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Americas Biodiversity Metric User Guide

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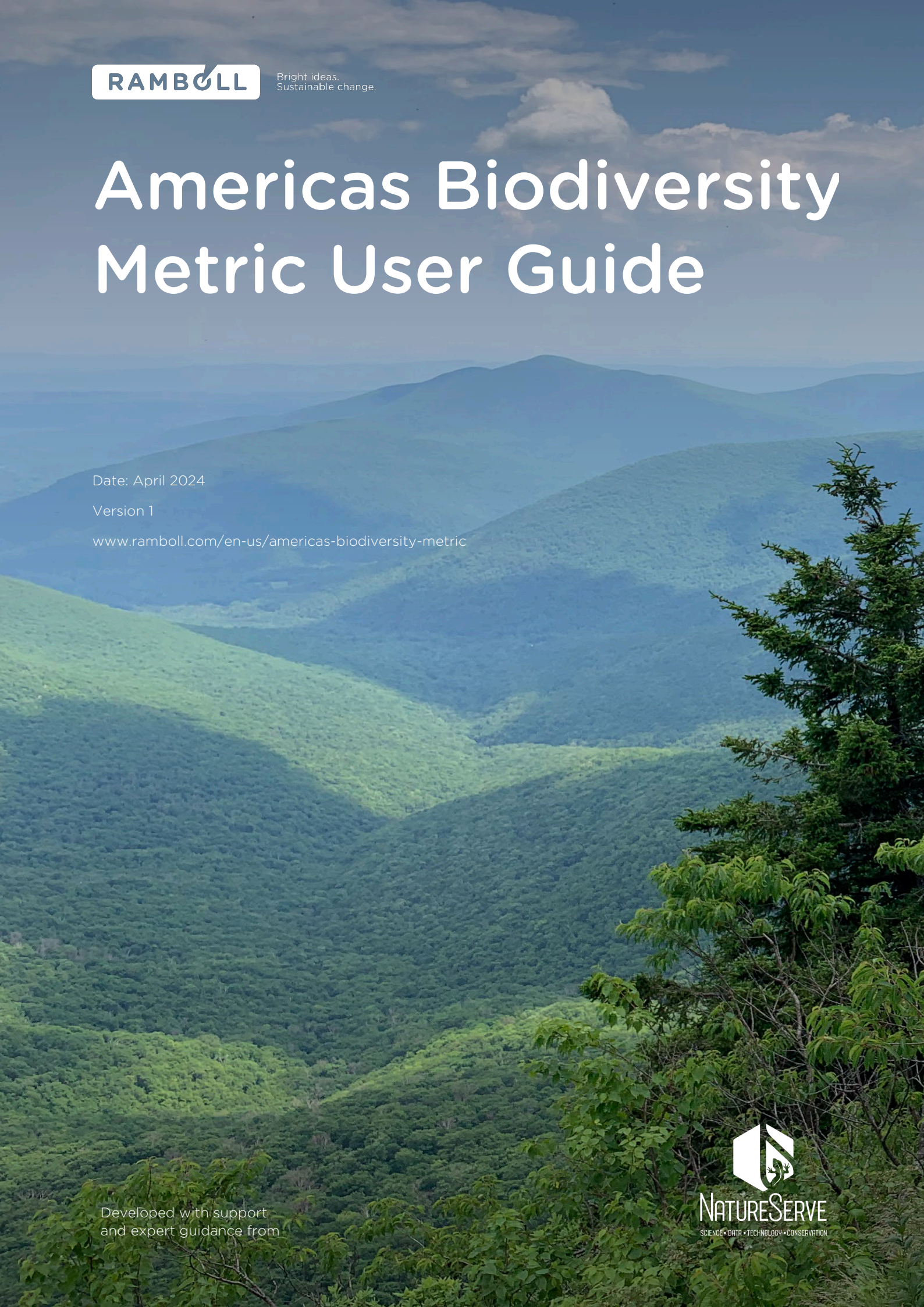
www.ramboll.com/en-us/americas-biodiversity-metric



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NATURESERVE

SCIENCE • DATA • TECHNOLOGY • CONSERVATION

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1. Acknowledgements

The Americas Biodiversity Metric is an adaptation of the Biodiversity Metric 4.0 developed by Natural England which was developed in a phased approach over nearly two decades for use in the United Kingdom. Access the metric at www.ramboll.com/en-us/americas-biodiversity-metric.

