



Cultivating Brownfields into Greenspace



This chapter discusses the varieties of greenspaces and their distinctive benefits to communities. It then details essential steps in the planning process: evaluating the needs of the community, assessing the characteristics of the brownfields that will be converted to greenspaces, and determining the cleanup standards based on the future usage of the site. Finally, the cost considerations associated with going from brown to green are explained.

Types of greenspace

Greenspace can be categorized in a few ways: parks, recreational spaces, greenways, and natural open spaces. The valuable functions of greenspace—conservation, recreation, transportation, and education—are performed in ways that are uniquely suited to each of the four greenspace types described in this section. The opportunities for physical exercise, social and community engagement, transportation, and learning are diverse, as communities across the country are discovering.

Parks

Parks are probably the largest greenspace category because so many different areas can be considered parks. A park is a form of developed open space, and it serves a variety of functions. Pocket parks (also known as play lots or mini parks) are often fenced, and they can contain benches, picnic tables, and playground equipment along with trees and other vegetation. Pocket parks are usually centrally located within residential or commercial areas. These relatively small properties can have enormous benefits to their surrounding communities, particularly those with disproportionately small amounts of open space. Parks can also be large spaces, such as a community park that serves multiple neighborhoods. Community parks tend to have multiple functions. For example, they may have recreational areas as well as walking trails within them. School parks are used by schools and the community at large. They blend multiple uses and users at a single site. Finally, parks may feature cultural and historical attractions. There are performing arts parks and parks on sites of historical significance.

Turning a landfill into a park in Colorado



The city of Englewood, Colorado, in partnership with the neighboring town of Sheridan, has capitalized on strong partnerships in order to turn a former landfill into an extension of its Centennial Park on the East bank of the South Platte River. When a trash company expressed interest in purchasing the closed landfill and converting it to a trash transfer facility, the city negotiated to purchase the 9.4-acre site. The city was able to acquire, assess, clean up and develop the site because of the collaboration of many levels of government, nongovernmental, and private sector organizations. Specifically, the city department of parks and recreation partnered with the U.S. Environmental Protection Agency (EPA), which provided funding for a brownfields assessment pilot and a brownfields revolving loan fund. The city also partnered with the Colorado Lottery Great Outdoors Colorado program, the state Brownfields Revolving Loan Fund, the local All Souls Catholic School, and the Colorado Rockies Youth Field of Dreams program.

To date, the site has been acquired, remediated, and redeveloped into a park with the following amenities:

- Baseball, soccer, and softball fields
- Trail connections to the Mary Carter Greenway
- Kayak chutes
- Fishing access
- Picnic pavillion

The expanded Centennial Park was dedicated with much fanfare in October 2001, and it was open to the public in the Spring of 2002.

Recreational space

Recreational space is often contained within larger parks, but it may also be self-contained in sports complexes which are likely to include athletic fields and associated buildings. Recreational areas are developed for the benefit of surrounding communities. The number of users served is determined by the size of the population near the facility, the size of recreational area, its location

relative to other, nearby recreational areas, and parking availability. In some cases, sports complexes may be very large, serving multiple communities. In addition to making recreational amenities accessible for public use, such areas provide opportunities for physical activity and social interaction.

Examples of recreational areas include baseball diamonds, tennis courts, basketball courts,

Promoting ecotourism in Northampton County, Virginia



Officials in rural Northampton County, Virginia, wanted to promote economic growth while preserving the pristine environment found in this unique Chesapeake Bay ecosystem. Therefore, they based their brownfields redevelopment strategies on principles of sustainability. Northampton County is a stopover site for migratory birds on their seasonal journey along the Atlantic Flyway. Capitalizing on this natural phenomenon, the county has made great strides in creating an ecotourism industry. The forested habitats of Northampton County support between six and seven million birds during a single fall migration, rivaling Cape May, New Jersey, a better known birding destination. Northampton County has established the annual Eastern Shore Birding Festival, which attracts birders from all over the country. As part of their brownfields redevelopment efforts, Northampton County decided to convert a landfill that is closing into a birdwatching destination. Because of its high elevation and clear views in 360 degrees, once the landfill is capped, trails will be built on top to facilitate bird watching. Trails will also be created through a mixed-maritime forest near the base of the landfill to provide other opportunities for interacting with nature.

