Solvay Rhodia Paulínia plant lies within the Brazilian Atlantic Forest.

WHC White Paper

Building Sustainable Supply Chains

How Nature-based Solutions Can Address Operational Risks

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Contents

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Introduction

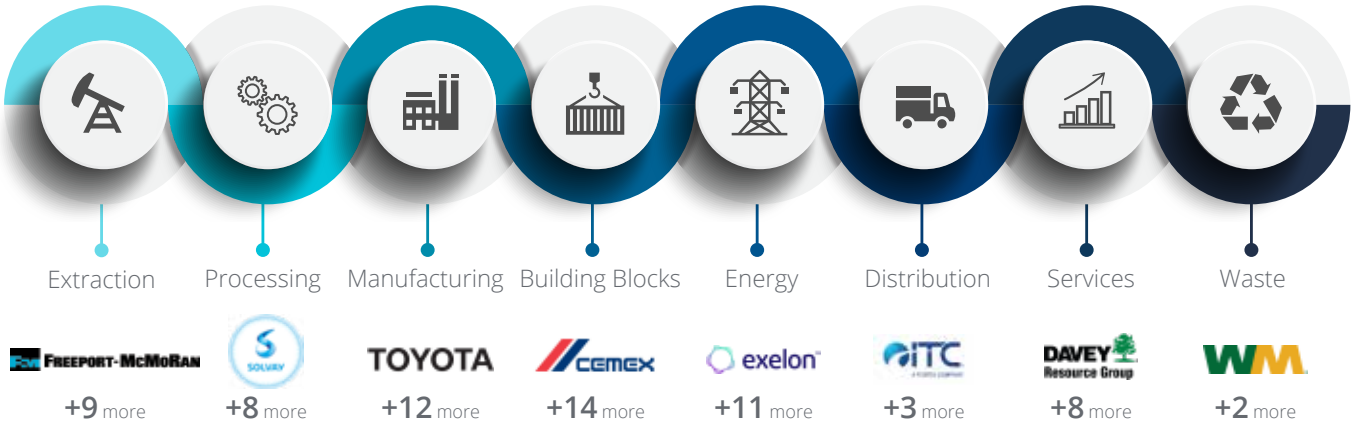
Life depends upon stable, symbiotic relationships, embedded in complex webs. In nature, this means maintaining a natural balance between different species and populations, despite competition on a smaller scale, to ensure a stable food web. The private sector likewise depends upon a complex web of symbiotic relationships between suppliers and consumers and upon ensuring the stability of the natural world so that businesses have a consistent source of the raw materials they need to operate. While companies within the same industry are in many ways competitors, knowledge-sharing and inter-industry collaboration have helped businesses stabilize risk as they've addressed the critical issues of worker safety and climate change.

While research on biodiversity's role in sustainable supply chains remains limited, there is increasing awareness of the parallels between nature and the business world[1] and of the need to conserve nature and resources to ensure long-term business sustainability. With this awareness has come a realization that companies can only truly have a net-zero (or net-positive) impact on the climate and biodiversity crises by addressing external environmental risks across their supply chains.

This movement toward holistic supply chain sustainability has, in part, been driven by pressure from investors and consumers. In a recent survey, 84% of investment managers stated that they view supply chain sustainability issues as a risk to their investments.[2] Studies have also suggested that individual customers perceive products with transparent, sustainable supply chains as higher quality,[3] and many corporations have begun implementing supplier codes of conduct to ensure that suppliers' practices are aligned with their internal corporate social responsibility standards.

While sustainable procurement has grown more common, the increasingly global nature of commerce poses challenges to traceability and communication across the supply chain. Different sectors and countries can have vastly different environmental regulations, and the long-distance transport of goods can exacerbate carbon emissions and biodiversity loss. An

WHC members on the supply chain



estimated 30% of threats to global biodiversity can be attributed to international trade. These impacts are disproportionately caused by the consumption habits of people in developed countries and are disproportionately felt by people and ecosystems in developing countries.[4] On the other hand, data sharing, value chain tracking and remote communications technologies are quickly improving, and supply chain-minded reporting frameworks are developing, all of which will help foster a culture of transparency across regions and industries.

These external pressures and opportunities will soon be compounded with additional regulatory pressure. In 2021, when voluntary sustainability efforts were deemed insufficient to ensure supply chain sustainability in the European Union (EU),[5] a stringent supply chain legislation (governing both sustainability and human rights matters) was announced. The legislation is likely to pass in 2022 and be implemented in 2023. This due diligence legislation will impact not only EU companies, but also those doing business in EU markets. While it will present challenges to suppliers worldwide, this legislation also has the potential to inspire companies operating in other parts of the world to bolster their voluntary supply chain sustainability efforts and possibly preempt the need for such regulatory action in their own countries.[6]

WHC (Wildlife Habitat Council) represents companies at every tier of the supply chain, from the extraction or harvesting of raw materials to the disposal of products at the end of their lifecycles:

- Extraction
- Processing
- Manufacturing
- Building blocks
- Energy
- Distribution
- Services
- Waste

Companies operating within each tier face unique challenges when it comes to sustainability, as well as unique opportunities to drive sustainable practices among their suppliers and customers.

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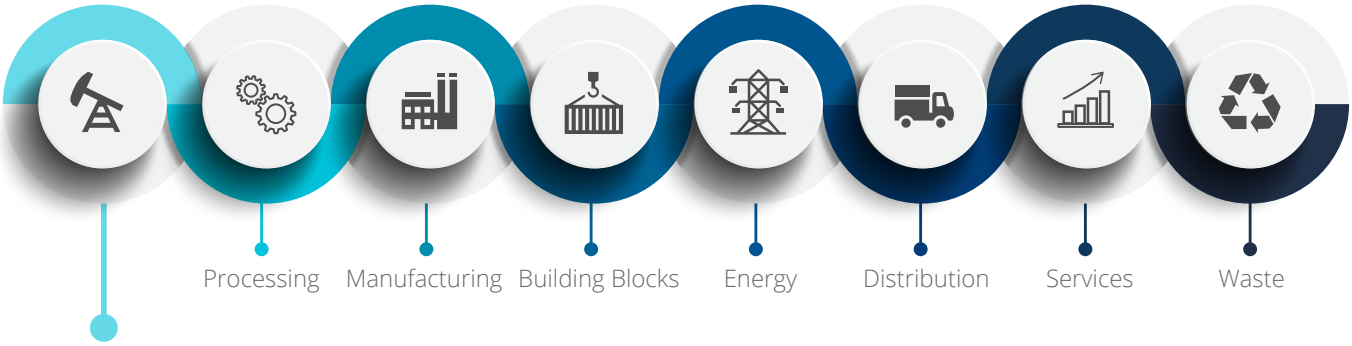
Companies in some supply chain tiers are more likely to directly impact biodiversity and climate and are seeking nature-based solutions (NbS) to these operational risks. Others primarily have indirect impacts (akin to scope 3 carbon emissions) and wish to address their impacts by working with sustainable suppliers (or empowering their existing suppliers to adopt sustainable practices).