This, and all versions of the biodiversity metric build on the biodiversity loss/gain framework developed by Jo Treweek[1] and Bill Butcher[1, 2], which incorporates habitat condition and a new concept of distinctiveness scores which was adopted by the Department for Environment, Food and Rural Affairs (Defra) and Natural England for their biodiversity offset pilots and metric, and contains public sector information under the UK Open Government License v3.0. This framework has subsequently been adopted by Ramboll for the Americas Biodiversity Metric; however the concept of distinctiveness has been replaced with "conservation priority."

The Americas Biodiversity Metric utilizes the International Vegetation Classification System (IVC), incorporating the U.S. National Vegetation Classification (USNVC), Canadian National Vegetation Classification (CNVC) and vegetation classification efforts extending into Latin America. It is based on the EcoVeg [3] approach developed through collaboration among NatureServe, the Ecological Society of America, federal agencies and regional NGOs. IVC data was obtained through NatureServe Explorer[4].

2. Introduction and document guidance

The Americas Biodiversity Metric (Metric) is a free to download biodiversity quantification tool designed to measure the biodiversity value of sites in the Americas. The Americas Biodiversity Metric initially focuses on U.S. habitats with planned future inclusion of Mexican and Canadian habitats as derived from the UNVC, CNVC, and IVC systems and is underpinned by select Ecological Integrity Assessment (EIA) criteria developed by NatureServe.

This user guide provides guidance for the use of the Americas Biodiversity Metric (Metric) tool and a summary of the key considerations and rationale unpinning its development. The information contained in this User Guide:

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[1] Treweek J. et al. (2009) Scoping study for the design and use of biodiversity offsets in an English Context

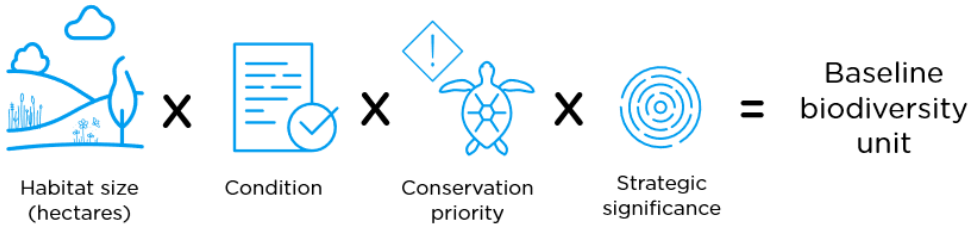
[2] Treweek J., Butcher B., and Temple H. (2010) Biodiversity offsets: possible methods for measuring biodiversity losses and gains for use in the UK. CIEEM In Practice

[3] Faber-Langendoen, D., Baldwin, K., Peet, R.K., Meidinger, D., Muldavin, E., Keeler-Wolf, T. and Josse, C., 2018. The EcoVeg approach in the Americas: US, Canadian and international vegetation classifications. Phytocoenologia, 48(2), pp.215-237

[4] NatureServe. 2024. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application].NatureServe, Arlington, Virginia. Available https://explorer.natureserve.org/ (Accessed: March 5, 2024)

