WILDLIFE HABITAT COUNCIL®

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March 5, 2018

Ms Cristiana Paşca Palmer,
Executive Secretary,
Secretariat of the Convention on Biological Diversity,
United Nations Environment Program

Dear Ms Cristiana Paşca Palmer,

It is my pleasure to submit relevant information to the Convention on Biological Diversity to inform the topic "Mainstreaming Biodiversity within and across sectors and other strategic actions to enhance implementation," planned as agenda item 5 for the second meeting of the Subsidiary Body on Implementation to be held this year in Toronto.

The submission has two parts. The first part is a summary of lessons learned as part of a three-decade engagement at the intersection of business and biodiversity. The second part contains several case studies from five white papers outlining the successful implementation of biodiversity programs in the industry sectors under consideration at the 14th Conference of the Parties (COP14.)

The Wildlife Habitat Council's unique perspective on corporate engagement with conservation has been formed following 30 years' experience across industry sectors advancing a model that marries voluntary conservation efforts with a standard for recognition called Conservation Certification that currently recognizes over 600 conservation programs worldwide in industry sectors including energy and mining, infrastructure, manufacturing and, processing.

While WHC's model is unique, it is also accessible and replicable and can be easily deployed to bridge the gap between planning and implementation which is one of the greatest challenges to biodiversity health.

If you have any questions about our work, our experiences or the company's that are engaged with us, please do not hesitate to contact me. I am happy to expand on our experiences in any appropriate forum.

With best wishes,

Margaret O'Gorman

Margaret O'Gorman
President

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Submission to Ref.: SCBD/MCO/AF/ML/GD/86933 dated 25 January 2018
Mainstreaming of biodiversity and other strategic actions to enhance implementation

Submitted by: Margaret O'Gorman, President, Wildlife Habitat Council, mogorman@wildlifehc.org

Submission date: 05 March 2018

Title: **Mainstreaming of Biodiversity Into the Sectors: Case Studies and Practical Examples**

Contents:

1. Wildlife Habitat Council – 30 Years Working with Industry

The Wildlife Habitat Council (WHC) has worked at the intersection of business and biodiversity for 30 years. In that time, it has developed a method of mainstreaming biodiversity into industry that does not rely on industry- or nation-specific tools, policies and practices. Instead, it creates a framework focused on the specific corporation that recognizes the needs of: corporate leadership to report positive outcomes; operations managers to support non-essential activities; and employees and community members to engage in meaningful ways that meet both ecological and social goals.

This framework requires a company to define a business need for biodiversity management. It also encourages a company to develop a strategic corporate conservation plan that outlines biodiversity objectives, assigns resources to biodiversity implementation, and develops KPIs for biodiversity reporting focused on action. By aligning conservation efforts with a business need, biodiversity evolves from an arm's-length philanthropic activity to an integrated, scalable company-wide program.

WHC works across industry sectors and international boundaries applying the same approach and framework regardless of local governance, operations type or ecoregion. With this approach, it has recognized over 600 programs in 19 countries from 100 global and national corporations with WHC Conservation Certification, the only voluntary sustainability standard designed for broad-based biodiversity enhancement activities. While Conservation Certification is a site-specific standard, its strength lies in its value as a consolidated metric for corporate reporting.

The design of Conservation Certification as a consolidated metric increases its use as a mainstreaming tool by providing flexibility to all land uses and all industry sectors. For example: a company with a value chain that stretches from large extraction facilities through mid-sized production and smaller distribution venues can use the standard at all facilities. In doing so, this changes the corporate perception of biodiversity management from being the exclusive purview of upstream extractive operations to instead being applicable to all locations. While the biodiversity impact at the larger landscape scale may be greater, the participation of all parts of the value chain leads to mainstreaming which results in institutional engagement over one-off, unique projects.

2. Business Drivers

WHC has identified 16 drivers for business to engage in mainstreaming biodiversity. These drivers are beyond compliance and can be organized mostly within a Corporate Social Responsibility (CSR) paradigm and associated business expectations recently emerged from 21st century concerns for human health and the environment.

The primary drivers of biodiversity within a CSR paradigm are social license to operate and, its close relative, government relations. Social license to operate can be secured through community relations. This may include education activities that meet corporate priorities for workforce development to hire and sustain engaged employees, especially through increasingly frequent post-merger and acquisition integration. These approaches can then provide a positive key performance indicator (KPI) for reporting and disclosures activities that may be leveraged to address activist shareholders and the needs of socially responsible investment funds.

In addition, and as an outcome of increased expectations of business in the 21st century, biodiversity is increasingly being incorporated into risk management which has evolved beyond traditional economic risks to a focus on non-traditional environment, social and governance risk that now promote enhanced approaches to biodiversity in both new and ongoing operations. The result is better reclamation and remediation outcomes that incorporate nature-based solutions and result in significant cost savings.

The starting point to mainstream biodiversity into industry is the business driver and clarity around the value of biodiversity within a business context. Fostering understanding by corporate leaders that biodiversity management efforts meet business challenges and opportunities is an effective and proven way to advance biodiversity actions and goals. When biodiversity management is seen to contribute to a solution it is viewed in a more favorable manner and resources are allocated to it. Once biodiversity management becomes part of a corporate KPI, mainstreaming has occurred, leading to subsequent improvements and significant expansion of efforts.

3. A Framework Versus A Tool

Once the business driver and the value of biodiversity has been recognized, a framework for action and mainstreaming can be built. By building a simple framework to mainstream biodiversity, corporations can then deploy the variety of tools available like valuation systems, spatial planning approaches, strategic environmental assessments, offset strategies and the mitigation hierarchy. A framework must also be the starting point for direct action and implementation. In addition, implementation within this business value framework can be used to report on objectives and impacts in line with the variety of

existing global, regional and local goals including the global Strategic Development Goals (SDGs), national biodiversity targets or regional and other ecological targets.

In short, the business driver approach recognizes the corporation as the organizing unit for action and allows external tools, policies and measures to be embraced and implemented appropriate to the specific context.

CEMEX, a global leader in the building materials industry, embraced the framework approach by working with partners towards different ecological impacts. CEMEX partnered with Bird Life International to develop a Biodiversity Action Plan Guidance which is being advanced at pilot sites in areas of high biodiversity value in five countries. It then partnered with WHC at locations not considered to be of high biodiversity value. At these locations, CEMEX overlaid a biodiversity theme to its education and outreach efforts and integrated its biodiversity management with its award-winning community outreach efforts. To date 24 CEMEX facilities are implementing conservation actions and associated education programs across the Americas. By creating a biodiversity framework and linking it to business value, CEMEX has mainstreamed biodiversity in an inclusive and sustainable manner.

Freeport McMoRan created a framework for mainstreaming biodiversity by adopting a corporate by enabling action on its corporate commitment to the environment that is expressed in different ways at different locations. The basis for the commitment is to be compliant with all required rules and regulations but to go beyond compliance where practicable to enhance the quality to the environment where the company operates. The company's policy commits Freeport McMoran to contributing to the conservation of biodiversity and is aligned to International Council on Mining and Minerals 10 Principles. This integration has seen biodiversity action in restoration, reclamation and remediation projects as well as in corporate citizenship community outreach and education efforts. By creating the framework, Freeport McMoRan allows action to cascade from corporate commitment to community impact.

4. The Commonalities

Across all industry sectors, a set of commonalities make the approach possible and replicable. Most every company regardless of industry sector consists of leaders, employees and stakeholders and follow a similar path of planning, design, execution and measurement on processes both large and small. All companies operate in a community, impact the land and use the resources, and each has a business reason to engage in biodiversity management. These commonalties depress the importance of state actors and make voluntary conservation action possible regardless of local governance.

General Motors (GM), the global automotive manufacturer, embraced these commonalities to mainstream biodiversity across its operations. GM following an industrial benchmarking exercise and stakeholder input developed a global sustainability goal to engage all of its manufacturing facilities in biodiversity programs by 2020 and is currently on track to meet this goal. The goal intersects with GM's employee engagement and community outreach goals and feeds into its reporting on the SDGs.

By embracing the commonalities, GM successfully rolled out a global program of biodiversity management that has to date engaged 71 facilities in 14 countries under one biodiversity metric. While using the framework approach, GM allowed different operations to adopt appropriate tools and approaches that would be locally relevant and increase odds of success and contribute to a global effort. So successful is GM's approach that when GM divested itself of its Opel/Vauxhall brand, the new

company continued to embrace its GM-inspired biodiversity efforts despite the loss of GM resources to support them.

In U.S. state of Michigan, **DTE Energy**, a regional utility company with generation, distribution and office locations in the city of Detroit, embraced the commonalities of place to engage different parts of the operations in biodiversity management efforts. In underserved urban neighborhoods of Detroit, greening efforts around office locations help improve community aesthetics but also storm-water management. At power plants in industrial neighborhoods, biodiversity programs enhance the environment for the community and create ecological connectivity. By enabling such projects at office locations, power plants, service centers and compressor stations, DTE mainstreams biodiversity into its operations, and in recent years, pushed its supply chain to make the same effort. The business value of DTE Energy's biodiversity management is integrated into the DTE mission to be a key element in Michigan's economic and environmental future.

5. Existing Challenges and Opportunities

The main challenge to mainstreaming biodiversity in industry sectors is the continued promotion of tools over frameworks. When specific tools are being promoted as the only solution to address corporate biodiversity needs, the tool will be adopted - but its adoption will not drive mainstreaming as other operations will be excluded from the tool's implementation. It is only by understanding the needs of the specific organization will biodiversity be mainstreamed. Showing a company how it can leverage its biodiversity work to meet a business challenge and allowing it to build a supporting framework within which appropriate tools are deployed will create the circumstances for success.

The promotion of tools over frameworks is frequently driven by competition between civic society groups seeking to secure contracts of work with the corporate sector without acknowledgement that the tool is not comprehensive and will not meet the needs of the entire company. Articulation of the limitations of tools and processes is critical for success in mainstreaming biodiversity. Recognition of the value of a *suite* of tools and approaches within a single business-focused framework remains an opportunity not yet fully realized.

Other challenges remain as follows:

- **The tyranny of metrics and the complexification of conservation** – The tools and practices being advanced by large international nongovernmental organizations (NGOs) and government development agencies remain beyond the reach of corporations that are not included on annual lists of top 500 companies by revenue. The tools require resource investments not available to all companies, and prescriptions for implementation tend to be academic in tone and not reflective of the operating environment. In addition, the fixation on complex metrics and the collection of data to support such metrics can be a significant barrier to entry.

- **The competing priorities of national and state government entities** – WHC has long recognized what it has termed "the unintended consequences of good behavior" which sometimes result when business improves its land stewardship with conservation-focused activities that are permitted and promoted by the government agency which governs natural resources management, and are then viewed in a less favorable light by agencies focused on

regulatory compliance. Since compliance generally trumps non-essential operations, efforts at conservation stewardship can easily be discouraged.

Opportunities exist to address these challenges especially with the current focus on mainstreaming in the industry sectors under consideration. At the national level, efforts must be undertaken to impress on government agencies the need to amplify NBSAPs outside of natural resources agencies and impel regulatory agencies to support the objectives of NBSAPs and understand the implications of their own regulations on biodiversity management. In many regulatory frameworks, the economic impacts of new regulations are expressed when regulations are developed, the environmental impacts should also be expressed in relation to NBSAPs.

Within the NGO community of practice, the need for pragmatic partnerships focused on the reality of operations beyond the C-suite is critical. High level "exclusive" partnerships that, while attractive to C-suite leadership, effectively tie the hands of local operations, limit biodiversity outcomes and create distrust of such initiatives. For real mainstreaming to happen implementation must be valued as much as conceptual tools and innovative technology. A matrix of opportunities and decision guidelines for companies could greatly aid corporate decision-making that would then enhance the odds of success and on-the-ground change. Such an approach would allow companies to make the right choices when entering into partnership efforts with NGOs.

To successfully mainstream biodiversity into operations, CBD and its NGO partners must pivot and view industry and its business needs as opportunities for biodiversity mainstreaming and not obstacles. By truly understanding the operational and governance needs of business, CBD can drive change at the national level. By likewise understanding the operational needs of business and corporate commonalities and acknowledging that no single tool represents a sole solution, NGO partners can open avenues for interactions with corporations that result in systematic, replicable change on the ground.

Attachments

A series of white papers authored by WHC which present case studies on successful approaches to biodiversity within a business framework. The case studies, while showcasing site-specific activities reflect the variety of ways in which biodiversity is mainstreamed in industry as each case study represents one instance of an overall corporate approach to conservation.

Reimagining the Corporate Campus

Creating Impactful Outcomes that Benefit Biodiversity and Communities

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Employees take part in an Earth Day planting of a pollinator garden at BASF's North American headquarters in Florham Park, NJ.

Message from our sponsor

At BASF, we believe stewardship and sustainability practices play a key role in protecting natural habitats and fostering biodiversity. Being environmentally and socially responsible goes hand in hand with running a profitable business and is important to our employees, customers and community partners.

For more than 14 years, BASF partnered with the Wildlife Habitat Council (WHC) on various projects at the company's sites across North America. We reestablished the natural habitats on an island in the Detroit River by building sustainable landfills and turning them into teaching environments as part of the WHC certification program. Seven of our U.S. sites currently hold WHC certification and eight more are currently in the process of applying. All of these sites embody our commitment to protecting and enhancing natural habitats and biodiversity. Our employees are committed to these priorities, and play an integral role in the achievement of our goals through active volunteerism and engagement.

Most recently, BASF employees at our North American Headquarters in Florham Park, New Jersey, engaged in projects to help us achieve WHC certification for the site. Located approximately 20 miles west of New York City, the corporate campus is designed so that nearly half of its 20 acres is undeveloped to benefit wildlife. During Earth Day 2016, employees in Florham Park worked alongside members of the community to design and plant pollinator gardens and a community vegetable garden. This portion of our corporate campus was transformed into an environment that not only provides educational opportunities for employees and the community, but also serves as valuable habitat for pollinators.

Through continued partnerships with WHC, BASF transforms its commitment to wildlife stewardship and habitat enhancement into sustainable programs. Through one such partnership, the Initiative for Natural Corridors, BASF is establishing locally relevant conservation projects at numerous BASF locations that contribute to landscape-scale priorities including watershed health and bird corridors.

In this white paper, you will find examples of partnerships between businesses and WHC to develop sustainable corporate campuses across the U.S. These demonstrate how organizations, no matter how big or small, can exist synchronously and sustainably with nature, a goal to which we can and should all aspire.

Sincerely,
Derek Fairclough
BASF Corporation, Senior Vice President, Environmental, Health and Safety

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Introduction

From a natural resources conservation point of view, some of the most intriguing and frustrating uses of land along the urban-rural transect lie within the suburbs. Residential subdivisions result in a landscape fragmented by roads, fences and sidewalks, while car-centric commercial development can impair water quality and increase heat islands[1] due to large parking lots and service roads. Throughout the suburban landscape, the illusion of nature is maintained with meticulously managed plantings, isolated tree islands, and the green rolling lawns of municipal parks, golf courses, business parks and other campus-like developments.

As the concept of ecosystem services and the benefits nature can bring become better known and accepted, land use planners, developers and even homeowners are taking action to address the fragmented landscape and the absence of green infrastructure by seeking to bridge the gap between the perception of nature and the reality of a functioning ecosystem.

The corporate campus is not isolated from this shift. Land managers, landscape architects and others know that the corporate campus has the potential to contribute to the reconnection of suburban lands and increase the functionality of ecosystems. Existing, traditional corporate campuses contain large tracts of lands that can be planted for biodiversity, existing ponds that can become wetlands, trees that can be better managed for habitat, and an employee base eager to engage in meaningful conservation. New corporate campuses are incorporating nature in their designs from the beginning, understanding not only the cost savings of native landscaping, but also the human benefits of a more natural setting.

Wildlife Habitat Council has been working with businesses across a variety of industries for over 25 years, facilitating and recognizing implementation of high-quality conservation projects on corporate lands. WHC understands the challenges and opportunities for implementing successful conservation projects on lands like corporate campuses, whose primary purpose is not habitat, and recognizes the leadership role business can play in enhancing corporate campus facilities.

This white paper contains case studies of corporate conservation programs that are implemented on a corporate campus setting. These examples are intended to provide inspiration and guidance for companies interested in managing a corporate campus with biodiversity in mind.

What does a corporate campus look like?

The corporate campus is an approach to workspace design that mimics traditional university campuses by setting buildings into lawns with formally-planted gardens on lands edged with pockets of large trees. The corporate campus gained popularity during the post-war suburbanization in the United States and has been adopted around the world, a highly-visible result of globalization.

