

Legend

Total PAH ug/kg without wood waste Site XS

- ND
- 0.1 - 1610.0
- 1610.1 - 22800.0
- >22,800

Cross Section Location

- West East
- North South 1

Wood Thickness (feet)

- <= 0.1
- 0.2 - 0.5
- 0.6 - 1
- 1.1 - 2
- 2.1 - 3
- 3.1 - 6.0



For north-south 1 cross section, see Figure 4-215.
For west-east 1 cross section, see Figure 4-216.

PROJECT: ASHLAND/NSP LAKEFRONT SITE ASHLAND, WISCONSIN			
TITLE: Figure 4-214 Sediment Sample Results - Total PAHs without wood waste layer - all depths			
DRAWN BY: JES	DATE: AS SHOWN	PROJECT: 25668375	
CHECKED BY: PJS	DATE: 30 JULY 2007	SHEET: 4-214	
APPROVED BY: JPT			
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RI Results - Sediments

- ◆ Approximately 10 acres including free product
- ◆ Most covered with wood waste
- ◆ During wave events free product causes slicks









Past Risk Assessments

- ◆ 1998
 - Baseline Ecological Risk Assessments
 - Human Health Risk Assessment
- ◆ 2002
 - Supplemental Ecological Risk Assessments

2007 Ecological Risk Assessment

- ◆ Based on data gaps
- ◆ Focused on a PAH range for benthic organisms

Ecological Risk Assessment Results (2 – 300 ppm range)

- ◆ Potentially harm to benthic invertebrates
 - bulk sediment chemistry
 - sediment toxicity testing
- ◆ No unacceptable risks to birds or mammals using the area
 - sporadic releases of tar/oils may cause added risk

Overview of 2007 HHRA

	Soil	Ground Water	Surface Water	Sediments	Fish	Air
Residential	◆					
Recreational	◆ ¹					
Swimmer			◆			
Wader			◆	◆		
Worker						
Industrial	◆ ²					◆ ²
Maintenance	◆					
Construction	◆	◆ ¹				◆ ¹
Angler					◆	

1- City Park only

2- Upper Bluff only

Overview of 2007 HHRA

	Soil	Ground Water	Surface Water	Sediments	Fish	Air
Residential	◆					
Recreational	◆ ¹					
Swimmer			◆ Adult & Adolescent			
Wader			◆	◆		
Worker						
Industrial	◆ ²					◆ ²
Maintenance	◆					
Construction	◆	◆ ¹				◆ ¹
Angler					◆	

1- City Park only

2- Upper Bluff only

Risks Exceeds U.S. EPA Health Thresholds

- ◆ All soils (upper bluff, park, filled ravine)
- ◆ Surface water (adult & adolescent swimmers)
- ◆ Surface water (adult & adolescent waders)
- ◆ Fish (smelt only)
- ◆ for Workers
 - Industrial – Indoor Air
 - Construction
 - ◆ Surface & Sub-surface Soil
 - ◆ Groundwater in Trenches
 - ◆ Trench Air

Chemicals of Greatest Concern

Polycyclic Aromatic Hydrocarbons (PAHs)	Soils	Sediment	Trench Water	Surface Water	Fish	Trench Air	Indoor Air
benzo(a)anthracene					◆		
benzo(a)pyrene	◆		◆	◆	◆	◆	
benzo(b)fluoranthene			◆	◆			
benzo(k)fluoranthene				◆			
dibenzo(a,h)anthracene			◆	◆			
indeno(1,2,3)pyrene			◆	◆			
dibenzofuran			◆				
fluoranthene			◆				
Fluorene			◆				
2-methylnaphthalene	◆		◆	◆			
naphthalene			◆			◆	

Chemicals of Greatest Concern

Volatile Organic Compounds (VOCs)	Soils	Sediment	Trench Water	Surface Water	Fish	Trench Air	Indoor Air
benzene			◆	◆		◆	
Ethylbenzene						◆	
toluene						◆	
xylenes						◆	
styrene						◆	
1,2,4-trimethylbenzene						◆	◆
1,3,4-trimethylbenzene						◆	
1,2,4-trichlorobenzene	◆						

Chemicals of Greatest Concern

PAHs (carcinogenic)

benzo(a)anthracene

benzo(a)pyrene*

benzo(b)fluoranthene

dibenzo(a,h)anthracene

indeno(1,2,3)pyrene

PAHs (non-carcinogenic)

dibenzofuran

fluoranthene

fluorene

2-methylnaphthalene

naphthalene*

Volatile Organic Compounds

benzene*

ethylbenzene

toluene

xylene

styrene

1,2,3-trimethylbenzene

1,3,5-trimethylbenzene

1,2,4-trichlorobenzene

- ◆ Soils on upper bluff with health risks are on the NSPW property, not on public or private residential properties.
- ◆ Soil vapors are not migrating towards homes.