Whether addressing direct or indirect impacts, it has become clear that there is no one-size-fits-all approach to integrating biodiversity considerations into the supply chain. Instead, individual site teams should engage in nature-positive actions that are locally appropriate, ideally in alignment with existing regional sustainability goals. At the company level, commitment to transparency and participation in regional, industry-wide and cross-sector coalitions can help companies meet the expectations of consumers, investors and regulators.[7]

This white paper explores how WHC members across the value chain are responding to industry-specific challenges and opportunities surrounding biodiversity and sustainability, and how they are working with each other on a large scale to create more sustainable supply chains.



Extraction

The extraction or harvesting of raw materials is critical to nearly every industry and human activity. While the world depends on these goods, the operational realities of extractive industries is they tend to have significant — and some of the most direct — impacts on nature, especially because there is often a correlation between high levels of biodiversity and the presence of oil, gas or mineral deposits. Extractive operations also, however, tend to have vast landholdings, as well as the knowledge needed to conduct habitat regeneration and monitoring, creating opportunities for ambitious biodiversity enhancement.[8]

To drive extractive companies toward sustainable operations and allow customers to purchase raw materials from operations whose sustainability has been verified by a third party, a suite of sustainability assurance frameworks for commodities like minerals and timber have emerged. Examples include the International Council on Mining and Minerals (ICMM), a membership-based organization whose members must adhere to a suite of CSR requirements, and the Forest Stewardship Council (FSC) certification framework, which tracks wood fiber from production to the manufacturing of end products.

CONSERVATION IN ACTION

FREEPORT-MCMORAN | AREQUIPA, PERU

ICMM's ten Mining Principles focus on social, environmental and governance practices. In accordance with ICMM Principle 7 (Conservation of Biodiversity, which emphasizes following the mitigation hierarchy to reduce harm to on-site flora and fauna), employees at Freeport-McMoRan's Cerro Verde Facility outside Arequipa, Peru manage the on-site population of federally listed guanacos using the mitigation hierarchy.

The guanaco is a camelid species closely related to the llama. While the species is abundant in parts of South America (including Patagonia), its populations have dropped in the Andean region, and it is listed as critically endangered in Peru. Within the country, the species has faced habitat loss, poaching and feral dog attacks. To address these threats, Freeport-McMoRan has banned hunting and firearms at its Unidad de Producción Cerro Verde site, a copper and molybdenum mine. To increase the amount of viable

Gopher tortoise burrows provide shelter to over 350 species in the American southeast, including the indigo and pine snakes, gopher frog and Florida mouse, particularly in the event of fires and storms.[10]

guanaco habitat, employees propagate and plant species that provide food to the guanacos.

Additionally, employees have identified and routinely address mine-specific threats to the species. Wildlife crossing signs are posted every two kilometers along the mine's entry road to address car strikes. To discourage guanacos from visiting operational areas, food sources like Weberbauerocereus weberbaueri (an endemic cactus species) and dung wallows (used to mark territory) found close to the mine are relocated to safer spaces on-site. Employees have been trained to notify a redirection brigade if guanacos are observed near the mine or road. Monitoring indicates that these actions have effectively eliminated on-site poaching and that guanacos are abundant across the property.

WHC-CERTIFIED SINCE 2011 **CERTIFIED GOLD**

CONSERVATION IN ACTION

GEORGIA-PACIFIC | MISSISSIPPI, U.S.A.

Georgia-Pacific (GP) holds a multi-site FSC Certification for its cellulose operations, including Leaf River in New Augusta, Mississippi. Since 2004, site employees have managed a sustainable forestry project that provides 1,456 acres of mixed-age tree stands for wildlife.

The Leaf River site features a paper mill and timber areas featuring loblolly, longleaf, slash and spruce pine trees, which are sustainably managed in accordance with FSC guidelines. Trees are harvested on a rotational basis to create mixed-age pine stands, which are known to be more resilient to pathogens and support a wider range of wildlife.[9] *Before harvesting trees, GP employees perform assessments of tree species' abundance and distribution, as well as the presence of endangered species, to minimize the biodiversity risks associated with the activity.*

The pine forests serve as a habitat for gopher tortoises, which burrow in the sandy soil in canopy openings, and for commensal species like indigo snakes that depend upon vacant burrows for overwintering. To ensure maximum habitat value for the tortoises, which are listed as threatened in southern Mississippi, employees also monitor and control the spread of invasive cogon grass in the area. Monitoring indicates that native vegetation is abundant, providing habitat to tortoises and other wildlife while helping the team uphold FSC standards.

