
USA Aberdeen - Edgewood: Bush River Watershed		1994		MD2210020036
USA Aberdeen - Edgewood: Gun Powder River Watershed		1994		MD2210020036
USA Aberdeen - Michaelsville	1986			MD3210021355
USA Aberdeen - Michaelsville: Romney Creek Watershed		1994		MD3210021355
USA Fort George Meade	1997			MD9210020567
USN Patuxent Naval Air Station	1996			MD7170024536
Woodlawn Co. Landfill	1987			MDD980504344

Pennsylvania				
A.I.W. Frank/Mid-County Mustang				PAD004351003
Allied Signal Aerospace Co. Guidance and Control Systems				PAD003047974
Ambler Asbestos Piles				PAD000436436
American Electronic Lab, Inc				PAD009224981
AMP Inc, Global Envir Services				PAD980693048
Austin Avenue Radiation Site	1993			PAD987341716
Bally Engineered Structure Incorporated				PAD061105128
Bell Landfill				PAD980705107

Region 3 *cont.*

Pennsylvania *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Berkley Products				PAD980538649
Berks Landfill Corp				PAD000651810
Berks Sand Pit				PAD980691794
Boarhead Farms	1989			PAD047726161
Bridesburg Dump	1984			PAD980508402
Brodhead Creek				PAD980691760
Brown's Battery Breaking		1991		PAD980831812
Butler Mine Tunnel	1987			PAD980508451
Butz Landfill				PAD981034705
Crater Resources, Inc./Keystone Coke Co./ Alan Wood	1993			PAD980419097
Croydon TCE Spill	1986			PAD981035009
Delta Quarries & Disposal Inc./Stotler Landfill				PAD981038052
Douglassville Disposal	1987			PAD002384865
Drake Chemical				PAD003058047
Dublin TCE Site				PAD981740004
Eastern Diversified Metals				PAD980830533
Elizabethtown Landfill	1989			PAD980539712
Enterprise Avenue	1984			PAD980552913
FMC Marcus Hook	1996			PAD987323458
Foote Mineral Co.	1993			PAD077087989
GMT Microelectronics				PAD093730174
Hamburg Lead Site				PASFN0305567
Havertown PCP Site				PAD002338010
Hebelka Auto Salvage Yard				PAD980829329
Hellertown Manufacturing Co.	1987			PAD002390748
Henderson Road		1989		PAD009862939
Industrial Lane				PAD980508493
Jack's Creek/Sitkin Smelting & Refining, Inc.	1989			PAD980829493
Keyser Ave. Borehole	1989			PAD981036049
Kimberton				PAD980691703
Lackawanna Refuse				PAD980508667
Lansdowne Radiation Site				PAD980830921
Letterkenny Army Depot (PDO Area)				PA2210090054
Letterkenny Army Depot (SE Area)				PA6213820503
Lord-Shope Landfill				PAD980508931
Lower Darby Creek Area	2003			PASFN0305521

Region 3 *cont.*

Pennsylvania *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Malvern TCE				PAD014353445
Marjol Operation				PAD003041910
Metal Bank of America	1984	1990		PAD046557096
Metropolitan Mirror and Glass				PAD982366957
Middletown Air Field				PAD980538763
Mill Creek Dump				PAD980231690
Modern Sanitation Landfill				PAD980539068
Moyers Landfill				PAD980508766
MW Manufacturing				PAD980691372
National Vulcanized Fiber				PAD107214116
Naval Air Development Center (8 Areas)				PA6170024545
North Penn - Area 1				PAD096834494
North Penn - Area 12				PAD057152365
North Penn - Area 2				PAD002342475
North Penn - Area 5				PAD980692693
North Penn - Area 6				PAD980926976
North Penn - Area 7				PAD002498632
Novak Sanitary Landfill				PAD079160842
Occidental Chemical Corp./Firestone Tire and Rubber Co.	1989			PAD980229298
Old Wilmington Road GW Contamination				PAD981938939
Palmerton Zinc Pile		date unk.*		PAD002395887
Paoli Rail Yard	1987	1991		PAD980692594
Publicker/Cuyahoga Wrecking Plant	1990			PAD981939200
Raymark				PAD039017694
Recticon/Allied Steel	1989			PAD002353969
Reeser's Landfill				PAD980829261
Revere Chemical Co.	1986			PAD051395499
Rohm and Haas Landfill	1986			PAD091637975
Sable Diamonds/US Metal & Coins				PAD982364234
Saegertown Industrial Area				PAD980692487
Salford Quarry	1997			PAD980693204
Shriver's Corner				PAD980830889
Stanley Kessler				PAD014269971
Strasburg Landfill				PAD000441337
Textron Lycoming				PAD003053709
Tinicum National Environmental Center	1986			PA6143515447

