

Washington County, Wisconsin: Graduate Student Creates a Site Inventory to Rank Brownfields Sites in Terms of Contaminant Exposures and Site Risks

Elizabeth Yogerst, VM, MPH., June 2018

We're all familiar with the term "rust belt." What was once a booming industrial area of the country has evolved into a blighted series of abandoned factories, run down businesses, and vacant land. "Rust" is a good way to describe much of the structure that is left behind.

Washington County, Wisconsin (WI) is one of these rust belt communities. It includes numerous rail lines with associated yardage areas and a mix of former small industrial facilities and town centers surrounded by agricultural areas. From 2014 – 2017, the County formed a Redevelopment Steering Committee (the Coalition) with five municipalities to identify and rank brownfield sites. The main contaminants of these sites included petroleum and metals (lead, arsenic, cadmium, and chromium).

The Coalition prioritized 24 sites (out of 115), using many factors to reach this conclusion (environmental conditions, redevelopment feasibility, community goal criteria). It completed environmental site assessments and developed two municipal area-wide development plans under a 2014 US Environmental Protection Agency (EPA) brownfields grant.

In 2017, Yogerst became involved with Washington County to provide a public health perspective on cleaning up and reusing brownfield sites. As part of her Master of Public Health degree requirements, she inserted existing Washington County environmental data in the Site Tool to connect brownfield sites and potential health outcomes.

Environmental data came from the site assessments, an EPA website, and the WI Department of Natural Resources brownfields web page. Yogerst presented the site inventory to Washington County to help spur action on redevelopment of these sites. At some sites, contaminant levels were higher than EPA soil standards for metals and other hazardous substances. Four of the five sites were in the middle of their respective villages and could pose public health risks. But now community residents and leaders are aware of the challenges and can make their plans.

One former rail yard has been redeveloped into an apartment complex. Although there are high levels of VOCs buried in the soils at a corner of the site, it is capped with a parking lot to prevent exposures. The apartment buildings do not have basements, which may further prevent exposures to any remaining contaminants in the soil.

Obviously, there is still work to do to reclaim and reuse land in Washington County, but thanks to Yogerst, the community has a road map for action.

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Table 1: Soil concentrations and residual contaminant level (RCL) of select compounds from 5 brownfields/land reuse sites, Washington County, Wisconsin

Contaminant	Units	Soil direct contact RCLs		5 land reuse site/slanted reuse category				
		NI	I	Petroleum Distributor/C1	Downtown Multi-use/R/C	Machine Shop/Plating/unknown	Rail Yard/R	
Metals								
Arsenic	mg/kg	0.613	2.39	93	15	n/v	10.8	n/v
Barium	mg/kg	15,300	100,000	190	110	114	191	114
Cadmium	mg/kg	70	798	n/v	0.96	n/v	0.72	n/v
Chromium	mg/kg	n/v	n/v	100	9.1	31.6	33.8	31.6
Lead	mg/kg	400	800	470	580	11	234	11
Mercury	mg/kg	3.13	3.13	0.081	0.11	0.024	0.075	0.017
Selenium	mg/kg	391	5,110	1.7	0.76	n/v	0.96	n/v
Silver	mg/kg	391	5,110	1.5	0.18	n/v	0.96	n/v
VOCs (chlorinated)								
1,1,1-Trichloroethane	µg/kg	n/r	640	n/v	n/v	0.129	n/v	n/v
Trichloroethylene	µg/kg	n/r	8,411	n/v	n/v	18.7	n/v	7,600
cis-1,1-Dichloroethene	µg/kg	n/r	2,340	n/v	n/v	3.54	n/v	17,000
trans-1,1-Dichloroethene	µg/kg	n/r	1,850	n/v	n/v	0.0131	n/v	4.1
Dichloroethene VOCs (non-chlorinated)								
Benzene	µg/kg	1,490	7,410	170	n/v	n/v	n/v	12,000
Ethylbenzene	µg/kg	7,470	3,700	980	n/v	n/v	0.0149	23,000
Toluene	µg/kg	818,000	818,000	1,500	n/v	n/v	0.0299	670
Xylenes, Total	µg/kg	260,000	260,000	3,100	n/v	n/v	0.1024	24,000
PAHs								
Benzo[a]anthracene	µg/kg	147	2,100	1,300	1,600	n/v	1,660	n/v
Benzo[a]pyrene	µg/kg	14.8	211	1,200	2,500	n/v	1,500	n/v
Benzo[b]fluoranthene	µg/kg	148	2,110	2,700	3,700	n/v	3,750	n/v
Chrysene	µg/kg	1,480	21,100	2,200	3,000	n/v	2,630	n/v
Dibenz[a,h]anthracene	µg/kg	14.8	211	340	290	n/v	264	n/v
Indeno[1,2,3-cd]pyrene	µg/kg	148	2,110	710	910	n/v	1,040	n/v

Note: Yellow highlight and bold = concentration above the RCL

Abbreviation: C = commercial; I = industrial; mg/kg = milligram per kilogram; NI = non-industrial; n/r = not reported; n/v = no value; PAHs = polycyclic aromatic hydrocarbons; R = residential; VOCs = volatile organic compounds; µg/kg = microgram per kilogram



National Center for Environmental Health Agency for Toxic Substances and Disease Registry