2.1. Metric design

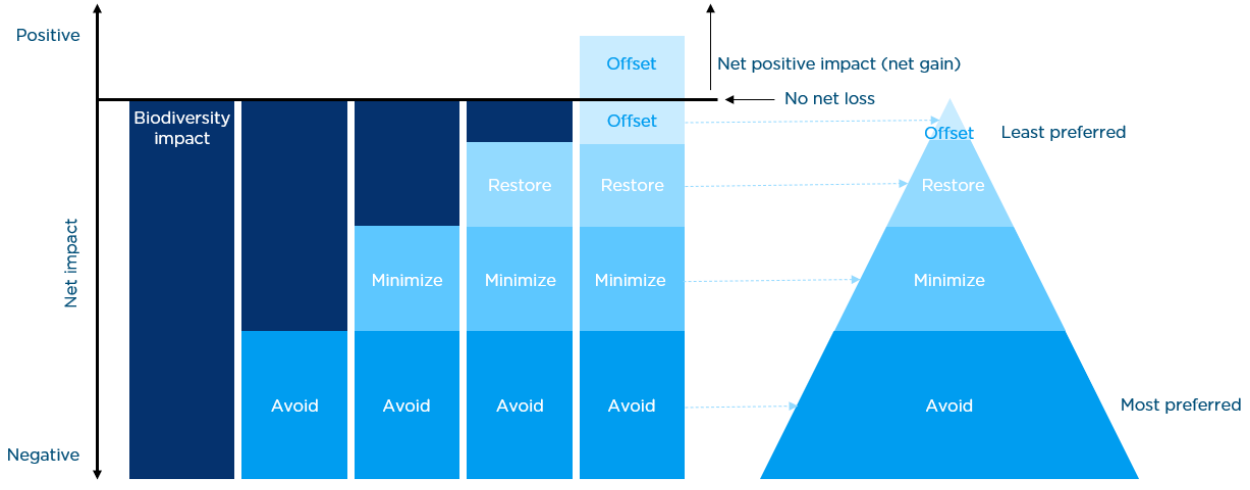
The Americas Biodiversity Metric has been adapted from the Natural England Biodiversity Metric 4.0[5] and utilizes a similar framework for assigning biodiversity value to habitats. The Metric is designed to evaluate biodiversity using the product of habitat size, quality (i.e., condition), conservation priority (i.e., global conservation status rank) and strategic significance (i.e., local importance/relevance for biodiversity) as a proxy for biodiversity value.



Core to the Metric is the understanding 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 value to biodiversity. The Metric generates a score, expressed in biodiversity units (BU), which can then be used to evaluate baseline biodiversity value, consistently track changes over time, perform alternatives analyses, and support the decision-making process in alignment with the mitigation hierarchy (Figure 1), a framework for managing risks and potential impacts related to biodiversity and ecosystem services[6]. Built-in calculations are designed to promote avoidance and minimization of impacts biodiversity impacts, while enhancement (i.e., repair/restoration) is favored over creation (compensation/offset), and on-site interventions are favored over off-site interventions.

Note that this Metric is not intended to evaluate species-level biodiversity or more comprehensive measures of ecological integrity. Instead, it largely relies on visual indicators of ecosystem health based on vegetation and disturbance characteristics. It also does not replace expert knowledge or override regulatory requirements.

Figure 1. The mitigation hierarchy comprises four sequential steps (avoid, minimize, restore, offset) intended to achieve no net loss and preferably a net gain in biodiversity



Adapted from Jones et al. 2019 One Earth

[5] Natural England, 2023. Biodiversity Metric 4.0 Calculation Tool. [Online] Available: Archive Site for Legacy Biodiversity Metrics (naturalengland.org.uk)

[6] The Biodiversity Consultancy. 2015. A cross-sector guide for implementing the Mitigation Hierarchy. Prepared on behalf of CSBI.

3. Applications

The Americas Biodiversity Metric is an evaluation tool that can be utilized to inform and enhance decision-making processes for land use planning, design, development siting, and land management. The Metric can be broadly applied to help organizations, businesses, governments, and other land-managing entities within the U.S. quantify and reduce impacts and deliver no net loss or net gain of biodiversity on their lands.

3.1. Evaluating biodiversity value within a site or defined area

At its most basic, the Metric is a tool for assessing biodiversity value within a defined area or site. It allows users to quantify the biodiversity value of habitats within a site by calculating the number of biodiversity units before and after development. To do so, the Metric employs common frameworks (e.g., global conservation status) and standard assessment methodologies (adapted from Ecological Integrity Assessment protocols), while allowing the user to incorporate local considerations such as local habitat rarity or relative importance.