Louise Monzigo, a professor at the University of California, Berkeley coined the term *pastoral capitalism* to explain how this workplace design resulted from the combined influences of a corporate management structure whereby senior managers directed dispersed operations from a central location; the decentralization of American cities due to political and economic factors; and the dominance of a pastoral aesthetic seen in suburban homes across the nation.

Different types of office developments can be called a corporate campus, each one differing in design, ownership and intent, but unified by a land use plan that clusters buildings, provides copious amounts of parking along a connecting ring road, and sets aside acres of manicured green space for mostly aesthetic purposes.

Types of corporate developments include:

- A traditional campus with multiple buildings serving the many functions of a single business.
- A campus containing one focal building where top executives and the functions they manage are concentrated in a headquarters.
- An office park, with multiple businesses co-located, providing smaller companies an opportunity to work in a suburban setting close to the businesses they service or the suburbs where their workers live.

Regardless of ownership and function, a majority of corporate campuses are composed of large amounts of land that, if managed correctly, can provide a plethora of conservation benefits beyond the visual.

Traditionally, corporate campuses have been managed in similar ways to the suburban gardens they mimic — chemical lawn maintenance, seasonal annual plantings and little patience for the intrusion of nature into such kempt places — form over function, with aesthetics being the primary driver.

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The reimagined corporate campus: opportunities to advance biodiversity

The opportunity exists to re-examine the way corporate campus lands are managed and move away from pastoral capitalism towards something that welcomes nature back through a shared benefits model. Corporate campus lands can be used to restore productive habitat and reconnect a fragmented suburban landscape.[2] In addition, they can be managed to perform functions driven by the needs of the people using these spaces, such as aesthetics, recreation, stormwater management, and connecting employees and community members to nature where they live and work. Typically, all of these benefits can be achieved without the loss of economic space and with the support of stakeholders.[3] Indeed, measures that benefit biodiversity tend to be viewed more favorably by stakeholders when they have another function, particularly if that function is related to recreation or health and well-being, and if the feature is tailored to the "tidy" external appearance of business environments.[4]

A wide array of opportunities exist for enhancing or restoring habitat for wildlife on a corporate campus setting. These opportunities can be considered on a spectrum of effort needed, from projects that require minimal time or resources to implement and can be maintained in a relatively passive way, to projects that require more effort to implement and require active maintenance and monitoring on a regular, long-term basis. **Projects that require greater effort often result in more impactful outcomes that benefit biodiversity and communities.**

The following pages describe some of the most common opportunities for conservation projects on corporate campuses, with examples of programs that have successfully implemented these projects and passed a rigorous review to achieve WHC Conservation Certification.

Spectrum of effort required for corporate campus conservation projects

Requires minimal time or resources to implement and maintain.

Requires significant amount of time and resources, and active, long-term monitoring and maintainence.

Reduced mowing

A reduced mowing project is relatively easy to implement on corporate campuses, and is on the lower end of the spectrum of effort. In essence, a reduced mowing project involves decreasing — or even eliminating — mowing of open areas of the site. Because implementation and maintenance in this case are relatively passive, this project requires very little employee time or costs beyond occasional monitoring. In fact, because mowing is reduced or eliminated, this project can actually help reduce site maintenance costs.

Reduced mowing can be beneficial in a variety of situations:

- A no-mow zone along a stream or pond shoreline can enhance water quality and help reduce flooding, as the taller vegetation can more effectively absorb stormwater and filter runoff before it enters the water body.
- Wildlife such as songbirds and insects use the tall vegetation for cover.
- The tall grasses are also an effective deterrent to nuisance Canada geese.

If aesthetics are a concern, reduced mowing can be implemented in areas of a corporate campus that are not very visible, such as in the rear of the property. However, using techniques such as maintaining a small mowed border and rounded, undulating edges can allow reduced mowing areas to be aesthetically pleasing for more visible areas.

Employees and other stakeholders will likely favor reduced mowing areas if they include flowering plants;[5] fortunately, an increase in native plants (including wildflowers) can occur in areas where mowing is reduced or eliminated.[6] Furthermore, installing signage can educate passers-by of its purpose and value.

Wildflowers on the campus of the DuPont Experimental Station in Wilmington, DE.

Reduced mowing projects can range in size but still produce the same benefits. A smaller reduced mowing project was developed at the DuPont Experimental Station in Wilmington, Delaware:

Certified with WHC since 1990, the DuPont Experimental Station is a 150-acre research and development facility established more than 100 years ago, and houses more than 2,000 workers. As part of its avian nest box program and native landscaping efforts, the DuPont team worked with the facility's landscaping crew to designate an open field as a no-mow zone. This 1-acre field is located adjacent to a 0.5-acre wildflower meadow and near several songbird nest boxes. The taller grasses growing in the field attract insects, which serve as a valuable food source to songbirds and supplements the foraging opportunities available in the neighboring meadow.

The General Motors (GM) Warren Technical Center in Warren, Michigan utilized 20 acres for its reduced mowing program:

The GM Warren Technical Center, located in southeastern Michigan, has been in operation since 1956 and certified with WHC since 2005. The campus comprises 709 acres in an expanding urban community, with facilities dedicated to the design, engineering, and testing of GM vehicles, as well as several habitats such as forested areas, man-made lakes, landscaping and large tracts of turf grass. In 2011, the team established a total of 20 acres of no-mow zones throughout the site. These no-mow zones provide numerous benefits, such as reducing the site's carbon footprint, providing habitat for ground-nesting birds, foraging birds and insects, and reducing water use. The team took management of the no-mow zones one step further by controlling non-native, invasive thistle in the summer and then seeding native wildflowers the following fall.

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Native landscaping

Among the many types of projects in the portfolio of WHC Conservation Certification programs, native landscaping is the most commonly implemented on corporate campuses. Landscaping is traditionally installed in corporate settings to enhance the visual aesthetic for employees and visitors, but typically uses non-native ornamental species. Companies are increasingly aware that native plants can also deliver the desired aesthetic, as well as other benefits including providing wildlife habitat and contributing to stormwater management. Native landscaping projects can typically be implemented with few to no obstacles, because the required infrastructure for managing on-site landscaping is already in place.[7]

Implementing native landscaping, particularly when coupled with educational initiatives such as informational signage about the native species, can also contribute to employees' and visitors' sense of place, perceptions of natural heritage, ecological literacy, and the role of the corporate campus in the broader ecological community.[8] In this way, a simple native garden can have broader conservation impacts on the local ecosystem, through the changed attitudes and actions of employees and community members beyond the property line.

Pollinator gardens

Within the realm of native landscaping, there are a variety of opportunities that can fulfill multiple functions, from aesthetics to ecosystem services, mostly on the lower to middle level of effort required. For example, a typical garden can be designed to be visually-pleasing while also targeting the needs of pollinators, and is moderately low on the scale of effort.

Pollinator gardens boost native bee diversity and abundance[9] and benefit breeding monarch butterflies when planted with milkweed.[10] An example of this practice exists at the Benjamin Moore Technical and Administrative Center in Flanders, New Jersey:

The Benjamin Moore Technical and Administrative Center, WHC-certified since 1996, is a 90-acre corporate campus with a variety of habitat types, including forest, grassland, gardens and other landscaping, agriculture, streams, and wetlands. In 2005, the Benjamin Moore team —named the Wild Ones— planted three small native gardens targeting pollinator species. The gardens were installed in high-visibility areas near the front entrance sign, the front walkway, and the cafeteria. The Wild Ones use an activity journal to track the success of the native

A common yellow throat at the Benjamin Moore Technical and Administrative Center in Flanders, NJ.

plantings and document butterfly use of the gardens on a weekly basis. They also mulch the butterfly garden in the spring and fall to prevent weed establishment, and enlist the help of other employees each Earth Day for clean up and weeding. The other two gardens are maintained on a regular basis by landscaping contractors.

Green infrastructure for stormwater management

Native landscaping can also be designed to provide a more functional outcome, such as contributing to stormwater management. This type of green infrastructure can come in many aesthetically-pleasing and wildlife-friendly forms, such as rain gardens, bioswales and living roofs. The vegetation and soils in green infrastructure improve the infiltration of rainwater and snowmelt, helping to reduce runoff and flooding in nearby areas. The plants and soils in green infrastructure also improve water quality by filtering out, absorbing and, in some cases, even detoxifying pollutants contained in runoff, including sediment, oil and grease,[11] heavy metals,[12,13] and volatile organic compounds.[14]

Rain gardens require more effort initially, but the maintainance and monitoring required fall on the lower end of the scale of effort.

The Ricoh Americas Corporation's West Caldwell, New Jersey Office maintains a thriving native landscaping project that includes a rain garden as well as pollinator gardens:

Ricoh Americas Corporation's West Caldwell Office, certified with WHC in 2015, is a 17.5-acre site dominated largely by the office building and landscaped lawn areas. The conservation program is centered around a strong native landscaping project that includes five pollinator gardens, one of which is also a rain garden planted in an area near the building's cafeteria that tends to collect water. Planted exclusively with native plants, the rain garden was specifically designed to improve water quality in stormwater runoff and to help decrease flooding and erosion. The Ricoh team diligently monitors, maintains and documents the gardens, using the company's intranet to provide project feedback, post photos, write informational articles, and share monitoring data. The team further engages employees in the project with events like a native plant giveaway for National Pollinator Week.

Conservation education

Learning need not be restricted to only "natural" areas. Even the most manicured habitats can provide an integrating context for teaching about conservation topics such as how the campus is sustaining biodiversity, how it fits into the local ecosystem, and how the projects on campus can be successfully replicated at home.

Conservation education provides distinctive benefits not only to the site's projects, but for the site's employees and members of the surrounding communities. Engaging employees in conservation education can improve the success and sustainability of the site's projects and creates a culture of learning and continuous improvement in the workplace. Providing conservation education to members of the community also improves awareness about conservation and related topics, increasing scientific literacy and encouraging community members to implement similar conservation activities on their own landscapes.

Place-based education on a corporate campus habitat provides an integrating context to accomplish STEM (Science, Technology, Engineering and Math) programs — challenging students to apply interdisciplinary thinking, work collaboratively for problem solving, and honing essential process skills such as data collection.

The amount of effort required for conservation education initiatives will depend largely on factors such as the size, scope and frequency of events, as well as the target audience. In general, conservation education will fall in the middle of the spectrum of effort needed for preparation, implementation and evaluation of activities.

The most accessible target audiences for education at a corporate campus are the employees and visitors to the site, particularly local students, who can be easily introduced to the projects on site and the wildlife species they benefit, and be educated about the value of the program and the company's commitment to biodiversity.

Students retrieve, identify and release species at Bayer Corporation in Pittsburgh, PA.

Conservation education and community outreach initiatives play a signficant role in many WHC Conservation Certification programs at corporate campuses, including Bayer Corporation's Pittsburgh Site:

Serving as the U.S. headquarters for Bayer Corporation, the Pittsburgh Site has been certified with WHC since 1999 and is managed by the 60-member Wildlife Sustainability Team. Among its many projects, the team maintains a walking trail through the site's habitats and highly-effective educational projects. The long-running Pond Study module, which is offered through Bayer's Making Science Make Sense initiative, provides students with hands-on, inquiry-based learning. The target audience is primarily elementary students, though the team has adapted the module for college students and community groups as well. Trained team members guide students in retrieving and identifying species in the pond before releasing them back to their habitat.

The team also works with local schools to offer educational activities about birds, using the site's diverse habitats and songbird nest boxes to enable students to observe birds to appreciate the habitats they require to survive. By working together with local educators, the team was able to refine the project activities to enable students to build science process skills, while also linking local habitats to global environmental issues.

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Avian nesting habitat

The corporate campus setting provides an ideal opportunity for providing nesting habitat for avian species, as the highly-manicured campus setting is often lacking in the nesting locations needed by a number of bird species. Many songbirds, for instance, nest in the natural cavities found in trees and snags (standing dead trees), which are typically not found on the manicured landscape of the corporate campus. Nest boxes in this setting can provide a man-made source of nesting locations for these cavity-nesting birds.

There exists a wide variety of target species for enhancing avian nesting habitat, though the specific context of a site, including the location and available habitats, will limit which species could be targeted. On a corporate campus setting, common target species could include songbirds, purple martins, peregrine falcons and other raptors, woodpeckers, owls, waterfowl and shorebirds.

Artificial nesting structures

Nest boxes and other forms of artificial nesting structures are an easy way to provide man-made nesting locations when these are in low supply in the surrounding landscape. In general, these structures are relatively simple and inexpensive to construct (or purchase) and install, and can be designed to fit the needs of a specific bird species. This project falls into the middle of the spectrum of effort because once installed, it requires a considerable time commitment in the form of regular monitoring and maintenance —ideally on a weekly basis during the breeding season— to keep the structures in good condition and prevent problems with pests, predators and invasive species.

The Bristol-Myers Squibb Wallingford Campus in Wallingford, Connecticut has maintained a successful nest box program for over 12 years:

The Bristol-Myers Squibb Wallingford Campus, certified with WHC since 2004, has maintained a nest box program targeting eastern bluebirds and tree swallows since the program's inception. The project started out with 12 nest boxes constructed and installed by local Boy Scouts, and currently boasts 27 nest boxes throughout the campus. The Bristol-Myers Squibb team diligently monitors the nest boxes every week from April through October and then cleans them out for the next year's inhabitants. At the conclusion of 2014, the team conducted a comprehensive analysis of the 10

Gull-billed tern incubating eggs at the Dow Chemical Company Texas Operations in Freeport, TX.

10 years of nest monitoring data gathered on-site, which allowed them to evaluate the success of individual boxes in providing nesting habitat, identify trends that suggested how certain nest boxes could be improved, and propose options to increase the project's conservation impact in the future.

Enhancement of existing avian nesting habitat

Enhancing avian nesting habitat on a corporate campus can also include improving existing nesting habitat or creating new nesting habitat. For example, ground-nesting grassland birds would benefit from converting a tract of lawn into a native meadow or prairie, while cavity-nesting birds would benefit from snags left in place where safety allows.

At The Dow Chemical Company's Texas Operations, located in Freeport, Texas, employees take great pride in the large, thriving colony of shorebirds that nest on the site of a former parking lot:

The Dow Chemical Company's Texas Operations, a long-standing program certified with WHC since 1992, encompasses 5,000 acres on the coast of the Gulf of Mexico. Among the managed habitats on site is a 4-acre nesting area for ground-nesting shorebirds, including black skimmers, least terns, and gull-billed terns. This nesting area, which has a substrate of crushed oyster shell and limestone, is a former employee parking lot that has been used by nesting shorebirds since the 1970s. The team works to keep this area protected from feral cats and other predators by maintaining fencing around the nesting area and monitoring the birds' reproductive success. Each year, the nesting colony continues to thrive; in 2013 alone, the team observed over 600 nests, with more than 800 young birds successfully fledging. The Texas Colonial Water Bird Survey, conducted by the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department, determined that the colony is one of the most successful shorebird nesting colonies on the Texas coast.

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Stray and feral cat control

Adoption is an ideal outcome for stray and feral cat populations.

Although less commonly implemented among Conservation Certification programs, corporate campuses nonetheless have considerable potential to control feral and stray cat populations.

Stray cats were born and raised in a domestic home but are now free-ranging, while feral cats were born and raised in the wild. Stray and feral cats kill an estimated 866.7 million to 2.7 billion birds and 4.2 to 14.9 billion mammals annually.[15]

Trap-neuter-release (TNR) is a commonly used method for reducing stray and feral cat populations, as it is both humane and effective when implemented long-term. TNR involves trapping stray and feral cats, spaying or neutering them, and releasing the cats back to where they were found. Over time, with continued TNR of any new stray and feral cats before they reproduce, the population decreases as fewer litters are born to replenish the population.[16] TNR can be made more effective, and can be used to successfully engage the local community, when it also incorporates an adoption initiative for kittens and tame adult cats.

Exelon Corporation's Kennett Square Campus in Kennett Square, Pennsylvania implemented a successful TNR program for stray and feral cats, partnering with a local rescue group:

The Exelon Corporation Kennett Square Campus, a 51.7-acre complex in a large business park setting, has incorporated TNR into their conservation program since 2012. Employees had been feeding several feral cats on the property, but when the Exelon team's research revealed the damage that feral cats can inflict on native wildlife populations, they contacted the local SPCA for assistance. Volunteers helped to trap the cats, and a local rescue group spayed and neutered, immunized, marked the cats for future identification, and released them back onto the site. The team decided to acclimate the cats to interaction with humans so they could be adopted, so over the course of two winters, boxes, bedding and food were set up in the wetland area where the cats were living. The cats were then trapped the following summer by a rescue group and all were rehomed with local families. The team continues to monitor the campus for the presence of other stray or feral cats.