Region 3 *cont.*

Pennsylvania *cont.*	**WSR**	**PNRS**	**USAF**	**EPA FACILITY ID**
Tonolli Corp				PAD073613663
Tysons Dump #1	1985			PAD980692024
UGI Corp. Gas Manufacturing Plant	1995			PAD980539126
USN Philadelphia Naval Shipyard				PA4170022418
USN Ships Parts Control Center	1996			PA3170022104
Wade (ABM)	1984			PAD980539407
Walsh Landfill				PAD980829527
Whitmoyer Laboratories				PAD003005014
Willow Grove Naval Air and Air Reserve Station				PAD987277837

Virginia				
Abex Corp.	1989			VAD980551683
Arrowhead Associates Inc./Scovill Corp.	1989			VAD042916361
Atlantic Wood Industries, Inc.	1987	1990		VAD990710410
C & R Battery Co., Inc.	1987			VAD049957913
Chisman Creek	1984			VAD980712913
Clarke L.A. & Son				VAD007972482
Elizabeth River				NA
First Piedmont Corp. Rock Quarry (Route 719)				VAD980554984
Former Nansemond Ordnance Depot	2002			VAD123933426
Ghost Fleet				NA
Greenwood Chemical Co				VAD003125374
H & H Inc., Burn Pit				VAD980539878
Hampton Roads Welders Site				VAD988197133
Kim-Stan Landfill	2002			VAD077923449
Langley Air Force Base/ NASA Langley Research Center	1995	1997		VA2800005033
Marine Corps Combat and Development Command	1995			VA1170024722
NASA Wallops Island				VA8800010763
Naval Amphibious Base Little Creek	2002			VA5170022482
Naval Surface Warfare Center - Dahlgren	1993	date unk.*		VA7170024684
Naval Weapons Station - Yorktown	1993	1997		VA8170024170
NWS Yorktown - Cheatham Annex	2004			VA3170024605
Oceana Naval Air Station Landfill				VA2170024606
Rentokil, Inc. (Virginia Wood Preserving Division)				VAD071040752
Rhinehart Tire Fire Dump				VAD980831796
Richmond, Fredericksburg & Potomac Railroad		1994		VAD020312013

Region 3 *cont.*

Virginia *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Saltville Waste Disposal Ponds				VAD003127578
Saunders Supply Co.	1987			VAD003117389
St Juliens Creek Annex (U.S. Navy)				VA5170000181
Suffolk City Landfill				VAD980917983
U.S. Defense General Supply Center				VA3971520751
U.S. Titanium				VAD980705404
USA Fort Eustis	1996	date unk.*		VA6210020321
USA Radford Ammunition Plt				VA1210020730
USA Woodbridge Research Facility				VA7210020981
USN Craney Island Fuel Terminal				VA7170022472
USN Fleet Combat Training Center				VA5170022938
USN Naval Shipyard Norfolk	1999			VA1170024813
USN Norfolk Naval Base	1997			VA6170061463
USN Radio Transmitting Facility				VA9170022488

Region 4

Alabama	WSR	PNRS	USAF	EPA FACILITY ID
Alabama Wood Treating Corp Inc				ALD058221326
American Brass Inc.	2002			ALD981868466
Ciba-Geigy Corp. (McIntosh Plant)	1990			ALD001221902
Gulf Oil Co				ALD000604249
Interstate Lead Co. (ILCO)				ALD041906173
Olin Corp. (McIntosh Plant)	1990			ALD008188708
Redwing Carriers, Inc. (Saraland)	1989			ALD980844385
Stauffer Chemical Co. (Cold Creek Plant)		1990		ALD095688875
Stauffer Chemical Co. (Lemoyne Plant)				ALD008161176
T.H. Agriculture & Nutrition (Montgomery)				ALD007454085
US Naval Outlying Barin Field				AL2170024630
USAF Maxwell Air Force Base				AL0570024182

Florida				
Acme Sponge and Chamois Co.				FLD001952159
Agrico Chemical Co.	1989			FLD980221857
Airco Plating Co				FLD004145140
Alaric Area GW Plume				FLD012978862