WHC-CERTIFIED SINCE 2000

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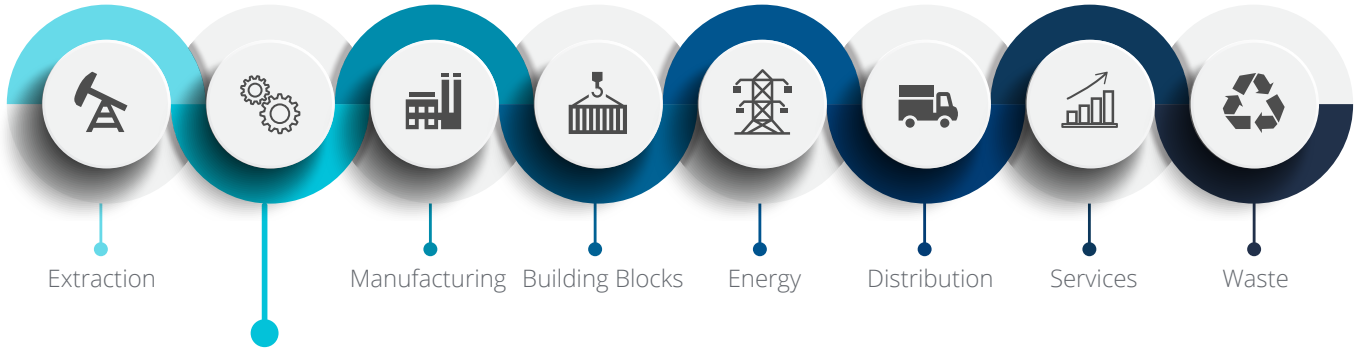

Processing

Once extracted, raw materials like ore and timber must be processed into intermediate ones before most manufacturing activities can take place. Processing operations have a variety of indirect impacts on biodiversity and the climate (e.g., habitat loss, disturbance and overharvesting of the goods processed), but they also have direct impacts in the form of air pollution, waterway eutrophication, carbon emissions, and noise and light pollution.[11]

Recognizing the direct and indirect impacts of the chemical processing industry on the environment, and the industry's dependence on ecosystem services (e.g., pollination, genetic diversity), trade associations such as the American Chemistry Council, European Chemical Industry Council and Brazil's Associação Brasileira da Indústria Química hold their members to the standards of the Responsible Care (RC) Global Charter, which prioritize environmental stewardship, stakeholder engagement and risk-aware management practices. While biodiversity is not mentioned by name in the RC Global Charter, its standards are intrinsically linked to the concept.[12] RC signatories commit to driving continuous improvement in chemical product safety and stewardship throughout the supply chain.

International chemical company Solvay has been a signatory to the RC Global Charter since the framework's inception in 2007 and is also a founding member of Together for Sustainability (TfS), a collective of 33 chemical companies working together to evaluate their supply chains and provide their suppliers with insights to help them improve their sustainability performance. After TfS audits were administered to suppliers during a 2013 pilot program, 91% of participating suppliers indicated that the feedback TfS provided added value to their operations.[13] Meanwhile, Solvay's Sustainable Portfolio Management methodology helps its customers evaluate and improve their own environmental impacts, and the company's One Planet initiative engages Solvay employees and suppliers in a range of sustainability actions and discussions.

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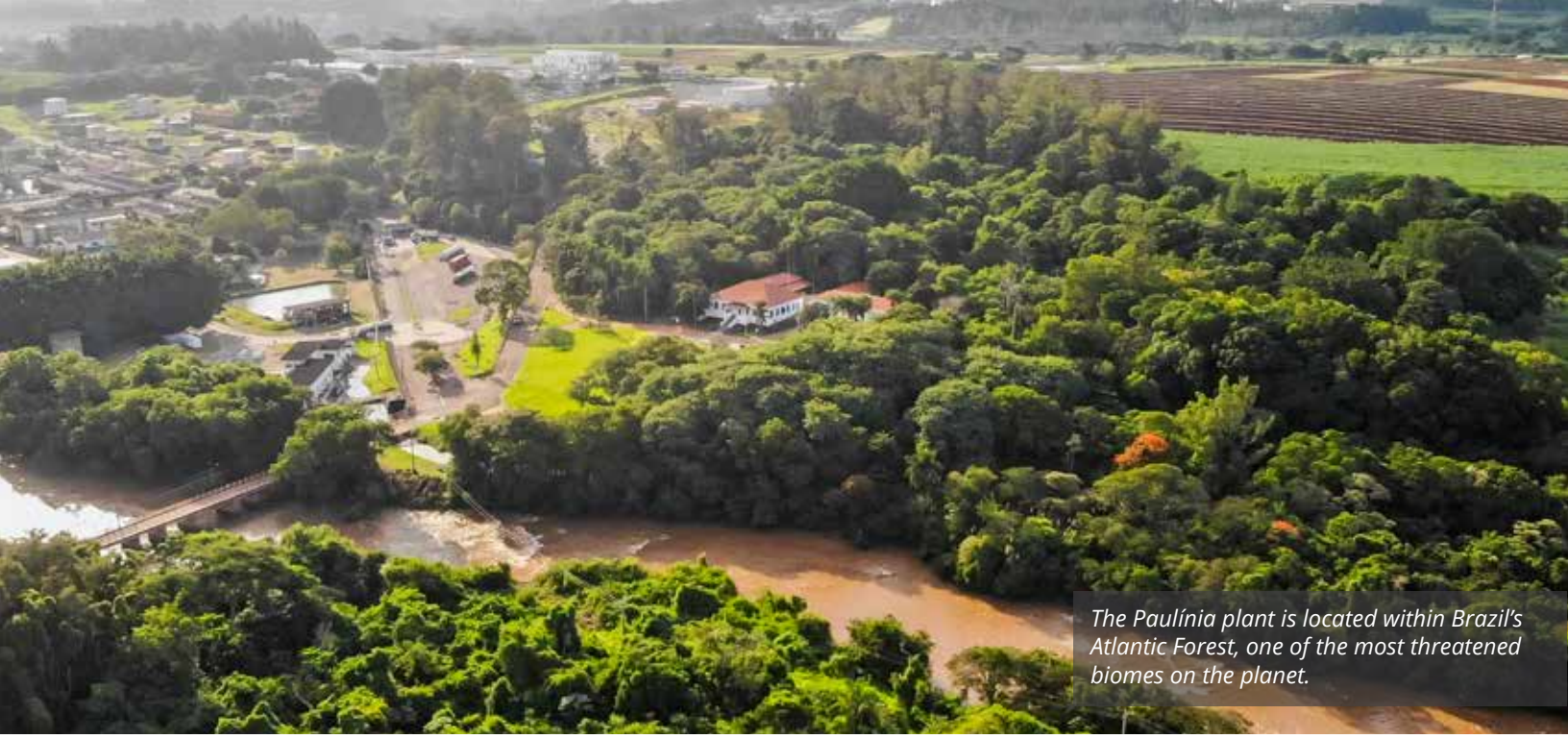

The Paulínia plant is located within Brazil's Atlantic Forest, one of the most threatened biomes on the planet.