Invasive species control

A pollinator garden at the Pfizer Sherwood Campus in Richmond, VA.

One of the most time and resource intensive projects that can be implemented on a corporate campus setting —but also one of the most ecologically valuable over the long term— is management of invasive species.

Invasive species are species (typically non-native) whose introduction to an ecosystem cause, or is likely to cause, harm to that ecosystem, the local economy, or human health. Invasive species can be any type of organism. WHC-certified programs commonly manage invasive plant species, which outcompete native plants, degrade habitat quality, and use vital resources without supporting native plant and animal communities.[17] Invasive species can also cause negative impacts for agriculture, water resource management, and wildfire management. Invasive species are considered one of the most serious threats to biodiversity today.

Invasive species management for existing infestations is particularly high on the spectrum of effort because it requires significant initial work to identify and remove the infestation, and then monitoring and follow-up control measures for regrowth over the long term.

Conservation projects that involve prevention or early detection and rapid response (EDRR) will not be as intensive at the start, but require long-term prevention measures or monitoring for new invaders.

The invasive species project at the Pfizer Sherwood Campus in Richmond, Virginia utilized both EDRR and removal of existing infestations:

Pfizer Sherwood Campus, certified by WHC since 2006, is a pharmaceutical research facility that encompasses 31 acres. The team initiated a control program for invasive species starting in 2008, with removal of invasive honeysuckle and scouring rush from the site's flower beds. Pfizer continued to expand its invasive species management efforts to include control of English ivy around trees starting in 2011, and control of porcelainberry and nandina in the pollinator garden, rain garden, and tree planting area starting in 2012. The team also conducted a thorough survey in 2014 of all managed habitats on-site to identify and remove invasive species. In addition, one team member used what he learned on-site about invasive species control to help control English ivy and honeysuckle at nearby Bryan Park, as part of a collaboration with the Chesapeake Bay Foundation.

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A call to action for corporate landowners

The global trend towards urbanization would suggest that the corporate campus is not the most likely workplace for the future, but many multi-national brands like Toyota, ExxonMobil, and General Motors take the opposite view, investing in new suburban complexes and retrofitting existing campuses to better meet workers' needs and address environmental sustainability. Within the fragmented suburban landscape, corporate campuses can add great ecological value through a variety of on-the-ground measures.

This white paper and the dozens of other example projects that have been recognized under WHC Conservation Certification also demonstrate that the reimagining can start from any aspect of the company. It can be driven by attention from the CEO's office as a corporate sustainability initiative, a group of employees interested in a specific conservation objective, or the maintenance crew seeking efficiencies. Projects can be small with a single conservation objective, or broad and holistic with multiple, interlinking components.

The examples presented here only explore a small share of the seemingly endless possibilities for rethinking the corporate campus. Perhaps only limited by resources, but certainly not by imagination, the corporate campus is a bounty of opportunity for conservation.

BASF's North American Headquarters, Florham Park, NJ.

The steps to reimaginging the corporate campus are simple

- Gain an understanding of the ecological address of the property. What watershed or ecoregion is it in? What is it adjacent to? What are the opportunities? What are the regulatory challenges, if any? This understanding will inform what can be done and where the investment will have the greatest conservation impact.
- Consider rethinking the formally-landscaped areas of the campus, starting with the Landscaping Project Guidance for inspiration. This Project Guidance describes how to build a sound landscaping project and offers strategies to strengthen programs for greater outcomes.
- Also consider addressing other areas of the campus, referencing other WHC Project Guidances; the Project Guidance themes selected will depend on the desired conservation outcome for the project. These themes might include: Pollinators, Avian, Bats, Invasive Species, Grasslands, Forests, Wetlands, Green Infrastructure, Species of Concern, Awareness and Community Engagement, Formal Learning, and Training.
- Build a team to support these efforts by drawing on employees with interests and expertise in native landscaping, bird watching or some other pursuit.

Conservation on the corporate campus has typically been limited to indoor efforts to reduce waste, energy and water use, all of which contribute substantial benefits to the environment. But, by creating conservation efforts on the "outside" of our buildings as well, we benefit both the natural environment and enhance our interaction with it.

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BASF We create chemistry

Thank you to BASF Corporation for underwriting the production of this publication.

WHC can help identify opportunities for conservation projects on corporate campuses and develop strategies that will mainstream biodiversity into operations. If you're interested in exploring these opportunities, please contact us at strategyandplanning@wildlifehc.org.

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Transforming Remediation Sites Into Conservation Assets

How Companies Leverage Business Needs for Positive Environmental Outcomes

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Boeing worked with federal and state agencies and local tribes to restore the Duwamish Waterway shoreline habitat in Seattle, WA.

Message from our sponsor

Remediate. Restore. Revitalize.

In our pursuit of global environmental leadership, we champion the value of going above and beyond compliance. Our robust remediation and restoration program exemplifies this approach. Put quite simply, our goal is to leave places better than we found them.

At Boeing, we have a long-standing commitment to clean up locations affected by past manufacturing activity or waste disposal. We have an experienced team dedicated to using innovative and comprehensive solutions to ensure the protection of human health and the environment.

We take pride in the work we've done to restore and return land to beneficial use. And we are proud to be recognized for that work by the EPA, and other federal and state agencies and organizations.

We can't do it all by ourselves. There's another 'R' that is fundamental to fulfilling our commitment: Relationships. We rely on collaboration with neighborhood groups to find the best solutions.

We partner with wildlife and conservation organizations to create and restore wildlife habitat.

They are the true experts. And they share our passion.

As part of the Wildlife Habitat Council (WHC) certification program, Conservation Certification, we have restored nearly 1,000 acres of habitat — from wetlands that support salmon to replanting efforts that benefit pollinators. We currently have four remediation sites with WHC Conservation Certification and we expect that number to grow substantially in the next few years. We are also expanding our partnership with WHC to pursue certification at some of Boeing's active manufacturing sites.

As we look ahead to Boeing's next century, we see a bright future on the horizon. We will continue to do our part to build a better planet.

Steve Shestag
Director, Environment
Environment, Health & Safety
The Boeing Company

On the cover: A Humboldt's lily grows at the Boeing former Santa Susana Field Laboratory in Simi Valley, CA.

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Introduction

Environmental remediation approaches, once viewed merely as mandated activities designed to protect human health, are moving beyond simply meeting regulatory requirements into an approach that looks at the broader picture. Increasingly, companies are adopting green and sustainable remediation practices as part of the remedy. They are utilizing their remediation sites to create wildlife habitat, support local conservation priorities, and build green spaces for the community. By using conservation-based approaches to site cleanup and reuse, companies are doing more than simply returning sites to their former states, but are instead leveraging conservation to transform liabilities into ecological, community and corporate assets.

Incorporating conservation into the remediation process can have a multitude of benefits, with the most obvious being the benefits to biodiversity and environmental health. The surrounding community can also benefit greatly from this approach. Property values near Superfund sites tend to increase once cleanup begins and again after a site has been de-listed.[1] Cleanup sites with ecological outcomes can also result in increased tax revenues, tourism, air and water quality, and improvements to overall quality of life for residents.[2]

Conservation-based approaches have the additional benefit of helping companies meet some of the business needs that can arise during the remediation process. Common business needs associated with cleanups include:

- **Meeting stakeholder priorities**
- **Facilitating permitting and remedy selection**
- **Reducing costs**
- **Minimizing harm to habitats and wildlife caused by remedial infrastructure and operations**
- **Improving negative community perceptions of the site**
- **Identifying beneficial and sustainable reuse of the property once the remedy is completed**

Fortunately, there are a multitude of conservation and conservation education opportunities that responsible parties can implement during the various phases of the remediation process to help address these business needs while also producing positive outcomes for ecology and community. These opportunities will depend on the types of habitats

A bumble bee at Boeing's Pollinator Prairie, a former cleanup site in Olathe, KS.

and species that occur on-site, as well as factors such as what stage the remediation process is in, whether there are site access restrictions and what resources are available for voluntary activities. Best practices show that incorporating conservation early in the remediation process produces the strongest outcomes for the local ecosystem, community and business. For example, during investigation or remedy selection and permitting, conservation objectives can drive solution development and selection, address concerns and priorities raised by stakeholders, motivate the inclusion of green and sustainable best management practices and, in some cases, reduce costs. There are instances, however, when integration of conservation-based approaches is not possible early in the process, but may be implemented during later phases, such as restoration of the site to a productive reuse or a return of the site to the community for recreational use.

This white paper will share case studies of companies that have applied conservation-based solutions at different points during the remediation process.

Each case study will demonstrate how conservation has been leveraged to meet a variety of business needs faced during site cleanups, as well as how remediation sites can make valuable contributions to both people and planet.

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Five phases of the remediation process

The remediation process generally consists of five phases: **Investigation**, **Remedy Selection and Permitting**, **Implementation**, **Maintenance and Monitoring**, and **Restoration and Site Reuse**. Although this process will vary for an individual site depending on the regulatory framework in which it operates, each phase represents a unique set of conservation opportunities that can be used to address business needs.

PHASE 1

Investigation

Study and exploration of the site to create a baseline confirming and quantifying the type, location and extent of any contamination present. This may include sampling the soil, subsoil, groundwater, surface waters or remaining structures.

PHASE 2

Remedy Selection and Permitting

Negotiations among responsible parties, regulatory agencies and stakeholders. Possible remedies are evaluated and quantifiable cleanup goals are identified before the final remedy is approved. This phase also includes securing permits from regulatory agencies to perform the prescribed work.

PHASE 3

Implementation

Execution of remedial activities, such as removal of contaminated soil, construction and operation of pump-and-treat systems or installation of impermeable caps to contain contamination.

PHASE 4

Maintenance and Monitoring

Long-term, responsible stewardship to ensure both the integrity of the cleanup and the functioning of any associated ecosystems created or otherwise impacted during cleanup operations.[3]

PHASE 5

Restoration and Site Reuse

Completion of the remedy and a return of the site to a productive and beneficial state.

Strategies to incorporate conservation into cleanup sites

Following are conservation programs that have successfully addressed business needs by integrating conservation goals into one or more phases of the remediation process. Each of these programs has achieved recognition for their efforts through WHC Conservation Certification, which provides rigorous, third-party certification for conservation and education activities, including those that might occur on a cleanup site.

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Improving public perception

In the early stages of a site cleanup, public perception of the site and its operations may represent significant challenges. These may result from: issues created by the contamination or cleanup operation; harm caused to human health; impacts to local recreation; species of concern or important natural resources; or disagreements among stakeholders. These issues can be sensitive and difficult to address, and often require a thoughtful, multi-pronged approach.

Incorporating conservation activities that benefit ecology can improve community acceptance of remediation, particularly if local stakeholders are involved in the process.[4]

CSX Transportation's Former Gautier Oil Site incorporated conservation and recreation goals into its remedy to address the needs of the surrounding neighborhood, demonstrate the site's ecological and social value, and establish goodwill with the community.

Situated on the banks of the West Pascagoula River and Bayou Pierre in a largely residential area of southeastern Mississippi, the 24-acre Former Gautier Oil Site was historically used for wood treatment operations using creosote and possibly hydrocarbon extender oils from 1870 to 1979, and then for waste oil recycling until 1983. In 1985, responsible parties entered into an Administrative Order of Consent with the U.S. Environmental Protection Agency (EPA), removing above-ground structures and possible sources of below-ground contamination. Final remedial construction began in early 2011 and was completed in December of that year, and included restoration of functional tidal wetlands with an artificial oyster reef, as well as transitional habitat between the wetlands and upland areas. The restoration design included dredging a channel in the wetlands deep enough to

Tidal wetlands on the West Pascagoula River at the CSX Former Gautier Oil Site in southeastern MS.

ensure that recreational boating along this stretch of the river could continue, as the remedy would have otherwise made this area too shallow.

In addition to wetland and transitional habitat, the team also implemented additional projects on-site to address environmental risk, including restoration of maritime forest habitat, open fields, and dune habitat, as well as ongoing control of invasive plants like phragmites and Chinese tallow throughout the site. Community members now have the opportunity to view wildlife from their homes or boats, and those who fish benefit from the improved fish habitat created by the wetland restoration. In addition, removal of above-ground structures and development of green space through the restoration also improved the visual aesthetic of the site, converting a visual blight into a community asset. To preserve this green space for the community in perpetuity, CSX entered into a conservation easement with the Land Trust for the Mississippi Gulf Coast in 2013. The Former Gautier Oil Site first achieved certification with WHC in 2012.

Learning about the species and habitats on-site can help site teams determine the potential for conservation activities as part of their site cleanup. One approach is to add ecological components such as habitat delineations or species surveys to existing data collection procedures like baseline inventories or long-term site monitoring, that provide information about the ecological condition of the site. This data can be used to identify potential conservation targets, set conservation objectives, make decisions during the cleanup process, or leveraged to demonstrate value to stakeholders and regulatory agencies.

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Using biodiversity restoration to reduce costs

In some cases, conservation activities can provide opportunities to reduce costs for remediation or stewardship. For example, the impermeable cap often used to contain contamination can only be planted with a non-woody vegetative cover to protect the integrity of the cap. The Conservation Foundation in Naperville, Illinois found that maintaining this vegetative cover as a native grassland or meadow, instead of non-native turf grass, saved over $85,000 USD per acre over 10 years as a result of reduced costs for mowing, watering, controlling grubs and pests, fertilizing and aerating.[5]

Proposing biodiversity restoration or community engagement elements can strengthen the case for cost-lowering remedies, such as those that involve less construction and minimize habitat disturbance. The inclusion of these elements in the proposed remedy serves to demonstrate goodwill and proactivity by the responsible party, and can help address concerns of community members and regulatory agencies and meet stakeholder needs. In many cases, it can often lead to faster remedy negotiations and permitting.

Bridgestone Americas' New Beginnings – The Woodlawn Wildlife Area (New Beginnings) in Port Deposit, Maryland is an example of a cleanup site where conservation goals were leveraged to negotiate a less-costly long-term remedy that saved the company approximately $36 million USD and returned the site to the community expeditiously.[6]

New Beginnings comprises 95 acres of grassland, woodland and wetland habitats in a rural area of northeastern Maryland. The site includes a 35-acre closed landfill, which was listed as a Superfund site in 1987 for groundwater contamination caused by the disposal of industrial waste for several decades prior to its closing in 1981. Although a Record of Decision was finalized in 1993, further studies documented natural attenuation (the breakdown of contaminants by soil bacteria), as well as evidence that the site posed no immediate threats to human health.

Given this information, Bridgestone elected to work with WHC to develop an ecological reuse vision for New Beginnings. Bridgestone successfully leveraged this vision to negotiate an update to the long-term remedy that would include a permeable, vegetated

An eastern box turtle at the Bridgestone New Beginnings site in Cecil County, MD.

cap on the landfill along with continued monitoring of the natural attenuation. At a projected cost of approximately $6 million USD over 15 years, this new remedy resulted in a significant cost savings compared to the original remedy, which involved a pump-and-treat system costing over $42 million USD.[7] *In addition, the new remedy provided additional benefits to the site by allowing existing habitat areas that would have been impacted by construction activities to remain undisturbed, and allowed Bridgestone to open the site to public access much more quickly. Today, New Beginnings is managed as an ecological and educational resource for the local community.*

A multitude of habitat and wildlife management projects are maintained on the site with the help of local partners such as Master Gardeners, youth groups and students from several nearby schools. These projects include invasive species control, nest box monitoring, and management of the pollinator gardens, man-made vernal pool, grasslands, and woodlands, as well as numerous opportunities for young learners to engage in participatory learning.

New Beginnings' conservation and education efforts have been certified with WHC since 2001.

The necessary role of government. Assigning clean-up responsibility may be difficult if the act is decades removed from the original contamination. In some cases, the remediation obligations are inherited as legacy liabilities though mergers and acquisitions, while in others the accountable party may no longer even exist, leaving the burden for clean-up with the government. In addition, communities coexist with a blight over which they have no control. With such complexity, government plays an essential role, providing the regulatory framework necessary to ensure orphan sites are not forgotten, responsible parties are held accountable, and community needs are met.

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Providing green space for education and recreation

Conservation and education activities can have a significant impact regardless of size — particularly in neighborhoods with socio-economic challenges. A remediation site can be transformed from neighborhood blight into highly-valuable resources for both wildlife and the surrounding community.

A need for green space or educational resources in an area can be identified during the site investigation phase by gathering baseline social metrics. This process can help determine gaps in conservation or STEM (science, technology, engineering and mathematics) education, or lack of outdoor learning spaces that could potentially be met through the cleanup or reuse of the site. If this data cannot be gathered during the investigation, other opportunities to assess community and ecological needs may occur later in the process, such as during public comment on the proposed remedy, or as part of stakeholder engagement efforts to help determine site reuse.

