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Recreational Reuse and the Benefit to Community A Beneficial Effects Economic Case Study for the Whitmoyer Laboratories Superfund Site



Introduction

Starting in 1934, the Whitmoyer Laboratories facility near Myerstown, Pennsylvania, manufactured veterinary pharmaceuticals. Waste disposal practices caused arsenic contamination in soil, groundwater and surface water, endangering private drinking water wells nearby. After changing hands several times, the facility was abandoned in 1984. In 1987, EPA placed the site on the Superfund program's National Priorities List. Early reuse planning and cooperation among EPA, the potentially responsible party (PRP) group, township officials, and state and local partners resulted in the successful cleanup and recreational reuse of the site. Today, the site is home to Jackson Recreational Park as well as part of Fairlane Avenue Park, providing much-needed recreational amenities for the community. These recreation resources bolster the local economy, boost property values, and result in public health and social benefits. EPA continues to monitor site conditions as groundwater cleanup continues.

Superfund site restoration and reuse can revitalize local communities with recreational opportunities, health and community benefits, property value increases, local spending, jobs and tax revenues. This case study explores the cleanup and recreational reuse of the Whitmoyer Laboratories site, illustrating the beneficial effects of Superfund redevelopment.

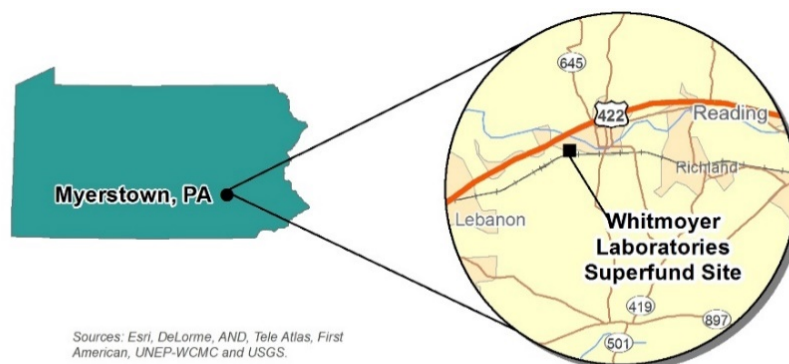
Beneficial Effects

The cleaned-up site is now home to Jackson Recreational Park and part of Fairlane Avenue Park – two of the area's premier parks. The redeveloped area includes soccer fields, a baseball diamond, a disc golf course, a walking trail and the historic Union Canal.

Over 500 area youth participate in soccer and baseball leagues at Jackson Recreational Park. The estimated direct-use value of recreational activities at the site totals at least \$137,000 per year.

Health benefits from the parks contribute to an estimated \$138,000 in annual medical savings.

New residential developments nearby benefit from the recreational opportunities offered by the parks. The total property value boost from the parks is estimated at about \$706,000.



Sources: Esri, DeLorme, AND, Tele Atlas, First American, UNEP-WCMC and USGS.

Figure 1. The Whitmoyer Laboratories site is located near Myerstown, Pennsylvania.

Site History

The Whitmoyer Laboratories site occupied 22 acres in Jackson Township, Lebanon County, Pennsylvania. The site is on the outskirts of Myerstown and is surrounded by agricultural and suburban residential areas. According to the U.S. Census, about 9,000 people live in Jackson Township.

A company made veterinary pharmaceuticals at the site between 1934 and 1984. Arsenic compounds were produced and stored at the site. The site included 17 buildings, 23 storage tanks, a concrete storage vault, 15 lagoons, a waste pit, a petroleum products pipeline and pump station, and a railroad spur. In 1964, the site owner detected arsenic pollution in the soil, groundwater and surface water. The cause of this pollution was previous disposal of wastes in the soil and unlined lagoons.

Prior to site cleanup, about 4,700 people used wells for drinking water within 3 miles of the site. The closest home is within 50 feet of the site and 1,300 people live within a 1-mile radius. An elementary school is located a half-mile away. Tulpehocken Creek, which has been proposed as part of Pennsylvania's scenic river system, runs next to the site.