3.2. Land use and sustainability planning

The Americas Biodiversity Metric tool can be applied throughout the land use planning and development siting decision-making processes, enabling developers and other stakeholders to make informed decisions in line with the mitigation hierarchy. The Metric allows developers to assess land use and development plans from the context of biodiversity impacts, evaluate scenarios to minimize biodiversity loss, and if needed, help identify target locations, habitats, and actions to achieve no net loss or net gain in biodiversity. This decision-making support can be tied into broader strategic sustainability initiatives such as no net loss of biodiversity, biodiversity net gain, and nature positive. The Metric enables standard quantification of biodiversity value which can be applied broadly across a diverse portfolio of sites, serving as a common language to evaluate and compare organizational assets.

3.3. Evaluating restoration outcomes

The Metric may be incorporated into the habitat restoration process in multiple ways and at various stages. The Metric can be applied before starting a restoration project to identify habitats in greatest need of intervention (i.e., restoration), and can inform the restoration approach by helping to identify targeted actions, based on the habitat assessment criteria, to improve degraded ecosystem properties and functions. Applying the Metric prior to the onset of restoration is also useful in establishing a baseline from which restoration success can be measured. Use of the Metric may also be included as part of the restoration monitoring plan as a standard method to track progress and guide follow-up management actions to ensure restoration success.

3.4. Alignment with global reporting frameworks and policies

The Americas Biodiversity Metric has been designed to help developers achieve and document no net loss or net gains for biodiversity associated with their operational footprint. These concepts underpin “nature positive” outcomes (e.g., no net loss of nature from 2020, net positive from a 2020 baseline by 2030, and full recovery from 2050), and have been adopted by international organizations such as the International Finance Corporation (IFC), the International Union for the Conservation of Nature (IUCN), International Petroleum Industry Environmental Conservation Association (IPEICA), and International Council on Mining and Metals (ICMM).

The Metric provides a common, accepted framework for conducting biodiversity assessments and documenting biodiversity risks and opportunities across a corporate portfolio, aids in the identification of material ecosystem impacts through data collection, and ensures that there is a consistent methodology to monitor these impacts. In this way, the Metric enables companies to align with global initiatives and frameworks such as the European Corporate Sustainability Reporting Directive (CSRD), European Sustainability Reporting Standards (ESRS), Taskforce on Nature-related Financial Disclosures (TNFD),

and Science Based Targets Network (SBTN), by informing target setting, monitoring progress, and facilitating compliance with reporting and disclosure requirements. The Metric can help companies demonstrate compliance with environmental regulations and international sustainability standards more effectively. Additionally, transparent reporting of positive environmental policies can enhance a company's brand and reputation and showcase its commitment to sustainability.

4. Terms and definitions

Table 1 lists key terms used in the Metric and their definitions.

Table 1. Terms and definitions

Metric term	Definition
Assessor	The qualified person completing the Metric. A qualified person has the knowledge and skillset to perform biodiversity assessments and complete and review biodiversity metric calculations.
Reviewer	A person reviewing the Metric. This may include the relevant regulatory agency or planning authority.
Habitat type	A habitat classification primarily derived from the International Vegetation Classification System (IVC), or National Vegetation Classification Systems (NVC)
Biodiversity unit (BU)	Biodiversity units are a proxy to describe biodiversity.
Project timeframe	The timeframe over which the Metric calculates gains and losses for specific habitat interventions.
On-site	On-site sheets of the Metric are for all land within the established boundary of a project. In a planning context, this usually means within the surveyed property boundary.
Off-site	Off-site sheets of the Metric are for interventions on land outside of the on-site boundary, regardless of proximity or ownership.
Size	The size of the habitat parcel to be retained, enhanced, created, or lost. Size is measured hectares and input in hectares. A conversion key is included on the Main Menu sheet to assist with conversion from acres. The Metric accepts size measurements to any number of decimal places, however entries up to 2 decimal places are recommended.
Conservation priority	A ranking of conservation priority of a given habitat based on its assigned global conservation status. Conservation priority is automatically assigned by the Metric.
Conservation status	A ranking of the global conservation status of a given habitat. These ranks are assigned by NatureServe scientists or by a designated lead office in the NatureServe Network. See **Table 7** for a summary of the nature serve global rank.
Condition	A measure of the habitat against its ecological optimum state. Condition is a way of evaluating variation in quality among patches of the same habitat type.
Condition assessment	The process of assigning habitat condition, to be undertaken by a qualified person. This may involve both field-based and remote sensing methodologies.
Area habitat	Habitats recorded in the Metric in area (acres).
Strategic significance	Describes the local significance of the habitat based on its location and the habitat type.
Parcel	A linked area of habitat of the same distinctiveness, condition, and strategic significance.
Difficulty	A measure which represents the uncertainty in the effectiveness of management techniques used to enhance or create habitat.
Time to target condition	The average time taken between the beginning of a habitat creation or enhancement project and the habitat achieving the desired target condition and/or distinctiveness.
Spatial risk	Spatial risk represents the relationship between the location of biodiversity loss (on-site) and where the off-site habitat interventions are to be performed. This applies to off-site interventions only.

