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Superfund Sites and Juvenile Detention: Proximity Analysis in the Western United States

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ABSTRACT

This study considers the relationship between juvenile detention centers and hazardous waste (Superfund) sites in nine western states in the United States. It asks whether there is a pattern of toxic industrial sites being placed within close spatial proximity of juvenile detention centers, and whether this proximity may result in greater health risks for the youths being imprisoned. Through use of Aeronautical Reconnaissance Coverage Geographic Information System (ArcGIS), it was determined that, out of 167 sites housing juveniles, four are within one mile of at least one Superfund site, and 49 are within 5 miles of at least one Superfund site. In addition, examination of the health consequences of proximity to certain toxics suggests that there are legitimate dangers associated with being housed in a juvenile detention facility located near a Superfund site. Although there is no disproportionate proximity compared with the general population, any citing of juvenile detention centers near toxic sites, or the siting of toxic sites near juvenile detention centers, is an instance of environmental injustice, as juveniles are unable to choose where they are housed, and juvenile detention centers disproportionately house youth of color, lesbian, gay, bisexual, transgender, and queer youth, and disabled youth.

Keywords: juvenile detention, environmental justice, superfund, prisons, jails, toxic sites

INTRODUCTION

In the late 1970s, in a small town in upstate New York, chemicals began to leach out of the ground and into homes, schools, and parks because they had been built on top of a capped hazardous waste landfill. This disaster, now known as Love Canal, led to increased threats to public health, the evacuation of families,[1] and legislative hearings in Congress.[2] In 1980, Congress passed CERCLA, the Comprehensive Environmental Response, Compensation, and Liability Act, which is better known as Superfund. This legislation provides a framework for cleaning up sites such as the one at Love Canal. By 2003, 1484 sites had been placed on the National Priorities List, which indicates those sites that are ''eligible to receive funding through the Superfund.''[3]

For more than four decades, scholars in the field of environmental justice (EJ) studies have documented trends at all geographic scales in which ''exposures to pollution and other environmental risks are unequally distributed by race and class.''[4] This problem of environmental injustice extends to Superfund sites; whereas the area within 3 miles of Superfund sites includes only 16% of the U.S. population, and it includes 19% of Black Americans and 23% of Hispanic/Latinx persons. In addition, 38% of the U.S. population is considered part of a

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[1]Jacob Darwon Hamblin. ''A Toxic Timeline: Lessons from Love Canal Offer Context for Complacent Environmental Policies.'' *Science* 353 (July 15, 2016): 226.

[2]Richard Clapp. ''The Love Canal Story Is Not Finished.'' *Environmental Health Perspectives* 117 (2009): A54.

[3]Sandra George O'Neil. ''Superfund: Evaluating the Impact of Executive Order 12898.'' *Environmental Health Perspectives* 115 (Oct 2007): 1087–1093.

[4]Paul Mohai, David N. Pellow, and J. Timmons Roberts. ''Environmental Justice.'' *Annual Review of Environment and Resources* 34 (2009): 405–430 [quote is from page 405].

minority group, whereas 49.3% of people living within 1 mile and 49.7% of people living within 3 miles of Superfund sites are minorities. Overall, 14.7% of the U.S. population is below the poverty line, whereas 16.7% of those who live within 1 mile of Superfund sites are living in poverty.[5] The U.S. Environmental Protection Agency (USEPA) writes, ''While there is no single way to characterize communities located near [Superfund] sites, this population is more minority, low income, linguistically isolated, and less likely to have a high school education than the U.S. population as a whole. As a result, these communities may have fewer resources with which to address concerns about their health and environment.''[6]

The populations housed in the prisons and jails of the United States are similarly disproportionately people of color and low-income people. According to the Federal Bureau of Prisons, as of January 2019, 38% of the inmates in their facilities were Black.[7] However, the U.S. Census Bureau estimates that only 13.4% of people living in the United States are Black or African American.[8] The National Association for the Advancement of Colored People (NAACP) points out that, ''Though African Americans and Hispanics make up approximately 32% of the US population, they comprised 56% of all incarcerated people in 2015'' and that ''the imprisonment rate for African American women is twice that of white women.''[9]

Recent scholarship concludes that prisons are sites that are often linked to public and environmental health threats, indicating that the prison system is an emerging area of concern for EJ scholars and activists.[10] In 2016, Paige Williams and the Prison Ecology Project conducted a study in which they examined the proximity of adult detention facilities to Superfund sites. They found that ''at least 589 federal and state prisons are located within three miles of a Superfund cleanup site on the National Priorities List, with 134 of those prisons located within just one mile.''[11] Their study, however, did not consider juvenile facilities. This research begins to fill that gap.