Adopting a youthful perspective on recreation in rural Pennsylvania



In the Appalachian community of Vintondale, Pennsylvania, there is plenty of open space but no formal recreational areas. At its peak, this once thriving coal-mining community supported thousands of miners and their families. Once the mines were closed and abandoned, however, environmental contamination at the site and health problems remained, along with a depressed economy. The 35-acre Vintondale site sits on top of an abandoned mine that spews acid mine drainage at a rate of 80 to 200 gallons per minute. Redevelopment plans call not only for treatment of the acid mine drainage, but also for the creation of wetlands and an active recreation area.

Representatives of all walks of community life were actively involved in the development of reuse plans for the site. For example, the youth were asked what they would like to see in the recreation area, and the consensus was a BMX bike area, which was incorporated as well as soccer and baseball fields, horseshoe pits, volleyball courts, playgrounds, and picnic areas.

and soccer fields. Recreational areas can also include revenue-generating spaces, such as golf courses and marinas, and their associated facilities such as parking lots and concession areas. Golf courses and marinas as revenue generating or at least self-funding areas, are not as accessible to all members of a community as no-fee recreational sites, but they can help to pay for their own creation and upkeep.

Greenways

Greenways are corridors of open space managed for conservation, recreation, and transportation purposes. They connect destinations and provide natural settings to be enjoyed by users.

Commuters on foot and bicycle use greenways as an alternative to car travel. In addition, bicyclists, walkers, joggers, and hikers rely on greenways for exercise and recreation.

In general, greenways are long and narrow and often link nature preserves, parks, historic sites, and populated centers. They normally follow natural or man-made features such as streams or mountain ridges, or abandoned rail lines. Examples of greenways include walking or bicycling trails, corridors used by wildlife for migrating between habitats, and riparian buffer zones along rivers and streams, which both protect waterways and provide continuous vegetated corridors for wildlife.

Natural open space

Natural open space can be used for preservation, conservation, and restoration (of endangered

species and their habitat, water resources, or cultural and historical resources), recreation (such as hiking and bird watching), and outdoor education. Examples of natural open space include forests, wetlands, riparian zones along streams, and prairies. More than other types of greenspace, these natural resources provide many of

Teeing off in Houston



The reuse of former landfills as golf courses is a booming business. Golf courses can be designed so as not to disturb buried wastes, and landfills can be graded with gentle slopes. For these reasons, landfills have become very attractive sites for golf courses. Approximately seventy landfills in the United States have been reused as golf courses over the past forty years.

In Houston, Texas, a former municipal landfill was converted into two eighteen-hole golf courses. The 450-acre landfill, owned by Browning Ferris Industries (BFI), ceased operations in 1979 and sat idle until 1997, at which time BFI entered into an agreement with EnCap Golf LLC to lease, assess, and redevelop the site. EnCap assessed the property and found methane gas. In response to this finding, BFI installed a landfill gas extraction system. EnCap built the golf courses, a clubhouse, a practice and training facility, a putting green, and maintenance facilities.

This golf course will be self-sustaining and is expected to generate revenues for the golf course operators.

For additional information see www.brownfieldgolf.com.

Transforming River Greenways in South Carolina



Rural Ware Shoals, South Carolina, once was home to a thriving textile mill used during World War II to manufacture military uniforms. With the downfall of the mill in the postwar years, Ware Shoals was left with a gaping hole in its town center. As part of a comprehensive effort to revitalize the downtown, the local government is redeveloping thirteen acres of former mill property into a greenway that will link the town center with the Saluda River. The steep slope of the planned greenspace will serve as a natural open space and trail head for a walking and biking trail to be established along the river bank. This greenway will be the centerpiece of an eight-mile trail network.