5. Guiding rules & principles

5.1. Metric rules

The rules outlined in Table 2 must be followed when utilizing the Metric, as they ensure consistent accountability across various projects and over time.

Table 2. Metric rules

Rule	Description
Rule 1	Competency requirements must be complied with. The biodiversity assessment process shall be performed by sufficiently trained and qualified individuals.
Rule 2	Biodiversity unit outputs are unique to this Metric. The results of other Metrics, including previous or similar versions of this Metric, are not comparable to those of this Metric.
Rule 3	The habitat trading rules of this Metric (Table 3) must be followed.
Rule 4	Losses and deterioration of irreplaceable or very high conservation priority (GX, GH, G1, G2, Table 7) habitat cannot be accounted for through this Metric.
Rule 5	In exceptional ecological circumstances, deviation from this Metric methodology may be required. Deviations must be fully justified, evidenced, and documented.

5.2. Metric trading rules (Rule 3)

Trading rules have been established to govern the type of habitat interventions allowable within the Metric, and set minimum habitat creation and enhancement requirements to compensate for specific habitat losses. In general, it is not permitted to replace habitats with habitats of lower conservation priority. Additional specifications are included in Table 3.

Table 3. Metric trading rules

Conservation priority	Baseline habitat conservation status (Table 7)	Trading rule
Very high	GX, GH, G1, G2	This Metric does not permit losses, and it necessitates a customized assessment and compensation
High	G3	Losses must be replaced with biodiversity units of the same habitat type
Medium	G4	Losses must be replaced by either: • Medium conservation priority habitats within the same broad habitat type; or • Any habitat from higher conservation priority category (from any broad habitat type)
Low	G5, GNA, GNR	Losses must be replaced with units of the same or higher conservation priority
Very low	Unassigned[7]	No compensation requirement

[7] Habitats with a conservation status of "Unassigned" include hardscaped areas such as roads, paved parking areas, traditional building footprints, and other impervious surfaces with little to no conservation value. This status has been created and assigned by Ramboll ecologists specifically for this Metric.

5.3. Metric principles

The principles outlined in Table 4 inform the use of the Metric to ensure consistency and accountability.

Table 4. Metric guiding principles

Principle	Description
Principle 1	This Metric is not intended to change existing biodiversity protections, statutory obligations, policy requirements, or regulatory guidance. The use of this Metric does not override the ecological mitigation hierarchy and other requirements (e.g., permit requirements)
Principle 2	This Metric should be used in accordance with established good practice guidance and professional codes.
Principle 3	This Metric is not a complex or comprehensive ecological model and is not a substitute for expert ecological advice.
Principle 4	Biodiversity units are a proxy for biodiversity and should be treated as relative values. The Metric does not replace species-level biodiversity assessments.
Principle 5	This Metric is designed to inform decisions in conjunction with locally relevant evidence, and expert input, judgement, and guidance.
Principle 6	Habitat interventions need to be realistic and deliverable, and target conditions able to be achieved within a relevant and realistic project timeframe. Ecological recovery times should be evaluated and considered when setting targets.
Principle 7	Created and enhanced habitats should seek, where practical and reasonable, to be local to impacts and deliver strategically important outcomes for nature conservation.
Principle 8	To understand trends in habitat condition and changes relative to the established baseline, post-intervention habitat assessments should be performed during the same time of year as the baseline assessment. The presence/absence of vegetation indicators is influenced by seasonal phenology.
Principle 9	The Metric does not enforce a minimum habitat size ratio for compensation of losses. However, proposals should aim to: • Maintain habitat extent (supporting more, bigger, better and more connected ecological networks); and, • Ensure that proposed or retained habitats are of sufficient size for ecological function.