Motorola Solutions' NGTF Habitat in Scottsdale, Arizona is a notable example of a small cleanup site that contributes to the local community, provides green space and enhances community connectivity, and reduces impacts by salvaging high-value trees.

Built in 2011, Motorola Solutions' NGTF Habitat includes a groundwater treatment facility and 1.7 acres of actively-managed habitat. The site is part of the North Indian Bend Wash Superfund Site remedy. When the property was acquired by Motorola in 2011, the site team began removing debris and constructed a granular activated carbon water treatment facility, which was completed in 2013. The team then began the installation of a native landscaping project, designed in close partnership with local experts from the City of Scottsdale, Master Gardeners, local nurseries and environmental consultants. The team planted an array of native, drought-tolerant plant species selected to benefit pollinators and other wildlife. These plants included mesquite trees that the team carefully salvaged prior to construction of the water treatment plant in 2011, as well as several caterpillar host plants and native cacti that provide important habitat for bees.

Diablo eyelash sage at Motorola Solutions' NGTF Habitat in Scottsdale, AZ.

To maintain the habitat area, the team uses Integrated Pest Management practices, which helps manage insect pests and weeds using techniques that cause the least harm possible to the native plantings and wildlife. Part of the habitat design also included the installation of a pathway through the habitat area that provides the community with easy viewing of the site's habitat and access to the nearby Arizona Canal Trail. The NGTF Habitat site team also engaged a local artist to create public art installations inside the garden using recycled materials, and registered the site as a stop on a local public art tour. The project continues to provide valuable wildlife habitat and public green space for education and recreation, thereby serving as a small but highly valued community asset in urban Scottsdale.

The program at NGTF Habitat was first certified by WHC in 2015.

Remediation sites, locations of past industrial misuse or accidents, are found across the world. These sites can be small, resulting from a single source of localized harm, or large with multiple sources of harm across many acres. Most sites, regardless of location, size or type of harm, have the potential to contribute to the community through conservation.

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Managing a restricted site with an event-based approach

Sites under long-term maintenance during the remediation process present numerous opportunities for implementing and monitoring conservation-based efforts. These sites commonly require periodic assessments of remedy implementation and stewardship, such as Superfund Five Year Reviews (FYRs). These assessment periods provide opportunities to evaluate existing conservation activities to determine if they are meeting objectives, and to incorporate new conservation activities into site stewardship.[8]

Long-term maintenance often necessitates limited access to a site due to concerns such as safety and liability. Although this restriction can influence the types of conservation activities that can be carried out, biodiversity conservation can be implemented with great success on both limited access and public access sites.

The Chemours Newport Site in Newport, Delaware, is engaged in a long-term maintenance and monitoring process. Due to site access restrictions, the site's wildlife habitat program is managed by a small, dedicated team of employees based at a corporate office nearby.

The Chemours Newport Site, currently 92 acres of freshwater wetland, deciduous forest and meadows, is a closed, former pigment manufacturing operation that utilizes a pump-and-treat system to address groundwater contamination. With the site under a period of long-term maintenance during its remedial process, Chemours decided to utilize the property to create wildlife habitat and engage company staff based out of a nearby office complex in habitat management activities. The site is fenced and requires special permission for access, so the team created conservation projects that can be managed by a team of employees who visit the site several times per year, with additional assistance from partners such as the Delaware Department of Agriculture and Monarch Watch.

A sunflower in a pollinator meadow at the Chemours Newport Site in Newport, DE.

Habitat projects include pollinator meadows, tree swallow nest boxes, and biological control of invasive purple loosestrife using Galerucella beetles. The Chemours team has creatively integrated these activities into company operations, helping to minimize the effort required to maintain and monitor the projects. For example, contractors and staff visiting the site to perform scheduled maintenance and monitoring are also engaged to perform habitat maintenance. To implement habitat updates, the team uses an event-based approach; a series of four planting events are scheduled during quarterly employee and contractor volunteer visits to the site to plant new native species in the pollinator meadows, pull weeds and perform nest box maintenance.

The Chemours Newport Site conservation program first achieved WHC Conservation Certification in 2012.

The initial site investigation might reveal opportunities to reduce the impacts of remedy construction and operations on habitats and wildlife. This could involve the salvaging or relocation of sensitive or rare plants or wildlife, adjusting the location of infrastructure to minimize fragmentation, or adjusting activities during sensitive periods for breeding birds or other species.[9]

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Meeting community needs through site reuse

In general, determining the end use of a cleanup site is a key factor in remedy selection and design, and can guide appropriate selection of conservation projects.[10] Many times, restoration planning offers opportunities to incorporate conservation or ecologically focused reuses, which can often help to meet objectives identified by stakeholders and community members. Conservation-focused reuses can easily be paired with community-focused reuses such as native gardens or nature trails alongside recreational areas or community spaces.

BASF Corporation's 1,200-acre Fighting Island, located on the Canadian side of the Detroit River in LaSalle, Ontario, has been transformed into a resource for local schools and community members with biodiversity restoration projects and educational facilities.

For much of the 20th century, Fighting Island was used for the disposal of alkaline by-products created from the manufacture of soda ash and other lime-based products. These by-products dried to a fine dust that blew onto the mainland, causing air quality and siltation issues. Beginning in the 1970s, BASF used settling dikes and revegetation efforts to reduce erosion and dust blow-off to the mainland while also creating wildlife habitat. The site team further elected to develop habitat areas and outdoor learning spaces as a long-term reuse for the local community.

BASF currently maintains multiple conservation projects on the island, including invasive species control, native tree and shrub plantings, bat houses, pollinator habitat, and native game bird reintroductions. Notably, BASF has constructed educational facilities such as classrooms and wetland

A great blue heron flying above BASF's Fighting Island in LaSalle, Ontario, Canada.

boardwalks, and hosts thousands of local students, teachers and scouts every year. The site functions as an outdoor learning laboratory for students and youth groups, who benefit from the custom standards-based STEM education curriculum developed in partnership with local teachers, as well as for teachers, who benefit from semi-annual teacher trainings.

The conservation program at BASF Fighting Island has been WHC-certified since 2002.

Ecological data collected on-site can be used to identify which habitats, species, or resources may be impacted by the cleanup. Once identified, responsible parties can use maintenance and monitoring activities to track those potential impacts. This can be of particular importance in cases where ecotoxicology or other harm to wildlife is a concern, or where disturbance has left the site vulnerable to invasive species infestation. In these cases, procedures such as Hazard Assessment and Critical Control Point (HACCP) and Early Detection/Rapid Response (EDRR) could be put into place to catch potential impacts early.

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A call to action for corporate landowners

The case studies highlighted in this white paper, and the dozens more recognized by WHC Conservation Certification, demonstrate the diverse array of opportunities to leverage conservation and conservation education during one or more phases of a remediation project's life cycle to meet business needs.

Projects can be small or large in size and scope. They can be in rural, suburban or urban areas. Their end use can be accessible to the public or restricted. But they all have the potential to not only benefit biodiversity and the local community, but also to meet business needs and establish companies as sustainability leaders.

Stakeholders often perceive a barrier to implementing conservation and education activities on cleanup sites, resulting from a lack of incentives to doing so. Achieving third-party recognition for these activities through programs such as WHC Conservation Certification is one way to combat these perceptions and provides a tangible incentive to integrate conservation and education into the remediation process.[11]

Monitoring the grassland at the Boeing Emery Landfill in Wichita, KS.

Steps companies can take to incorporate conservation and education into their cleanup sites

- Assess the existing ecological conditions on-site and in the surrounding landscape to determine the potential for conservation activities.
- Consider ways to incorporate ecological benefits into the cleanup as early as possible in the remedial process, such as during site assessment and remedy negotiation.
- Consult with the surrounding community and other stakeholders to determine community needs for conservation education and green space, and to determine the potential for incorporating education and outreach activities.
- Download the WHC Remediation Project Guidance to assist you in designing a project that will have a meaningful conservation and education impact. The Project Guidance describes how to build a sound conservation project on a cleanup site and provides strategies to strengthen programs for greater outcomes.
- Demonstrate the success of your conservation programs by seeking WHC Conservation Certification, a rigorous, third-party standard. Through the WHC Remediation Project theme, as well as other relevant Habitat, Species, and Education and Awareness themes, WHC Conservation Certification recognizes and incentivizes proactive, beneficial actions taken as part of a cleanup that enhance project outcomes, such as integrating conservation early in the process, or involving the community in project design and implementation.

Companies that adopt and integrate conservation best practices across their entire remediation portfolios set a new standard within the industry and create positive, measurable and meaningful impacts to ecosystems and communities.

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Download the Remediation Project Guidance and other Project Guidances at **wildlifehc.org/project-guidances**

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WILDLIFE HABITAT COUNCIL

The Critical Role of the Private Sector in Species Recovery and Protection

Prioritizing Species of Concern Conservation Programs

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The West Indian manatee is classified as threatened on the Endangered Species Act list. The Florida Fish and Wildlife Conservation Commission has partnered with the Tampa Electric Company (TEC) to help conserve and monitor manatees at the TEC Manatee Viewing Center.

Message from our sponsor

The mission of the Alliance for America's Fish & Wildlife is to secure funding to conserve some of our nation's most precious natural resources — our fish and wildlife. We know that Americans benefit from healthy and accessible fish, wildlife, and habitats, and we all have a role to play in safeguarding them for future generations. The Alliance values innovation and realizes a creative solution is needed to conserve our natural resources for the benefit of our economy and way of life.

The Alliance is the result of the Association of Fish & Wildlife Agencies' Blue Ribbon Panel on Sustaining America's Diverse Fish and Wildlife Resources, and an unprecedented partnership of representatives from the outdoor recreation, retail and manufacturing sector, energy and automotive industries, private landowners, educational institutions, conservation organizations, sportsmen's groups, and state and federal fish and wildlife agencies. The Alliance is utilizing this partnership to implement the panel's recommendations to dedicate existing royalties from energy and mineral development to states needed to implement voluntary, non-regulatory measures proven to prevent endangered species listings.

It costs the American public and the private sector hundreds of millions of dollars each year to mitigate and restore threatened and endangered species. These expenses, disruptions, and uncertainties can be avoided or greatly reduced through proactive conservation measures. Public and private partners together can help fish and wildlife, help companies meet their corporate environmental sustainability goals, and build confidence and appreciation in the communities where they work.

Healthy fish and wildlife populations fuel our economy, and provide important recreational opportunities. By partnering with the private sector, as well as state and federal governmental agencies, we can conserve our fish and wildlife resources and prevent population declines and habitat degradation. We look forward to partnering with the Wildlife Habitat Council and its member businesses to advance this 21st century vision for fish and wildlife conservation for *Our Nature, Our Nation, and Our Future*.

Nick Wiley
President, Association of Fish & Wildlife Agencies; Executive Director, Florida Fish and Wildlife Conservation Commission; Steering Committee Member, Alliance for America's Fish & Wildlife

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On the cover: An endangered Mexican black bear at the CEMEX El Carmen site in Coahuila, Mexico. Photo: Santiago Gibert Isern

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WILDLIFE HABITAT COUNCIL℠

Introduction

There exists, across the world, a societal consensus that when populations of species of plants and animals decline to critically low levels, action should be taken and resources invested to stop and reverse the decline and save the species from extinction or extirpation. The International Union for Conservation of Nature (IUCN) Red List of Threatened Species, the most comprehensive and objective source of information on declining species worldwide, contains assessments of more than 75,000 species of which 8,000 vertebrate species, 4,500 invertebrate species and 11,000 plant species are considered threatened with extinction.

The agreement to help stop species extinctions arose from the knowledge that land use, non-sustainable hunting and illegal collecting caused species like the dodo, passenger pigeon and Irish elk to disappear forever. This is now supported by government policies that place a regulatory framework around the problem in an effort to drive recovery efforts based on best science and practices, and to stem further loss from human impacts.

This consensus and the frameworks that support it have led to some remarkable recovery stories where populations of rare species recovered and returned to healthy, sustainable levels. In the United States, the iconic bald eagle recovered from a population of less than 500 breeding pairs in the lower 48 states in the 1960s to more than 10,000 pairs when the eagle was removed from the endangered species list in 2006. In Europe, the European bison was extinct in the wild in the early 20th century, but after a large-scale breeding and reintroduction program, wild populations have re-established in areas of central and eastern Europe, with a population now totaling nearly 3,000 individuals — an increase of 3,084 percent since 1960.[1] In Chad, the scimitar-horned oryx is being reintroduced to the wild from a breeding program in Abu Dhabi.

Across the world, the regulatory frameworks that govern species protection and recovery differ from authority to authority, but contain many common approaches informed by conservation science. These approaches are primarily focused on creation or protection of critical habitat, and curtailing activities that impact life cycle and breeding success. Such approaches can lead to conflicts if business operations are impacted, timelines elongated and budgets affected. The most common business complaint about endangered species rules is the uncertainty that implementation of such regulations introduce.

Once extinct in the wild, European bison now total 3,000 — an increase of 3084% since 1960.

Many businesses have shown leadership in this arena, however, innovating to adapt to the presence of imperiled species on their lands and pivoting to play critical roles in species recovery. These businesses understand that compliance with endangered species conservation programs generate a return on investment (ROI) that can include reduced costs, a secured social license to operate, and an increase in public support.

In the U.S., 80 percent of the habitat that species listed under the Endangered Species Act depend on exists on private lands. Therefore, leadership by business, across all scales of land holdings, is essential to species protection and recovery.

This white paper shares case studies of companies that implemented best practices during development, construction, operations and reclamation to restore or recover a species of concern.

Each case study will demonstrate how the private sector can play a critical role in the recovery of animal or plant species on their lands that are in decline.

WILDLIFE HABITAT COUNCIL℠

Adjusting operations to protect peregrine falcons

Most endangered species laws at national or federal/provincial levels include prohibitions for activities that harm, harass or result in the death of a protected species (in the United States, this is referred to as the "take" of a protected species). For example, in Wisconsin, all native, non-game birds, their eggs and their nests are protected from harm, killing or possession. It is also illegal to harm, kill, transport, possess or sell any wild animal on the state's endangered species list.

When operations may result in the harm of a protected species in Wisconsin, businesses must either acquire an incidental take permit from the state or adjust their operations to prevent the harm from happening. These adjustments might include moving operations to another area, or changing the timing of a certain activity so that it occurs when the species is not using the site.

At Georgia-Pacific's Broadway Facility in Green Bay, Wisconsin, demolition of an unused structure was delayed to prevent harm to a pair of peregrine falcons and their nest. The team engaged in voluntary actions to ensure the birds could continue to nest on-site following the demolition, and in doing so supported the peregrine's continued recovery in this region.

The Broadway Facility is located on 940 acres along the shores of the Fox River in northern Wisconsin, not far from the river's mouth on Lake Michigan. Peregrine falcons, who are protected in Wisconsin as an endangered species, were first discovered to be nesting at the site during a pre-demolition inspection of an obsolete chemical storage tank in 2008. To prevent harm to the birds and their young, demolition of the tank was halted for the duration of the nesting season. An expert from Wisconsin Falconwatch also assisted the team with sexing, banding and taking blood samples from the nest's sole chick, who was named Phoenix.

"Queenie" in her nest box at the Georgia-Pacific Broadway Facility in Green Bay, Wisconsin.

The team at the Broadway Facility wanted to continue providing peregrines with a safe, stable place to nest on-site after the demolition of the silo. At the end of the 2008 nesting season, a nest box was built in an appropriate location close to the original nest site. The team ensured that the nest box location simulates a natural outcropping with an updraft, which fledging falcon chicks need for their first flight. Peregrines have used the nest box and successfully bred each year since its installation.

Working with Wisconsin Falconwatch, the team bands the chicks each year and monitors the falcons' health and reproductive success using a combination of a nest cam, guarded viewing holes in the side of the box, and casual observations of falcon activity during the course of the workday. Since the program's inception, falcons at the site have produced 25 chicks — 10 from the original pair, Queenie and Elmo, and 15 from a new pair, Chloe and Elmo, that took over the nest box in 2012. As one of only 32 known nesting sites in Wisconsin, the Broadway Facility makes an indispensable contribution to peregrine falcon recovery in the state.

This program was first certified by WHC in 2014.

Populations of the peregrine falcon *(Falco peregrinus)* declined precipitously in the 1950s-70s due to the widespread use of pesticides like DDT, and in 1970 was listed as an endangered species under the U.S. Endangered Species Preservation Act of 1966 and its successor, the U.S. Endangered Species Act of 1973. The banning of DDT and other recovery efforts like captive rearing, training, and release of birds to the wild, combined with the peregrine falcon's ability to adapt to hunting and nesting in urban and industrial environments, enabled this species to bounce back from the brink of extinction. It was delisted from the federal Endangered Species Act in 1999 but, in some states like Wisconsin, recovery has not been as swift and the species is still protected at the state level.

