

Introduction

Superfund site cleanup can support redevelopment that brings properties back into productive use and revitalizes local communities in various ways. Commercial redevelopment brings economic benefits such as jobs, new businesses, tax revenues and local spending. Public service redevelopment provides new facilities for public safety personnel and other local government functions. This case study focuses on the benefits from recreational redevelopment at cleaned-up Superfund sites. These benefits include expanded recreational opportunities, health and community benefits, property value increases, local spending, jobs and tax revenues.

Beneficial Effects Highlights

The cleaned-up Whitmoyer Laboratories site in Pennsylvania is now home to 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 play soccer and baseball at the site. The estimated direct use value of recreational activities at the site totals at least \$137,000 per year.

Cleanup of Lipari Landfill in New Jersey allowed multiple parks to return to recreational use. The parks support recreational and minor league professional athletics with baseball, softball, soccer and football fields. Other amenities include walking trails, fishing, boating, disc golf, playgrounds and picnic facilities. Recent economic studies conservatively estimate a \$101,000 annual direct use value for park facilities.

At just these two sites, the health benefits from people exercising at the parks help save an estimated \$275,000 a year in medical costs.

Economists estimate that properties near parks enjoy a 5% boost in property value. At these two sites, the estimated property value boost adds up to over \$2.0 million.

Economic Value of Recreational Redevelopment

Cleaned-up Superfund sites have been redeveloped for a variety of recreational purposes, including sports fields, trails, playgrounds, picnic facilities and disc golf courses. This section of the case study describes various beneficial effects from recreational redevelopment as well as some of the economic methodologies that measure the value of recreational areas.

Direct Use Value

People greatly value the opportunity to participate in recreational activities. This direct use value can be quantified using a



Figure 1. Cleaned-up sites can provide space for much-needed sports fields such as this baseball diamond in New Jersey.

methodology that relies on “unit-day values” from the U.S. Army Corps of Engineers. For general recreation activities, the estimated daily value per participant ranges from \$3.90 to \$11.71.¹ Multiplying these values by the numbers of participants and the number of days a typical participant practices or plays at a park can yield annual values in the hundreds of thousands of dollars for a given park.

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). This economic approach is called “willingness to pay” or “contingent valuation.” A 2007 study found that households in Alberta, Canada, would be willing to pay US\$17 per year for small enhancements in sports and recreation programs.²

A third way to monetize how much participants value an activity is to calculate the total number of dollars they spend to participate in the activity (e.g., equipment costs, registration fees, travel costs). The value they place on the recreational activity must be at least as great as the amount they spend to participate in the activity.

Health Benefits

One of the most important benefits provided by parks is the improved health of park visitors. This includes physical health benefits from outdoor exercise as well as mental health benefits from time spent participating in various outdoor activities. 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.³

The Trust for Public Land has developed a series of methodologies to calculate the economic value provided by various attributes of urban park systems. To estimate the health benefits provided by parks, The Trust for Public Land estimates an annual savings of \$1,100 in medical expenses for every adult who exercises regularly, based on a review of health care economics literature.⁴ For people over the age of 65, the annual benefit is estimated to be \$2,210, due to the higher medical expenses of seniors.

\$137,000 per year

Recreational redevelopment at a cleaned-up Superfund site in Pennsylvania provides at least \$137,000 per year in estimated direct use value from youth soccer and baseball, walking and jogging, and other recreational activities.

Source: EPA Superfund Redevelopment Initiative. 2020. Recreational Reuse and the Benefit to Community: A Beneficial Effects Economic Case Study for the Whitmoyer Laboratories Superfund Site.



Figure 2. A cleaned-up site in Pennsylvania is now home to an 18-hole disc golf course. A local volunteer installed the course.

¹ Range of unit-day values for general recreation from U.S. Army Corps of Engineers Economics Guidance Memorandum 16-03.

² Johnson, Bruce, Whitehead, John, Mason, Daniel and Walker, Gordon. 2007. Willingness to Pay for Amateur Sport and Recreation Programs. Contemporary Economic Policy. US\$17 (converted from the study’s 2007 Canadian dollar value of \$18).