Site Cleanup

The site's owner declared bankruptcy in 1984 and abandoned the site in 1987. After studying the contamination, EPA listed the site on the Superfund program's National Priorities List in 1987 and began providing bottled water to homes with contaminated drinking water. Emergency work continued in 1988 and 1989 with the removal of drums, tanks and laboratory chemicals from the abandoned facility. In 1991 and 1992, the previous site operators connected affected homes to the public water supply.

EPA selected and refined the site's long-term remedy in a series of decision documents between 1989 and 2012.



Figure 3. Groundwater cleanup takes place at the site's groundwater treatment facility.

The group of companies responsible for the contamination (the PRP group) reached an agreement with EPA in 1992 and began conducting the long-term phase of the cleanup. From 1994 to 1996, the PRP group demolished the site's buildings and sent debris and sludge off site for disposal. An additional 1,415 tons of contaminated soil were excavated and sent off site for treatment and disposal in 1998. In 1998 and 1999, the PRP group excavated about 18,000 tons of arsenic-contaminated lagoon wastes and sent them via rail cars to an off-site treatment and disposal facility. Soil that was lightly or moderately contaminated was capped with a 2-foot layer of soil.

The PRP group built a full-scale groundwater treatment facility in 1997 and 1998. The system reduces contamination by pumping



Figure 2. Jackson Recreational Park opened in 2005 on part of the cleaned-up site.

water from nearby groundwater wells and treating it. The treatment facility continues to operate, processing over 130,000 gallons of contaminated water each day.

Land use controls have been put in place to make sure people do not come into contact with contamination that remains in subsurface soil and groundwater. In June 2002, EPA hosted a public event to celebrate the completion of remedy construction. EPA will continue to monitor the site in perpetuity through five-year reviews to make sure the remedy continues to protect public health and the environment.

Redevelopment and Transformation

Jackson Township's leaders were able to see beyond the site's cleanup and envision a redevelopment plan for the site. The township's population was growing steadily in the 1990s and early 2000s, with resulting demand for additional recreational opportunities. Before the cleanup was complete, township officials proposed redeveloping the site as a recreational park and gained the support of EPA and the PRP group. The parties worked together to



Figure 4. Jackson Recreational Park has two full-size, lighted soccer fields plus additional practice areas.

incorporate the planned reuse as part of the cleanup design. The soil cap was designed to accommodate the park's future structures, utilities and foundations for light poles. The cap's final grading was designed to accommodate the future playing fields. The PRP group agreed to conduct the additional work even before transferring the property to the township. In October 2004, EPA entered into a Prospective Purchase Agreement (PPA) with Jackson Township to facilitate purchase of the site property for recreational uses. In 2005, the township took ownership of the property and opened Jackson Recreational Park to the public. Across the road, Fairlane Avenue Park opened in 2012; part of the park is located on the former site.

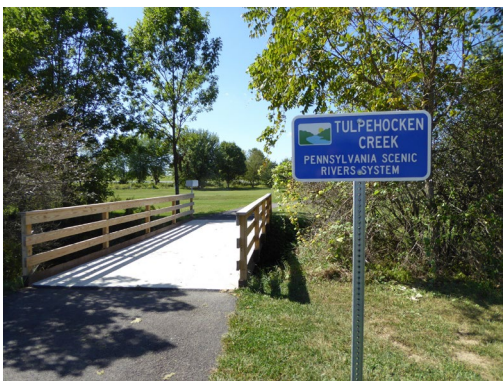


Figure 5. One of the two new pedestrian bridges across Tulpehocken Creek that provide access to the site's recreational trail.

A variety of partners assisted in the site's recreational redevelopment. The PRP group funded the initial development of Jackson Recreational Park. EPA's Superfund Redevelopment Initiative and the U.S. Soccer Foundation helped build the soccer fields at the park. The Pennsylvania Department of Conservation and Natural Resources awarded the township several Community Conservation Partnerships Program grants to acquire the parkland and further develop the parks. Most recently, the Community Conservation Partnerships Program provided \$175,000 in 2017 to add new recreational amenities at Jackson Recreational Park and Fairlane Avenue Park, including a paved recreational trail across the site with two pedestrian bridges across the creek. In total, the township has brought in more than \$650,000 in outside funding for the two parks.