CONSERVATION IN ACTION

SOLVAY | SÃO PAOLO, BRAZIL

Solvay operates the Rhodia Paulínia facility in Brazil, manufacturing chemicals including phenol, solvents and silica. In accordance with One Planet principles, employees have committed to reforesting the site to reconnect it with other Atlantic Forest fragments.

The Rhodia Paulínia plant is located 75 miles north of São Paulo, within Brazil's Atlantic Forest, one of the most threatened biomes on the planet — it is estimated that less than 12% of the original forest is intact, and much of what remains has been fragmented by urbanization and agriculture. Per regulatory requirements, Solvay has had to restore the on-site forested areas comprising the Legal Reserve. The company is committed to exceeding any regulations, aiming to complete its reforestation work in 15 years (rather than 20, as mandated) and planting only native tree species like pau ferro and guava (regulations only require that 50% of species be native).

The forestry project has provided connectivity between other nearby Atlantic Forest fragments, supplying important habitat for wildlife including jaguars, toucans, capybaras, the vulnerable species guara wolf and cougar, and the near-threatened water tiger. The forest has grown so dense that it is difficult for employees to access its interior, and the water quality and volume within local springs have improved.

WHC-CERTIFIED SINCE 2019

CERTIFIED GOLD

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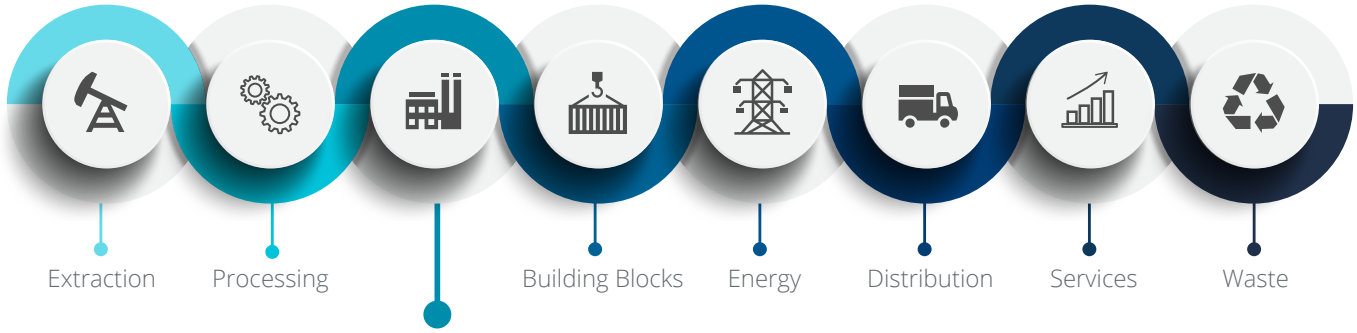

Manufacturing

Diverse and highly globalized, the manufacturing sector represented 15% of the global GDP in 2016 and is projected to continue growing, particularly in rapidly developing countries like Brazil, China and India.[14] While there are some environmental risks associated with manufacturing operations (localized pollution), pressing challenges involve the indirect impacts associated with upstream suppliers and environmental issues associated with the use or disposal of end products. Given the resource intensity and environmental impacts of both manufacturing and operating automobiles, and the difficulty disposing of them, the automotive industry is an exemplar of these challenges — and a leader in addressing them. Suppliers Partnership for the Environment (SP) was founded in 2002 to provide a platform to auto manufacturers, suppliers, regulatory agencies and NGOs to collaborate on sustainable supply chain initiatives. SP participants include WHC members Toyota, GM, Stellantis and WM.

In 2019, SP participated in the organization's first-annual Pollinator Project Challenge, organized by WHC and leadership from Toyota and WM. As of 2021, the challenge had resulted in the management of over 206 pollinator initiatives on over 2,400 acres of corporate lands, with participants representing both the automotive sector and its suppliers.[15]

CONSERVATION IN ACTION

TOYOTA MOTOR NORTH AMERICA | TEXAS, U.S.A

The Pollinator Project Challenge aligns with internal Toyota commitments to biodiversity, as presented in the Toyota Environmental Challenge 2050. Company communications such as the 2020 North American Environmental Report highlight opportunities for site teams along monarch butterflies' migratory pathways (including the Toyota Motor Manufacturing Texas [TMMTX] facility in San Antonio) to support the species through habitat enhancements.

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Toyota team members manage pollinator habitats for monarch butterflies and other pollinators in San Antonio.

In support of local pollinators including the monarch butterfly, TMMTX employees maintain 76 acres of grassland habitat and a .7-acre pollinator garden that each feature a variety of host and nectar plants.

Toyota Motor North America has manufactured Tundra and Tacoma model cars at its San Antonio facility since 2006. The same year, employees began constructing the two on-site pollinator habitats with input from partners at the San Antonio Zoo and Texas Parks and Wildlife Department. The areas feature native plants such as zizotes milkweed, Texas vervain, autumn sage and purple coneflower. Interpretive signage has been installed in the garden area, and employees and local youth are regularly invited to pollinator-themed education events.

The areas are weeded and watered throughout the week and monitored at least once a year. As many as 180 monarch sightings have been recorded in a single monitoring session, alongside observations of species like the pipevine swallowtail and queen butterfly. The team plans to add more milkweed to the areas to support the large monarch butterfly population and have certified the site as a Monarch Waystation through Monarch Watch.