Research methods

For this study we tracked 167 juvenile detention locations in the Western United States. These include county- and state-run traditional detention and correctional facilities. Youth correctional camps (including fire camps), youth centers, transition centers, and group homes were not included because the population sizes of those facilities are quite small and location data are unreliable. All of these detention centers are or were located in nine states (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington). The choice to focus on these states represented a desire to capture trends occurring in the Western United States, as a first step toward an eventual national-scale analysis. Addresses for juvenile detention centers were retrieved from detention center or corrections facility websites, or acquired through e-mail correspondence with administrative staff of the detention centers or corrections departments. With respect to exploring spatial proximity to environmental hazards, we tracked 264 Superfund sites, including those that have been proposed for the National Priorities List, sites currently on the list, and sites that have been deleted from the list. The list of Superfund sites, the status of these sites, and their contaminants were gathered from the USEPA's Superfund website.

The actual proximity to Superfund sites that may pose a safety or health risk remains unclear. This is, in part, due to the fact that all Superfund sites are distinct—each has varying concentrations of different contaminants. The buffer distances of 1, 1.8, 3, and 5 miles were chosen based on their use in other important studies of spatial proximity to hazardous waste sites. For instance, in their study of the relationship between hazardous facilities and income dynamics, Downey and Crowder use both 400-foot square grid cells and 1.5 mile radii. They found that ''environmental racial inequality is pervasive'' in the nine regions they studied.[12] In *Toxic Wastes and Race at Twenty*, the authors use a 1.8-mile radius ''because it falls within the radius that numerous studies have noted adverse health and property value impacts.''[13] They point out that ''people of color make up the majority of those living in host neighborhoods within 3 kilometers (1.8 miles) of the nation's hazardous waste facilities.''[14] Similarly, the EUROHAZCON study found that ''residence within 3 km [or 1.8 miles] of a landfill site was associated with a significantly raised risk of

[5]Office of Land and Emergency Management. Population Surrounding 1, 836 Superfund Remedial Sites. Environmental Protection Agency, 2017. https://www.epa.gov/sites/production/files/201509/documents/webpopulationrsuperfundsites9.28.15.pdf (Last accessed on August 14, 2019).

[6]*Ibid.*

[7]Federal Bureau of Prisons. August 31, 2019. Inmate Race. Federal Bureau of Prisons. https://www.bop.gov/about/statistics/statistics_inmate_race.jsp (Last accessed on September 7, 2019).

[8]United States Census Bureau, QuickFacts UNITED STATES. U.S. Department of Commerce, 2018. https://www.census.gov/quickfacts/fact/table/US/PST045218. (Last accessed on July 22, 2019).

[9]NAACP. Criminal Justice Face Sheet. NAACP, No Date. https://www.naacp.org/criminal-justice-fact-sheet. (Last accessed on July 22, 2019).

[10]Robert Todd Perdue. ''Linking Environmental and Criminal Injustice: The Mining to Prison Pipeline in Central Appalachia.'' *Environmental Justice* 11 (2018): 177–182.

[11]Candace Bernd, Maureen Nandini Mitra, and Zoe Loftus-Farren. America's Toxic Prisons: The Environmental Injustices of Mass Incarceration. Truthout, 2017. https://truthout.org/articles/america-s-toxic-prisons-the-environmental-injustices-of-mass-incarceration (Last accessed on September 3, 2019).

[12]Liam Downey and Kyle Crowder. ''Using Distance Decay Techniques and Household-Level Data to Explore Regional Variation in Environmental Inequality.'' In: Juliana A. Maantay and Sara McLafferty (eds). *Geospatial Analysis of Environmental Health*, Vol. 4. (Springer Publishing, 2011), 373–394.

[13]Robert Bullard, Paul Mohai, Robin Saha, and Beverly Wright. *Toxic Waste and Race at Twenty 1987–2007: A Report Prepared for the United Church of Christ Justice & Witness Ministries*. (United Church of Christ, Justice and Witness Ministries, 2007).

[14]*Ibid.*

congenital anomaly.''[15] The authors concluded that, ''There was a fairly consistent decrease in risk with distance away from these sites.''[16] A study of the health effects of living near landfills defined its exposed population as those who lived within 3 km of landfills.[17]