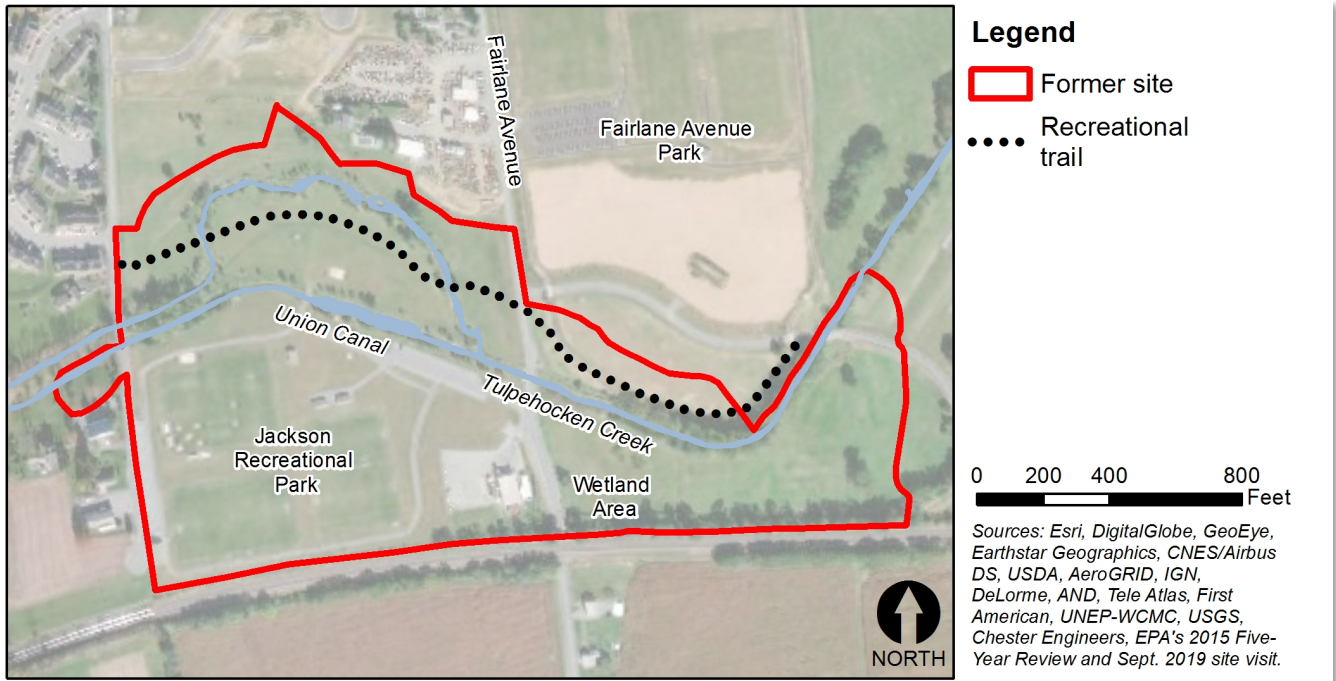


Figure 6. Recreational and ecological areas at the Whitmoyer Laboratories site.

Beneficial Effects

Today, the Whitmoyer Laboratories site has been redeveloped as Jackson Recreational Park as well as part of Fairlane Avenue Park. The former site is now home to two of the area’s premier recreational areas, with soccer fields, a baseball diamond, a disc golf course, a walking trail and the historic Union Canal. The sports facilities are enjoyed by nearby residents, workers at an adjacent industrial facility and out-of-town visitors. In addition, wetlands have been established on part of the site, providing valuable habitat for various species. This section describes the beneficial effects of recreational reuse at the site.