WHC-CERTIFIED SINCE 2015 **CERTIFIED GOLD**

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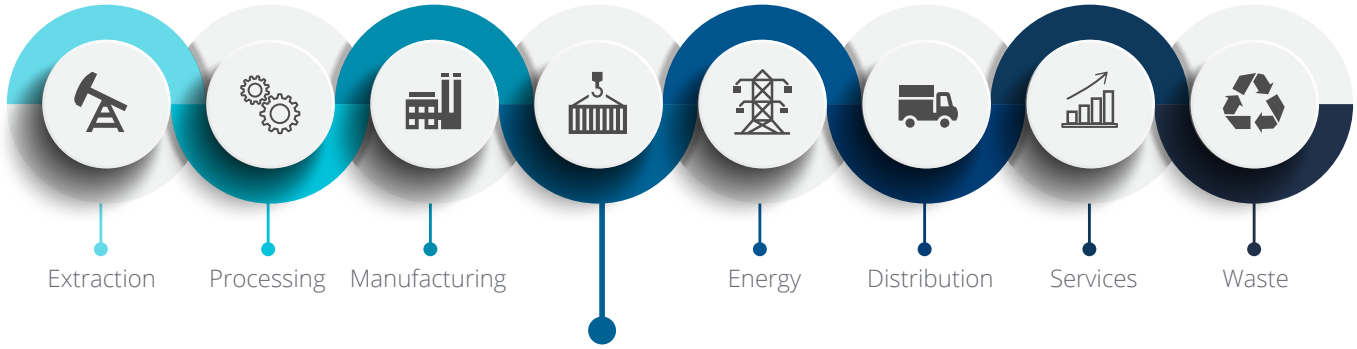

Building Blocks

Cement is one of the most used resources worldwide, and the cumulative area of the world's buildings is expected to double in the next forty years. While a critical part of the global economy, the cement industry emits 8% of the world's carbon, largely because of processes that entail the calcination of limestone.[16] This creates opportunities for the industry to develop NbS to address emissions, while also addressing the industry's impacts on biodiversity (such as habitat fragmentation and noise pollution).

The Cement Sustainability Initiative is a global effort spearheaded by 24 leading cement producers (including founding member CEMEX, a long-time WHC member) with operations in 100+ countries. These 24 companies, which represent 1/3 of the world's cement production, seek to collaboratively develop a framework for industry sustainability. The framework will be built around six critical issues: climate protection, fuels and raw materials use, employee health and safety, emissions reductions, local impacts and land stewardship, and reporting and communications.[17]

Reclamation of quarries is tied to regulatory requirements, but many operations have gone above and beyond, often through the implementation of Biodiversity Action Plans (BAPs), which are largely voluntary plans that are focused on reestablishing local biodiversity through holistic land stewardship practices.

CONSERVATION IN ACTION

CEMEX | CALIFORNIA, U.S.A.

In 2007, CEMEX initiated a partnership with BirdLife International to develop its BAP Standard, a framework being used to guide the creation of site-specific BAPs at CEMEX operations in high-biodiversity areas. Among the objectives of the partnership and resulting standard is a desire to promote conservation in and near Important Bird Areas (IBAs).

CEMEX operates the Rockfield Quarry just north of Fresno, California. The quarry is located near the Lost Lake Park and Sierra Meadow-South IBAs and features 100 acres of riparian forest habitat. Recognizing that increased development in the Fresno area was decreasing the amount of habitat available to native

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CEMEX's Rockfield Quarry features 100 acres of riparian forest which provides habitat for avian species such as the ash-throated flycatchers.

cavity-nesting songbirds (including tree swallows, house wrens, ash-throated flycatchers and western bluebirds), the team installed 20 nest boxes between 2017 and 2018, with help from consultants. The native vegetation in the forest, including valley oak and western sycamore, provides food for the birds, and the nearby river provides water.

The boxes are cleaned out each year and monitored through the nesting season (February through August). The team has seen as many as 287 native birds fledge in a single year. These avian conservation efforts align with a number of municipal and state wildlife action plans, as well as the avian conservation priorities established through the CEMEX-BirdLife International partnership.

WHC-CERTIFIED SINCE 2017

Karst Habitat Restoration

Limestone and dolomite are some of the most frequently extracted rocks. Often found in karst formations, they provide critical habitat for wildlife such as cave salamanders, isopods and threatened springsnail species. Many of these species have adapted to the low light and alkaline conditions common in karsts and are threatened by the changes in light and pH levels that can come with rock extraction.[18] Quarry operations can mitigate their impact on these ecosystems by identifying and avoiding areas of high biodiversity on their lands, or by conducting reclamation with attention to karst restoration.

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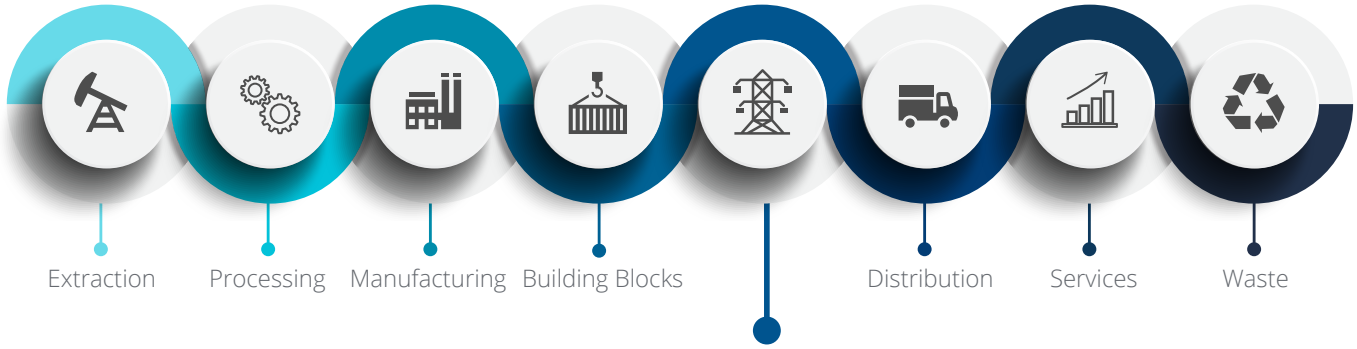

Energy

Global energy demand is projected to increase by 30% by 2040,[19] underscoring the need to empower both household and commercial consumers to select energy sources most in line with their pro-environmental values and goals. While the upstream and downstream impacts of conventional energy production (e.g., the impacts of fossil fuel extraction, CO2 emissions) are well-documented, renewable energies (which are projected to represent 40% of power generation by 2040)[21] pose their own unique environmental dependencies (e.g., water to operate hydro dams and cool solar panels, rare earth metals for turbines and photovoltaic cells) and challenges for biodiversity (e.g., bat and bird collisions with turbines, aquatic habitat fragmentation from dam construction). Additionally, 82% of mining areas target materials needed for renewable energy production, and the demand on these extractive operations can be expected to increase as renewable energy grows in popularity.[21]

The biodiversity challenges associated with renewable and conventional power generation underscore the need for NbS to mitigate environmental risk, greater coordination between utilities companies and mines and the development of multi-stakeholder, cross-sector alliances and assurance frameworks. Utilities companies, however, also have opportunities to address how energy is consumed through customer engagement efforts. For instance, over 75% of global energy demand in buildings is used for heating and cooling,[22] and utilities companies can promote NbS that moderate temperatures to complement engineered efforts to increase energy efficiency.