³ U.S. Department of Health and Human Services. 2018. Physical Activity Guidelines for Americans, 2nd edition.

⁴ The Trust for Public Land. 2016. The Economic Benefits of the Park & Recreation System in San José, California.

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.”

\$275,000 per year

Local residents save an estimated \$275,000 per year in health care costs thanks in part to the recreational opportunities now available at two cleaned-up Superfund sites in New Jersey and Pennsylvania.

Sources: EPA Superfund Redevelopment Initiative. 2020. Recreational Reuse and the Benefit to Community: A Beneficial Effects Economic Case Study for the Lipari Landfill Superfund Site.

EPA Superfund Redevelopment Initiative. 2020. Recreational Reuse and the Benefit to Community: A Beneficial Effects Economic Case Study for the Whitmoyer Laboratories Superfund Site.

Community Benefits

As public gathering places, parks provide community and social benefits. Youth sports leagues provide opportunities for coaches to positively impact their players as well as opportunities for parental involvement and for parents to meet one another. People on and off the field – including players, parents, siblings and coaches – benefit from the social interactions that occur at recreational parks.

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

- Volunteer hours.
- Charitable donations to parks.



Figure 3. This recreational trail at a cleaned-up site in New Jersey provides area residents with opportunities for outdoor exercise.



Figure 4. In addition to organized team sports, local residents enjoy unstructured recreational time at on-site parks.



Figure 5. The cleaned-up Lipari Landfill in New Jersey now provides a variety of recreational activities, including this playground.

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.

The economic value of volunteering can be monetized using the average hourly rate for volunteer time calculated by the nonprofit group Independent Sector.⁷

Groups and individuals also make charitable contributions to parks, demonstrating their commitment to the benefits provided by recreational areas. These contributions can be in the form of money or items such as picnic shelters or benches. In addition, parks often host charitable fundraising events such as 5K runs.

Local Businesses

Recreational reuse can bolster local economies through increased consumer spending, job creation and additional tax revenue. Out-of-town visitors such as sports tournament attendees stimulate local economies by spending money at lodgings, restaurants and other businesses. 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. It supports 7.6 million jobs and provides a total of \$125 billion in federal, state and local tax revenue each year.⁸

In addition, high-quality recreational opportunities are a powerful economic development tool that inform where businesses and workers decide to locate.⁹ By transforming an industrial eyesore into an attractive park, a community can flip a negative and turn it into a prized local asset. Many communities have already discovered that a cleaned-up site can offer significant acreage in a prime location at a good price. This opportunity often meshes well with the increasing demand for sports facilities experienced by many localities.



Figure 6. The local Rotary Club donated benches to Jackson Recreational Park at a cleaned-up site in Pennsylvania.

1.1 million jobs

America's local park and recreation agencies generated \$154 billion in economic activity in 2015, \$81 billion in value added and more than 1.1 million jobs that boosted labor income by \$55 billion.

Source: National Recreation and Park Association. 2018. Economic Impact of Local Parks: An Examination of the Economic Impacts of Operations and Capital Spending by Local Park and Recreation Agencies on the United States Economy.

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

⁸ Outdoor Industry Association. 2018 Outdoor Recreation Economy Report.

⁹ National Recreation and Park Association. 2018. Promoting Parks and Recreation's Role in Economic Development.

Property Value Benefits

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.¹⁰ 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 to 1,500 feet, but 75% of the premium value generally occurs within the 500-to-600-foot range.¹¹ The Trust for Public Land’s methodology conservatively assumes a 5% increase in property value for all residential properties within 500 feet of a park. Its 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.

\$2.0 million

The property value boost for homes near the recreational parks at two cleaned-up Superfund sites is estimated at nearly \$2.0 million.

Sources: EPA Superfund Redevelopment Initiative. 2020. Recreational Reuse and the Benefit to Community: A Beneficial Effects Economic Case Study for the Lipari Landfill Superfund Site.

EPA Superfund Redevelopment Initiative. 2020. Recreational Reuse and the Benefit to Community: A Beneficial Effects Economic Case Study for the Whitmoyer Laboratories Superfund Site.