While seeking to understand the spatial relationship between facilities for treatment, storage, and disposal of hazardous wastes and communities of color, Anderton *et al.* used both census tracts and a 2.5-mile radius.[18] In their analysis of prisons in close proximity to Superfund sites from 2016, Paige Williams and researchers at the Truthout media organization used 1- and 3-mile radii.[19] Finally, the USEPA and Office of Emergency Land Management's document titled ''Population Surrounding 1,836 Superfund Remedial Sites'' from October of 2017 discusses the populations surrounding Superfund sites by using the radii of 1 and 3 miles.[20] Thus, after executing a comprehensive survey and consideration of buffer distances and distance to hazard measurements across the literature, we concluded that although there is no consensus on best practices, a reasonable approach would be to use four different distances. Therefore, using Aeronautical Reconnaissance Coverage Geographic Information System (ArcGIS), we determined which juvenile detention centers were within 1, 1.8, 3, and 5 miles of at least one Superfund site. This required buffer analysis (which allowed for the creation of radii around each detention center). To determine where there was overlap in the periods in which the juvenile detention center and the Superfund site were in existence, the dates that Superfund sites were proposed for the National Priorities List (found on the USEPA Superfund website) were used. Proposed dates were used (rather than the listing date), as it is likely that toxics were present at the site when it was proposed for the list. For some juvenile detention centers, we were unable to locate the date they began housing juveniles. Thus, this study does not test for spatial correlations; rather, we provide a count of the number of detention facilities within certain distances or radii in relationship to Superfund sites. The four distances around each detention center allowed us to determine which and how many Superfund sites were within those radii, but we did not gather information on the exact distances between each Superfund site and detention center.

FINDINGS

After completing the buffer analysis, we found that at least 40 juvenile detention centers are or were within 5 miles of at least one Superfund site when temporal overlap was considered. The results for within 3, 1.8, and 1 miles were 18, 6, and 3 sites, respectively, when examining temporal overlap. Tabulated results can be found in Appendix Tables A1–A6.

At the <5-mile radii level, we found 68 total pairings of detention centers and Superfund sites, when not considering temporal overlap. This number differs from the 40 detention centers discussed earlier, because some detention centers are within 5 miles of more than one Superfund site. Narrowing this down to only sites with overlapping time frames, there were 55 pairings with known temporal overlap, and where we know whether the detention center or the Superfund Site came first. Further, we found that in 39 cases, the detention center was housing juveniles before the Superfund site was proposed for the National Priorities List.

Los Padrinos Juvenile Hall: a short case study

The results of this study (Appendix Tables A1–A6) reveal how many juvenile detention centers are within different distances of Superfund sites. Los Padrinos Juvenile Hall, in Los Angeles, California, provides an example of a detention center that is in close proximity to many Superfund sites—it is within 5 miles of four Superfund sites. All four of these Superfund sites are currently on the National Priorities List and were proposed for the National Priorities List after Los Padrinos began housing juveniles in 1957—one was proposed in 1998, one in 2001, and two in 2011. The primary contaminants of concern at these sites are volatile organic compounds (VOCs), including trichloroethylene (TCE), which is discussed in more detail next. The American Lung Association explains that exposure to some VOCs ''can irritate the eyes, nose, and throat, can cause difficulty breathing and nausea, and can damage the central nervous system as well as other organs.'' They also point out that ''some VOCs can cause cancer.''[21]

To gather information on the demographics of the youth incarcerated at Los Padrinos Juvenile Hall, we used data from Los Padrinos High School, where all minors without General Education Diplomas (GEDs) held at the prison attend. During the 2017–2018 school year, 38.4% of the students at this school were Black or African American. White students made up only 3.7% of the school population.[22] This is despite the fact that only 7.1% of Los Angeles County's children are African

[15]H. Dolk, M. Vrijheid, B. Armstrong, L. Abramsky, F. Bianchi, E. Garne, V. Nelan, E. Robert, J.E. Scott, D. Stone, and R. Tenconi. ''Risk of Congenital Anomalies Near Hazardous-Waste Landfill Sites in Europe: The EUROHAZCON Study.'' *Lancet* 352 (1998): 423–427 [quote is from page 423].

[16]*Ibid.*

[17]H.M.P. Fielder, C.M. Poon-King, S.R. Palmer, N. Moss, and G. Coleman. ''Assessment of Impact of Health of Residents Living Near the Nant-y-Gwyddon Landfill Site: Retrospective Analysis.'' *BMJ* 320 (January 1, 2000): 19–22.

[18]Douglas L. Anderton, Andy B. Anderson, John Michael Oakes, and Michael R. Fraser. ''Environmental Equity: The Demographics of Dumping.'' *Demography* 31 (1994): 229–248.

[19]Bernd, Nandini Mitra, and Loftus-Farren. (2017). *Op. cit.*

[20]U.S. EPA. *Office of Land and Emergency Management Estimate*. (Population Surrounding 1836 Superfund Remedial Sites, 2017).

[21]American Lung Association. Volatile Organic Compounds. American Lung Association, 2019. https://www.lung.org/our-initiatives/healthy-air/indoor/indoor-air-pollutants/volatile-organic-compounds.html (Last accessed on July 22, 2019).

[22]California Department of Education. School Accountability Report Card Reported Using Data from the 2017–2018 School Year. California Department of Education, 2019. www.sarconline.org/SarcPdfs/Temp/19101990121871.pdf (Last accessed on August 12, 2019).