There are also opportunities for utility companies to engage in industry-wide initiatives like the Electric Utility Industry Sustainable Supply Chain Alliance (the Alliance), which has promoted sustainable procurement practices through an industry-specific supplier scorecard system and by providing opportunities for companies to share best practices. DTE Energy, a founding member of the Alliance, has also implemented internal practices, including a pre-qualification process for potential vendors and resources to familiarize vendors with the company's ISO 14001-compliant environmental management

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system (EMS). Alliance member Exelon has likewise implemented a screening system in which potential suppliers disclose environmental risks and opportunities and holds multi-site certification to the ISO 14001 standard.

CONSERVATION IN ACTION

EXELON | WASHINGTON, D.C., U.S.A.

To ensure that site and regional employees have a strong foundation in the company's EMS, the team at the Exelon Benning Service Center has integrated ISO-aligned environmental awareness trainings into its education efforts.

Exelon manages the Benning Service Center in Washington, D.C., along the Anacostia River. Over time, the river has lost 6,500 acres of wetland habitat and 70% of its forest cover to urbanization and has experienced high levels of water pollution.[23] While electricity generation ceased in 2012, the site remains an important energy transmission center and employee hub. Employees at the site began addressing local pollution and habitat loss issues in 1997, when they constructed on-site stormwater ponds and planted them with native species including pickerelweed and soft-stemmed bulrush. Since 2002, employees have also planted 3.5 acres of pollinator plants throughout the site, including around the property's perimeter to beautify the area for community members.

To inform employees and community members about the site's environmental stewardship practices, informative signage was installed along a riverfront trail near the plant, and employees and community members are frequently invited to partake in events such as lessons on pollinators, river cleanups and tree plantings designed to moderate temperatures in local homes. Recognizing that the site is located along an ecologically sensitive watershed, the Benning Service Center's educational project also entails yearly employee trainings about the site's ISO-compliant EMS. The trainings cover topics such as avian awareness and how site operations have upstream and downstream impacts on the environment.

Post-training assessments and random interviews administered year-round indicate that employees have a solid understanding of the EMS and how it addresses key environmental challenges. Employees have also indicated that the trainings have increased their interest in outdoor activities such as recreational birdwatching, illustrating that Exelon's efforts have inspired independent behavior changes among participants.

WHC-CERTIFIED SINCE 1998

The ISO 14001 Standard

ISO 14001, one of several environmental management standards governed by the International Organization for Standardization, has been widely adopted worldwide. Over 300,000 certifications have been granted to companies and operations in 171 countries.[24] Studies have suggested that companies with an EMS certified to the ISO 14001 standard are 40% more likely to assess their suppliers' environmental performance and 50% more likely to require that suppliers adopt specific environmental practices.[25]

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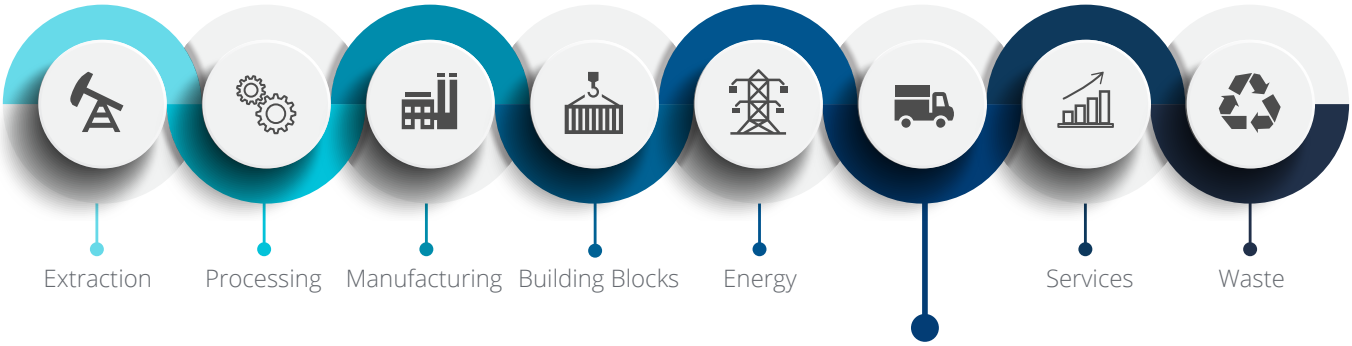

Distribution

The distribution of raw materials, electricity and manufactured goods depends upon the construction and maintenance of rights-of-way (ROWs), such as roads, pipelines and transmission corridors. As trees' roots and limbs can cause damage to this infrastructure, the reclamation processes that occur after these ROWs are constructed typically result in the creation of grassland habitat. When ROWs are constructed within forests, this practice results in fragmentation and the overall loss of late successional habitat but can also provide new resources for species that thrive in early successional or edge habitats. ROWs can also, however, act as ecological traps for wildlife. Edge habitats and low-traffic roads can act as movement corridors for predators, leading to the overhunting of prey species, and aquatic insects looking for water can become disoriented by roads when water-like mirages appear.[26] The feathering of habitat edges and use of rougher materials in road construction can help mitigate these threats with minimal impact to ROW functionality.[26] Rights-of-way typically transect properties owned by multiple stakeholders resulting in challenges associated with engaging a wide range of landowners with conflicting expectations — but there are also opportunities for stakeholder collaboration.

Companies in the electric transmission sector are increasingly recognizing the opportunity to use the corridors of grasslands resulting from ROW construction to increase habitat for pollinators and other wildlife. WHC members such as Ernst Seeds, NiSource, Bayer, ComEd and Davey Resource Group have engaged with University of Illinois Chicago and Energy Resources Center to promote this practice and develop resources through the Rights-of-Way as Habitat Working Group, and WHC member ITC Holdings has engaged with a range of community partners in its service area to create habitat for monarch butterflies and other pollinators.