Ecological Benefits from Parks

Parks and other green spaces provide many types of ecological benefits. They combat climate change by sequestering carbon in trees. They cool down urban areas through the transpiration that happens in the leaves of trees. They provide habitat for plants and animals.

Parks also help reduce the amount of surface water runoff, thereby reducing the cost of managing stormwater. Park vegetation and soil capture rainwater and allow it to either evaporate or recharge aquifers, rather than running into streams and sewers. This helps prevent flooding and erosion. There is a cost to managing stormwater – building and maintaining the “gray infrastructure” of storm sewer systems, holding tanks and wastewater treatment plants. That is why



Figure 7. Ecological restoration at a cleaned-up site in New Jersey has included a no-mow wildflower meadow, riparian border restoration and erosion prevention using natural plantings around Alcyon Lake.

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

– Tom Houtz, Jackson Township Supervisor

¹⁰ 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.

¹¹ Shoup, Lily and Ewing, Reid. 2010. The Economic Benefits of Open Space, Recreation Facilities and Walkable Community Design.

many localities are opting to invest in “green infrastructure” such as green roofs, permeable pavements and bioswales. The Trust for Public Land has developed a methodology to estimate the cost savings provided by the stormwater reductions due to parks. The site-specific estimate uses a model developed by the U.S. Forest Service along with site-specific parameters (such as geographic location, climate region, surface permeability and impervious area) to calculate the reduction in runoff due to a locality’s park acreage. This is multiplied by an estimated cost per cubic foot to manage stormwater. Recent studies by The Trust for Public Land have found stormwater reduction benefits of \$450 to \$580 per acre.¹²

Conclusion

Recreational redevelopment of cleaned-up Superfund sites has been happening successfully for decades. As more and more communities across the country experience increasing demand for recreational opportunities, local leaders continue to capitalize on the recreational potential of cleaned-up sites. The significant value of recreational redevelopment can be measured in a variety of ways, from direct use value to health benefits to property value increases. EPA recently investigated the beneficial effects from recreational redevelopment at the Lipari Landfill and Whitmoyer Laboratories sites – the estimated benefits include \$275,000 a year in medical cost savings, over \$2.0 million in increased property values and \$238,000 a year in direct use recreational value. Other benefits include community social benefits, increased income for local businesses and workers, and ecological benefits.



Figure 8. Local residents now enjoy a half-mile recreational trail that crosses a cleaned-up site in Pennsylvania.

*For more information about EPA’s Superfund Redevelopment Initiative, visit:
www.epa.gov/superfund-redevelopment-initiative.*

¹² The Trust for Public Land. 2016. The Economic Benefits of the Park & Recreation System in San José, California. <https://www.tpl.org/node/96851>. The Trust for Public Land. 2019. The Economic Benefits of Metroparks Toledo. https://www.tpl.org/sites/default/files/files_upload/Toledo-Report.pdf. The Trust for Public Land. 2008. How Much Value Does the City of Philadelphia Receive from its Park and Recreation System? https://www.tpl.org/sites/default/files/cloud.tpl.org/pubs/ccpe_PhilaParkValueReport.pdf.

Appendix A: Recreational Uses at Superfund Sites

A 2020 analysis by EPA's Superfund Redevelopment Initiative identified 157 Superfund sites with recreational reuse or continued use (see Table A-1 below).^{13,14} These sites contain 803 individual instances of recreational on-site uses (see Table A-2 below). The most frequently identified recreational uses were baseball/softball fields (108), trails (89), other recreation (87),¹⁵ municipal parks (69) and soccer fields (68).

Interesting research highlights include:

Trails (89 uses at 72 sites) and **Rail Trails** (6 uses at sites): In addition to the many walking trails and paths at local parks, several sites support regionally important trails. The Little Miami Scenic Trail, the third-longest paved trail in the United States, crosses the Peters Cartridge Factory site in Region 5. The Great Northern Historical Trail, which follows 22 miles of the route of the old Great Northern Railway (later purchased by Burlington Northern) crosses the Burlington Northern (Somers Plant) site. The Platte River Trail, a 28.5-mile multi-use trail along the Platte River in Denver, crosses the Denver Radium site twice.

