Putting Numbers on Nature: A New Approach to Biodiversity Measurement in the Americas

RAMBØLL

Bright ideas.
Sustainable change.

Access Ramboll's Americas Biodiversity Metric & Global Biodiversity Metric!

Authors

Matt Dreimiller and Dan Rockefeller, Ramboll

What is biodiversity and how is it measured?

The Convention on Biological Diversity defines biodiversity as "the variability among living organisms from all sources," which includes variability "within species, between species, and of ecosystems." Biodiversity supports essential ecosystem functions such as pollution, nutrient cycling, and climate regulation, all of which are vital for human well-being.

Biodiversity is an indicator of ecosystem health and can be measured in several ways. Common methods include species inventories that evaluate the number and relative abundance of species in a given area, genetic analyses that evaluate genetic diversity within and between populations of the same species, and ecosystem or habitat assessments that examine the variety, extent, and quality of ecosystems and their associated functions.

Why measure biodiversity?

According to the International Panel on Biodiversity and Ecosystem Services (IPBES), unique ecosystems and biodiversity are in rapid decline. With over one million plants and animals facing the threat of extinction, measuring biodiversity is more important than ever. Measuring biodiversity can help environmental practitioners make informed science-based decisions to maximize actions that support biodiversity. Habitat-based biodiversity metrics, such as the Americas Biodiversity Metric, are designed to quantifiably evaluate the extent and quality of ecosystems in support of the land use planning and decision-making process in alignment with the targets established in the Kunming-Montreal Global Biodiversity Framework.

A Biodiversity Metric for the Americas

Ramboll has partnered with NatureServe to develop the Americas Biodiversity Metric 1.0 (ABM), an adaptation of the Biodiversity Metric 4.0 by Natural England. ABM release 1.0 focuses on habitats in the Northeastern U.S., including New Jersey, New York, and Pennsylvania, with future versions covering the remaining habitats in the U.S., Canada, and Mexico, as derived from the International Vegetation Classification System (IVC).

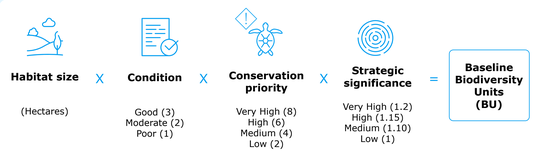
The ABM is a free to download biodiversity tool designed to measure biodiversity, assess impacts, and inform and support decision making and engineering and landscape design by quantifying biodiversity value in a consistent, transparent, and scientifically robust way. Built-in calculations are aligned with the mitigation hierarchy and are designed to:

1. Promote avoidance and minimization of biodiversity impacts
2. Favor enhancement (i.e., repair/restoration) over creation (i.e., offsets)
3. Favor on-site interventions over off-site interventions

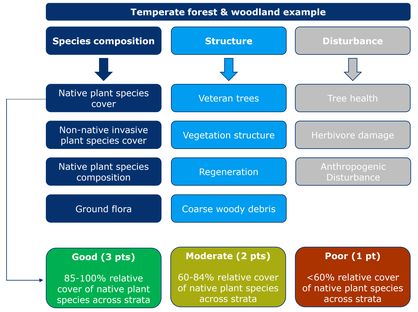
Biodiversity baseline

Core to the Metric is the ecological principle that habitats of larger size and higher quality are better able to support the range of species typically associated with a given habitat, and thereby, are of greater biodiversity value. As such, the Metric utilizes a framework that assigns biodiversity value to habitats using the product of four main variables:

- Habitat Size: an area-based measurement of the habitat in hectares
- Habitat Condition: a measure against a roughly optimum state for a given habitat using a prescribed set of assessment criteria within the Metric, including quality indicators uniquely tailored to each broad habitat type. A condition rating is assigned based on a field evaluation of quality indicators, which are generally focused on plant community composition, community structure, and anthropogenic disturbance
- Conservation Priority: a ranking automatically assigned by the Metric based on a given habitat's global conservation status rank. Global conservation status rankings have been assigned by scientists at NatureServe
- Strategic Significance: a largely qualitative assignment of local habitat importance based on published conservation or biodiversity action plans, strategies, or policies relevant to the habitat's location, State or Provincial conservation status rank, and cultural significance



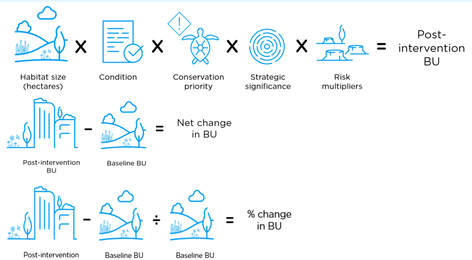
Evaluating habitat condition



Calculating change

The ABM allows users to evaluate the impact of habitat interventions resulting from development (loss) and habitat creation and enhancement (e.g., restoration). To do so, risk multipliers have been introduced to account for the challenges associated with any restoration project, recognizing that habitats which are more difficult to create, take longer to reach target conditions, and are not local to an impact are less likely to succeed. In this way, the Metric acts in alignment with the mitigation hierarchy to disincentivize damaging habitats which are difficult to create or take longer to establish, and to incentivize habitat creation and enhancement in advance of proposed losses. Consequently, larger areas of habitat improvement are needed to offset losses or damage.

The Metric incorporates three types of risk multipliers into its intervention calculations: difficulty risk, temporal risk, and spatial risk.



Applications

Biodiversity baseline and screening: In the initial stages of site selection, the ABM can serve as a pre-screening tool to evaluate candidate sites for development based on their biodiversity value. Organizations can use this tool to select sites with lower biodiversity scores in alignment with the mitigation hierarchy principle of "avoidance."

Sustainable land use planning and design: Once a site is selected, the ABM can be applied throughout the land use planning and design phase to make informed decisions consistent with the mitigation hierarchy. The Metric facilitates the identification of habitats that should be avoided, particularly those with higher biodiversity value and/or longer restoration return times. Additionally, the Metric promotes minimization of impacts to high-value habitats and guides restoration and offset efforts, where necessary.

Operational sites: Using the Metric to evaluate operational facilities can optimize biodiversity potential across an existing portfolio. By understanding the condition and type of habitats found on-site, organizations can develop targeted strategies to achieve biodiversity uplift goals.

Corporate sustainability goals and reporting: The Metric provides standard quantification of biodiversity value, applicable across a variety of sites and geographies. This "common language" approach facilitates the evaluation and comparison of organizational assets, such as site portfolios, and supports the integration of site-level biodiversity actions into broader corporate sustainability goals.

Ramboll in Brief

Independent consultancy and engineering firm owned by the Ramboll Foundation and founded in 1945 in Denmark.

240 global offices in 35 countries with 60 offices in the Americas.

Services focused in seven markets, including Buildings, Transport, Architecture, Landscape and Urbanism, Water, Energy, Management Consulting, and Environment and Health.

Let's chat!

Dan Rockefeller
U.S. Biodiversity Metrics Lead
Daniel.Rockefeller@ramboll.com

Vikki Patton
Global Biodiversity Metrics Lead
Vikki.Patton@ramboll.co.uk

Lis Nelis
Principal, Biodiversity & Ecosystems
lnelis@ramboll.com

Matt Dreimiller
Ecologist, Biodiversity & Ecosystems
mdreimiller@ramboll.com