



BIODIVERSITY & WATER

The mapping of biodiversity is an increasingly important metric in the journey towards achieving CSR goals. Similarly understanding the Water Footprint of a company has become an operational necessity. Sustainability is now an integral component of doing business, with biodiversity and water being a business imperative to owners required to responsibly address large areas containing significant biodiversity features and sensitive water environs in their operations in order to establish long term access to natural resources. Changing regulations around the world will, if not already, enforce the need to consider each site and evaluate how existing conditions, offsetting and future rehabilitation of properties fit with local ecosystems and align with protection agreements.

Golder has considerable experience in assessing, monitoring and enhancing biodiversity on a variety of natural, disturbed and industrial landscapes primarily through early recognition, careful planning and integrated design which can win favour in negotiation with governing authorities, interest groups and communities. Golder's expertise in the area of water, including its responsible use, management and mitigation of impacts results in an appropriate balance being taken by Golder for our clients on their sites and effective communication to the various stakeholders involved. Our knowledgeable and innovative approach to biodiversity and water management will contribute to your goal of long-term access to natural resources and enhance your CSR programme.

Specific Biodiversity and Water related services Golder provides include:

AQUATIC & TERRESTRIAL BIOLOGY INVENTORY

- Natural environment screening studies in support of applications for permits and licenses
- Detailed natural environment studies and impact assessments in accordance with regulatory standards supported by field studies in fish, bird, amphibian inventories and habitat assessment and mapping including wetland, fishery and vegetation surveys
- Development of biological monitoring programs, wildlife management and fisheries habitat compensation and restoration planning

WATER MANAGEMENT

- Impact assessments on water uses
- Water footprinting of an organization

- Innovative design of water management systems and sites to save on operational costs
- Incorporation of water balances and feature design into rehabilitation planning

BIODIVERSITY PLANNING & DESIGN

- Assessing, monitoring and enhancing biodiversity on disturbed, natural and industrial landscapes
- Localized rehabilitation planning incorporated into regional biosphere considerations
- Biodiversity target establishment and benchmark assessments taking into account climate, air, water, soil, sources of food for flora and fauna and enjoyment of the surrounding community
- Detailed ecological and physical assessments to establish biodiversity index levels and concepts for future enhancements
- Environmental Disaster Management

ECOLOGICAL RISK & TOXICOLOGY ASSESSMENTS

- Assessment of project impact with respect to toxicological uptake of the ecological community
- Species identification/benefit analysis for rehabilitation of properties in the context of specific biosphere habitats and invasive species avoidance

CLOSURE PLANS & REHABILITATION

- Incorporation of biodiversity design into final closure and rehabilitation planning
- Landscape architecture, closure visualization, and performance studies
- Rehabilitation design and construction management

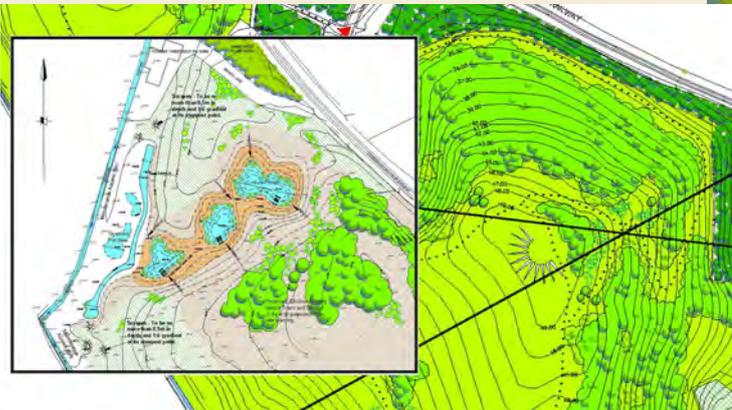
CONSTRUCTION MATERIALS

GOLDER'S PROFESSIONALS HAVE EXPERIENCE IN CREATIVE BIODIVERSITY DESIGNS FOR OUR CLIENTS IN ALL SECTORS, INCLUDING CONSTRUCTION MATERIALS. A FEW REPRESENTATIVE PROJECT EXAMPLES ARE HIGHLIGHTED BELOW:

Golder was retained to carry out a biodiversity assessment and design enhancements including the translocation of acid grassland, metalliferous vegetation and calcareous grassland onto the outer profiles of a large screening berm next to a grassland nature reserve. A series of new ponds and marsh areas for amphibians was also created along with footpath linkages which are used by over 30,000 visitors each year. The site regularly attracts over 30 different species of nesting birds per year in addition to many more that use it for foraging. It is also home to a thriving population of Great Crested Newts, with vast areas of successfully translocated grassland habitats. The site has been nominated for a national restoration award.



EUROPE, VA 261



Golder was retained by a client to complete a multi-disciplinary study, comprising of groundwater, surface water, and ecology in support of a license application for an almost 2,000 hectare property for supply of a high quality limestone reserve. As part of the study a rehabilitation master plan was developed to enhance biodiversity in the future extraction area. The concept utilized landscape level ecological data from the surrounding region, combined with land use trends and constraints to derive long term objectives. The ranges and types of habitats designed for the site included alvars, wetlands, talus, lakes and woodlands.

Golder was retained to design a reclamation plan for a rock quarry that would identify ways to increase the wildlife diversity within the local landscape. This included the enhancement of existing areas of hazel scrub as wildlife corridors, and connecting these with the surrounding landscape. The walls of the quarry were designed to create rock wall habitat including crevices for roosting bats, foraging areas for birds and insects, lichen and moss growth and nesting areas for larger birds. Grassland habitat was created on the quarry floor through the use of low nutrient soils available on the site and local seed sources to maintain the local biodiversity of the area.



A large Construction Materials client approached Golder to complete a combined rehabilitation plan for multiple sites they owned in close proximity to one another. Golder recommended a 'design with nature' concept be pursued which entailed the design of a variety of biodiversity enhancements for the post-extraction lands, including stepped and incised quarry wall treatments, tableland bedrock barrens, nearshore and shoreline wetlands, tableland woodlands and on-shore nest platforms for birds of prey. The rehabilitation opportunity will allow the client to showcase the potential to enhance local biodiversity by creating natural features that would be self-sustaining and highly valued as natural systems post-extraction.



ENGINEERING EARTH'S DEVELOPMENT, PRESERVING EARTH'S INTEGRITY.

solutions@golder.com
www.golder.com

Africa	+ 27 11 254 4800	Europe	+ 44 1628 851851
Asia	+ 86 21 6258 5522	North America	+ 1 800 275 3281
Australasia	+ 61 3 8862 3500	South America	+ 56 2 2616 2000