Direct Use Value

Park users derive enjoyment from recreational activities at the site. These activities include:

- Soccer leagues with 360 youth participants (recreation and travel leagues)
- Summer soccer camp with 120 youth participants
- Youth baseball league
- 18-hole disc golf course
- Paved half-mile recreational trail
- Annual Easter egg hunt with 200 youth participants
- Annual Four Chaplains Scholarship Run

The value associated with participating in recreational activities can be quantified using an established methodology that relies on “unit-day values” from the U.S. Army Corps of Engineers. Table 1 below presents estimated direct use values for recreational activities at the site.

Table 1. Direct Use Value

Activity	Number of Participants	Days Used per Year by Typical Participant	User-Days per Year	Value per Day	Annual Value
Soccer	360 ^a	60 ^b	21,600	\$3.90 ^c	\$84,240
Soccer Camp	120 ^a	4 ^a	480	\$11.71 ^d	\$5,621
Baseball	200 ^e	20 ^e	4,000	\$3.90 ^c	\$15,600
Disc Golf	200 ^e	6 ^e	1,200	\$3.90 ^c	\$4,680
Walking / Jogging	200 ^e	30 ^e	6,000	\$3.90 ^c	\$23,400
Easter Egg Hunt	200 ^f	1	200	\$11.71 ^d	\$2,342
Four Chaplains Scholarship Run	100 ^e	1	100	\$11.71 ^d	\$1,171
Total					\$137,054

Notes:

^a Source: Interview with Myerstown Soccer Club.

^b Estimated based on two seasons per year, with 10 games and 20 practices per season.

^c Low end of range for general recreation unit-day value from U.S. Army Corps of Engineers Economics Guidance Memorandum 16-03.

^d High end of range for general recreation unit-day value from U.S. Army Corps of Engineers Economics Guidance Memorandum 16-03.

^e Estimated.

^f Source: Interview with Jackson Township supervisor Tom Houtz.



Figure 7. Jackson Recreational Park has a lighted baseball/softball field with aboveground dugouts.

In addition to the direct-use value estimates in Table 1, another way to quantify the value that a community places on recreational opportunities is to ask community members how many dollars a certain park is worth to them (whether or not they themselves actually go to the park). These economic approaches are called “willingness to pay” or “contingent valuation.” A 2007 study found that households in Alberta, Canada, would be willing to pay US\$17 (converted from the study’s 2007 Canadian dollar value of \$18) per year for small enhancements in sports and recreation programs.¹ Applying this willingness-to-pay value to the 3,279 households in Jackson Township yields a total annual value of about \$56,000. Including the 1,342 households in the adjacent

¹ Johnson, Bruce, Whitehead, John, Mason, Daniel and Walker, Gordon. 2007. Willingness to Pay for Amateur Sport and Recreation Programs. Contemporary Economic Policy.

Myerstown Borough increases this value to about \$79,000. This value is likely a significant underestimate given that Jackson Recreational Park and Fairlane Avenue Park are much more than a “small enhancement” and that some park users come from outside the township.

A third way to monetize how much participants value an activity is to calculate how many dollars they spend to participate in the activity. Their perceived value must be at least as great as the amount they spend. Myerstown Soccer Club states that the approximate cost is \$40-60 per season (or \$80-120 per year) to participate in the recreational soccer league. For the travel league, the yearly cost is \$185-225 plus the cost of a uniform every other year. Assuming that half of the 360 soccer players play in the recreational league and half in the travel league, and using the average of each cost range, the total cost to participate is \$54,900.

Local Businesses

Recreational reuse can bolster local economies through increased consumer spending, job creation and additional tax revenue. The Outdoor Industry Association’s 2017 Outdoor Recreation Economy Report shows that outdoor recreation in the United States generates \$887 billion in consumer spending annually, supports 7.6 million jobs and provides a total of \$125 billion in federal, state and local tax revenue each year.² For Pennsylvania alone, the Outdoor Industry Association estimates \$29 billion in consumer spending annually, 251,000 jobs and \$8.6 billion in salaries as a result of outdoor recreation. These activities generate about \$1.9 billion in annual state and local tax revenues.