Region 4 *cont.*

Florida *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
American Creosote Works (Pensacola Plant)	1984	1989		FLD008161994
Anaconda Aluminum Co./Milgo Electronics				FLD020536538
Anodyne, Inc				FLD981014368
B&B Chemical Co., Inc				FLD004574190
Bay Drum				FLD088783865
Beulah Landfill				FLD980494660
BMI-Textron				FLD052172954
Broward County-21st Manor Dump	1992			FLD981930506
Cabot/Koppers				FLD980709356
Cascade Park Gasification Plant				FLD981931959
Chemform, Inc.	1990			FLD080174402
Chevron Chemical Co. (Ortho Division)				FLD004064242
Coleman-Evans Wood Preserving Co				FLD991279894
Cypress Garden Skis				FLD029505161
Davie Landfill				FLD980602288
Dubose Oil Products Co				FLD000833368
Escambia Wood Treating				FLD008168346
Florida Petroleum Processors				FLD984184127
Florida Steel Corp				FLD050432251
Gardinier Inc/ Ft Meade Mine				FLD000827428
Harris Corp. (Palm Bay Plant)	1986	1990		FLD000602334
Helena Chemical Co. (Tampa Plant)	1993			FLD053502696
Hipps Road Landfill				FLD980709802
Hollingsworth Solderless Terminal				FLD004119681
JEA Kennedy Generating Station				FLD000907907
JEA Northside Generating Station				FLD000735860
Kassauf-Kimerling Battery Disposal		1989		FLD980727820
Kerr-McGee Site				NA
Madison County Sanitary Landfill				FLD981019235
MRI Corporation	1997			FLD088787585
Munisport Landfill	1984			FLD084535442
Normandy Park Apartments				FLD984229773
Peak Oil Co./Bay Drum Co				FLD004091807
Peele-Dixie Wellfield Site				FLD984259374
Pensacola Naval Air Station	1990			FL9170024567
Pepper Steel & Alloys, Inc				FLD032544587
Pickettville Road Landfill	1984	1990		FLD980556351

Region 4 *cont.*

Florida *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Piper Aircraft/Vero Beach Water & Sewer				FLD004054284
Pleasant Grove Landfill				FLD984169763
Raleigh Street Dump				FLD984227249
Reeves SE Corp Southeastern Wire Div				FLD000824888
Reeves Southeastern Galvanizing Corp.				FLD000824896
River Hills Drive Battery				FLD984258574
Sapp Battery Salvage		1989		FLD980602882
Schuylkill Metals Corp				FLD062794003
Sherwood Medical Industries				FLD043861392
Sixty-Second Street Dump	1984	1989		FLD980728877
Solitron Devices, Inc				FLD032845778
Solitron Microwave	2002			FLD045459526
Southern Solvents, Inc				FL0001209840
St. Augustine Gas Company				FLD101835528
Standard Auto Bumper Corp.	1989			FLD004126520
Stauffer Chemical Co. (Tampa Plant)	1993			FLD004092532
Stauffer Chemical Co. (Tarpon Springs)	1993			FLD010596013
Sydney Mine Sludge Ponds		1989		FLD000648055
Taylor Road Landfill				FLD980494959
Trans Circuits, Inc.				FLD091471904
United Metals, Inc.	2004			FLD098924038
US NASA Kennedy Space Center				FL6800014585
USAF Cape Canaveral AFB				FL2800016121
USAF Eglin AFB Armament Division				FL8570024366
USAF Homestead AFB				FL7570024037
USAF MacDill AFB				FL2971590003
USAF NAS Key West (Boca Chica)				FL6170022952
USAF Patrick AFB				FL2570024404
USAF Tyndall Air Force Base	1997			FL1570024124
USCG Station Key West				FL1690331300
USN Air Station Cecil Field	1990			FL5170022474
USN NAS Jacksonville	1990			FL6170024412
USN Naval Air Station Mayport				FL9170024260
USN Naval Air Station Whiting Field Site 5	1996			FL2170023244
USN Naval Coastal Systems Ctr.				FL8170023792
Watson’s Bayou				NA
Whitehouse Oil Pits				FLD980602767

Region 4 *cont.*

Florida *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Wilson Concepts of Florida, Inc				FLD041184383
Wingate Road Municipal Incinerator Dump				FLD981021470
Woodbury Chemical Co. (Princeton Plant)	1989			FLD004146346
Zellwood Ground Water Contamination				FLD049985302