WILDLIFE HABITAT COUNCIL℠

Partnering with regulatory agencies to save the American eel

Government agencies responsible for enforcing endangered species laws and regulations make productive partners for companies engaging in conservation activities for species of concern. They can provide the expertise needed to guide companies through the process of obtaining permits and can help identify opportunities for voluntary conservation activities. They can even provide hands-on assistance with the implementation of conservation activities.

Ontario's Ministry of Natural Resources (OMNR) is the agency responsible for protecting species of concern in the Canadian province of Ontario, under the authority of the Ontario Endangered Species Act. Under this act, species classified as endangered or threatened, as well as their habitats, automatically receive legal protection. Although the OMNR does not require permits for activities that protect or recover a protected species, the work must be registered with the OMNR and follow its guidelines. For example, all efforts must be made to minimize impacts on the species and its habitat, and all sightings of the species must be reported. In addition, certain activities such as capture-mark-return may have adverse effects on species or habitats and typically require a protection or recovery permit from the OMNR.

The Ontario Power Generation (OPG) R.H. Saunders Generating Station worked in cooperation with the OMNR for several decades to mitigate threats to American eels in the St. Lawrence River from the presence of the site's hydroelectric facility.

The OPG Generating Station is a hydroelectric facility situated on the St. Lawrence River and includes 53 acres of river habitat actively managed by the site's team, with assistance from partners such as Fisheries and Oceans Canada, Atlantic Veterinary College, Riveredge Associates and Kleinschmidt Associates. OPG primarily manages the river for American eels, which is listed as an endangered species by the province of Ontario and was discovered on-site during surveys.

From 2006-2010, OPG worked in cooperation with its partners to increase the species' breeding population in the river by stocking approximately 4 million juvenile eels, known as "glass eels" or elvers, in an upstream area away from the turbines. OPG continues to

OPG also supports eel habitat research at the St. Lawrence River Institute of Environmental Science.

monitor the effectiveness of this stocking effort, and has found that the stocked eels appear to be growing well and dispersing into new habitats.

To better help eels safely move past the station's turbines, the team installed improvements to an eel ladder including a substrate that provides eels with better traction for climbing the ladder, a covering over the ladder to increase darkness, and an extension 300 meters upstream that allows eels to exit the ladder into calmer waters.

A trap-and-transport effort was also implemented, in which adult eels are captured upstream of the dam, measured for size and health, and injected with a PIT (Passive Integrated Transponder) tag before being released downstream of the turbines. This allows monitoring of adult eels while reducing turbine strikes to eels moving downstream. A survey conducted twice per week from June to September tracks the benefits of the trap-and-transport effort by tracking injury and mortality rates in eels migrating downstream past the facility. Tagged eels continue to be tracked over time as they use the eel ladder, which was fitted with a PIT tag detector.

This OPG program has been WHC-certified since 2009.

The American eel *(Anguilla rostrata)* is a freshwater fish listed as an endangered species under the Ontario Endangered Species Act. Like most aquatic species, American eels are threatened by water development (dams, impoundments and other barriers). In fact, 91% of endangered fish are impacted by water development.[2] The Ontario Ministry of Natural Resources has a recovery plan for this species, with the goal to re-establish a healthy population of this species throughout its historical range in Ontario by 2150.

WILDLIFE HABITAT COUNCIL℠

Leading one of the largest black bear conservation efforts in Mexico

In Mexico, species of concern are protected primarily under the authority of the federal government, specifically by the Mexican Official Norm (NOM)-059, through the authority of SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales/Secretariat of the Environment and Natural Resources). However, there are still a number of challenges that have hindered the establishment of robust wildlife management initiatives and the enforcement of biodiversity protection laws in Mexico, including understaffing of agencies and a lack of federal funding for programs.[3] These challenges are not unique to Mexico; government agencies and conservation organizations around the world struggle with insufficient funding and resources for the protection of species of concern.

When these challenges limit protections for species of concern, corporate landowners play a vital role in protecting wildlife populations from illegal hunting, as well as in restoring lands degraded by historical mismanagement.[4]

CEMEX's El Carmen site in northeastern Mexico engages in a variety of conservation activities in cooperation with regulatory agencies to benefit endangered Mexican black bears and their habitat, creating one of the largest and most important black bear conservation efforts in Mexico.

The El Carmen site consists of 346,689 acres located in the north of the state of Coahuila, Mexico, and in the south of the state of Texas in the U.S. A significant portion of the property consists of the Big Bend-Rio Bravo transboundary biological corridor, which traverses the Mexico-U.S. border and provides a vital movement corridor for numerous species. The conservation program at El Carmen is focused on the conservation of local habitats and native mammals.

A Mexican black bear at the CEMEX El Carmen site in Coahuila, Mexico. Photo: Santiago Gibert Isern

CEMEX entered into an agreement with SEMARNAT to establish a Wildlife Conservation Management and Sustainable Utilization Unit (UMA) on CEMEX land to support the conservation and management of Mexican black bears. It aligns these efforts with the SEMARNAT Programa de Acción para la Conservación de la Especie, Oso negro americano (Action Plan for the American black bear). CEMEX works with local conservation experts to protect the bears from poaching with vigilant monitoring, and coordinates with local, state, and federal agencies to protect and manage the bears' habitat through prevention of forest fires, pest monitoring, protection of the Big Bend-Rio Bravo transboundary biological corridor, protection of temperate forest habitat, and maintenance of natural and artificial water sources. CEMEX also conducts extensive research of the bear population on-site, using scientific monitoring protocols and data analysis. This research has included population studies on the bears' DNA, movement and dispersal, sex and age ratios, reproductive rates, cub survival, habitat use, and diet. The CEMEX agreement with SEMARNAT also includes engaging in conservation education about black bears for local landowners and community members.

The program at El Carmen achieved WHC Conservation Certification in 2016.

One of the many species listed by SEMARNAT is the Mexican black bear *(Ursus americanus* subsp. *eremicus)*, which is designated as "in danger of extinction." Black bear populations in Mexico have decreased by 80%, and are threatened by illegal hunting and loss of habitat. They were officially listed in 1986, but protections such as a moratorium on hunting were in place before then.

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Protecting threatened and endangered plant species in the Yucatan

Although animal species of concern are often the focus of protection and recovery programs, plant species of concern are just as important to protect. The IUCN currently lists over 11,000 plant species as threatened, including 2,509 species that are critically endangered.[5]

Many endangered species lists include plants, but the associated regulatory framework does not extend the same measures of protection and recovery to plants that are given to animals. For example, the U.S. Endangered Species Act does not prohibit harming, killing or possessing listed plant species outside of federal lands, while listed animal species are protected wherever they are located. This discrepancy makes voluntary activities to protect endangered plants even more critical to their recovery.

Vulcan Materials Company's Cantera CALICA, located on Mexico's Yucatan Peninsula, participates in recovery efforts for several plant species of concern.

The facility in Playa del Carmen, Quintana Roo comprises 5,362 acres and includes habitats such as forested areas, gardens, rocky areas and lakes. Four plant species of concern and an additional 22 native plants are being preserved in greenhouses around the site. These species include Cuban cedar (Cedrela odorata), which is designated as "subject to special protection" in Mexico and listed in CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), as well as three species designated as "threatened" in Mexico, the buccaneer palm (Pseudophoenix sargentii), Florida thatch palm (Thrinax radiata) and Mexican silver palm (Coccothrinax readii).

The Florida thatch palm is designated as threatened in Mexico.

These four plants have been endangered for some time due to destruction of their habitat and illegal trafficking of the species, and recovery has been slowed due to low reproductive rates. SEMARNAT and CITES have designated these plants as species of concern, due to their commercial value and population declines resulting from habitat destruction and illegal trafficking.

The team at CALICA contributes to the recovery of these native plants be engaging in activities to assist in the plants proper reproduction and restoration. This includes a year-round program in which the team propagates the four plant species in a greenhouse and then transfers the greenhouse-grown plants to restoration areas both inside and outside the property, following all pertinent environmental protection policies established in Mexico. Vulcan engages in these activities through a voluntary agreement with the Secretary of the Environment, SEMARNAT, and the Federal Attorney for Environmental Protection in Mexico (PROFEPA), and regularly submits reports to these agencies about the project's progress. These agencies aim to maintain this project on a permanent basis. The project also contributes to the recovery of the region's plant species of concern by researching and monitoring the species' reproductive and survival rates.

Vulcan's CALICA conservation program was first certified by WHC Conservation Certification in 2016.

WILDLIFE HABITAT COUNCIL℠

Managing vulnerable species at a mine site

In addition to species of concern that receive federal and/or state protection, there are often species with conservation needs that are not yet protected. Companies can still engage in voluntary activities to protect these species, and there are programs to assist in these efforts.

A State Wildlife Action Plan (SWAP) exists for each of the 56 U.S. states and territories. One of the primary goals of these SWAPs is to not only protect endangered and threatened species, but to keep common species common.

Each SWAP includes a list of species that are not yet in danger of extinction, but have low or declining populations and would therefore benefit from conservation activities. These species are often indicative of the overall diversity and health of the state's wildlife. These species are classified with names like species of greatest conservation need (SGCN) and species of special concern. While not regulatory in nature, the SWAPs provide guidance and recommendations for management activities and regulation of species of concern that are not already protected by existing laws and regulations.

Many countries, such as Canada, have similar programs. While species classified as endangered or threatened on Ontario's Species at Risk List receive automatic protections, those classified as "species of concern" do not. This presents an opportunity for companies to engage in conservation activities that can make a positive impact on the recovery and restoration of the vulnerable species on their lands.

At the Freeport-McMoRan Morenci Mine in eastern Arizona, conservation projects include management for three species listed as SGCN in the state: Mexican free-tailed bats, Rocky Mountain bighorn sheep and burrowing owls.

The Morenci Mine spans over 50,000 acres that include active metal mining areas as well as cave, desert scrub, chaparral, mixed woodland and riparian habitats.

In 2010, working in collaboration with partners WHC, Bat Conservation International, the Arizona Game and Fish Department (AZGFD) and the Bureau of Land Management, a bat gate was installed over the entrance of Eagle Creek Bat Cave, once thought to be home to one of North America's largest colonies of

A displaced burrowing owl being placed in an artificial burrow as part of relocation program.

Mexican free-tailed bats. The gate prevents public access to the cave while allowing bats to freely move in and out. Bat use of the cave is monitored with techniques such as a thermal camera and imaging software to estimate the bat population with the help of the U.S. Army Corps of Engineers. At the time of the gate installation, the colony size was estimated at 30,000 bats. The cave currently provides roosting habitat for 1.8 million Mexican free-tailed bats.[6]

Rocky Mountain bighorn sheep have been managed since 2006 to allow sustainable hunting and wildlife viewing opportunities by the community, while also preventing vehicle collisions and other conflicts with site operations. For example, Freeport-McMoRan provided water catchment and storage devices for the sheep to use in safe areas. In addition, the on-site population is used as a source for approved translocations to other sites in Arizona. The team also works with AZGFD to monitor the sheep's movement and distribution patterns. At their peak, North American bighorn sheep numbers were estimated between 1.5 and 2 million.[7] Desert populations have since fallen to about 20,000 and Rocky Mountain populations are at about 45,000. Arizona's bighorn population is estimated at 6,000 animals.[8]

Burrowing owls are in decline in many parts of the western U.S. In an effort to protect the burrowing owl, companies like Freeport-McMoRan are implementing large-scale installation of artificial burrows, providing valuable and much-needed habitat for this unique and beautiful creature. One of the hallmarks of the project is the community engagement. Freeport-McMoRan has provided a variety of educational opportunities for hundreds of community volunteers who have assisted with burrow installation. They partner with Wild at Heart, a local rescue, rehabilitation and release center for birds of prey, to teach volunteers about burrowing owls and their habitat.

The Freeport-McMoRan Morenci Mine program has been WHC-certified since 2012.

Reducing risk with conservation plans and agreements

In the U.S. there are a variety of mechanisms companies can use to reduce risk if operating in areas containing critical habitat for rare or declining species.

A Safe Harbor agreement provides certainty for operations by setting conservation management expectations for a landowner which, when met, will shield the landowner from further expectations or requirements. Safe Harbor agreements are voluntary and applicable for single species already listed on the endangered species list. Candidate Conservation Agreements (CCA) and Candidate Conservation Agreements with Assurances (CCAA) provide opportunities for the federal government to work with private landowners to establish guidelines for species that are not yet listed but are in decline. These voluntary agreements are designed to create innovation in species management and incentivize private landowners to be actively involved in keeping such species from being listed. These agreements are also focused on single species.

Habitat Conservation Plans (HCPs) are required in many instances and can be focused on a single species or multiple species within a natural community. A HCP is required when a species or its habitat will be impacted in some way, which is known as incidental take. The main focus of an HCP is the habitat upon which the listed species depends. An HCP also includes the anticipated effects of the incidental taking and how they will be minimized or mitigated. Issuance of the incidental take permit makes the elements of the HCP legally binding.

HCPs as a regulatory and species protection tool have been demonstrated to have a significant positive impact on species recovery. Species with HCPs are more likely to show improvement in recovery status, less likely to experience decline than species without an HCP, and the recovery benefits are greater when species have larger plans.[9]

In addition to being used as part of the incidental take permitting process, HCPs can also include affected species that are not protected by law. This might include species that are candidates for listing or are otherwise considered sensitive in the region. Incorporating proactive voluntary conservation measures for these species into HCPs allows companies to stay a step ahead of regulations, reducing risk and uncertainty about necessary actions in the case of listing.

Grassland habitat at Waste Management's El Sobrante site in Corona, California.

The Waste Management (WM) El Sobrante Landfill and Wildlife Preserve in Riverside County, California is managed for multiple species on-site through the framework of an HCP, which it entered into with state and federal regulatory agencies. This agreement includes both listed species and unlisted but sensitive species.

The El Sobrante site spans 1,333 acres in southern California, and includes both active landfill areas and undisturbed open space. To protect the many rare and protected species that use the site, WM entered into an HCP in 2001. This agreement was carefully designed in cooperation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game to address impacts to 31 protected or sensitive species and their habitats during landfill expansion.

The agreement authorizes incidental take of the 31 species covered and provides measures to mitigate these impacts through the preservation of 688 acres of open space and restoration of an additional 617 acres on top of the closed landfill. It covers two protected species — the federally-endangered and state-threatened Stephens' kangaroo rat, and the federally-threatened coastal California gnatcatcher — as well as 29 other species that are considered vulnerable by resource agencies, and are included in the event that they are listed by the state or federal government during landfill expansion activities.

WM has implemented a number of projects targeting these species and their habitats with the help of local youth groups, including propagation of the rare many-stemmed dudleya plant, native wildflower and tree plantings, installation of artificial burrows for burrowing owls, trash cleanups and closure of illegal ATV trails to prevent further damage to the habitat.

WM also found success working with local conservation land managers experimenting with targeted sheep grazing to control invasive grasses, which significantly degrade habitat quality for the Stephens' kangaroo rat.

The program at El Sobrante has been certified by WHC since 2003.

WILDLIFE HABITAT COUNCIL℠

A call to action for corporate landowners

The case studies highlighted in this white paper, and the dozens more recognized by WHC Conservation Certification, demonstrate that companies from all industry sectors have the opportunity to implement reproducible models for the conservation of species of concern.

Although such conservation activities can lead to additional costs, companies can achieve a return on investment through improved reputation and the resulting benefits.[10]

Third-party recognition programs for these activities, such as WHC Conservation Certification, can be beneficial to companies in managing risk, communicating outcomes and meeting biodiversity goals. The WHC standard is designed to provide tangible data on company's conservation activities that go above and beyond compliance. In doing so, WHC Conservation Certification helps companies demonstrate a long-term commitment to managing quality habitat for wildlife, conservation education and community outreach initiatives.

At the beginning of the nineteenth century, there were between 1.5 million to two million bighorn sheep in North America. Today, there are less than 70,000.[11]

Corporate landowners can engage in the following actions to benefit species of concern

- Conduct biological surveys to find out which species of concern occur or might occur on-site.
- Download the WHC Species of Concern Project Guidance to assist you in designing a project that will have a meaningful conservation and education impact. The document provides guidance on how to build a sound conservation project, and strategies to help achieve stronger outcomes.
- Coordinate with regulatory agencies that oversee protection of species of concern to evaluate the suitability and potential of the project, and establish best practices.
- Implement species restoration and management activities that aid in, or contribute to, a species recovery goal.
- Demonstrate your species of concern environmental stewardship by seeking WHC Conservation Certification, a rigorous, third-party standard. Through the WHC Species of Concern theme, and at least as one other Habitat, Species, or Education and Awareness theme, WHC Conservation Certification recognizes and incentivizes voluntary conservation activities that benefit species of concern, such as habitat protection, habitat restoration and managed reintroductions.