5.4. Best practices for development

The following are a set of best practices intended to serve as a guide toward realizing biodiversity net gains on development projects. These best practices have been adapted from the Good Practice Principles for Development[8] used in the UK but have global application and should be considered throughout the land use planning and development process (Section 10.2).

Table 5. Best practices for development

Best practice	Description
Apply the mitigation hierarchy	Prioritize minimizing impacts on biodiversity by taking all possible measures to avoid them. As a last resort, and with the agreement of external decision-makers where feasible, consider compensating for unavoidable losses. If compensating within the development area is not viable or does not yield the greatest benefits for nature conservation, offset biodiversity losses by creating gains elsewhere.
Avoid losing biodiversity that cannot be offset by gains elsewhere	Prioritize minimizing impacts on irreplaceable biodiversity by taking all possible measures to avoid them. These impacts cannot be offset to achieve no net loss or net gain.
Be inclusive and equitable	Involve stakeholders from the outset by engaging them in the design, implementation, monitoring, and evaluation of the net gain approach. Strive to achieve net gain collaboratively with stakeholders and ensure that the benefits are distributed equitably among all parties involved.
Address risks	Minimize challenges, uncertainties, and risks associated with achieving net gain. Incorporate established methods for adding contingency when calculating biodiversity losses and gains. This accounts for remaining risks and compensates for the time between losses occurring and gains being fully realized.
Make a measurable net gain contribution	Strive to achieve a quantifiable, overall gain for biodiversity and the ecosystem services, all while directly supporting nature conservation priorities.
Achieve the best outcomes for biodiversity	Maximize positive outcomes for biodiversity by leveraging robust, credible evidence and local knowledge to make well-justified decisions in the following scenarios: • Compensation: Ensure that compensation is ecologically equivalent in type, amount, and condition. Consider the location and timing of biodiversity losses. • Biodiversity trade-offs: When compensating for one type of biodiversity loss, provide a different type that yields greater benefits for nature conservation. • Local net gain: Strive for net gain within the development area while also contributing to nature conservation priorities at local, regional, and national levels. • Habitat enhancement: Enhance existing habitats or create new ones. • Ecological connectivity: Foster more extensive, larger, and better-connected areas for biodiversity.
Be additional	Strive to achieve nature conservation outcomes that significantly surpass existing obligations. Avoid merely delivering something that would occur naturally or without additional effort.
Create a net gain legacy	Ensure that net gain generates enduring benefits by taking the following steps: • Stakeholder engagement: Collaborate with stakeholders to agree on practical solutions that secure net gain in perpetuity. • Adaptive management: Plan for adaptive management and secure dedicated funding for long-term net gain management. • Resilience to external factors: Design net gain initiatives for biodiversity to be resilient to external factors, particularly climate change. • Risk mitigation: Address risks arising from other land uses. • Avoid displacement: Be cautious not to displace harmful activities from one location to another. • Local-level management: Support local-level management of net gain activities.
Optimize sustainability	Prioritize biodiversity net gain and, whenever feasible, optimize broader environmental benefits for a sustainable society and economy.
Be transparent	Ensure transparent and timely communication of all net gain activities, sharing insights and learning with all stakeholders.

[8] CIEEM, CIRIA, and IEMA. 2016. Biodiversity Net Gain: Good practice principles for development. Accessed March 13, 2024 from https://cieem.net/wp-content/uploads/2019/02/Biodiversity-Net-Gain-Principles.pdf

6. Metric components

6.1. Habitat classification

Habitats within Version 1.0 of the Metric primarily follow the United States National Vegetation Classification System[9, 10] (USNVC) developed through collaboration between NatureServe, the Ecological Society of America (ESA) and various federal agencies. The USNVC is a comprehensive hierarchical classification system covering all vegetation types and geographies within the U.S. The Metric utilizes Level 6 (Group) habitats as the basis to evaluate biodiversity value. Agricultural and developed habitats primarily follow the USNVC at various levels in the hierarchy. A full list of Metric habitat types is made available by NatureServe[10].