Habitat and species preservation



The protection of endangered flora and fauna under the Endangered Species Act (ESA) has traditionally focused on the individual species at risk. However, there is a growing trend toward species protection using a multi-species and habitat-based planning approach. Habitat conservation plans (HCPs) are legal agreements that promote species protection under the ESA based on the premise that if the habitat of the species is protected, the ability of the population to survive is greatly increased. HCPs are the primary mechanism for protecting habitat of endangered species on privately owned (nonfederal) lands. They offset development or other land-use modifications that could further endanger the survival and recovery of the species. If private landowners wish to take any action on property that serves as habitat to threatened or endangered species, they must apply for an incidental take permit from the U.S. Fish and Wildlife Service. In order to receive such a permit, the property owner must complete a habitat conservation plan that illustrates that the recovery and survival of the species would not be appreciably reduced under the plan. Increasingly, HCPs are used to address large geographic areas and the habitats of multiple species.

Redeveloped brownfields can be habitat for threatened or endangered species. For example, wildlife corridors between “islands” of natural habitat are especially important for mammalian inhabitants of urban or suburban areas where deaths from vehicular traffic threaten species survival. In addition, such corridors can effectively link individuals or populations of species, increasing their ability to socialize, feed, and propagate, thus strengthening populations. Former brownfields can be developed into greenways for wildlife corridors. Ecologically enhanced brownfields can supplement existing habitat or replace modified or destroyed habitat. A future possibility is habitat banking. Like wetland banking, it would allow ecological areas to be “banked” to replace those destroyed or modified by development. Redeveloped brownfields might serve as the banked properties.

The survival of species depends on viable habitats. Therefore, the scientific information on which HCPs are based must be reliable. Before brownfields or any other properties are converted to use as habitat for threatened or endangered species, optimal conditions for the species' recovery and long-term survival must be well understood. The site must then be altered to fit these stringent ecological requirements.

Challenges to habitat creation

Some environmentalists question the practice of creating ecological areas to serve as habitats for threatened and endangered species. They are concerned with the viability of newly created habitats replacing known habitats, and with the underlying assumptions of many HCPs that may not withstand scientific scrutiny. One challenge to habitat creation is faced by local governments responsible for enforcing many ESA requirements. Local governments may lack both the expertise and the resources to adequately safeguard habitats of endangered species. Other challenges include a perception that creating ecological enhancements requires greater effort and expertise than are available at the local level, and that the high costs of creating and maintaining habitats may exceed revenues anticipated from development projects.

Additional scientific research is required before the practice of creating habitats for endangered species is accepted by all stakeholders. Training would be a useful step toward helping local government officials apply ESA requirements in a flexible yet effective manner.

the environmental services critical to healthy ecosystems. Riparian zones along waterways help to control flooding, wetlands filter pollutants out of waterways and provide habitat for migratory birds, and wooded areas absorb heat and pollutants from the atmosphere.

Brownfields themselves are not necessarily conducive to supporting healthy ecosystems. Once restored as greenspace properties, former brownfields can support healthy ecosystems.

The planning process

Successful brownfields programs all have one thing in common: the active participation of stakeholders in every stage of the planning process. They develop the vision for site reuse, prioritize resources, and even contribute to long-term maintenance of redeveloped sites. Local government officials, federal and state government agencies, community groups, developers, lenders, and others in the private sector take ownership of the project and have a vested interest in seeing it to completion.

There is not a one-size-fits-all approach for stakeholder involvement in the brownfields-to-greenspace planning process. Creating greenspace with the highest and best use calls for a flexible and site-specific approach that coordinates diverse stakeholders with wide-ranging interests. Regardless of the site, however, planning will involve the following steps:

- Assessing community needs
- Identifying characteristics of the site available for redevelopment
- Understanding the contamination levels and cleanup standards for the site based on future usage
- Prioritizing limited resources

Assessing community needs

As in any redevelopment project, an assessment of long-term community needs should serve as the basis for framing the discussion. There is no cut-and-dry equation to determine the per capita greenspace requirements of a community. The National Recreation and Park Association sug-

gests using a site-specific approach to enable local governments and communities to establish their own guidelines for greenspace based on community needs, available facilities, and available land.¹