Through conservation best practices during development, construction, operations and/or remediation, companies can make an important positive impact on the recovery and restoration of declining animal and plant species.

WILDLIFE HABITAT COUNCIL℠

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Download the Species of Concern Project Guidance and other Project Guidances at **wildlifehc.org/project-guidances**

Thank you to the Alliance for America's Fish & Wildlife for underwriting the production of this publication.

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WHC can help support species of concern conservation activities from the design and planning, to the implementation and management of a program. We do so through a framework that connects business drivers, stakeholder and community relations, and ROI to positive environmental outcomes. For more information, please contact us at strategyandplanning@wildlifehc.org.

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WILDLIFE HABITAT COUNCIL

Prioritizing Pollinators in Corporate America

How Companies Can Align Their Business Needs with the *National Strategy to Promote the Health of Honey Bees and Other Pollinators*

WILDLIFE HABITAT COUNCIL

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Corporate lands of all sizes and scopes can have the potential to implement pollinator projects and contribute to the goals of the National Strategy. *With thoughtful design, pollinator projects can meet business needs for site maintenance, employee and community engagement, and corporate goals for sustainability reporting.*

Contents

WILDLIFE HABITAT COUNCIL℠

Introduction

The White House's *National Strategy to Promote the Health of Honey Bees and Other Pollinators* (*National Strategy*), released on May 19, 2015, contains three overarching goals: the reduction in honey-bee colony loss during winter, the recovery of the monarch population to 225 million butterflies on wintering grounds in Mexico, and the restoration or enhancement of 7 million acres of land for pollinators.

The *National Strategy* contains items of research and best practices for land management on federal and non-federal lands, with particular interest in utilizing public-private partnerships to further the three goals. It also contains actions for education and outreach.

Recognizing that the federal government cannot achieve the goals of the *National Strategy* alone, public-private partnerships are highlighted as an important tool, and a commitment was made for the development of a public-private partnership plan.

The Wildlife Habitat Council (WHC) has been working with businesses of all types for over 25 years, facilitating and recognizing implementation of high-quality pollinator conservation projects on corporate lands. WHC understands the challenges and opportunities for creating high-quality pollinator habitat on lands whose primary purpose is not habitat, and recognizes the key role business can play to meet the goals of the *National Strategy.*

In this white paper, WHC will provide examples of how companies have taken action to protect pollinators, increase public awareness around the issue, and create pollinator-friendly habitat.

These examples are intended to provide inspiration and guidance for other landowners seeking to take actions to meet the goals of the *National Strategy.*

Why pollinators and their decline matters

Pollinators are species that feed upon the nectar and pollen provided by flowering plants, helping plants reproduce by moving pollen between flowers in the process of feeding. There are approximately 200,000 species of animals that act as pollinators, including bees, butterflies, moths, hummingbirds, beetles, wasps and flies. In some regions, vertebrates such as bats and other mammals, honeyeaters, sunbirds, snakes and lizards also serve as pollinators.

Pollinators are vital to the health and economy of the world, propagating wild flowering plants as well as many crops. Insect pollination is vital to food security, contributing to at least 35% of the world's food production and pollinating many other plants needed for beverages, fibers, medicines and spices. The value of their pollinating services, as well as the value of products like honey produced directly by pollinators, is estimated in the billions, with the value provided by insect pollination in the U.S. alone estimated at $40 billion.[1]

Across the globe, pollinator species are in decline due to a decrease in habitat available to them,[2] degradation and fragmentation of much of the remaining habitat,[3] reductions in floral diversity,[4,5] the effects of pesticide misuse, and a movement away from pollinator-friendly practices on both small, local scales and large, regional scales.[6] Not only does this trend impact the U.S. and global economy, pollinator declines are indicative of stresses to, and overall declines in, the health of the environment.[7] The loss of butterflies also impacts native bird populations, because 96% of North American bird species rely on insects — mainly caterpillars — to feed their young.[8]

Because of pollinators' links to food production in the U.S. and the associated impact of the loss of pollinators on the economy, President Barack Obama issued a memo establishing a joint task force on pollinators in June 2014. In May 2015, the joint task force released the *National Strategy*.

In the U.S., concern is for two types of pollinators: native pollinators like butterfly and native bee species, and cultivated pollinators like European honeybees whose importation into the U.S. helped establish its current system of food production. In the *National Strategy*, the monarch butterfly has been singled out for special attention due to a recent and rapid decline in the number of monarchs overwintering in Mexico.

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The *National Strategy* outlines three overarching goals for action by federal departments and agencies in collaboration with public and private partners:

1. Reduce honeybee colony losses during winter (overwintering mortality) to no more than 15% within 10 years. This goal is informed by the previously released Bee Informed Partnership surveys and the newly-established quarterly and annual surveys by the United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). Based on the robust data anticipated from the national, statistically-based NASS surveys of beekeepers, the Task Force will develop baseline data and additional goal metrics for winter, summer and total annual colony loss.

2. Increase the Eastern population of the monarch butterfly to 225 million butterflies occupying an area of approximately 15 acres (6 hectares) in their overwintering grounds in Mexico, through domestic and international actions, and public-private partnerships, by 2020.

3. Restore or enhance 7 million acres of land for pollinators over the next 5 years through federal actions and public-private partnerships.

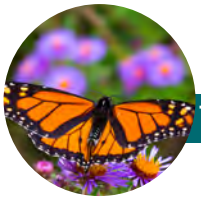
Becoming part of the solution: pollinator conservation on corporate lands

The simple act of installing pollinator-friendly habitat is at the core of the *National Strategy* and, unlike for other declining species of wildlife, this installation need be neither complex nor costly. Given the fact that pollinators do not require large acreages of undisturbed wilderness and that small patches of habitat can produce beneficial results, corporate lands of all sizes and scopes can have the potential to implement pollinator projects and contribute, in a meaningful way, to the goals of the *National Strategy*. With thoughtful design, pollinator projects can meet business needs for site maintenance, employee and community engagement, and corporate goals for sustainability reporting. In addition, education and outreach to communities can have a huge impact on personal actions outside of the corporate landscape, increasing the benefits to pollinators.

Following are examples of the variety of projects for pollinators that businesses can implement on their lands to meet the goals of the *National Strategy*, with examples of successful corporate conservation programs.

Small-scale pollinator gardens

Rights-of-Way as pollinator habitat



Targeting pollinator species of concern

Pollinator-friendly remediation

Pollinator education

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Small-scale pollinator gardens

The *National Strategy* pushes for improvements to the quantity and quality of overall acreage for pollinators. Among the many habitat types it discusses, the strategy includes support for the creation or enhancement, on both public and private lands, of pollinator gardens that target monarch butterflies.

One of the most common projects for pollinators in the portfolio of WHC Conservation Certification programs, i.e., programs that have passed a stringent review to receive Conservation Certification, is the pollinator garden. Pollinator gardens are usually small in scale but still of real value to pollinators. They demonstrate how small areas can provide usable habitat for pollinators, which being generally small, winged and highly mobile, are able to use small patches of habitat within their flying ranges to piece together a complete habitat.[9] Bees seem particularly willing to use small patches of habitat.[10] The natural behavior of many pollinators includes traveling frequently between feeding and nesting sites.

Even gardens in more developed areas, such as corporate sites in urban settings, can help boost pollinator diversity and population size. When gardens in these settings incorporate plants that target bees, for example, they can predictably increase bee diversity and abundance.[11] Gardens planted with milkweed have been shown to be effective in helping monarch populations, and may even be preferred over natural areas as egg-laying sites by female monarchs.[12]

As with all programs that have achieved WHC Conservation Certification, PPG's Monroeville Business & Technology Center in Monroeville, Pennsylvania went through a stringent certification process.[13] This program's pollinator projects meet two of the goals set forth in the *National Strategy*, namely increasing pollinator habitat and conserving monarch butterfly populations:

At the Monroeville Business & Technology Center, a long-standing program certified with WHC since 2000, a pollinator garden and a patch of milkweed planted along a nature trail provide valuable pollinator habitat and educational opportunities in an outdoor classroom setting for employees and community members. The pollinators supported by these habitats in turn provide food for eastern bluebirds, which utilize the nest boxes surrounding the garden. One of the

program's ongoing challenges is the dry, poor quality soil, which makes it difficult to maintain a thriving garden. Instead of constantly replacing the plantings, the team tries to address this problem by reducing other factors that limit plant growth, focusing on weeding, cutting back the previous year's growth each spring, and letting vegetation grow naturally. The positive impacts to pollinators are enhanced by educating the community about these species, with lessons for students about the life cycle and migration of monarch butterflies, celebrations for National Pollinator Week, and a "lunch and learn" workshop about butterfly identification for employees.

The ITC Corporate Headquarters near Detroit, Michigan is an award-winning model of pollinator gardens that also meets both of these goals:

At the ITC Corporate Headquarters, certified with WHC since 2010, the program's team has maintained several garden projects targeting pollinators, with over 1,000 native plants installed in these gardens since 2009. One of the projects is a butterfly garden that includes milkweed plantings for monarchs and is a registered Monarch Waystation. The team also installed bee blocks to provide nesting habitat for wild bees and signage to educate employees and community members visiting the garden. Reduced chemical usage throughout the site further benefits pollinators. Leading to the success of these gardens was a well thought-out planning process that took into account the ecology and habitat needs of local pollinators and integration with other projects on-site, as well as regular follow-up monitoring to assess the gardens' success and benefit to pollinators. Working with knowledgeable contractors further aided the gardens' success. When time constraints and low availability of ITC employees turned garden maintenance into a challenge, the team hired outside contractors to maintain the gardens to ensure they continued to provide value, though employees are still encouraged to help with weeding on regularly scheduled workdays.

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Rights-of-Way as pollinator habitat

On the opposite end of pollinator projects from pollinator gardens are those that restore pollinator habitat on a large scale, such as conversion of rights-of-way (ROWs) to pollinator habitat. ROWs are an ideal industrial application for creating pollinator habitat. It is not surprising, then, that the *National Strategy* places particular importance on the potential of ROWs for expansion of pollinator habitat because "they constitute large land acreage on a cumulative basis, are generally maintained in sunny areas with low vegetation height (ideal pollinator habitat), and often extend for considerable distances, thereby potentially acting as corridors for species movement and adaptation to climate change."[14] Powerline ROWs alone have the potential to provide 5 million acres of bee-friendly habitat in the U.S., given appropriate management,[15] and when managed correctly can support rare and unique bee species that heavily-reforested areas cannot.[16]

ROWs managed for pollinators enhance habitat connectivity in areas with limited amounts of available pollinator habitat. Habitats connected by ROW corridors have been shown to support greater densities of butterflies than isolated habitat patches.[17]

WHC works with a number of companies that maintain ROWs as corridors for electrical transmission, natural gas pipelines, railroads and other purposes.

Exelon's BGE Rights-of-Way Environmental Stewardship Program in Howard County, Maryland has used research to show that native bees respond positively to the use of Integrated Vegetation Management (IVM) as a habitat management strategy on ROWs:

For Exelon's BGE Rights-of-Way Environmental Stewardship Program, two locations served as pilot sites for IVM implementation, with the positive results leading to implementation of IVM on other rights-of-way within BGE's network. This program, certified with WHC since 2011, focuses on the use of IVM to control invasive species and restore native early-successional plant communities. These restored communities provide valuable habitat for a variety of native bees, butterflies, birds and other wildlife. Research conducted with the help of the United States Geological Survey (USGS) demonstrated the value that restored native communities provided to native bees. The use of knowledgeable partners and contractors for project implementation, as well as the application of follow-up monitoring on the response of plant and animal communities to IVM, helped this program overcome the challenges of maintaining low-growing vegetative communities along BGE's ROWs and ensure it succeeds in providing conservation value over the long term. Building support within the local community by holding meetings and giving presentations about the program further contributed to its success as a pilot program by addressing local concerns about tree removal.

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Targeting pollinator species of concern

Conservation efforts to protect species of concern (species designated as threatened or facing decline) and their habitats are of particular importance because these species face high risk of further population losses or extinction. Extinction is defined as a permanent loss of biodiversity and any aesthetic, ecological, educational, historical, recreational and scientific value that species provided to natural and human systems. The loss of species also causes an imbalance in the ecosystems where they lived, particularly if that species was highly specialized, and its ecological role cannot be filled by another species.

Half of the species listed as endangered or threatened under the U.S. Endangered Species Act maintain at least 80% of their habitat on private lands. Businesses with, or the potential of, pollinator species of concern occurring on their lands, can play a significant role in the conservation and recovery of these species.

Conservation of the monarch butterfly is singled out in the *National Strategy* as one of the three goals for pollinator conservation efforts, due in large part to the significant and rapid decline this species has experienced over the past decade. In the past two winters, the monarch butterfly migration sank to the lowest recorded levels, with an imminent risk of population failure.[18] Corporate lands of all types can help support breeding and migrating monarchs; even small pollinator gardens planted with milkweed can play a viable role in monarch conservation.[19]

The General Motors Detroit-Hamtramck Assembly Center, located in urban southeast Michigan, is an example of a typical corporate conservation program that includes a project targeting monarchs and that has successfully moved through WHC's rigorous Conservation Certification process:

Certified with WHC since 2006, the GM Detroit-Hamtramck Assembly Center program includes a 20-acre grassland that specifically targets monarch butterflies and other pollinators with plantings of milkweed and other nectar-bearing plants, as well as native warm-season grasses, and control of invasive species. In addition to pollinator habitat, it provides other benefits such as habitat for birds and bats, improved aesthetics for the property, and improved water quality and stormwater infiltration. The grassland habitat was installed to replace turf grass, not only to benefit pollinators but to also help address stormwater management issues experienced on-site. Several factors contributed to its success as a valuable pollinator habitat, including the exclusive use of native

species in plantings, the elimination of insecticide use in the area, and working with knowledgeable contractors who could effectively implement project activities. The team also took advantage of an opportunity to expand the grassland from 16.5 to 20 acres in 2011-2013 when soil from a parking lot expansion became available for use in grading the remaining 3.5 acres. This team's efforts meet the National Strategy's *goals to conserve monarchs and increase pollinator habitat.*

The program at Pacific Gas & Electric (PG&E) Tulare Hill Safe Harbor Agreement Habitat Restoration Site in Santa Clara County, California is working to conserve the endangered Bay checkerspot butterfly and its habitat, utilizing partnerships with other local private and public entities working toward the same goal:

PG&E's Tulare Hill Safe Harbor Agreement Habitat Restoration Site, certified with WHC since 2002, has largely been successful due to its use of a voluntary Safe Harbor Agreement (SHA) and collaboration to protect and restore an endangered pollinator species and its habitat while also ensuring the continued safe transmission of electricity. When grazing on the property was halted in the early 2000s, PG&E discovered that invasive grasses began proliferating on-site, impacting the federally-threatened Bay checkerspot butterfly and the California serpentine grassland it relies upon. Collaboration with the U.S. Fish and Wildlife Service (USFWS) and other organizations in the area led to the development of the SHA, making it possible for the team to continue maintaining the transmission towers on site while also protecting and restoring habitat for the Bay checkerspot butterfly. As part of the SHA, grazing was reinstated on the property in a more restricted fashion to help control invasive grasses and promote the growth of native plants. In addition to benefitting biodiversity, this arrangement benefits the local cattle rancher and the local economy by increasing cattle grazing opportunities. With the renewal of the SHA in 2013, the team expanded its conservation efforts by collaborating with local entities such as the Waste Management Kirby Canyon Recycling and Disposal Facility – another WHC-certified program with California serpentine grassland and a thriving population of Bay checkerspot butterflies – to translocate 5,000 larvae and 60 adults from the Kirby Canyon site to the serpentine grassland at the Tulare Hill site and a neighboring property, greatly enhancing connectivity among the three sites. PG&E then provided a grant to the Silicon Valley Land Conservancy to support follow-up monitoring of the reintroduced butterflies.

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Pollinator-friendly remediation

Among the many approaches for public-private partnerships discussed in the *National Strategy*, implementing more pollinator-friendly practices on cleanup sites is noted as an important route. The U.S. Environmental Protection Agency (USEPA) has already issued new "green remediation" guidelines that include considerations for land management and ecosystems protection in remediation or site cleanup projects. The *National Strategy* notes that remediation, as well as other related actions such as green infrastructure installation and landfill capping, offers an opportunity to benefit pollinators. Using pollinator-friendly plantings as part of remediation will align with the USEPA's new guidelines, save land managers on long-term maintenance costs, and support beneficial reuse of the property.