The majority of habitats included in the Metric are terrestrially based, however select area-based aquatic habitats have been included where appropriate. This initial version of the Metric does not include linear habitats such as watercourses (e.g., rivers, streams).

6.2. Irreplaceable and very high conservation priority habitats

Metric Rule 4 (Table 2) states that losses or impacts to irreplaceable and very high conservation priority (global conservation status ranks GX, GH, G1, & G2) habitats cannot be accounted for though this Metric. These habitats hold global significance, ranking as highly threatened and internationally scarce. Consequently, when dealing with such habitats, coordination with relevant agencies and other stakeholders becomes essential. Compensation for losses will be evaluated on a case-by-case basis, considering the lead agencies involved in the project, and must comply with relevant policies and regulations, if any. It is crucial to minimize losses to these habitats whenever possible. Application of the mitigation hierarchy early in the land use planning and development process can help avoid impacts to irreplaceable habitats.

However, if there are no losses or deterioration of irreplaceable habitats, their enhancement can contribute to the calculation of biodiversity units. You may include irreplaceable habitats within the baseline for enhancement purposes only. Additionally, regulatory compensation required to address specific losses or deterioration cannot be included in the post-development sheets of the Metric.

6.2.1. Documenting irreplaceable habitats

- On the Start tab, select if irreplaceable habitats are present on-site.
- All irreplaceable and “very high” conservation priority habitats must be recorded in the irreplaceable habitat sheet within the metric.
- Select the irreplaceable habitat sheet to specify the type, extent (number, area) and post-intervention status of all irreplaceable habitats within the site.

6.3. Habitat condition

Habitat condition is a measure against the optimum state for a given habitat and is often driven by previous and current land use and management practices as well as environmental stressors such as invasive species, browsing pressure, and climate change. Condition is measured using a prescribed set of condition assessment criteria for a given habitat type. Condition assessment criteria were developed in alignment with select EIA indicators developed by NatureServe.

[9] USNVC (United States National Vegetation Classification) Database 2.04. 2024 Federal Geographic Data Committee, Vegetation Subcommittee. Washington D.C. Available https://usnvc.org/. Accessed: February 8, 2024

[10] NatureServe. 2024. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available https://explorer.natureserve.org/. Accessed: March 5, 2024

6.3.1. Condition assessment criteria

Habitat condition is the primary user-derived input used in Metric calculations and the condition assessment criteria serve as the basis for performing the condition assessment. The criteria underpinning condition assessments for the Americas Biodiversity Metric are primarily based on key indicators included in NatureServe's Ecological Integrity Assessment (EIA) protocol[11, 12]. However, the Metric criteria (i.e., indicators) are a simpler subset of those included in the EIA and are largely focused on vegetation and other visual indicators of habitat quality.

6.4. Conservation priority

Version 1.0 of the Metric utilizes global conservation status ranks of the habitats as the basis to assign conservation priority categories. Global conservation status ranks have been assigned by NatureServe scientists utilizing the methodology described in *NatureServe Conservation Status Assessments: Methodology for Assigning Ranks*[13]. Nine factors are used to evaluate and assign global conservation status ranks for habitats (Table 6). Global Conservation Status Ranks and associated definitions[14] are presented in Table 7. The Metric automatically assigns conservation priority based on habitat type (Table 8).

Table 6. Summary of NatureServe Conservation Status Rank Factors. Adapted from NatureServe Conservation Status Assessments: Methodology for Assigning Ranks[13]