American or Black, whereas 18.2% of them are white.[23] In addition, 100% of the students at this school were socioeconomically disadvantaged, 25% were English learners, 32.9% had disabilities, and 19.5% were foster youth.[24] Given that all four of these sites were proposed for the National Priorities List, this suggests the possibility that this neighborhood was targeted for placements of multiple polluting industries. The race, income level, and ability of the youths at Los Padrinos, and the fact that these youths did not choose to be placed in this potentially dangerous location, make this a clear instance of environmental injustice. Exposure to any toxicant or environmental pollutant on juveniles with still growing minds and bodies could result in health effects that follow any minor held at this facility long after their time is served.[25]

Potential health impacts

The next section examines the health effects of Superfund contaminants that appear in the data repeatedly (at least five times). These are tetrachloroethylene (PCE), VOCs, TCE, polychlorinated biphenyls (PCBs), and heavy metals. These compounds can be found in the soil, groundwater, surface water, or air on and around Superfund sites, and they can impact the body through contact with these contaminated substrates.

The PCE exposure often occurs through inhalation, and acute exposure to vapors may have negative impacts on the central nervous system, or may cause death.[26] Over long periods of exposure, PCE may cause changes to vision, neurobehavioral effects, weight gain, and irritation to respiratory, dermal, and ocular systems. The USEPA, the International Agency for Research on Cancer, the National Research Council, and the National Toxicology Program have classified PCE as a potential human carcinogen.[27]

The VOCs appear in our data set eighteen times. Examples of common VOCs include PCE and formaldehyde. Exposure to formaldehyde may result in irritation to the eyes, upper respiratory tract, gastrointestinal tract, or skin.[28]

Exposure to TCE, an industrial solvent, can occur through inhalation, and acute exposure may cause ''central nervous system depression, loss of consciousness, and even death.'' Exposure may also impact the immune system, kidneys, male reproductive system, liver, and developing fetuses. Those who are exposed may also experience irritation in their dermal and ocular systems or may have depressed bodyweight gain.[29] Creosote, which is ''the name used for a variety of products that are mixtures of many chemicals,'' can be absorbed through the stomach, skin, lungs, or intestines. Exposure at low levels over a long period can cause respiratory tract irritation, cornea damage, skin damage, and sunlight sensitivity. It is likely that effects in children are similar to those in adults.[30]

People can be exposed to PCBs, which are ''synthetic organic chemicals,'' through inhalation or ingestion of contaminated foods. At high levels, PCB exposure can cause rashes and acne. Some studies have pointed to gastrointestinal discomfort, lung and nose irritation, fatigue, depression, and changes in liver and blood as health impacts of exposure to PCBs.[31]

Heavy metals also appear in our data 18 times. Examples of heavy metals that may cause problems for human health are arsenic, cadmium, lead, and mercury. Lead exposure is of most concern with regard to children, for whom it may cause neurotoxic effects. Arsenic exposure is known to increase cancer risk, and it may cause skin lesions.[32] In sum, proximity to or drift from contaminants at Superfund sites may present significant health risks for populations residing nearby, and that includes juveniles incarcerated in detention facilities in the Western United States.

CONCLUSION

Just like their counterparts designed for adults, juvenile detention centers disproportionately house people of color. For example, in 2014, Black children were only 14% of the nation's youth population,[33] but there were 42% of detained children in the United States.[34] A 2013 study of juvenile incarceration rates between 1997 and 2006 found that, at juvenile institutions, ''Blacks are overrepresented at a margin of more than 3 to 1 when considering their representation in the population.''[35] These statistics exemplify a problem known as disproportionate minority confinement—people of color are incarcerated at much higher rates than white Americans.

[23]kidsdata.org. Child Population, by Race/Ethnicity. Lucile Packard Foundation for Children's Health, 2019. https://www.kidsdata.org/topic/33/child-population-race/pie#fmt=144&loc=364&tf=108&ch=7,11,726,10,72,9,73,87&pdist=73 (Last accessed on August 20, 2019).

[24]California Department of Education (2019). *Op. cit*.

[25]Agency for Toxic Substances and Disease Registry. *Principles of Pediatric Environmental Health-Why Are Children Often Especially Susceptible*. (U.S. Department of Health and Human Services, 2014).

[26]Agency for Toxic Substances and Disease Registry. *Draft Toxicological Profile for Tetrachloroethylene*. (U.S. Department of Health and Human Services, 2014).

[27]*Ibid.*

[28]Agency for Toxic Substances and Disease Registry. *Public Health Statement Formaldehyde*. (U.S. Department of Health and Human Services, 2008).