Georgia				
Brunswick Wood Preserving	1997			GAD981024466
Camilla Wood Preserving Company	1999			GAD008212409
Cedartown Industries, Inc				GAD095840674
Cedartown Municipal Landfill				GAD980495402
Diamond Shamrock Corp. Landfill				GAD990741092
Firestone Tire & Rubber Co (Albany Plant)				GAD990855074
Hercules 009 Landfill				GAD980556906
Hercules Inc				GAD004065520
International Paper Co				GAD000827444
LCP Chemicals Georgia		1995		GAD099303182
Marine Corps Logistics Base				GA7170023694
Mathis Brothers Landfill				GAD980838619
Monsanto Corp. (Augusta Plant)				GAD001700699
New Sterling Landfill				GAD980495451
Robins Air Force Base				GA1570024330
T.H. Agriculture & Nutrition (Albany)				GAD042101261
Terry Creek Dredge Spoil Areas/Hercules Outfall	1997			GAD982112658
Woolfolk Chemical Works, Inc				GAD003269578

Mississippi				
Chemfax, Inc.	1995			MSD008154486
Chevron Pascagoula Refinery				MSD054179403
Chevron USA Incorporated Collins Terminal				MSD980602064
Davis Timber Company	2004			MSD046497012
Gautier Oil Co., Inc.	1989			MSD098596489
Naval Construction Battalion Center				MS2170022626
Southeast Mississippi Industrial Council				MSD980403240
Tennessee Gas Pipeline/CS 530				MSD991277542
USAF Keesler AFB				MS2570024164

Region 4 *cont.*

North Carolina	WSR	PNRS	USAF	EPA FACILITY ID
ABC One Hour Cleaners	1989			NCD024644494
Camp Lejeune Military Res. (USNAVY)	1989			NC6170022580
Charles Macon Lagoon & Drum Storage				NCD980840409
Cherry Point Marine Corps Air Station				NC1170027261
Dockery Property				NCD980840342
Estech General Chemical				NA
FCX, Inc. (Washington Plant)	1989			NCD981475932
Geigy Chemical Corp. (Aberdeen Plant)				NCD981927502
General Electric Co/Shepherd Farm				NCD079044426
Georgia-Pacific Corporation Hardwood Sawmill				NCD000813592
Koppers Co. Inc. (Morrisville Plant)				NCD003200383
LCP Holtrachem/Honeywell				NA
National Starch & Chemical Corp.				NCD991278953
New Hanover County Airport Burn Pit	1989			NCD981021157
Northeast Chemical Site				NA
Old ATC Refinery				NCD986186518
Potter's Septic Tank Service Pits	1989			NCD981023260
Reasor Chemical Company	2004			NCD986187094
Roanoke River, GP & Weyerhaeuser Sites				NA
Triangle Pacific Corp IXL Division				NCD087336335
Weyerhaeuser Company Plymouth Wood Treating Plant				NCD991278540

South Carolina	WSR	PNRS	USAF	EPA FACILITY ID
Allied Terminals Incorporated				SC0000861054
Beaufort County Landfill				SCD980844260
Brewer Goldmine				NA
Calhoun Park Area		1993		SCD987581337
Carolawn, Inc				SCD980558316
Charleston Harbor Restoration Projects				NA
Charleston Landfill				SCD980846034
Columbia Nitrogen				SC0001040393
Geiger (C&M Oil)	1984			SCD980711279
Helena Chemical Co. Landfill	1989			SCD058753971
International Paper Co.				SCD055915086
Kalama Specialty Chemicals				SCD094995503
Koppers Co., Inc. (Charleston Plant)	1993			SCD980310239

Region 4 *cont.*

South Carolina *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Leonard Chemical Co., Inc				SCD991279324
Lexington County Landfill Area				SCD980558043
Macalloy Corporation	2004			SCD003360476
Naval Shipyard - Charleston				SC0170022560
Naval Weapons Station - Charleston				SC8170022620
Palmetto Recycling, Inc				SCD037398120
Para-Chem Southern, Inc				SCD002601656
Parris Island Marine Corps Recruit Depot		1995		SC6170022762
Savannah River Site (USDOE)	1990			SC1890008989
USDOI Charleston Harbor Site		1993		SCD987572674
Wamchem, Inc.	1984			SCD037405362

Region 5

Illinois	WSR	PNRS	USAF	EPA FACILITY ID
Dupage River Restoration				NA
Fort Sheridan				IL8214020838
Great Lakes Naval Training Center				NA
Great Lakes Restoration Grants				NA
Outboard Marine Corp				ILD000802827
Yeoman Creek Landfill				ILD980500102
Indiana				
Grand Calumet/IHC Area of Concern				IND980500573
Inland Steel Company				IND005159199
Michigan				
Allied Paper/Portage Creek/Kalamazoo River				MID006007306
Cannelton Industries				MID980678627
Deer Lake				MID980679799
Ford Motor Co				MID005057005
Hooker Montague Plant				MID006014906
Manistique River/Harbor, Area of Concern				MID981192628
Muskegon Chem Co.				MID072569510
Packaging Corp. of America				MID980794747
Plainwell Paper				MID053666228