Stakeholders should take into consideration what greenspace amenities would most benefit the particular community as a whole. The type of greenspace chosen will be influenced by the community's socioeconomic and geographic characteristics. As a report by the Center for Public Environmental Oversight states, "urban trails-built along old railroad tracks, creeks, and utility rights-of-way-provide more opportunities for families from poor neighborhoods to exercise or enjoy the outdoors than large, pristine, remote parks. Soccer fields and tot lots are treasured in dense urban areas."²

One way of assessing community needs is through observation. Perhaps a brownfield property is already being used as an ad-hoc children's playground or a neighborhood community garden, demonstrating the need for such uses. Other tools for determining the needs of the community would include surveys of local residents. Surveys could be conducted in any number of ways. For example, volunteers could walk from home to home and ask a series of questions, local officials could attend neighborhood association meetings and query residents, or questionnaires could be sent by mail for residents to complete and return.

Rural communities are likely to have abundant open space but may face a dearth of designated recreation areas such as bike paths or baseball diamonds. Likewise, residents of a highly urbanized community may have access to a public garden, but may not have easy access to playgrounds or athletic fields.

In a blighted urban area with inadequate greenspace, small pocket parks can be a tremendous asset to a community. For example, in San

¹ J. Mertes, and J. Hall, *Park, Recreation, Open Space and Greenway Guidelines*, National Recreation and Park Association and the American Academy for Park and Recreation Administration, 1996.

² Center for Public Environmental Oversight and the Pacific Studies Center, *Citizens' Report on Brownfields*, vol. 1, no. 3, October 1999, p.4.



Tremont Community Garden,
South Bronx, New York,
Winter 2002.

Francisco's Mission District, the Parque Niños Unidos! (Park of United Children), before cleanup and redevelopment was a heavily contaminated lot. However, it was the only property in the neighborhood with space for children to play. Following ten years of community organizing lead by the organization, "People Organizing to Demand Environmental and Economic Rights," (PODER), the city cleaned up the property and turned it into a pocket park. This park

has had great effects on the community, both direct and indirect. First and foremost, it established a safe, centrally located place for both children and adults to congregate. In addition, the process of working toward the creation of the park united residents behind a common goal and empowered them to pursue their vision.

Another example of a small greenspace with a big impact on the community is the Tremont Community Garden in New York's South Bronx neighborhood. This low-income and minority community relies on its garden as a center of day-to-day communal life as well as neighborhood celebrations, such as children's birthday parties and summer cook-outs. For local elementary school and day care center students, it is a safe and educational destination, as well as a relaxing refuge for residents after work and on weekends. This garden for all ages is the glue that unites the community. Prior to becoming a community garden, this half city-block property was a dilapidated apartment building owned by the New York City Housing Preservation Department. In 1981, the senior citizens of the neighborhood, with help from an organization called Bronx 2000, cleared the site and established the community garden. They faced many physical challenges maintaining the garden, however, the broader Tremont community took over management of the garden in 1999, after the Trust for Public Land (TPL) rescued the property from the

Creating lasting impacts



In addition to purchasing the Tremont Community Garden in the South Bronx and making significant infrastructure improvements, the Trust for Public Land has trained community gardeners at the site (and at many other gardens in Manhattan, the Bronx, Brooklyn, and Queens) on the basics of community garden management and governance of land trusts. The training spans many topics such as, community organizing, leadership, conflict resolution, creation of bylaws, membership development, ensuring public access to the gardens, organizational development, and building ties to other community institutions. Besides improving the management of community gardens, these education and outreach efforts by TPL provide important ancillary benefits to gardeners in their professions outside the garden gates.

auction block. New York City was about to auction off hundreds of gardens on city-owned properties when TPL and the New York Restoration Project negotiated with the city to purchase 114 gardens. Since that time, with extensive financial and technical assistance from the Trust for Public Land, as well as technical support from a local nonprofit organization called Project Green Thumb, local residents have been able to expand the Tremont Community Garden into an adjoining lot, install an irrigation system, and erect a wrought iron fence around the perimeter of the property.