[29]Agency for Toxic Substances and Disease Registry. *Draft Toxicological Profile for Trichloroethylene*. (U.S. Department of Health and Human Services, 2014).

[30]Agency for Toxic Substances and Disease Registry. *Toxicological Profile for Wood Creosote, Coal Tar Creosote, Coal Tar, Coal Tar Pitch, and Coal Tar Pitch Volatiles*. (U.S. Department of Health and Human Services, 2002).

[31]Agency for Toxic Substances and Disease Registry. *Toxicological Profile for Polychlorinated Biphenyls (PCBs)*. (U.S. Department of Health and Human Services, 2000).

[32]Lars Järup. ''Hazards of Heavy Metal Contamination.'' *British Medical Bulletin* (December 2003): 167–182.

[33]Office of Adolescent Health, The Changing Face of American's Adolescents. Housing and Human Services, 2019. https://www.hhs.gov/ash/oah/facts-and-stats/changing-face-of-americas-adolescents/index.html. (Last accessed on July 22, 2019).

[34]NAACP (No Date). *Op. cit*.

[35]Jaya Davis and Jon R. Sorensen. ''Disproportionate Minority Confinement of Juveniles: A National Examination of Black-White Disparity in Placements, 1997–2006.'' *Crime and Delinquency* 59 (2013): 115–139.

Juvenile detention centers also disproportionately house lesbian, gay, bisexual, transgender, and queer (LGBTQ) youth. Only between 7% and 9% of all youth nationwide are lesbian, gay, or bisexual, whereas 20% of all youth in juvenile justice facilities and 39.4% of girls in juvenile justice facilities are lesbian, gay, or bisexual.[36]

An understanding of whether the Superfund site or the juvenile detention center came first is important for assigning responsibility for this environmental injustice. Although this could mean that polluting companies consciously or unconsciously placed their toxic sites near juvenile detention centers, an important thing to consider is that, in cases where a juvenile detention center opened before an associated Superfund site was proposed for the National Priorities List, it is difficult to know whether the toxins were spilled before or after the detention center opened because the EPA does not provide data on when toxics began to spill at each site. Therefore, it is difficult to be sure that a juvenile detention center actually began housing juveniles before the toxics were present.

Relatedly, one of the central counter-arguments to the environmental injustice thesis is the minority move-in hypothesis.[37] In circumstances where populations—often low-income people and people of color—are living and working in areas contaminated by toxic waste, the minority move-in hypothesis tries to answer the question of whether the people or the toxics were in the area first. It posits that, in many cases, low-income people and people of color move into neighborhoods already contaminated by toxic waste due to low land prices and lower property values. This narrative conveniently shifts the blame away from toxic industries and government institutions, in particular, and from the deeply racist dynamics of capitalism more generally.[38] In a major study, researchers found that evidence to support the minority move-in hypothesis is quite weak, because in the majority of cases, toxic industries followed affected populations after residents moved in, not the other way around.[39] With respect to our research on juvenile detention centers, even in cases where a detention center began housing juveniles after a polluting industry began spilling toxics, the people inside the facility bear absolutely no responsibility for living near the site because they have no choice as to where they are incarcerated. They are forced into facilities from which they cannot escape. In cases where detention centers are near Superfund sites, juveniles (who are disproportionately LGBTQ youth and/or youth of color) are likely forcibly exposed to dangerous contaminants without their knowledge. This makes the incarceration of juveniles near Superfund sites a clear case of environmental injustice.

When juvenile detention centers are sited near Superfund sites (or when toxic industries are sited near juvenile detention centers), environmental injustice is present because queer youth and youth of color are disproportionately affected. This is true despite the fact that this study finds that juvenile detention centers are not disproportionately close to Superfund sites, because children are housed near toxic terrain without their consent and, likely, without their or their parents' knowledge.

This study faced two key limitations. The first is that we were unable to access the dates for the opening of some juvenile detention centers. This made it challenging to know whether there was temporal overlap with Superfund sites and, therefore, whether a given detention center began housing juveniles before or after the Superfund site was proposed for the National Priorities List. The second limitation was that we focused exclusively on Western states. In the future, we plan to expand the scope of this research to examine juvenile detention centers in states outside of the Western United States. In addition, future research should examine the proximity of juvenile and adult detention facility locations to hazardous waste sites other than Superfund sites, since there is a considerable range of other hazardous land uses and pollution point sources across the nation. Finally, there are numerous opportunities to analyze other instances of environmental injustice within prisons, such as those having to do with water, food, and extreme temperatures, which previous research on adult prisons has found to be highly relevant to EJ studies.[40]

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[36]Center for American Progress. Unjust: LGBTQ Youth Incarcerated in the Juvenile Justice System. Movement Advancement Project, 2017. https://lgbtmap.org/file/lgbtq-incarcerated-youth.pdf (Last accessed on August 14, 2019).