Region 5

Michigan *cont.*	**WSR**	**PNRS**	**USAF**	**EPA FACILITY ID**
Shiawassee River				MID980794473
Thunder Bay				MID985640630
Torch Lake				MID980901946
Velsicol Chemical Corporation				MID000722439

Minnesota				
St Louis River/Interlake				MND039045430

Ohio				
Ashtabula River				NA
Fields Brook				OHD980614572

Wisconsin				
Ashland/NSP Lakefront Site				WISFN0507952
Boerke Site				WID981189632
Fort Howard Paper Co. Lagoons				WID006136659
Fort Howard Steel Incorporated				WID006141402
Fox River NRDA/PCB Releases	2003			WI0001954841
GLNPO Legacy Act				NA
Hayden Mill Pond				NA
Kohler Co. Landfill				WID006073225
Moss-American (Kerr-McGee Oil Co.)				WID039052626
Sheboygan Harbor & River				WID980996367

Region 6

Louisiana	**WSR**	**PNRS**	**USAF**	**EPA FACILITY ID**
1994 Conoco EDC Spill				NA
American Creosote Works, Inc. (Winnfield Plant)				LAD000239814
Bayou Bonfouca				LAD980745632
Bayou d'Inde				LAD981916570
Bayou Sorrel Site	1984			LAD980745541
Bayou Trepagnier (Shell Oil Co/Norco Mfg Complex)				LAD008186579
Bayou Verdine, Occidental Chemical				LAD985195346
Calcasieu Estuary				LA0002368173
Calcasieu Estuary Workgroup (RCRA/CERCLA/Water)				NA

Region 6 *cont.*

Louisiana *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Calcasieu Parish Landfill				LAD980501423
Delatte Metals	2002			LAD052510344
Devil's Swamp Lake				LAD985202464
Gulf State Utilities-North Ryan Street				LAD985169317
Lake Salvador				NA
Madisonville Creosote Works	1997			LAD981522998
Mallard Bay Landing Bulk Plant	2004			LA0000187518
New Orleans Naval Air Station				LA6170022788
Petro-Processors of Louisiana, Inc.				LAD057482713
Ponchatoula Battery Company				LAD062644232
PPG Industries Inc.				LAD008086506
Southern Shipbuilding Corp.				LAD008149015
Texaco				NA

Texas				
ALCOA (Point Comfort)/Lavaca Bay	1995			TXD008123168
Bailey Waste Disposal	1985	1989		TXD980864649
Brine Service Company	2004			TX0000605264
Brio Refining, Inc.	1989	1989		TXD980625453
Brio/DOP				NA
Chevron Products Co.				TXD008090409
Corpus Christi Naval Air Station				TX7170022787
Crystal Chemical Co.	1989	1989		TXD990707010
Dixie Oil Processors, Inc.	1989	1989		TXD089793046
EI Dupont De Nemours & Co Beaumont Works				TXD008081101
Encycle				NA
Falcon Refinery				TXD086278058
French, Ltd.	1989	1989		TXD980514814
GB Biosciences Corporation				TXD000836486
Geneva Industries/Fuhrmann Energy				TXD980748453
Green's Bayou				NA
Gulfco Marine Maintenance				NA
Harris (Farley Street)				TXD980745582
Highlands Acid Pit	1989			TXD980514996
International Creosoting				TXD980625636
Malone Service Company, Inc.	2003			TXD980864789
Motco, Inc.	1984			TXD980629851

Region 6 *cont.*

Texas *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
North Cavalcade Street				TXD980873343
Palmer Barge Line	***2005***			***TXD068104561***
Patrick Bayou	2003			TX0000605329
Petro-Chemical Systems (Turtle Bayou)				TXD980873350
Shell Deer Park				NA
Sheridan Disposal Services				TXD062132147
Sikes Disposal Pits	1989			TXD980513956
South Cavalcade Street				TXD980810386
Sprague Road Groundwater				TX0001407444
Star Lake Canal Site - Port Neches				TX0001414341
State Marine	1999			TXD099801102
Tex-Tin Corp.	1989			TXD062113329
Triangle Chemical Co				TXD055143705