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- ◆ Soil vapors are not migrating towards homes.
- ◆ Health risks in fish related to smelt.
 - PAHs elevated in sport fish, but are safe to eat.

Figure 2.1. PAHs in Smelt Caught in Ashland, Wisconsin.

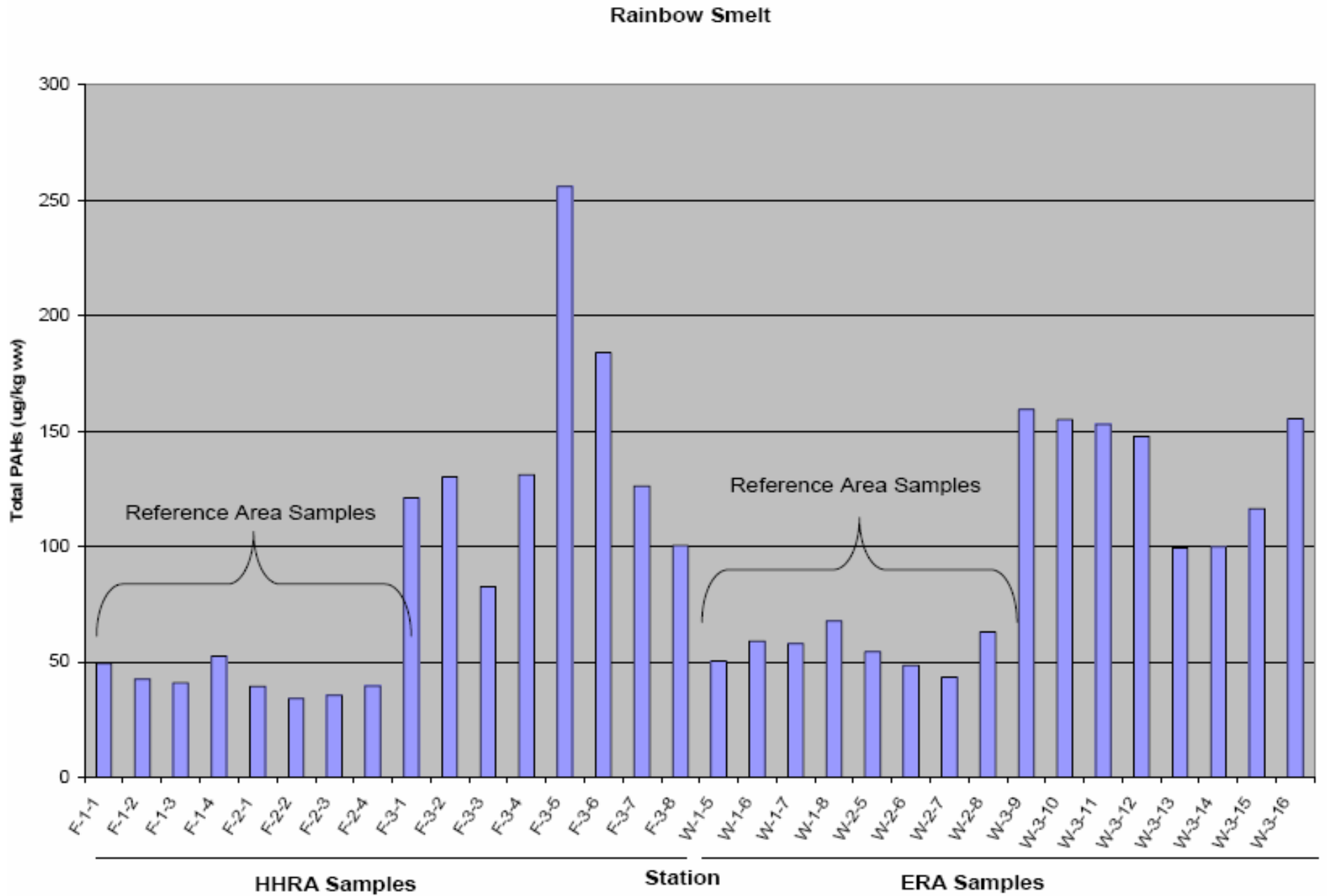
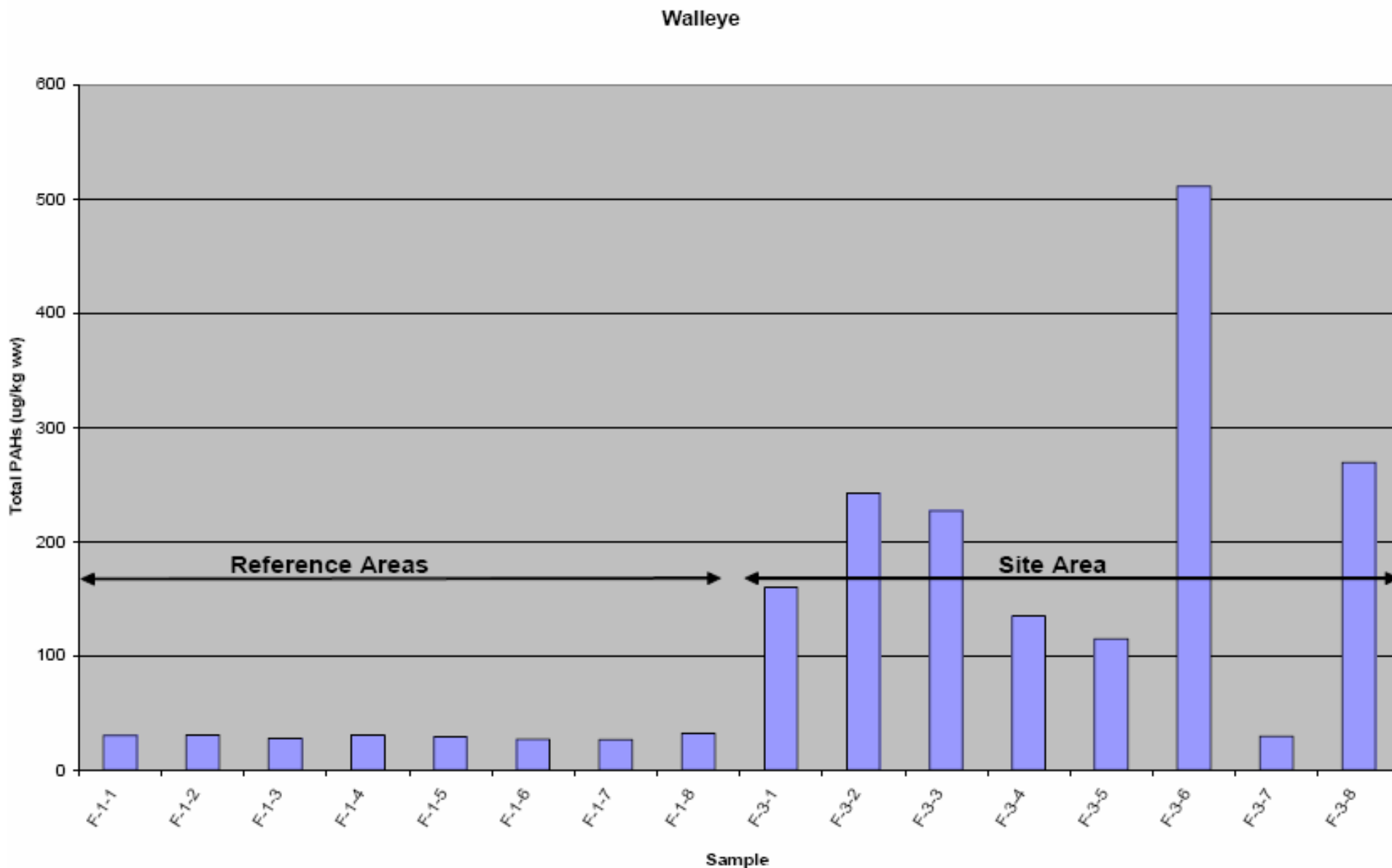


Figure 3.1. PAHs in Walleye Caught in Ashland, Wisconsin.