This case study estimates the sales revenue associated with recreational activities at the site. This study estimates that the average cost for soccer equipment (e.g., cleats, shin guards, uniform) is \$60 per year. The league provides each player with a soccer ball. Multiplying by the 360 soccer players yields a total annual soccer equipment cost of \$21,600. For baseball, this study estimates an average annual equipment cost of \$100; this includes the cost of cleats, a bat, a glove and a uniform. For an estimated 200 baseball players, the total annual baseball equipment cost would be \$20,000. Much of this spending occurs at local sports equipment retailers.

In addition, the site’s redevelopment helps support at least one part-time job. Jackson Township recently hired a part-time maintenance worker to handle the needs of its recreational areas. Township employees also mow the parks.



Figure 8. The cleaned-up site is now home to an 18-hole disc golf course, installed by a local volunteer.



Figure 9. In addition to organized team sports, local residents enjoy unstructured recreational time at the on-site parks.

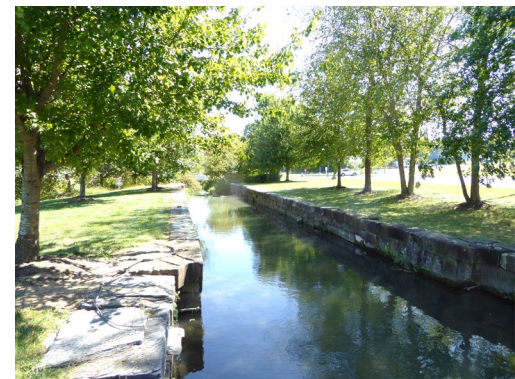


Figure 10. The site’s redevelopment allows park visitors to access the historic Union Canal.

² Outdoor Industry Association. 2018 Outdoor Recreation Economy Report.

Health Benefits

One of the most important benefits provided by parks is the improved health of park users. This includes both physical health benefits from outdoor exercise, as well as mental health benefits from time spent participating in various outdoor activities. Following the methodology developed by the Trust for Public Land, this study assumes an annual savings of \$1,100 in medical expenses for every adult who exercises regularly.³ For people over the age of 65, the annual benefit is \$2,210, due to their higher medical expenses. The Trust for Public Land's methodology does not quantify the health benefits for children.



Figure 11. The site's recreational trail provides area residents with opportunities for outdoor exercise.

The recreational trail that crosses the site is popular among walkers and joggers. The U.S. Department of Health and Human Services recommends that adults get at least 150 minutes of moderate-intensity aerobic physical activity or 75 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination each week.⁴ This study estimates that 100 adults meet these guidelines using the recreational trail and other areas at the site. This does not include the many adults who participate in less-frequent exercise or other activities at the park. Assuming that a quarter of the 100 adults are seniors yields an estimated **annual savings of \$137,750 in medical expenses** due to recreational redevelopment at the site.

Researchers have found that there are significant mental health benefits from participating in sports and even from living near a park. For example, a 2011 paper found that "sports participation has a positive effect upon the subjective well-being of the population."⁵ Sturm and Cohen (2014) found that "mental health is significantly related to residential distance from parks, with the highest MHI-5 [five-item Mental Health Inventory] scores among residents within short walking distance from the park (400m) and decreasing significantly over the next distances."⁶ They calculated that "a nearby urban park is associated with the same mental health benefits as decreasing local unemployment rates by 2 percentage points."

³ The Trust for Public Land. 2016. The Economic Benefits of the Park & Recreation System in San José, California.

⁴ U.S. Department of Health and Human Services. 2018. Physical Activity Guidelines for Americans, 2nd edition.

⁵ Downward, Paul and Rasciute, Simona. May 2011. Does sport make you happy? An analysis of the well-being derived from sports participation. Pages 331-348.

⁶ Sturm, Roland and Cohen, Deborah. 2014. Proximity to urban parks and mental health. Journal of Mental Health Policy and Economics. 17(1): 19–24.