Region 9

American Samoa	WSR	PNRS	USAF	EPA FACILITY ID
Taputimu Farm	1984			ASD980637656

California				
AERA/SWEPI (Former Hercules Gas Plant)				NA
Aerojet General Corp				CAD980358832
Alameda Naval Air Station	1989			CA2170023236
Avila Beach				NA
B.F. Goodrich				NA
Bolsa Chica Lowlands				NA
Brown & Bryant, Inc. (Arvin Plant)				CAD052384021
Camp Pendleton Marine Corps Base	1990	1992		CA2170023533
Caretaker Site Office Treasure Island				CA7170023330
Casmalia Resources				CAD020748125
Chevron USA Richmond Ref				CAD009114919
Coast Guard Aid to Navigation Battery Sites (AtoN)				NA
Coast Wood Preserving	1984			CAD063015887
Concord Naval Weapons Station (Naval Weapons Station Concord)	1993	1990		CA7170024528

Region 9 *cont.*

California *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Concord Naval Weapons Station (Naval Weapons Station)	1989			CA7170024528
Cooper Drum Co.	1993			CAD055753370
Crazy Horse Sanitary Landfill				CAD980498455
CTS Printex, Inc.	1989			CAD009212838
Del Amo Facility	2004			CAD029544731
Del Amo Facility (Del Amo)	1992			CAD029544731
Del Norte Pesticide Storage	1984			CAD000626176
El Toro Marine Corps Air Station	1989			CA6170023208
Fairchild Semiconductor Corp (Mt View)				CAD095989778
Farallon Islands		1990		CAD981159585
Fleet Industrial Supply Center Oakland				CA4170090027
Fort Ord	1990	1992		CA7210020676
Fresno Municipal Sanitary Landfill				CAD980636914
GBF, Inc. Dump	1989			CAD980498562
GBF, Inc. Dump (GBF/Pittsburg Landfill)	1993			CAD980498562
Gray Eagle Mine				CAD000629923
Guadalupe Oil Field				NA
Halaco Engineering Co				CAD009688052
Hamilton AFB				CA3570024288
Hewlett-Packard (620-640 Page Mill Road)	1989			CAD980884209
Hexcel Corporation				CAD058783952
Hunters Point Naval Shipyard	1989	1989		CA1170090087
Intersil Inc./Siemens Components	1989			CAD041472341
Iron Mountain Mine	1989	1989		CAD980498612
J.H. Baxter & Co				CAD000625731
Jasco Chemical Corp.	1989			CAD009103318
Jet Propulsion Laboratory (NASA)				CA9800013030
Kaiser Steel Corp. (Fontana Plant)				CAD008274938
Kearney-KPF				CAD981429715
Liquid Gold Oil Corp.	1984			CAT000646208
Long Beach Naval Station				CA2170023194
Louisiana-Pacific Corp				CAD065021594
Mare Island Naval Shipyard				CA7170024775
McClellan Air Force Base (Western Parcels)				NA
McCormick & Baxter Creosoting Co.	1993			CAD009106527
McLaughlin Mine				NA

Region 9 *cont.*

California *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
McNamara & Peepe Sawmill				CA0001097088
M-E-W Study Area				CAD982463812
MGM Brakes	1984			CAD000074120
Modesto Ground Water Contamination				CAD981997752
Moffett Naval Air Station	1986			CA2170090078
Montrose Chemical Corp.	1985			CAD008242711
NASSCO/SW Marine Shipyard				NA
Naval Air Station Lemore				CA3170024381
Naval Base Ventura County, Port Hueneme				CA6170023323
Naval Shipyard Long Beach				CA1170090483
Naval Station San Diego				NA
Naval Supply Center Pt Molate Site				CA0170090021
Naval Training Center (Boat Channel)				NA
Newmark Ground Water Contamination				CAD981434517
North Island Naval Air Station				CA7170090016
Oakland Army Base				CA4210020661
Oakland Naval Supply Ctr/Alameda Fac				CA1170090012
Pacific Coast Pipe Lines	1989			CAD980636781
Pacific Missile Test Center				CA9170027271
Palmyra Atoll				NA
Palos Verdes Shelf				NA
Playa Vista Development Project				CAD982418139
Point Loma Naval Complex				CA1170090236
Port of Long Beach				NA
Presidio of San Francisco				CA7210020791
Ralph Gray Trucking Co				CAD981995947
Redwood Shore Landfill				CAD982462343
Rhone-Poulenc, Inc./Zoecon Corp.	1985			CAT000611350
Riverbank Army Ammunition Plant	1989			CA7210020759
Romic Chem Corp				CAD009452657
Sacramento Army Depot				CA0210020780
San Diego Bay Toxic Hot Spot Cleanup/TMDL				NA
San Diego Naval Training Center				CA7170090057
San Francisco Bay				NA
Seal Beach Naval Weapons Sta.				CA0170024491
Shell Oil Co Martinez				CAD009164021
Simpson-Shasta Ranch				CAD980637482