A number of corporate conservation and education programs with pollinator projects are implemented on cleanup sites. For the Boeing Company's Pollinator Prairie, this former Superfund site in northeastern Kansas was transitioned into a community asset that provides recreational opportunities, pollinator habitat, and pollinator education opportunities:

Certified with WHC since 2011, the Boeing Company's Pollinator Prairie engages community members of all ages in pollinator education. The pollinator gardens on-site, which are maintained entirely by local Master Gardeners and other volunteers, provide the community with a working example of pollinator habitat and demonstrate the importance of pollinators. Transition of this former Superfund site into reuses for pollinator habitat, recreation and education meets the post-remediation needs for the property and enhances community support for the site. Partnerships and community volunteers are a cornerstone of this program, which has no on-site employees to implement or maintain projects. A local Master Gardener organizes all of the volunteers for garden maintenance and other workdays, as well as for educational events like National Pollinator Week and the monarch migration celebration. Experts from the Pollinator Partnership and Monarch Watch also assisted with development and implementation of the program, helping with activities such as design of educational signage, plant selection and development of the site's management plan.

Pollinator education

The *National Strategy* recognizes the importance of education and outreach in pollinator conservation. Such efforts help to increase awareness of the importance of pollinators, educate on how to help their declining populations, and generate an understanding that pollinator conservation is a shared responsibility of every person in the nation.

Among the education and outreach approaches discussed by the *National Strategy* are those commonly integrated into WHC Conservation Certification programs including hosting National Pollinator Week and National Public Lands Day events for the local community, working with schools to provide pollinator education activities that link to the school's learning standards and goals, engaging youth and families in informal pollinator education activities, training employees on the use of pollinator-friendly practices in land management, and preparing future pollinator scientists through STEM-based education initiatives.

Education about pollinators and other conservation topics feature prominently in pollinator projects at the Waste Management Bucks County Landfills in Bucks County, Pennsylvania:

At the heart of the success for the Bucks County Landfills Intergenerational Pollinator Partnership Project is a strong partnership between the program (certified with WHC since 2001), schools in the Pennsbury School District, and the Falls Township Senior Center. The partners constructed pollinator gardens at the Waste Management facility, at Pen Ryn School, and at the Falls Township Senior Center. Installation of these gardens was met with many challenges, including the loss of trees and delays of installation due to Hurricane Sandy and other severe weather, and receipt of an incorrect seed mix that included several aggressive and invasive species. The team and partners met these challenges well, replanting trees at the site and hand-pulling the unwanted species from the gardens. These gardens now provide participants with hands-on learning opportunities that correlate with learning standards for students and opportunities for day-to-day interaction with nature, as well as creating pollinator habitat connected by similar conservation objectives. In addition, the garden (or "learning laboratory") at the Bucks County Landfills meets Americans with Disabilities Act (ADA) standards, ensuring that students, employees and visitors of all abilities can enjoy the gardens.

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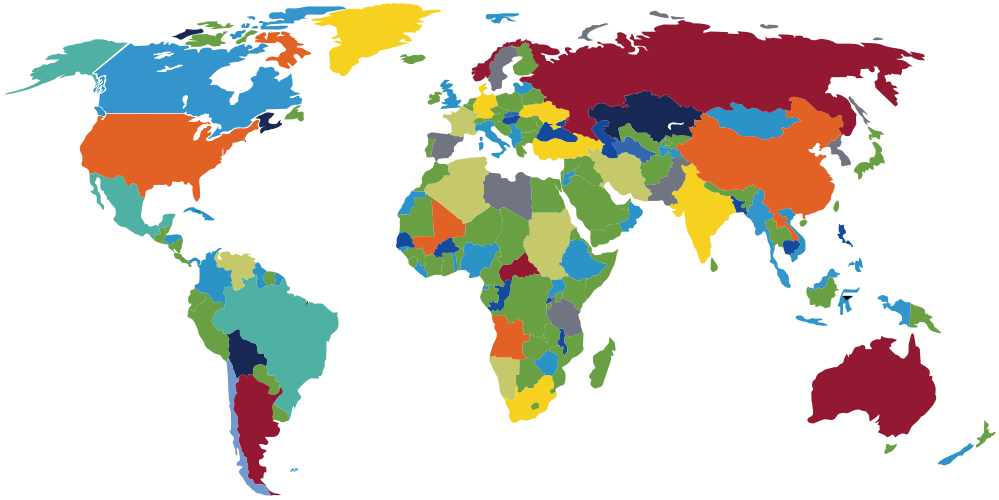

Corporate pollinator projects outside the U.S.

While the strategies outlined in this white paper and the *National Strategy* are targeted to facilities in the U.S., many of them are applicable for implementation outside the U.S. Corporations working outside of the U.S. can also refer to pollinator strategies and initiatives created for their particular nation or region, such as Australia's Pollinator Protection Initiative, the United Kingdom's *The National Pollinator Strategy: For Bees and Other Pollinators in England*, the pan-European SUPER-B initiative, or the African Pollinator Initiative. The profusion of pollinator conservation organizations and initiatives around the world signify the urgency of creating more pollinator habitat on corporate landscapes.

A call to action for corporate landowners

The *National Strategy* establishes a clear expectation that corporate landowners will participate in the "'all hands/all lands" approach to effectively manage pollinator health. The goal of restoring 7 million acres of land for pollinators over the next 5 years cannot be met without the participation of corporate lands. The examples in this white paper show that pollinator conservation programs can be as varied as the lands available for implementation.

The following are first steps a landowner can take to contribute to the *National Strategy* and increase habitat for pollinators:

- Assess the size and location of the land available for pollinator projects. Whether it is a small rain garden or a large prairie, size is not an issue as pollinators can thrive in a wide range of habitat sizes.
- Determine what regulatory or operating restrictions may impact your ability to plant pollinator-friendly species and attract pollinators to your lands.
- Download the free WHC Pollinator Project Guidance to assist you in designing a project that will have a meaningful impact on pollinators. The Project Guidance describes how to build a sound pollinator project and describes strategies to strengthen programs for greater outcomes.

In addition, by seeking WHC Conservation Certification for a program, a corporate landowner will demonstrate that their efforts have met third-party standards and can be counted toward the 7 million acre goal.

Pollinator projects need not be complex or expensive, and in this critical case of pollinator species with rapidly declining populations, every act of conservation matters, and every act will make a difference.

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Prioritizing Pollinators in Corporate America
How Companies Can Align Their Business Needs with the *National Strategy to Promote the Health of Honey Bees and Other Pollinators*

WHC can help identify opportunities for pollinator projects on corporate lands and develop strategies that will mainstream biodiversity into operations. If you're interested in exploring these opportunities, please contact us at strategyandplanning@wildlifehc.org.

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Lehigh Hanson, Inc. is one of North America's largest manufacturers and suppliers of construction materials. Our core products of aggregates and cement are the key raw materials used to make concrete. In our industry, we rely on the earth's raw materials and natural resources for our livelihood. It is an extractive and energy intensive process. Consequently, it is extremely important that we operate our businesses in a socially and ecologically responsible manner.

From maximizing our use of alternative fuels and raw materials in our cement plants, to energy reduction programs in our aggregates, ready mixed concrete and asphalt facilities, we are committed to lowering our carbon footprint and reducing our reliance on fossil fuels.

At our production facilities throughout North America, we continue to reduce our energy intensity and lower emissions. We are proud that many of our cement plants have earned the U.S. Environmental Protection Agency (EPA) ENERGY STAR® certification for superior energy management. In addition, many of our aggregates plants have achieved the ENERGY STAR Challenge for Industry by reducing their energy intensity over 10 percent within one year. Our Mission Valley Rock plant in Sunol, California was the first aggregates plant in the U.S. to achieve the ENERGY STAR Challenge for Industry.

While we depend on the earth's resources for our products, we also ensure that our sites are safe and that we protect habitats during the life of our operations and beyond. We also work closely and transparently with our neighbors and stakeholders. I am pleased with the progress we have made, but we must continually look for ways to improve our performance. Not only is it the right thing to do from a corporate social responsibility standpoint, it is an essential part of growing our business going forward.

Patrick James
Vice President, Environment, Safety and Health
Lehigh Hanson

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Introduction

Nature is the original engineer. It harnesses solar energy for food, heals itself through growth, and has a wide variety of security systems to protect against predators and other invaders. Many biological-engineered solutions are species-specific, but at a macro level nature also engineers solutions that benefit a wide range of species, including humans. Today, when nature is a key component of a human-engineered solution, it is called green infrastructure.

Green infrastructure is an approach to mitigating environmental challenges using living-engineered solutions - vegetation, soils and natural processes – or other constructs. Most frequently, green infrastructure is used to meet the challenge of stormwater management, using vegetation to slow, filter and absorb runoff. Additional challenges that can be met with green infrastructure might include thermal insulation for buildings, carbon sequestration, and reducing wildlife-vehicle impacts on roadways. Green infrastructure might consist solely of green space, as in a rain garden, or can involve a creative combination of vegetation and engineered features, such as with green roofs.

While some definitions of green infrastructure are broadened to contain all of nature, this white paper will focus on engineered solutions.

Like most engineered solutions, thoughtful design can enhance the experience and improve the outcome. A basic rain garden may mitigate stormwater runoff, but a well-designed rain garden using a diversity of native flowering plants can also provide habitat for birds and insects where such habitat is scarce. When considering the urban canopy, not all trees offer equal shade opportunities and not all trees are equal when it comes to providing for the birds, bats and other species that forage, nest and roost in trees. A green roof can be designed to contain a narrow list of plants resilient to a harsh environment, or it can be designed for seasonal interest and maximum habitat benefit.

In fractured landscapes where nature remains only in small, managed patches, green infrastructure provides an opportunity to not only mitigate environmental concerns but also to increase green, productive places across the built environment.

The implementation of green infrastructure solutions has been driven mostly by government, led by wastewater agencies and sustainable development groups, and focused on the public realm. Business can contribute effective solutions and innovation in this arena. Every parking lot at an office location or manufacturing site can be transformed with rain

A well-designed rain garden can provide habitat for birds and insects where such habitat is scarce.

gardens. Every operations facility can use bioswales to address intermittent or cyclical flooding events, and every single corporate location can benefit from an expanded tree canopy. Well-designed green infrastructure solutions are resilient and cost-effective, requiring less maintenance than typical hardscape solutions. In jurisdictions with taxes on stormwater runoff, green infrastructure solutions save money by reducing the tax burden.

There are numerous strategies that can be used for integrating green infrastructure into commercial, industrial and other corporate landscapes. While the specific techniques, project scale and designs will vary from location to location, the principles of green infrastructure are universally applicable. Therefore, green infrastructure is remarkably versatile as a solution for corporate landscapes.

The following pages describe some of the more common types of green infrastructure projects, with accompanying case studies of corporate conservation programs that have successfully applied these solutions and passed the rigorous review process of WHC Conservation Certification.

Each case study will demonstrate how the private sector can mitigate environmental concerns while increasing green, productive spaces across the built environment.

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Rain gardens

One of the most commonly-implemented types of green infrastructure is the rain garden. Rain gardens are planted landscapes designed to collect, filter and treat stormwater runoff. The water quality benefits of rain gardens have been well-studied — rain gardens have been shown to remove suspended solids,[1] oil and grease,[2] excess nitrogen[3] and several heavy metals[4] from runoff.

When their design incorporates native vegetation, rain gardens can greatly benefit biodiversity; pollinators and songbirds can benefit from the nectar, seeds, berries, leaves, stems, and cover provided by the native plants in rain gardens.

Rain gardens are a versatile project for corporate facilities — they can be designed in a variety of shapes and sizes to fit a site's stormwater management needs, available space and desired landscaping aesthetic.

Rain gardens are also very accessible for employee volunteers. While the design requires engineering knowledge to facilitate adequate stormwater management, the resulting garden is a concept with which most people have some familiarity, making it easier to encourage employee involvement in installation and maintenance.

Monsanto's Chesterfield site in Missouri includes a rain garden designed specifically to benefit monarch butterflies and other pollinators.

Chesterfield, the company's global hub for research and development and agricultural innovation, comprises 210 acres adjacent to the Missouri River. A $400 million expansion, which began in 2013, offered many opportunities to create green spaces, including several rain gardens that were created to address stormwater runoff following the construction of a new parking garage and building.

The project team aligned its efforts with Monsanto's company-wide commitment to monarch conservation and with local initiatives for pollinator conservation. Employees planted the rain gardens with native wildflowers, including 100 milkweed seedlings to benefit monarch butterflies.

The team engages local middle school students in education about green infrastructure and stormwater management, including a project in which the team helps students develop stormwater management designs, sharing real-world experience and offering advice on best practices.

Students from the Grand Rapids Child Discovery Center at the Wayland Warehouse during an educational field trip.

Two ITC facilities, the Wayland Warehouse and the Belleville Warehouse on Michigan's southern peninsula, have installed rain gardens using similar strategies.

The Wayland and Belleville conservation programs, both of which have been WHC-certified since 2014, are focused around rain gardens that help manage stormwater runoff while also providing habitat. These rain gardens were similarly designed and installed with the assistance of landscape contractors. A mix of sand, compost, topsoil and mulch was used to support plant growth as well as provide adequate drainage to capture runoff. Both gardens were planted with native vegetation that provides valuable food and habitat cover for wildlife such as pollinators and songbirds. The plant species were chosen for their aesthetic value and for their tolerance of fluctuating conditions. The site teams added nest boxes for chickadees and wrens, and nest tube bundles for native bees to further benefit wildlife using the garden. The two teams also partnered to present educational workshops about the rain gardens for local schools and community groups.

At the 20-acre Belleville property, the rain garden encompasses 4,600 square feet and is designed with three basins to intercept and filter stormwater runoff from the building's roof and parking lot. The garden was initially planted with over 1,100 native wildlife-friendly plants, including swamp milkweed, purple coneflower, black-eyed Susan, and little bluestem, and an additional 64 plants were added in 2016. The garden was installed in June 2012, and the site's landscaping contractors continue to monitor and maintain it monthly.

The rain garden at the 9-acre Wayland Warehouse facility comprises 700 square feet and is designed to capture thousands of gallons of stormwater runoff from the building's roof. The garden was installed in 2012 and was expanded in 2016 with an adjoining 1,200-square-foot upland garden. The plant species selected include pollinator-friendly species such as purple coneflower, boneset, sneezeweed, blue flag iris, cardinal flower, great blue lobelia, marsh blazing star, and black-eyed Susan. The team also added signage about the garden's benefits to wildlife and water quality in April 2013. A landscaping contractor monitors and maintains the gardens monthly during the growing season.