Community Benefits

As public gathering places, parks provide community and social benefits. The soccer and baseball leagues provide opportunities for coaches to positively impact their players, as well as opportunities for parental involvement and meeting other parents. When soccer games take place at Jackson Recreational Park, the total number of attendees at the park can reach 500 to 600 people, including players, parents, siblings and coaches. People on and off the field benefit from the social interactions at the park.

The Trust for Public Lands methodology quantifies community benefits in two ways:

- Volunteer hours: monetizes using average hourly rate for volunteer time.
- Charitable donations to parks.



Figure 12. The local Rotary Club donated benches to Jackson Recreational Park.

The estimated amount of time volunteered each year at Jackson Recreational Park is 740 hours, including games and practices for soccer and baseball. Applying the 2018 value of volunteer time for Pennsylvania calculated by Independent Sector (\$24.94 per hour), yields a **value of \$18,456 for the volunteer hours devoted to the park.**⁷ This does not include the time spent by a local volunteer to install the park's disc golf course.

Groups and individuals also make charitable contributions to parks, demonstrating their commitment to the benefits provided by recreational areas. At Jackson Recreational Park, the local Rotary Club donated many benches located across the park.

The annual Four Chaplains Scholarship Run, organized by the Evangelical Seminary in Myerstown, uses the site's recreational trail as part of its running route. All registration fees from the race are used to fund scholarships for military chaplain candidates.

Property Value Benefits

The residents of nearby neighborhoods enjoy being within walking distance of the recreational trail and other amenities offered by the parks. The newest residential development nearby even owes its name to the parks – Park View Estates. Economists have found that having a park nearby increases the value of nearby real estate. For example, a 2005 survey of the previous 20 years of research on this topic in the United States recommends a 20% increase in value as a guideline for properties abutting or fronting a passive park (with lower premiums for parks serving primarily active users), with substantial impact up to 500 to 600 feet.⁸ A 2010 review of over 60 studies on the impact of open spaces on residential property values found that increases in property value existed up to 500 to 600 feet away from the park; for community-sized parks over 30 acres, the effect may be measurable out

"Jackson Recreational Park is one of the premier recreation locations in the township."

– Tom Houtz, Jackson Township Supervisor

⁷ Independent Sector. 2018. The Value of Volunteer Time / State and Historical Data.

⁸ Crompton, John L. 2005. The Impact of Parks on Property Values: Empirical Evidence from the Past Two Decades in the United States. *Leisure Management* 10, 203-218.

to 1,500 feet, but 75% of the premium value generally occurs within the 500 to 600 foot range.⁹ The Trust for Public Land has developed a methodology for analyzing the economic benefits of parks. The Trust’s methodology conservatively assumes a 5% increase in property value for all residential properties within 500 feet. The Trust’s methodology does not include commercial properties because, although it is likely that commercial properties experience property value increases due to proximity to parks, economists have not yet measured these effects for commercial properties.

For this case study, it is conservatively assumed that a 5% property value boost is experienced by residential properties within 500 feet of the site’s recreational, ecological and open space. Figure 13 shows parcels within 500 feet of the site boundary. All areas within the site boundary are now in recreational, ecological or open space use. For the purposes of this analysis, only residential parcels that are at least halfway within the 500-foot buffer are included; these are shown in green on Figure 13. The total assessed value of these parcels is \$14,126,100. Using a conservative value of 5% for the park proximity premium yields a ***property value benefit of \$706,305*** due to proximity to the recreational, ecological and open space areas at the site.