Region 9 *cont.*

California *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Sola Optical USA, Inc.	1989			CAD981171523
Solar Turbines, Inc.				CAD008314908
Solvent Service, Inc.				CAD059494310
South Bay Asbestos Area	1985			CAD980894885
Spectra-Physics, Inc				CAD009138488
Sulphur Bank Mercury Mine				CAD980893275
Synertek, Inc. (Building 1)				CAD990832735
Tosco Corp Avon Ref				CAD000072751
Travis Air Force Base	1990			CA5570024575
TRW Microwave, Inc (Building 825)				CAD009159088
United Heckathorn Co.				CAD981436363
Unocal San Francisco Refinery				NA
Vandenberg AFB			1994	CA9570025149

Federated States of Micronesia				
PCB Wastes				FMD980637987

Guam				
Andersen Air Force Base	1993			GU6571999519
Apra Harbor Naval Complex				GU7170090008
Naval Air Station Agana				GU0170027320
Naval Sta Guam				GU7170027323

Hawaii				
ABC Chem Corp				HID033233305
Barbers Point Naval Air Station				HI1170024326
Bellows Air Force Station				HI3570028719
Chemwood Treatment Co, Inc.				HID981424138
Del Monte Corp. (Oahu Plantation)	1995			HID980637631
Hawaiian Western Steel Limited				HID981581788
Hickam Air Force Base				HI8570028722
Honolulu Skeet Club				HI0000768382
Kahoolawe Island				HI6170090074
Kailua-Kona Landfill				HID980497184
Kapaa Landfill				HID980497176
Kapalama Canal/Honolulu Harbor				NA
Kewalo Incin Ash Dump				HID980497226

Region 9 *cont.*

Hawaii *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Kure Atoll, U.S. Coast Guard				HID984470039
Marine Corps Base Hawaii				HI6170022762
Naval Submarine Base				HI3170024340
Pearl City Landfill	1984			HID980585178
Pearl Harbor Naval Complex				HI4170090076
Pearl Harbor Naval Station	1992	1993		HI2170024341
Tern Island				NA
USCG Base Honolulu				HID984469890
Waiakea Pond/Hawaiian Cane Prdts Plant		1990		HID982400475

U.S. Minor Outlying Islands	
Johnston Atoll	UM4210090003
Midway Island Naval Air Station	UM6170027332
Sand Island	NA
Wake Island Air Field	HI0570090001

Region 10

Alaska	WSR	PNRS	USAF	EPA FACILITY ID
Adak Naval Air Station	1993			AK4170024323
Alaska Pulp Corp		1995		AKD009252487
Dutch Harbor Sediment Site		date unk.*		AKSFN1002080
Elmendorf Air Force Base	1990	1990	1994	AK8570028649
Fort Richardson (US Army)	1995			AK6214522157
Fort Wainwright				AK6210022426
Kennicott Copper Mining Co				AKD983073123
Ketchikan Pulp Co		1998		AKD009252230
Klag Bay Site	2002			AK0002364768
Metlakatla Indian Community (Brownfield Site)				NA
Standard Steel & Metal Salvage Yard (USDOT)	1990	1990		AKD980978787
USAF Eareckson AFS				AK9570028705
USAF King Salmon Airport		1999		AK3570028669
USDOC NOAA National Marine Fisheries Service				AK0131490021
USNAVY Barrow Naval Arctic Research Lab				AK2170027245

Region 10 *cont.*

Idaho	WSR	PNRS	USAF	EPA FACILITY ID
Blackbird Mine	1995	1994		IDD980725832
Grouse Creek Mine				IDD000643254
St Maries Creosote				IDSFN1002095
Stibnite/Yellow Pine Mining Area	2003			IDD980665459

Oregon				
Allied Plating, Inc.	1987	1988		ORD009051442
East Multnomah County Ground Water Contamination				ORD987185030
Gould, Inc.	1984	1988		ORD095003687
Harbor Oil Inc.	2004			ORD071803985
Hoys Marine, LLC				ORD987190840
Joseph Forest Products				ORD068782820
Martin-Marietta Aluminum Co.	1987	1988		ORD052221025
McCormick & Baxter Superfund Site	1995	1995		ORD009020603
Northwest Pipe & Casing Co.	1993			ORD980988307
Port of Coos Bay - Charleston Boat Yard		date unk.*		OR0001389972
Portland Harbor (Lower Willamette River)	2003	1999		ORSFN1002155
Portland Harbor Arkema Early Action				ORSFN1002155
Portland Harbor GASCO Early Action				ORSFN1002155
Portland Harbor Port of Portland / T4				ORSFN1002155
Reynolds Metals Company		1996		ORD009412677
Rhone Poulenc Inc. Basic Chemicals Division	1984			ORD009025347
Taylor Lumber and Treating	***2005***	***1991***		***ORD009042532***
Teledyne Wah Chang	1985	1988		ORD050955848
Union Pacific Railroad	1990	1990		ORD009049412