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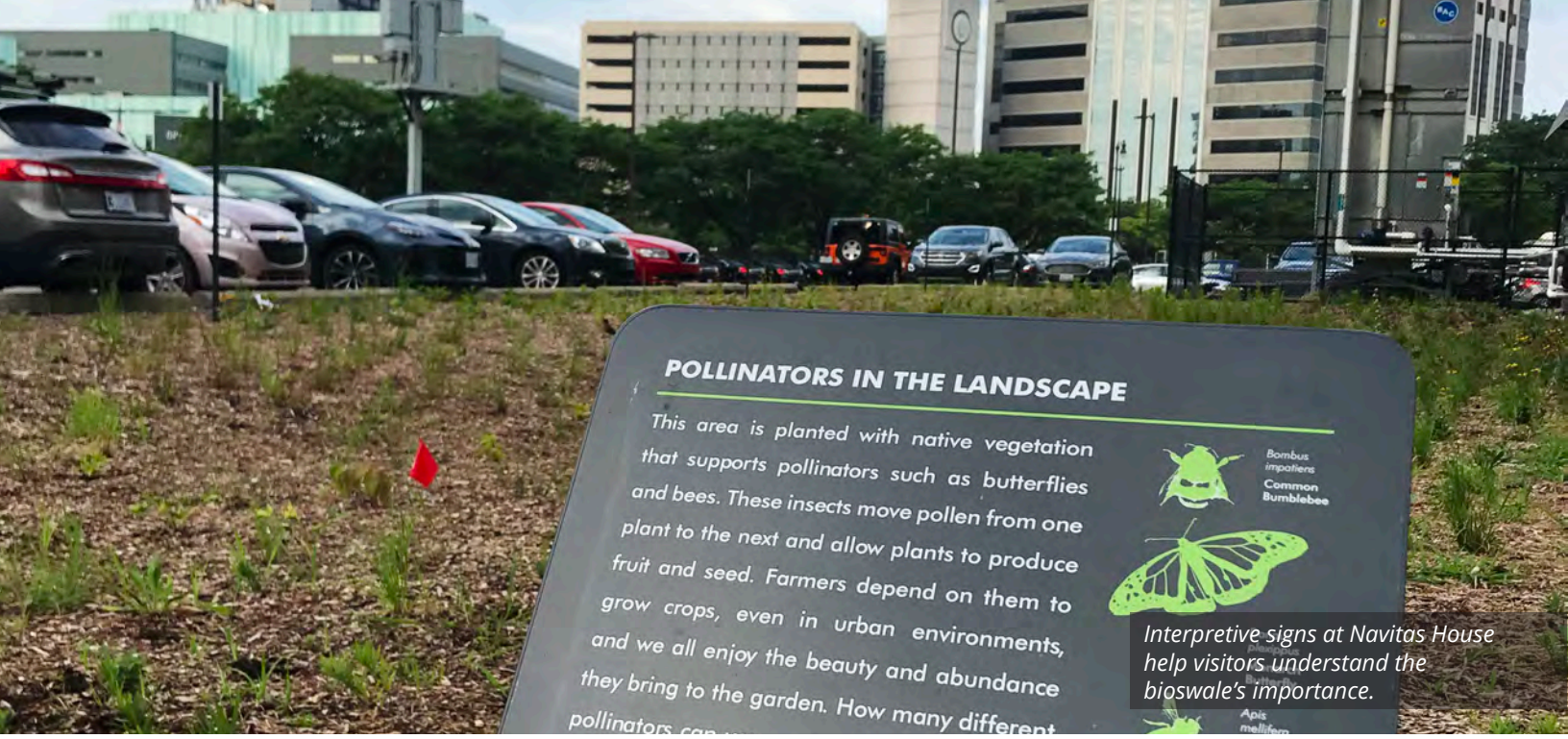
Bioswales

Bioswales are vegetated channels that retain and treat stormwater runoff as it moves from one place to another. Although bioswales provide a bioretention function similar to rain gardens, they are designed as linear features with a gentle slope that allows runoff to flow through the swale, rather than as depressions for simply collecting runoff. They sometimes connect to an overflow feature such as a detention pond in case of heavy rainfall.

Planting native, deep-rooted vegetation in a bioswale enhances both its stormwater management and biodiversity values. The native plants slow and filter runoff, and encourage infiltration as it flows through the swale, while also providing valuable food, shelter and breeding habitat for a variety of wildlife species.

As linear features, bioswales are well-suited for construction alongside parking lots and roads. Many corporate facilities already have grassy or gravel swales present near parking lots or other runoff-prone areas. These swales can easily be converted to bioswales with the addition of native grasses, wildflowers and shrubs, enhancing their effectiveness at managing stormwater while also creating valuable habitat for pollinators, songbirds and other wildlife.



Interpretive signs at Navitas House help visitors understand the bioswale's importance.

At DTE Energy's Downtown Detroit Headquarters Complex in Michigan, rehabilitation of an old building in a densely developed area of the city presented an opportunity for creating a bioswale to help manage stormwater runoff.

Located on 20 acres in downtown Detroit, the site's conservation program includes Navitas House, a three-story, 32,000 square-foot Art Deco building that was purchased in 2012 as part of DTE Energy's investment in the community. The renovation of Navitas House, home to 140 employees, included installation of a 6,000-square-foot bioswale. The bioswale was planted with numerous grasses and wildflowers, all of which are native to Michigan and were selected for their value to pollinators and birds. In such a densely occupied area of the city, the bioswale provides an important pocket of habitat. It also lifts some of the burden of stormwater management from the already-stressed city wastewater system by filtering and absorbing runoff from the area around Navitas House.

The Navitas House bioswale location is highly visible and well-trafficked by employees, area residents and visitors alike. Interpretive signs help visitors to the site understand why such green solutions are important in an urban setting.

The site stands as a symbol of DTE Energy's urban revitalization efforts in Detroit and the neighborhood the company has called home for more than a century.

The conservation program at Navitas House has been WHC-certified since 2000.

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Green roofs

Green roofs, also called living roofs and vegetated roofs, are roofs that are partially or completely covered with vegetation. Green roof designs generally include a layer of soil or other growing medium and hardy vegetation that can withstand extreme conditions on a roof, as well as other components to protect the building below and direct excess runoff. The vegetation and growing medium together help to absorb rainfall, slow the remaining runoff, and filter out pollutants.[5] For example, green roofs can absorb nitrogen, and some designs appear to rapidly neutralize acid rain.[6]

Green roofs also reduce energy costs by providing shading, evaporative cooling, and interception of sunlight. This benefit is often overlooked and undervalued, but computer modeling indicates that as climate change raises building surface temperatures, green roofs will make a dramatic difference in mitigating this increase, particularly in urban centers with little green space.[7]

Furthermore, green roofs can provide biodiversity benefits. Even in urban areas, green roofs planted with native vegetation can attractive native bees. This benefit is multiplied when there is additional green space nearby that also provides habitat.[8]

Buildings of all types are suitable for green roof applications, including those in commercial, industrial and highly urban settings.[9] New construction can be enhanced by incorporating a green roof into the building design, and many existing buildings can even be retrofitted with certain types of green roof designs.

Exelon's Pepco WaterShed Center for Sustainability in Rockville, Maryland is a model home designed to demonstrate green infrastructure and sustainable building features, including a green roof.

The conservation program at the Pepco WaterShed Center for Sustainability is centered around a 900-square-foot building which was constructed by students from the University of Maryland. It is designed to serve as an educational demonstration of a sustainable home, including water- and energy-saving features inside the home and green infrastructure

This Pepco model home is designed to serve as an educational demonstration of a sustainable home.

features incorporated into the landscape. The model home includes a 400-square-foot green roof that helps to absorb and filter rainfall. Excess rainwater is directed to the constructed wetlands, which helps to further filter out pollutants. The green roof is planted with six different varieties of native, drought-resistant sedum, which provide valuable habitat for pollinators. The employee team assists graduate students from the University of Maryland in collecting research data on the green roof's water and energy balance. Among their findings, the team has found that plant cover on the roof reduces the summer roof temperatures by 20° to 60° Fahrenheit. The green roof's habitat is complemented by using native species in the site's rain garden and constructed wetland.

Education is an integral component of this program. The team uses the building to teach students and visitors about topics such as sustainable living, wetland habitats, recycling, energy and water conservation, erosion caused by stormwater runoff, and how runoff from pervious surfaces differs from runoff from impervious surfaces. The program was first certified by WHC in 2014.

Although green roofs like this one are most commonly planted with sedums due to their hardiness, simple growth needs and high evapotranspiration rates, the use of only one type of plant limits a green roof's benefit to local biodiversity. This is particularly true in locations with no native species of sedum. Fortunately, advances in green roof technologies mean companies can use a greater range of vegetation in their green roofs. Projects such as the green roof at the American Society of Landscape Architects' headquarters in Washington, D.C.,[10] as well as studies of green roof vegetation,[11] demonstrate that many other types of plants such as cacti, grasses, vines and wildflowers can also be successfully used to create functional green roofs that are both attractive and wildlife-friendly.

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Green walls

Green walls can integrate habitat into building design without occupying valuable space.

Green walls, also called living walls, are walls that are partially or completely covered by vegetation, using soil or another growing medium to facilitate vegetative growth. They provide many of the same benefits as green roofs, helping to absorb and filter rainwater and greywater, reduce energy costs for heating and cooling of the building, and improve air quality.

Green walls that utilize native vegetation provide a creative way of integrating habitat into building design without occupying valuable space. This can be particularly important in an urban context where land for green space is limited.[12]

Green walls come in a variety of designs, from simple climbing vines growing up a wall, to more complicated modular and hydroponic systems.[13]

Green walls need not be expensive or complicated, as evidenced by the team at Bridgestone Americas Neumaticos de Monterrey. They partnered with schools to create low-cost green walls using native species and readily-available materials.

The Bridgestone Neumaticos de Monterrey conservation program encompasses 190 acres in the town of Ciénega de Flores in northern Mexico. The site team works both on and off the property to restore the submontane scrub ecosystem, engaging families and students in habitat enhancement projects that also incorporate education. For one of these initiatives, the team collaborates with local educators to create green walls at schools using recycled plastic bottles and native plants grown in the facility's greenhouse. Students help collect and decorate the bottles, and plant them with vegetation and a mixture of soil, compost, perlite, and peat moss before hanging them on an exterior wall of the school.

At the first green wall installation, over 300 students and parents participated, creating a 3'x8' green wall with 120 native pollinator-friendly plants. The team has since partnered with an additional 350 student and parent volunteers to install green walls and native tree plantings at two other schools in the area.

The biodiversity and sustainability goals of the green walls at each school are complemented by native landscaping such as gardens or tree plantings. The team uses the installations to teach the students about pollinators, the three Rs (reduce, reuse and recycle), responsible consumption, carbon dioxide emissions, and climate change.

More ways to implement green infrastructure to meet environmental challenges and benefit biodiversity

In addition to the green infrastructure projects already being implemented as part of WHC Conservation Certification programs—rain gardens, bioswales, green roofs and green walls—there are many more ways to implement biodiversity-friendly green infrastructure solutions to meet environmental challenges on corporate landscapes, including:

- **Curb cut-outs and stormwater planters** turn curbside trees and gardens into pockets of habitat that collect and infiltrate runoff from streets and sidewalks, while also providing shade and improving air quality. Although typically implemented along municipal roadways, this style of green infrastructure could be easily adapted for the roads and parking lots inside corporate property lines.
- **Strategic tree plantings** can provide many benefits, including improved air quality and temperature regulation, as well as important nesting and foraging habitat for a variety of animals. Native trees with high wildlife value could be strategically planted in locations across corporate landscapes to reduce building and road surface temperatures in the summer, decreasing the energy demands for air conditioning in buildings and cars. Evergreen trees can also provide a buffer against cold winter winds, reducing the energy needed for heating buildings.
- **Engineered wildlife corridors** such as green culverts and green bridges provide wildlife with safe passage across roads and other man-made barriers. These corridors utilize vegetation and other habitat features of two adjoining areas to create a sense of consistency that encourages wildlife to use them. Corporate landscapes with challenges such as wildlife-vehicle collisions and nuisance wildlife may wish to explore use of these corridors to reduce conflicts while also enhancing habitat connectivity.

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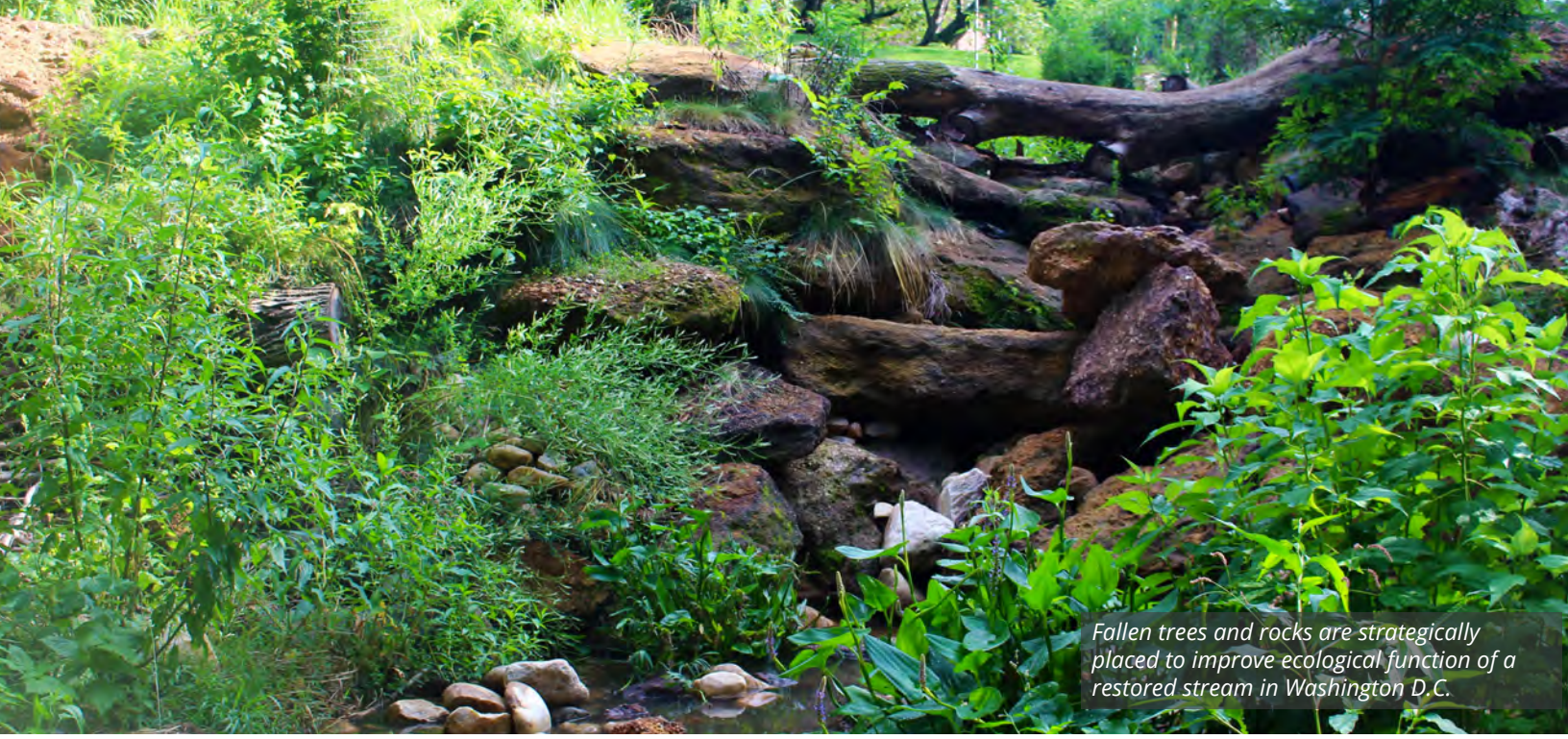
A call to action for corporate landowners

Green infrastructure is versatile, beneficial and well-suited to corporate properties of all types — from industrial facilities and suburban corporate campuses, to office buildings in dense urban areas.

As the case studies in this white paper demonstrate, green infrastructure can easily be designed to benefit both businesses and biodiversity. Although such conservation activities can lead to additional costs, companies can achieve a return on investment through improved reputation and the resulting benefits.

Third-party recognition programs for these activities, such as WHC Conservation Certification, can be beneficial to companies in managing risk, communicating outcomes and meeting biodiversity goals. The WHC standard is designed to provide tangible data on company's conservation activities that go above and beyond compliance. In doing so, WHC Conservation Certification helps companies demonstrate a long-term commitment to managing quality habitat for wildlife, conservation education and community outreach initiatives.

Through green infrastructure best practices, companies can deliver resilient and cost-effective solutions to environmental concerns, while creating a positive impact on biodiversity.



Fallen trees and rocks are strategically placed to improve ecological function of a restored stream in Washington D.C.

Corporate landowners can engage in the following actions when exploring the use of green infrastructure solutions for their lands:

- Assess the environmental challenges on the property that may be addressed with green infrastructure. Are there any areas that experience heavy stormwater runoff or flooding issues? Are there roads with frequent wildlife-vehicle collisions? Are heating or cooling costs high, or are there any parts of the building that seem to heat up quickly in the summer or always seem cold in the winter?
- Evaluate whether your facility can install wildlife-friendly green infrastructure to lower or even eliminate the burden of municipal stormwater fees or rain taxes, exceed regulatory requirements for stormwater management, or boost property values.
- Download the free WHC Green Infrastructure Project Guidance to assist you in designing a green infrastructure project that will both address your environmental challenges and provide meaningful benefit to biodiversity. The Project Guidance describes how to build a sound green infrastructure project and offers strategies to strengthen programs for greater outcomes.
- Implement green infrastructure activities that aid in, or contribute to, an environmental goal.
- Demonstrate the success of your facility's green infrastructure projects by seeking WHC Conservation Certification, a rigorous, third-party standard. Through the WHC Green Infrastructure theme, WHC Conservation Certification recognizes and incentivizes a variety of green infrastructure projects, including those discussed in this white paper.

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Endnotes

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Download the Green Infrastructure Project Guidance and other Project Guidances at **wildlifehc.org/project-guidances**

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WHC can help support green infrastructure activities that benefit biodiversity, from the design and planning, to the implementation and management of a program. We do so through a framework that connects business drivers, stakeholder and community relations, and ROI to positive environmental outcomes. For more information, please contact us at strategyandplanning@wildlifehc.org.

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