Boating: Boating uses include infrastructure such as boat launches (11 uses at 10 sites) and marinas (4 sites) as well as boating use of on-site waterbodies (13 sites). At the Diamond Alkali site in Region 2, college, high-school and community rowing clubs practice and compete on the Lower Passaic River. The Gowanus Canal site is frequented by recreational canoers and kayakers and a rowing regatta was staged there in June 2019. The Sikes Disposal Pits site (Region 6) supports a marina frequented by boaters and fishers.

Niche Sports Facilities: In addition to soccer fields (68 fields at 23 sites), basketball courts (40 courts at 19 sites), and baseball and softball fields (108 fields at 30 sites), many sites support other unique sports facilities such as skate parks, equestrian facilities, disc golf courses, rock climbing areas and paragliding facilities. Ruby Hill Park, located on the Denver Radium site, includes Ruby Hill Bike Park, which includes a slopestyle course and dirt jumps. In the winter, the site supports Ruby Hill Rail Yard, the country's first free urban terrain park, which has become a nationwide model for city/ski resort collaborations. This is one of six sites that supports winter sports activities – other sites support skiing, snowmobiling and sledding.

For additional information on sites in recreational reuse, visit www.epa.gov/superfund-redevelopment-initiative/superfund-sites-green-space-reuse.

¹³ The study did not include all the Superfund sites that are in recreational use. The study is intended to be a snapshot in time, the actual number of sites in recreational use, as well as number of reuse instances, change frequently.

¹⁴ "Reuse" means a site has a new type of use following cleanup. "Continued use" means the pre-cleanup land use is continuing after cleanup.

¹⁵ The "other recreation" category includes recreational use types that do not fall within other defined categories (e.g., paragliding, futsal, bocce and exercise stations).

Table A-1. Number of Sites with Recreational Uses, by Region and Type

EPA Region	Sites with Uses by Region										Total	Rank
	1	2	3	4	5	6	7	8	9	10		
Total Sites in Recreational Use¹⁶	22	22	29	20	31	6	5	9	5	8	157	-
Trail	5	12	12	10	14	2	4	6	3	4	72	1
Municipal Park	6	7	8	7	11	2	1	4	2	4	52	2
Other Recreation	9	6	9	5	12	4	1	3	0	3	52	2
Playground	2	9	6	5	8	0	1	3	1	2	37	4
Picnic Area	1	4	8	3	7	4	2	2	1	1	33	5
Baseball/Softball Field	1	7	6	4	8	0	0	3	1	0	30	6
Fishing	2	1	4	4	5	3	1	2	0	1	23	7
Soccer Field	2	4	4	2	8	0	0	1	1	1	23	7
Basketball Court	3	4	3	3	3	0	0	2	1	0	19	9
Other Park	4	6	3	2	1	2	0	0	0	1	19	9
Boating	1	2	1	1	3	3	0	0	0	2	13	11
Other Athletic Field	1	3	2	1	4	0	0	0	1	1	13	11
Golf Course	2	0	4	1	2	0	1	0	1	0	11	13
Recreation or Community Center	0	0	6	2	1	0	0	1	1	0	11	13
Tennis Court	2	2	4	0	3	0	0	0	0	0	11	13
Boat Launch	1	1	1	0	4	2	0	0	0	1	10	16
Football Field	0	2	1	2	4	0	0	1	0	0	10	16
Hunting	2	0	2	2	1	0	2	0	0	0	9	18
Model Aeronautics	1	0	0	3	2	0	0	0	0	0	6	19
Rail Trail	1	1	3	0	0	0	0	1	0	0	6	19
Volleyball Court	1	1	1	0	2	0	0	0	1	0	6	19
Winter Sports	2	0	0	0	1	0	0	3	0	0	6	19
Pool	0	1	2	0	0	0	0	2	0	0	5	23
Undetermined/Unconfirmed Recreational Use	1	0	1	0	2	0	0	1	0	0	5	23
Equestrian	2	1	0	1	0	0	0	0	0	0	4	25
Marina	1	0	0	0	1	2	0	0	0	0	4	25
National/State Park	1	1	1	1	0	0	0	0	0	0	4	25
Pier	0	0	1	0	2	0	0	0	0	1	4	25
Skate Park	0	0	1	0	2	0	0	0	0	1	4	25
Track	0	0	2	1	1	0	0	0	0	0	4	25
Driving Range	0	0	2	1	0	0	0	0	0	0	3	31
Ice Rink	0	0	1	0	2	0	0	0	0	0	3	31
Disc Golf	0	0	0	0	2	0	0	0	0	0	2	33
Other Field	0	1	0	0	0	0	0	1	0	0	2	33
Other Indoor Recreation	0	0	1	0	0	0	0	0	0	0	1	35
Rock Climbing/Bouldering	0	0	1	0	0	0	0	0	0	0	1	35