CONSERVATION IN ACTION

ITC HOLDINGS | MICHIGAN, U.S.A.

ITC Holdings operates electricity transmission lines throughout the midwestern U.S., including a right-of-way that transects the Tomlinson Arboretum in Clinton Township, Michigan. Through collaboration

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ROW grasslands are managed by ITC employees in Clinton Township, Michigan.

between ITC and arboretum stakeholders, the ROW is maintained as a native grassland habitat.

The 24-acre Tomlinson Arboretum is located in Clinton Township, Michigan, a suburb of Detroit. The arboretum was established in 2009 and features a variety of native trees, wildflowers and shrubs, as well as a community bicycle path. A transmission line operated by ITC Holdings runs through the western edge of the arboretum and was once surrounded by frequently mowed turfgrass, providing little habitat value for wildlife. ITC sought to revitalize the ROW area but also understood that tree plantings would be a liability to the transmission lines. Instead, in 2012, a 1.25-acre native grassland was established along the corridor, containing native grasses and forbs such as rough blazing-star, switchgrass, wild columbine and multiple milkweed varieties.

ITC employees, including a company environmental consultant, now work closely with arboretum stakeholders (Tomlinson Arboretum Committee, Friends of the Tomlinson Arboretum) on ROW and arboretum maintenance, including mowing, controlled burns and invasive species management. Monitoring indicates that plant diversity in the area remains stable, and native wildlife, including hawks, warbler, deer and a variety of butterflies (such as monarchs and black swallowtails) have been identified on-site.

WHC-CERTIFIED SINCE 2014 CERTIFIED SILVER

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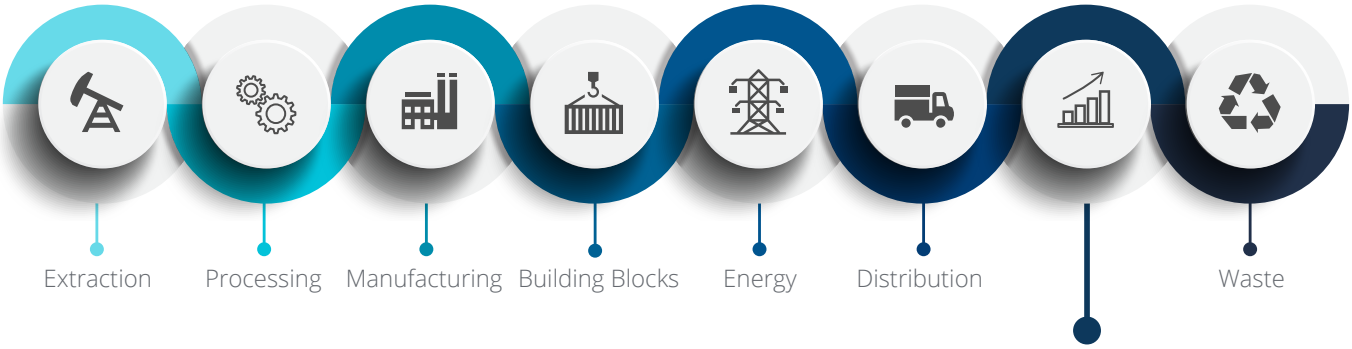

Services

The tertiary, or service, sector comprises a wide range of activities such as financial management, consulting, tourism and healthcare. Companies in this sector tend to have limited direct impacts on biodiversity but more significant indirect impacts than other sectors. Because their impacts (and dependencies) on nature are less apparent, and the need to secure social license to operate is less dire in some service industries, companies in this sector may be slower to adopt voluntary biodiversity measures. Companies are, however, recognizing the importance of addressing their indirect impacts and the benefits of collaboration with suppliers across the value chain.[28]

Tertiary sector companies can also use their areas of expertise to drive environmental action. For instance, tech companies like WHC member IBM have developed comprehensive supply chain tracking software to help corporate customers assess their impacts, and environmental consulting companies can use their lands to demonstrate the practices they encourage.

CONSERVATION IN ACTION

DAVEY TREE EXPERT CO. | VIRGINIA, U.S.A.

Wetland Studies and Solutions (WSSI), a subsidiary of Davey Tree Expert Company, has drawn from internal knowledge of habitat creation to foster biodiversity at its main office in Virginia.

The main office of environmental consulting firm WSSI is located in Gainesville, Virginia, 35 miles southwest of Washington, DC. The LEED-certified building features a green roof and is surrounded by an acre of forested wetlands and areas that feature native landscaping. In addition to providing habitat for wildlife such as brown-belted bumblebees, damselflies and house wrens, these areas also serve as a showcase of employees' environmental expertise.

A WSSI landscape architect designed and created the on-site pollinator garden in 2005 using a native seed mix created by Davey Tree, containing species like common little bluestem, butterfly milkweed and partridge pea. A team of WSSI scientists (including employees from the Environmental Science, Engineering and Ecosystems departments) now

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WSSI's green roof in Gainesville, Virginia is designed to mimic hydrology of local forest and wetland habitats.

conduct monitoring and maintenance, with an advisor from Davey Tree helping to ensure that no one species overpowers the others.

The construction of the green roof in 2006 has reduced the building's impervious surface area by 3,626 square feet, significantly decreasing roof runoff. The structure was designed by WSSI to mimic hydrology of local forest and wetland habitats, and features native vegetation like black-eyed Susan, lavender, blue mist flower, purple cone flower and New Jersey tea, as well as non-native (but non-invasive) succulents, which are commonly used in green roofs because they are lightweight and require little soil. To construct the wetland areas, the team used flexible pond liners filled with humus-rich soil, which is always kept saturated using an irrigation sensor that can sense moisture levels and only dispenses water when needed. To encourage employee and visitor exploration, the roof features a pathway, patios and seating areas.

As a result of these efforts, the building uses 70% less potable water and 42% less energy than most offices of its size. These habitat features are regularly showcased to visitors through tours, demonstrations and presentations, as well as marketing brochures that highlight the company's environmental knowledge while promoting the installation of green roofs.