[37]P. Mohai, D.N. Pellow, and J.T. Roberts. ''Environmental Justice.'' *Annual Review of Environment and Resources* 34 (2009): 405–430.

[38]Laura Pulido. ''Geographies of Race and Ethnicity II: Environmental Racism, Racial Capitalism and State-Sanctioned Violence.'' *Progress in Human Geography* 41 (2017): 524–533.

[39]Paul Mohai and Robin Saha. ''Which Came First, People or Pollution? Assessing the Disparate Siting and Post-siting Demographic Change Hypotheses of Environmental Injustice.'' *Environmental Research Letters* 10 (2015): 115008.

[40]David Pellow, Jasmine Vazin, Harrison Ashby, Michaela Anastasia Austin, Sage Kime, Shannon McAlpine, and Yue Shen. *Environmental Injustice Behind Bars: Toxic Imprisonment in America*. (Annual Report by University of California Santa Barbara's Prison Environmental Justice Project, an initiative of the Global Environmental Justice Project, September 2018); David Pellow, Michaela Anastasia Austin, Michelle Le, Shannon McAlpine, Akari Roudebush, Yue Shen, and Unique Vance. *Exposing Deliberate Indifference: The Struggle for Social and Environmental Justice in America's Prisons, Jails, and Concentration Camps*. (Annual Report by UCSB's Prison Environmental Justice Project, October 2017).

(*Appendix follows* →)

Appendix

Appendix Table A1. Superfund Sites Within 5 miles of Los Padrinos Juvenile Hall in Downey, California (Los Angeles County)

Superfund site	*Distance (miles) from Los Padrinos*	*Contaminants*	*Groundwater contamination?*
Southern Avenue Industrial Area	(1–1.8)	VOCs	Yes
Jervis B. Webb Co.	(1–1.8)	VOCs (including TCE)	Yes
Cooper Drum Company	(1–1.8)	Unspecified	Yes
Pemaco Maywood	(3–5)	VOCs	unknown

TCE, trichloroethylene; VOCs, volatile organic compounds.

Appendix Table A2. Zero to One Mile Data

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which came first?*
Juvenile Justice Center Chehalis (Lewis County, WA)	American Crossarm and Conduit Co.	1988–present	PCP, creosote, other ''hazardous chemicals'' (ground water, surface water, soil, sediments)	Detention center
Fred C. Nelles Youth Correctional Facility (Los Angeles County, CA)	Omega Chemical Corporation	1998–2004	VOCs, PCE, TCE, Freon (soil, groundwater)	Detention center
Green Hills School (Lewis County, WA)	American Crossarm and Conduit Co.	1989–present	PCP, creosote, other ''hazardous chemicals'' (ground water, surface water, soil, sediments)	Superfund site
Northern Oregon Regional Correctional Facility (Wasco County, OR)	Martin-Marietta Aluminum Co.	NA	''Hazardous chemicals'' (soil, sediment, groundwater)	NA

NA, not applicable; PCE, tetrachloroethylene; PCP, pentachlorophenol.

Appendix Table A3. One to 1.8 Mile Data

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which came first?*
Santa Cruz County Juvenile Hall (Santa Cruz County, CA)	Watkins-Johnson Co. (Stewart Division Plan)	1987–present	Unspecified (unspecified)	Detention center
Los Padrinos Juvenile Hall (Los Angeles County, CA)	Southern Avenue Industrial Area	2011–present	VOCs (soil, groundwater)	Detention center
	Jervis B. Webb Co.	2011–present	VOCs, TCE (soil, groundwater)	Detention center
	Cooper Drum Company	2001–present	Unspecified (soil, groundwater)	Detention center
Mill Creek Youth Center (Weber County, UT)	Ogden Defense Depot (DLA)	1984–present	''Hazardous chemicals'' (soil, groundwater)	Detention center

(*Appendix continues* →)