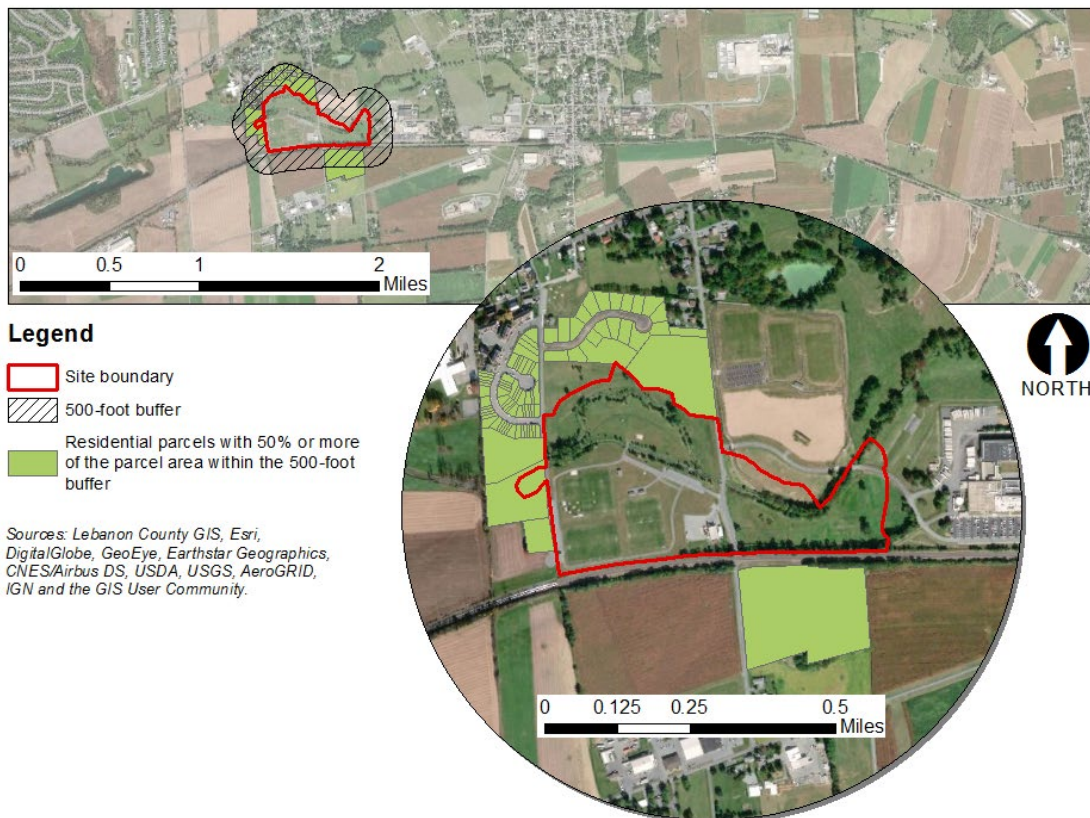


Figure 13. Residential parcels within 500 feet of recreational and ecological areas at the Whitmoyer Laboratories site.

⁹ Shoup, Lily and Ewing, Reid. 2010. The Economic Benefits of Open Space, Recreation Facilities and Walkable Community Design.

Conclusion

Collaboration among EPA, the PRP group, the township and other partners was vital to the successful cleanup and beneficial reuse of the Whitmoyer Laboratories Superfund site. The township stated its preference for recreational redevelopment early in the cleanup process, allowing the PRP group to integrate reuse considerations as part of cleanup planning.

This once-contaminated area now supports two thriving recreational parks with soccer and baseball fields, a walking trail, a disc golf course and the historic Union Canal. In addition, a wetland area provides valuable ecological habitat. The recreational redevelopment of the site is estimated to provide at least \$137,000 in direct use value, nearly \$138,000 in annual medical savings and about \$706,000 in property value increases.



Figure 14. Local residents now enjoy a half-mile recreational trail that crosses the cleaned-up site.

*For more information about EPA's Superfund Redevelopment Program, visit:
<https://www.epa.gov/superfund-redevelopment-initiative>.*



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Technical Appendix

Property Values

EPA obtained data on the most recently assessed values for property parcels near the Whitmoyer Laboratories Superfund site in November 2019 through property records accessible through the Lebanon City Authority/GIS Department and Lebanon County Assessment Department’s ArcGIS Online Living Atlas feature layer.¹

Table 1. Property Values for Residential Parcels Located within the 500 Foot Buffer²