- ◆ Soils on upper bluff with health risks are on the NSPW property, not public or residential properties.
- ◆ Soil vapors are not migrating towards homes.
- ◆ Health risks in fish related to smelt.
 - PAHs elevated in sport fish, but are safe to eat.
- ◆ Data not collected to assess trespasser risks at WWTP.
- ◆ Overall Findings similar to the SEH Human Health Risk Assessment – 1998

2003 Public Health Assessment Remains Current

- ◆ Coal tars in sediments are a public health hazard.



WARNING

**CONTAMINATED SEDIMENT
AREA**

**NO WADING NO SWIMMING
NO BOATING NO ANCHORING**

**SEDIMENTS CONTAIN HAZARDOUS
SUBSTANCES**

**SHOULD THIS OIL & TAR SUBSTANCE COME
INTO CONTACT WITH SKIN, WASH OFF
IMMEDIATELY WITH SOAP AND WARM WATER**

**CONTAMINANTS MAY BE RELEASED FROM
SEDIMENTS IF DISTURBED**

**WADING, SWIMMING, BOATING, AND
ANCHORING PROHIBITED IN THIS AREA.**

**THIS AREA HAS BEEN DESIGNATED A
SAFETY ZONE
BY THE U.S. COAST GUARD
FOR INFORMATION CALL THE DEPARTMENT
OF NATURAL RESOURCES AT (715) 635-4049**

2003 Public Health Assessment Remains Current

- ◆ Coal tars in sediments are a public health hazard.
- ◆ Coal tar slicks can be released when sediments are disturbed.



2003 Public Health Assessment Remains Current

- ◆ Coal tars in sediments are a public health hazard.
- ◆ Coal tar slicks can be released when sediments are disturbed.
 - Safe to swim at beach in Kreher Park.
 - Ashland municipal water safe to drink.
- ◆ During cleanup of MGP sites, airborne releases can be a short term health concern for nearby residents.
 - Manage emissions during clean up.

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Preliminary Remediation Goals (PRGs)

- ◆ Groundwater

 - Wisconsin Groundwater Standards
(Chapter NR 140)

- ◆ Soils

 - Wisconsin Soils standards and Human
Health Risk Assessment

- ◆ Sediments – Based on Ecological
Risk Assessments

A two-tiered sediment PRG is proposed

1. Sediments in greater than 6 feet 9.5 ppm
2. sediments less than 6 feet will have a UV-light adjusted PRG

In addition, although these conditions will likely address all sediments where there is free product (NAPL), the PRG is amended to explicitly provide for the removal of all sediments associated with NAPL even if they occur in areas where PAH concentrations are lower than the proposed PRG of 9.5 ppm.

Detailed Analysis Criteria

- ◆ overall protection of human health and the environment;
- ◆ compliance with ARARs (**local, State and Federal requirements**);
- ◆ long-term effectiveness and permanence;
- ◆ reduction of toxicity, mobility, or volume;
- ◆ short-term effectiveness;
- ◆ implementability;
- ◆ cost;
- ◆ State acceptance; and
- ◆ community acceptance.

THRESHOLD CRITERIA

Overall Protection of Human Health and the Environment

- How Alternative Provides Protection of Human Health and Environment

Compliance with ARARs

- Chemical-Specific
- Action-Specific
- Location-Specific

BALANCING CRITERIA

Long-term Effectiveness and Permanence

- Magnitude of Residual Risk
- Adequacy and Reliability of Controls

Reduction of Toxicity, Mobility, or Volume Through Treatment

- Treatment Process Used and Materials Treated
- Volume of Materials Destroyed or Treated
- Degree of Expected Reductions
- Degree to Which Treatment is Irreversible
- Type and Quantity of Residuals Remaining

Short-term Effectiveness

- Protection of Community During Remediation
- Protection of Workers During Remediation
- Environmental Impacts
- Time Until RA Objectives Are Achieved

Implementability

- Ability to Construct and Operate Technology
- Reliability of Technology
- Ease of Undertaking Additional RAs, if Necessary
- Ability to Monitor Effectiveness of Remedy
- Ability to Coordinate and Obtain Approvals from Other Agencies
- Availability of Services and Materials

Cost

- Capital
- Operating and Maintenance
- Present Worth

MODIFYING CRITERIA

State/Support Agency Acceptance¹

Community Acceptance¹

¹ The assessments of these criteria are generally not completed until after public comment on the RI/FS report and the proposed plan is received.