Appendix Table A4. 1.8–3 Mile Data

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which came first?*
Juvenile Justice Center Chehalis (Lewis County, WA)	Hamilton/Labree Roads Ground Water Contamination	1991–1995	''Hazardous chemicals'' (soil, sediment, groundwater, surface water)	Detention center
Central Valley Juvenile Detention and Assessment Center (San Bernardino County, CA)	Norton Air Force Base	1984–present	PCBs, dioxins, heavy metals, acids (groundwater, soil)	Detention center
Decker Lake Youth Center (Salt Lake County, UT)	Portland Cement (Kiln Dust 2&3)	Unknown	Heavy metals (soil, air, groundwater)	Unknown
Denney Juvenile Justice Center (Snohomish County, CA)	Tulalip Landfill	1997–2002	Metals, pesticides, PCBs, PAHs (groundwater, surface water, sediment)	Superfund site
Dorothy Kirby Center (Los Angeles County, CA)	Pemaco Maywood	1998–present	VOCs (unspecified)	Detention center
Durango Juvenile Detention Facility (Maricopa County, AZ)	Nineteenth Avenue Landfill	Unknown	VOCs, heavy metals, PCBs, pesticides (groundwater, soil)	Unknown
Fred C. Nelles Youth Correctional Facility (Los Angeles County, CA)	Waste Disposal, Inc.	1986–2004	Unspecified (unspecified)	Detention center
Green Hills School (Lewis County, WA)	Hamilton/Labree Roads Ground Water Contamination	2000–present	''Hazardous chemicals'' (soil, sediment, groundwater, surface water)	Detention center
Juvenile Justice Campus (Fresno County, CA)	Purity Oil Sales, Inc.	2006–present	VOCs, heavy metals, phenols, PCBs, oil, grease, pesticides (groundwater, soil)	Superfund
Kitsap County Juvenile Detention (Kitsap County, WA)	Puget Sound Naval Shipyard Complex	1998–present	petroleum hydrocarbon, heavy metals, VOCs, SVOCs, PCBs (soil, groundwater, marine sediment)	Superfund
McLaughlin Youth Center (Anchorage County, Alaska)	Standard Steel and Metal Salvage Yard (USDOT)	1989–present	Unspecified (unspecified)	Detention center
Northern Oregon Regional Correctional Facility (Wasco County, OR)	Union Pacific Railroad Co. Tie-Treating Plant	1999–present	Unspecified (soil, groundwater)	Superfund
Thurston County Juvenile Detention Facility (Thurston County, WA)	Palermo Well Field Ground Water Contamination	1996–present	TCE, PCE (groundwater)	Detention center
Wasatch Youth Center (Salt Lake County, UT)	Murray Smelter	1994–2018	Heavy metals (soil, sediments, groundwater)	Detention center
Whatcom Juvenile Detention (Whatcom County, WA)	Oeser Co.	Unknown	Unspecified (soil, groundwater)	Unknown
Juvenile Justice Center (Yakima County, WA)	Yakima Plating Co.	Unknown	Heavy metals (groundwater, subsurface soils)	Unknown
	Pesticide Lab (Yakima)	Unknown	Unspecified (unspecified)	Unknown

PCBs, polychlorinated biphenyls; PAHs, polycyclic aromatic hydrocarbons; SVOCs, semivolatile organic compounds.

(*Appendix continues* →)

Appendix Table A5. Three to Five Mile Data

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which was first?*
Juvenile Justice Center Chehalis (Lewis County, WA)	Hamilton/Labree Roads Groundwater Contamination	1991–1995	''Hazardous chemicals'' (soil, sediment, groundwater, surface water)	Detention center
Butte County Juvenile Hall (Butte County, CA)	Western Pacific Railroad Co.	NA	Heavy metals, waste solvents, oils, grease (unspecified)	NA
	Louisiana-Pacific Corp.	NA	PCP (groundwater)	NA
	Koppers Co., Inc. (Oroville Plant)	2003–present	PCP, other ''hazardous substances'' (soil, surface water, groundwater)	Superfund site
Central Juvenile Hall (Los Angeles County, CA)	San Fernando Valley (Area 4)	1984–present	VOCs, including TCE and PCE (groundwater)	Detention center
Central Valley Juvenile Detention and Assessment Center (San Bernardino County, CA)	Newmark Ground Water Contamination	1988–present	VOCs, TCE, and PCE (unspecified)	Detention center
District VI Juvenile Detention Center (Bannock County, Idaho)	Union Pacific Railroad Co.	1993–1997	Heavy metals and organic compounds (soil, groundwater)	Superfund site
	Pacific Hide and Fur Recycling Co.	1993–1999	PCB, lead (soil)	Superfund site
Dorothy Kirby Center (Los Angeles County, CA)	Southern Avenue Industrial Area	2011–present	VOCs (soil, groundwater)	Detention center
	Operating Industries, Inc., Landfill	1984–present	Organic and inorganic compounds (air, groundwater, soil, leachate)	Detention center
	Jervis B. Webb Co.	2011–present	VOCs, TCE (soil, groundwater)	Detention center
	Cooper Drum Company	2011–present	Unspecified (soil, groundwater)	Detention center
Fairbanks Youth Facility (Fairbanks North Star Borough, Alaska)	Alaska Battery Enterprises	1988–1996	Lead and other ''hazardous chemicals'' (soil)	Detention center
Gila County Juvenile Detention (Gila County, AZ)	Mountain View Mobile Home Estates	NA	Asbestos (groundwater, soil)	NA
Green Hills School (Lewis County, WA)	Centralia Municipal	1989–present	Heavy metals and hazardous chemicals (soil, groundwater, surface water)	Superfund site
King County Juvenile Detention (King County, WA)	Pacific Sound Resources	1993–present	Unspecified (soil, groundwater)	Detention center
	Lockheed West Seattle	2006–present	Hazardous chemicals (sediment)	Detention center
	Harbor Island (Lead)	1982–present	Lead and other contaminants, PCBs, arsenic, carcinogenic PAHs, TBT, and mercury (groundwater, settlement, soil, mud)	Detention center