¹⁶ Some sites report more than one recreational use.

Table A-2. Instances of Recreational Uses, by Region and Type

EPA Region	Instances of Uses by Region										Total	Rank
	1	2	3	4	5	6	7	8	9	10		
Total Recreational Uses	86	116	155	72	207	31	18	65	27	26	803	-
Baseball/Softball Field	3	25	15	11	40	0	0	8	6	0	108	1
Trail	7	13	17	10	17	2	8	8	3	4	89	2
Other Recreation	19	7	11	6	21	8	2	10	0	3	87	3
Municipal Park	6	12	15	7	12	3	1	7	2	4	69	4
Soccer Field	3	5	16	3	26	0	0	2	9	4	68	5
Playground	2	11	7	6	10	0	1	5	1	2	45	6
Basketball Court	6	6	13	4	4	0	0	6	1	0	40	7
Picnic Area	1	5	8	3	8	5	2	5	1	1	39	8
Tennis Court	9	9	6	0	11	0	0	0	0	0	35	9
Fishing	2	1	4	4	6	4	1	2	0	1	25	10
Other Athletic Field	1	3	2	1	15	0	0	0	1	1	24	11
Other Park	4	6	3	2	2	2	0	0	0	1	20	12
Volleyball Court	8	1	1	0	3	0	0	0	1	0	14	13
Boating	1	2	1	1	3	3	0	0	0	2	13	14
Football Field	0	2	1	2	6	0	0	2	0	0	13	14
Recreation or Community Center	0	0	7	2	1	0	0	1	1	0	12	16
Boat Launch	1	1	2	0	4	2	0	0	0	1	11	17
Golf Course	2	0	4	1	2	0	1	0	1	0	11	17
Hunting	2	0	3	2	1	0	2	0	0	0	10	19
Pool	0	3	3	0	0	0	0	2	0	0	8	20
Winter Sports	2	0	0	0	1	0	0	4	0	0	7	21
Model Aeronautics	1	0	0	3	2	0	0	0	0	0	6	22
Rail Trail	1	1	3	0	0	0	0	1	0	0	6	22
Ice Rink	0	0	3	0	2	0	0	0	0	0	5	24
Undetermined/Unconfirmed Recreational Use	1	0	1	0	2	0	0	1	0	0	5	24
Equestrian	2	1	0	1	0	0	0	0	0	0	4	26
Marina	1	0	0	0	1	2	0	0	0	0	4	26
National/State Park	1	1	1	1	0	0	0	0	0	0	4	26
Pier	0	0	1	0	2	0	0	0	0	1	4	26
Skate Park	0	0	1	0	2	0	0	0	0	1	4	26
Track	0	0	2	1	1	0	0	0	0	0	4	26
Driving Range	0	0	2	1	0	0	0	0	0	0	3	32
Disc Golf	0	0	0	0	2	0	0	0	0	0	2	33
Other Field	0	1	0	0	0	0	0	1	0	0	2	33
Other Indoor Recreation	0	0	1	0	0	0	0	0	0	0	1	35
Rock Climbing/Bouldering	0	0	1	0	0	0	0	0	0	0	1	35