Washington				
ALCOA (Vancouver Smelter)	1989	1989		WAD009045279
American Crossarm & Conduit Co.	1989	1988		WAD057311094
Asarco Incorporated				WAD010187896
Bangor Naval Submarine Base	1990	1991		WA5170027291
Bangor Ordnance Disposal (USNavy)		1991		WA7170027265
Bellingham Portfield				NA
Boeing Company Plant 2				WAD009256819
Bonneville Power Administration Ross Complex (USDOE)	1990	1990		WA1891406349

Region 10 *cont.*

Washington *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Boomsnub/Airco				WAD009624453
Centralia Municipal Landfill	1989	1989		WAD980836662
Commencement Bay, Near Shore/Tide Flats		1988		WAD980726368
Commencement Bay, Near Shore/Tide Flats & South Tacoma Channel	1984			WAD980726368; WAD980726301
Diagonal Duwamish Trustee Cleanup				NA
Hamilton /Labree Roads GW Contamination				WASFN1002174
Hamilton Island Landfill (USA/COE)	1992	1991		WA5210890096
Hanford 100-Area (USDOE)	1989	1988		WA3890090076
Hansville Landfill				WAD000711804
Harbor Island (Lead)	1984	1989		WAD980722839
Harbor Island Lockheed Shipyards				WAD980722839
Harbor Island West Waterway Sediments				WAD980722839
Jackson Park Housing Complex (USNavy)	1995	1992		WA3170090044
Lower Duwamish Waterway	2003			WA0002329803
Middle Waterway, Tacoma, WA (CB/NT)				WAD980726368
Naval Air Station, Whidbey Island (Ault Field)	1986	1989		WA5170090059
Naval Air Station, Whidbey Island (Seaplane Base)	1986	1989		WA6170090058
Naval Undersea Warfare Engineering Station (4 Waste Areas)		1989		WA1170023419
Northwest Transformer (South Harkness Street)	1989	1988		WAD027315621
Occidental Chemical, Tacoma, WA (CB/NT / Hylebos)				WAD980726368
Oeser Company	1997			WAD008957243
Old Navy Dump/Manchester Lab (USEPA/NOAA)	1996	1995		WA8680030931
Olympic View Sanitary Landfill				WAD042804971
Pacific Sound Resources	1995	1992		WAD009248287
Pacific Wood Treating				WAD009422411
Palermo Well Field Groundwater Contamination				WA0000026534
Puget Sound Naval Shipyard	1995	1992		WA2170023418
Quendall Terminals	1985			WAD980639215
Rayonier Incorporated Port Angeles Mill (ITT Rayonier)		2000		WAD000490169
Seattle Municipal Landfill (Kent Highlands)	1989	1988		WAD980639462
Slip 4, LDW Early Action				WA0002329803
South Tacoma Field				WAD980724173
Strandley/Manning Site		1992		WAD980976328
T-117, LDW Early Action				WA0002329803

Region 10 *cont.*

Washington *cont.*	WSR	PNRS	USAF	EPA FACILITY ID
Thea Foss Waterway, Tacoma, WA (CB/NT)				WAD980726368
Tulalip Landfill	1992	1991		WAD980639256
United Marine Shipyards				WAD009264284
US Navy Puget Sound FISC Dept.				WA2170023426
Vancouver Water Station #1 Contamination				WAD988519708
Washington Natural Gas - Seattle Plant		1996		WAD980639280
Western Processing Co., Inc.	1984			WAD009487513
Weyerhaeuser Co Landfill				WAD009041450
WPNSTA Seal Beach Det. Port Hadlock		1989;1995		WA4170090001
Wyckoff Co./Eagle Harbor (ferry dock & wood treatment facility)	1986	1988		WAD009248295

* date unk. = date unknown

Carlos M. Gutierrez
Secretary, U.S. Department of Commerce

Vice Admiral Conrad C. Lautenbacher, Jr., USN (Ret.)
Under Secretary for Oceans and Atmosphere and NOAA Administrator

Richard W. Spinrad, Ph.D.
Assistant Administrator
Ocean Services and Coastal Zone Management

August 2005