Map Number	Total Assessed Value of Land and Buildings
23-2364768-380447-0000	\$116,900
23-2364759-380403-0000	\$113,700
23-2364749-380368-0000	\$114,800
23-2364707-380329-0000	\$129,700
23-2364637-380273-0000	\$122,200
23-2364667-380261-0000	\$122,200
23-2364685-380252-0000	\$121,900
23-2364709-380239-0000	\$121,800
23-2364742-380230-0000	\$121,700
23-2364769-380224-0000	\$121,700
23-2364794-380197-0000	\$124,300
23-2364457-380185-0000	\$121,600
23-2364457-380165-0000	\$121,600
23-2364608-380147-0000	\$123,400
23-2364454-380145-0000	\$123,000
23-2364650-380079-0000	\$121,800
23-2364596-380119-0000	\$121,600
23-2364451-380126-0000	\$121,600
23-2364806-380054-0000	\$123,700
23-2364589-380100-0000	\$121,600
23-2364448-380106-0000	\$115,600
23-2364581-380082-0000	\$121,600
23-2364666-380050-0000	\$121,800
23-2364445-380060-0000	\$121,800
23-2364575-380054-0000	\$126,800
23-2364777-380028-0000	\$129,200

¹ Property values from the Lebanon County Assessment Office website:

<http://www.lebcounty.org/depts/Assessment/Pages/default.aspx>.

² Only parcels that are 50% or more within the 500-foot buffer are included.

Map Number	Total Assessed Value of Land and Buildings
23-2364679-380032-0000	\$121,800
23-2364706-380018-0000	\$122,300
23-2364748-380018-0000	\$122,200
23-2364570-379995-0000	\$122,000
23-2364453-379983-0000	\$125,800
23-2364598-379978-0000	\$121,600
23-2364612-379964-0000	\$121,600
23-2364627-379950-0000	\$121,600
23-2364645-379928-0000	\$121,600
23-2364812-379927-0000	\$123,400
23-2364781-379926-0000	\$121,600
23-2364761-379925-0000	\$121,600
23-2364741-379924-0000	\$121,600
23-2364721-379923-0000	\$121,600
23-2364691-379922-0000	\$122,300
23-2364460-379941-0000	\$121,600
23-2364465-379922-0000	\$121,600
23-2364471-379903-0000	\$121,600
23-2364478-379884-0000	\$121,800
23-2364471-379844-0000	\$128,900
23-2364531-379835-0000	\$121,600
23-2364559-379822-0000	\$121,600
23-2364576-379812-0000	\$121,700
23-2364594-379803-0000	\$122,200
23-2364613-379796-0000	\$122,300
23-2364640-379784-0000	\$121,800
23-2364820-379784-0000	\$129,700
23-2364792-379784-0000	\$116,000
23-2364772-379784-0000	\$121,800
23-2364683-379782-0000	\$121,600
23-2364752-379783-0000	\$121,600
23-2364732-379783-0000	\$115,600
23-2364713-379782-0000	\$121,600
23-2364657-379612-0000	\$334,500
23-2364813-379289-0000	\$328,700
23-2364804-379011-0000	\$242,100
23-2366299-378587-0000	\$459,600
23-2365926-380311-0000	\$425,000
23-2365500-380440-0000	\$239,800
23-2365425-380525-0000	\$226,300
23-2365175-380660-0000	\$221,100
23-2365075-380325-0000	\$248,700

Map Number	Total Assessed Value of Land and Buildings
23-2364975-380300-0000	\$243,200
23-2365250-380500-0000	\$227,400
23-2365425-380675-0000	\$268,700
23-2365350-380690-0000	\$270,000
23-2365260-380690-0000	\$257,400
23-2365150-380375-0000	\$231,200
23-2365350-380525-0000	\$260,200
23-2364990-380450-0000	\$241,000
23-2365500-380675-0000	\$267,300
23-2365200-380435-0000	\$255,300
23-2365905-380491-0000	\$129,100
23-2365575-380660-0000	\$239,500
23-2365650-380600-0000	\$252,600
23-2365650-380500-0000	\$275,700
23-2365125-380600-0000	\$254,800
23-2364910-380450-0000	\$268,000
23-2365075-380515-0000	\$264,100
Total	\$14,126,100
5% of total	\$706,305