(*continued*)

(*Appendix continues* →)

Appendix Table A5. (Continued)

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which was first?*
Kitsap County Juvenile Detention (Kitsap County, WA)	Bremerton Gasworks	2011–present	Unspecified (unspecified)	Superfund
Linn-Benton Detention Center (Linn County, OR)	Teledyne Wah Chang	1997–present	Radionuclides, VOCs (soil, sediment, groundwater)	Superfund
Los Padrinos Juvenile Hall (Los Angeles County, CA)	Pemaco Maywood	1998–present	VOCs (unspecified)	Detention center
Mendocino County Juvenile Hall (Mendocino County, CA)	Coast Wood Preserving	1982–present	Chromium, arsenic (soil, groundwater)	Detention center
North Coast Youth Correctional Facility (Clatsop County, OR)	Astoria Marine Construction Company	2011–present	''Hazardous chemicals'' (soil, settlement, groundwater)	Detention center
Oak Creek Youth Correctional Facility (Linn County, OR)	Teledyne Wah Chang	1997–2003; 2008–present	Radionuclides, VOCs (soil, sediment, groundwater)	Superfund
	Amer ican Lake Gardens/ McChord AFB	1983–present	''Hazardous chemicals'' (groundwater)	Detention center
Remann Hall (Pierce County, WA)	Commencement Bay, South Tacoma Channel	1982–present	Hazardous chemicals, VOCs, heavy metals (groundwater, soil)	Detention center
Sacramento County Youth Detention Facility (Sacramento County, CA)	Sacramento Army Depot	1984–present	VOCs, heavy metals (soils, groundwater)	Detention center
	Mather Air Force Base	1984–present	Unspecified (unspecified)	Detention center
Salt Lake Valley Juvenile Detention Center (Salt Lake County, Utah)	Wasatch Chemical Co. (Lot 6)	Unknown date-present	''Hazardous chemicals''	Unknown
	Portland Cement (Kiln Dust 2&3)	Unknown date–present	Heavy metals (soil, air, groundwater)	Unknown
	Murray Smelter	Unknown date–present	Heavy metals (soil, sediment, groundwater)	Unknown
San Joaquin Juvenile Hall (San Joaquin County, CA)	Sharpe Army Depot	1984–present	VOCs (groundwater, soil)	Detention center
	McCormick and Baxter Creosoting Co.	1993–present	Wood-treating chemical compounds (soil, groundwater, sediment)	Detention center
Santa Clara Juvenile Hall (Santa Clara County, CA)	Synertek, Inc. (Building 1)	1988–present	VOCs (soil)	Detention center
	Lorentz Barrel and Drum Co.	1988–present	''Hazardous chemicals'' (soil, groundwater)	Detention center
	Intel Corp. (Santa Clara III)	1984–present	VOCs (groundwater)	Detention center
Spokane Juvenile Detention Center (Spokane County, WA)	Spokane Junkyard/ Associated Properties	Unknown	PCBs, lead, solvents (soil)	Unknown

(*continued*)

(*Appendix continues* →)

Appendix Table A5. (Continued)

Juvenile detention center	*Superfund site*	*Dates of overlap*	*Contaminants (location)*	*Which was first?*
Stanislaus County Juvenile Hall (Stanislaus County, CA)	Modesto Ground Water Contamination	2011–present	PCE (soil, groundwater)	Superfund
Wasatch Youth Center (Salt Lake County, UT)	Wasatch Chemical	1987–2018	''Hazardous chemicals'' (soil, sludge, groundwater)	Detention center
	Portland Cement (Kiln Dust 2&3)	1984–2018	Heavy metals (soil, air, groundwater)	Detention center
Yakima County Juvenile Justice Center (Yakima County, WA)	FMC Corp. (Yakima)	1995–present	Pesticides (soil, groundwater)	Superfund
Juvenile Detention Center (Yakima County, WA)	Yuma Marine Corps Air Station	2002–present	Chlorinated solvents (groundwater)	Superfund

Appendix Table A6. Number of Sites Within Select Distances (Miles) of the Nearest Superfund Site

	<1 mile	*<1.8 miles*	*<3 miles*	*<5 miles*
Independent of time overlap	4	7	23	49
Dependent on time overlap	3	6	>18	>40