Assessing the characteristics of available space

Stakeholders planning brownfields-to-greenspace must assess characteristics of available sites as well as the needs of the community. Unlike previously unused properties, the nature of brownfields may limit their future use due to the size, shape, or contamination on site. The size, topography, natural features, and habitat potential of a site can determine the most appropriate greenspace use. For example, a narrow linear path along a canal would not be suitable for development as a baseball diamond or golf course, but it might be appropriate for a walking or bicycle trail. If the linear spaces stretches for many miles, a bike trail might be suitable, whereas an urban pedestrian trail fits easily into shorter distances. Similarly, sites hospitable to wildlife, or even to threatened or endangered species, may be best used as restored wildlife habitat.

Environmental cleanup

States set cleanup standards for brownfields based on the future use of the land. Converting brownfields, in most cases formerly industrial properties, into greenspaces with recreational uses generally means cleaning up to more stringent standards than if the site were to be used again for industrial purposes. In other words, the remediation could be more extensive and costly than returning the site to its original industrial use. However, different types of greenspace may have different cleanup requirements depending upon how the site will be used. For example, a

How clean is clean?



The goal of remediation is to make an area safe for its intended usage, but remediation itself can be a destructive activity. Removal of contaminated soils and replacement with clean fill not only removes contaminants, but it also removes the biomass contained in the soils and destroys the soil structure. Soil vapor extraction can “clean” all of the biological life out of the soil, leaving it unable to support biota. For planned land uses dependent upon healthy ecosystems, biological treatment may be a better cleanup option. Biological treatments such as phytoremediation (the use of plants to extract contaminants from soils) or in-situ bioremediation (the saturation of contaminated soils with nutrients that degrade contaminants) are less destructive of natural systems but also take longer to complete and are more difficult to control than traditional engineered remedies. Of course, the necessary cleanup efforts will depend on the site-specific situation.

small community playground that would be used by children would have to meet stringent standards for human health risks. A vast open area, for example, could be designed in a way that maximizes public usage of the clean areas and minimizes exposure to contaminated areas. The contaminated area could be capped and paved for use as a parking area, while clean areas could be used for trails, restored natural spaces, or playgrounds.

Voluntary cleanup programs (VCPs) create incentives for parties to clean up sites on their own, and enable states to avoid enforcement actions in some cases. While VCPs differ from state to state, they share some common features. For example, signed agreements between the state and the party conducting the cleanup often limit the liability of prospective purchasers and developers. Many states use risk-based cleanup standards that tailor the specific requirements to the human health and environmental risks posed by the site and to the future property use. VCPs may allow some contamination to remain on site as long as users are not exposed to unsafe levels.

Costs of going from brown to green

Brownfields cleanup and greenspace redevelopment require resources at six stages:

- Assessment—the evaluation of the site for contamination
- Planning—the process by which stakeholders provide input and make decisions about the site's future use
- Remediation—site cleanup to enable future land uses to be developed while ensuring that any remaining contamination does not pose unacceptable risks to human health and the environment
- Site assembly—the piecing together of different land parcels to create a contiguous site for redevelopment
- Construction or development—the creation of the greenspace including site preparation (for example, grading the site, riverbank stabilization) and installation of materials (such as, native plants and fencing)
- Maintenance—ongoing upkeep of the site to ensure its long-term viability.

Because greenspace development generally does not create significant jobs or generate tax revenues from the get-go, collaboration and partnerships are particularly important at each of these stages. Leveraging both in-kind and cash resources from stakeholders can greatly alleviate the financial costs for the local government and foster a greater sense of community collaboration and accomplishment.

Funding for greenspace development comes from public (federal, state, and local governments) and private sources as discussed in Chapter 3. Of course, some greenspaces such as fee-based botanical gardens, recreational areas such as golf courses and marinas, and park settings that host sporting or cultural events are revenue generating. Fee-based developments may be more politically popular because they are self-sustaining, but they do not necessarily improve the quality of life of all residents equally, regardless of their socio-economic status. Some may not be able to benefit directly from the facility.