WHC-CERTIFIED SINCE 2020 CERTIFIED SILVER

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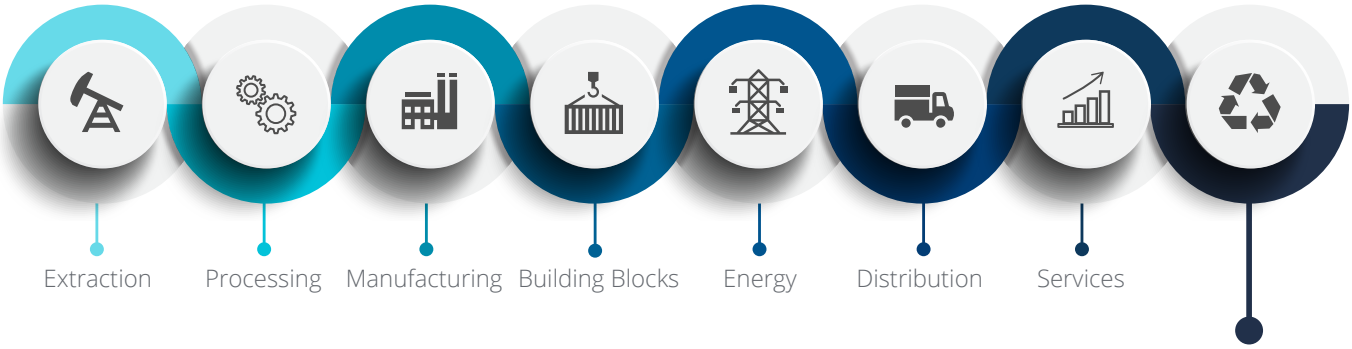

Waste

Eventually, products (and the byproducts of their creation) must be disposed of, recycled or stored, and should be done so in an efficient manner that minimizes the risk of pollution or contamination. Excessive generation of waste and poor waste management harm wildlife both directly (e.g., consuming litter or microplastics can harm animals) and indirectly (e.g., methane from landfills can contribute to climate change, and fertilizer not taken up by plants can cause waterway eutrophication). As with the mines and quarries at the start of the supply chain, many waste management techniques (such as landfilling) also require large tracts of land, temporarily decreasing available habitat for wildlife and causing fragmentation.

Households and upstream companies can address these challenges by generating less waste, including food waste, as studies have suggested access to food in landfills can discourage birds from migrating in the winter.[29] Landfill operators and other waste management facilities have the opportunity to promote these practices, while ensuring the efficient transport and processing of waste and using their reclamation processes to create thriving habitats.

CONSERVATION IN ACTION

WM | NEW HAMPSHIRE, U.S.A.

A WM waste transfer station in Rochester, New Hampshire is comprised of operational areas and grasslands located within a forest. Local youth are regularly invited on-site to learn about both the value of the resulting edge habitat and the importance of responsibly managing waste.

The WM Laconia Transfer Station is located in in the fastest-growing area of New Hampshire.[30] The station accepts a wide range of waste, including household garbage and electronics, appliances and commercial waste, and efficiently transports them to the proper disposal facilities. The property, which is surrounded by forestland, features landscaped areas and wetlands, in addition to native grassland habitat containing species such as barnyard grass, wild cucumber, goldenrod, cow vetch and milkweed. Recognizing the value of the on-site natural areas to species that live in edge habitats, in 2010, WM employees began monitoring this area and removing invasive plants

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Nest boxes at the WM Laconia Transfer Station provide habitat for native blue birds.

such as Japanese knotweed. The following year, ten bluebird nest boxes were installed to provide nesting habitat for the edge-dwelling species.

To educate visitors about on-site habitats, interpretive signage was installed within the residential waste drop-off area, and employees began hosting annual Earth Day events for youth groups, high school students and employees' children. The lessons, which have been planned in conjunction with local teachers and a state biologist, cover biodiversity topics (e.g., edge habitat's vulnerability to invasive species and the importance of supporting native wildlife) as well as industry-specific topics (e.g., the importance of reducing waste and stormwater runoff, how transfer centers help efficiently transport waste, methods for capturing and reusing methane).

Post-event evaluations indicate a high level of knowledge retention, and the team is developing additional, hands-on activities for future events.

WHC-CERTIFIED SINCE 2012 CERTIFIED SILVER

Globalization Challenges with Recycling

While the environmental benefits of recycling are well-documented, with the rise of globalization, it is becoming more common for recyclable goods to be exported to other countries for processing, creating new challenges in supply chain traceability. In 2015, the EU exported about 46% of plastic collected for recycling, largely to countries in east and southeast Asia.[31]

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A Call to Action for Corporate Landowners

This white paper demonstrates the increasing importance of integrating biodiversity and other environmental considerations into supply chain management practices, and how companies along every tier of the supply chain can champion internal sustainability goals while also supporting the goals of their suppliers, customers and industry peers. As demonstrated in this publication's case studies and the many other examples in the WHC Index, on-the-ground conservation work can align with supply chain management initiatives in a variety of ways.

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, all of which can contribute to a more sustainable supply chain. The WHC standard provides tangible data on a company's conservation and education activities that go above and beyond compliance. In doing so, WHC Conservation Certification helps companies demonstrate a long-term commitment to quality habitat for wildlife, conservation education and community outreach initiatives.

Corporate landowners can engage in the following actions to foster more sustainable supply chains while providing biodiversity uplift:

- Research the sustainability and land stewardship practices of potential suppliers and provide trainings for current ones surrounding biodiversity and conservation.
- Integrate biodiversity considerations into purchase orders, contracts or supplier code of conduct.
- Educate customers (both household and corporate) on how to properly maintain and dispose of products to reduce waste.
- Seek partnerships and consult with local experts for assistance with project design, implemention, maintainance and monitoring.
- Join or establish an industry-specific supply chain coalition and discuss ways to integrate biodiversity into the coalition's framework.
- Share your story of a successful conservation program by seeking WHC Conservation Certification, a rigorous, third-party standard. WHC Conservation Certification recognizes and incentivizes voluntary conservation activities to manage wildlife, restore and maintain native habitats and engage the community.

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Endnotes

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WHC can help support a wide spectrum of 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 and conservation education outcomes. For more information, please contact us at whcconsulting@wildlifehc.org.

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