However, the community at-large does benefit indirectly from fee-based greenspaces in many important ways. They can provide environmental services, scenic vistas, and habitat for wildlife.

The need for greenspace maintenance must be recognized upfront (that is, before stakeholders move forward with a greenspace project). First, poorly maintained greenspaces can lure undesirable activities such as loitering and littering. Second, in a fiscal crisis, funding for maintenance is likely to be among the first items cut from a city budget. Therefore, funding for maintenance should be secured early on. Funding mechanisms for ensuring the long-term maintenance of greenspaces include public-private partnerships and land trusts. Finally, once public perception about an area becomes negative, the poor opinion is extremely difficult to change. Therefore, maintaining a park is as important as developing it in the first place.

Maintenance costs will be affected by any land use controls put in place to protect human health and environment from exposure to risks. Unless a site has unrestricted use (that is, unless it is cleaned up to such an extent that a small child could safely live on the site for many years without any negative long-term health consequences), controls are necessary. Demands for land change over time. A property that was not economically viable for residential development one day might be desirable the next, but the contamination levels on site might be safe only for industrial uses. Land use controls help to ensure that the uses of the land remain consistent with the residual contamination levels on site and can protect the public from incompatible land uses.

Land use controls include both engineering and institutional controls. Examples of the former are engineered caps or fences that restrict the public from coming into contact with contamination. Institutional controls include zoning and zoning overlays, siting restrictions, easements, and restrictive covenants. Local governments are often responsible for ensuring that land use controls remain in effect long after the site has been redeveloped. Therefore, monitoring, maintenance, enforcement, and tracking of land use controls should be included in the maintenance

Costs associated with different greenspaces

- *Pocket Parks*—Cost is the major obstacle to the creation of pocket parks or other small greenspaces. Compared with large, regional parks, these small, neighborhood-centered parks have high development and maintenance costs per number of users. Local governments' budgets for parks and recreation are usually limited and some jurisdictions have found that small pocket parks are less economical or provide less “bang for the buck” than regional parks or recreation areas because they do not take advantage of economies of scale the way these larger parks do. Pocket parks, however, are very popular among residents and studies have shown that they increase the values of surrounding properties.
- *Recreational Areas*—Site development for recreational areas can be a significant undertaking, depending on the specific recreational use. For example, constructing soccer fields or baseball diamonds would require grading, planting grass, installing turf, or removing vegetation (for baseball diamonds), fencing, and possibly adding parking facilities and lighting. Maintenance costs would include grass or turf care on a frequent basis.
- *Natural Open Space*—Site development costs for natural open space also depend on the specific requirements for the site. These costs may include landscape planning, planting of vegetation, and engineering to support stream banks or reinforce steep cliffs. Maintenance costs may include tree trimming and removal of dead trees, planting of native species, and removal of invasive species.
- *Greenways*—Site development costs for greenways may include grading and paving, signage, and lighting. Hiking or walking trails could require smaller initial investments, particularly if pavement is not required. Maintenance costs may include repaving and signage and lighting repair.

plans for the site, and funding for such activities should be identified and allocated prior to site redevelopment.

Mixed used developments that include greenspace as well as residential and in some cases, commercial properties, also influence project costs. Such mixed uses have led to successful public-private partnerships for greenspace development. They can be financed by the private developer as a way to increase the marketability and value of the development or to provide a guarantee of public benefits in exchange for private income-generating activities. In such scenarios the site maintenance may be funded by the private developer or by fees paid by future tenants or property owners.

Conclusions

Communities throughout the country have successfully turned brownfields into community assets. The variety of greenspaces that can be created (parks, recreation areas, greenways, and natural open spaces) offers communities flexibility in brownfields cleanup and redevelopment. To be successful, redevelopment requires the active engagement of diverse stakeholders at each stage in the process. They must understand community needs and the characteristics of the site, know the cleanup required for use as greenspace, prioritize resources, and demonstrate a commitment to long-term maintenance and land use controls.