Factor category	Subcategory	Factor	Definition
Range	Range/ distribution	Range extent	Minimum area that can be delimited to encompass all present occurrences of a species or ecosystem, typically excluding extreme disjuncts and vagrancies.
		Area of occupancy	Area within the range extent that an ecosystem actually occupies. For ecosystems, areas can be measured or estimated directly based on the best available information. Area of Occupancy for ecosystems is assessed based on selecting the typical spatial pattern of the type (small patch, large patch, matrix).
	Abundance/ condition	Number of occurrences	Number of extant locations (stands) of an ecosystem.
		Number of occurrences or percent area with good ecological integrity	1) Number of occurrences (locations, stands of an ecosystem) that have excellent-to-good viability or ecological integrity (A or B occurrence ranks), such that there is the likelihood of persistence if current conditions prevail; OR 2) Percent of the total area occupied by an ecosystem that has excellent-to-good viability or ecological integrity.
		Environmental specificity	The degree to which an ecosystem depends on a relatively scarce set of substrates or other abiotic and/or biotic factors within the overall range. Relatively narrow requirements are thought to increase the vulnerability of a species or ecosystem.
Threats	--	Overall threat impact	Degree to which the integrity of an ecosystem is affected by extrinsic factors (stressors) that degrade integrity or viability, and which are characterized in terms of scope and severity. Threats are typically anthropogenic, having either direct (e.g., habitat destruction) or indirect (e.g., introduction of invasive species) impact.

[11] Faber-Langendoen, D., Lemly, J., Nichols, W., Rocchio, J., Walz, K., & Smyth, R. (2019). Development and evaluation of NatureServe's multi-metric Ecological Integrity Assessment Method for wetland ecosystems. Ecological Indicators, 104, 764–775. https://doi.org/10.1016/j.ecolind.2019.04.025

[12] Faber-Langendoen, D., J. Rocchio, T. Ramm-Granberg, W. Nichols, J. Bouchard [and others].2024. (Draft) NatureServe Ecological Integrity Assessment: Protocols for Rapid Field Assessment of Upland Ecosystems. NatureServe, Arlington, VA

[13] Faber-Langendoen, D., J. Nichols, L. Master, K. Snow, A. Tomaino, R. Bittman, G. Hammerson, B. Heidel, L. Ramsay, A. Teucher, and B. Young. 2012. NatureServe Conservation Status Assessments: Methodology for Assigning Ranks. NatureServe, Arlington, VA

[14] NatureServe. 2024. NatureServe Global Conservation Status Ranks. NatureServe, Arlington, Virginia. Available https://explorer.natureserve.org/AboutTheData/DataTypes/ConservationStatusCategories. Accessed: March 5, 2024

Factor category	Subcategory	Factor	Definition
		Intrinsic vulnerability	Degree to which intrinsic or inherent characteristics, such as likelihood of regeneration or recolonization for ecosystems, make it susceptible or resilient to natural or anthropogenic stresses or catastrophes.
Trends	--	Long-term trend	Degree of past directional change in extent of occurrence, area of occupancy, number of occurrences, and/ or ecological integrity of occurrences over the long term (ca. 200 years).
		Short-term trend	Degree of past directional change in extent of occurrence, area of occupancy, number of occurrences, and/or ecological integrity of occurrences in the short-term, considered to be typically within 50 years for ecosystems, or within 10 years or 3 generations, whichever is longer (up to 100 years), for species.

Table 7. Global conservation status ranks for ecosystems with associated conservation priority rank and definitions.

Conservation priority	Global rank	Definition
Very high	GX	Presumed collapsed (ecosystem): Collapsed throughout its range, due to loss of key dominant and characteristic taxa and/or elimination of the sites and ecological processes on which the type depends.
	GH	Possibly collapsed (ecosystem): Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include that an ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is collapsed throughout its range.
	G1	Critically imperiled: At very high risk of collapse due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
	G2	Imperiled: At high risk of collapse due to restricted range, few occurrences, steep declines, severe threats, or other factors.
High	G3	Vulnerable: At moderate risk of collapse due to a fairly restricted range, relatively few occurrences, recent and widespread declines, threats, or other factors.
Medium	G4	Apparently secure: At fairly low risk of collapse due to an extensive range and/or many occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
Low	G5	Secure: At very low risk collapse due to a very extensive range, abundant occurrences, and little to no concern from declines or threats.
	GU	Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.
	GNR	Unranked: Global rank not yet assessed.
	GNA	Not applicable: A conservation status rank is not applicable because ecosystem is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For ecosystems, the type is typically non-native (e.g. many ruderal vegetation types), agricultural (e.g. pasture, orchard) or developed (e.g. lawn, garden, golf course).
Very low	Unassigned	Habitats with a conservation status of “Unassigned” include hardscaped areas such as roads, paved parking areas, traditional building footprints, and other impervious surfaces with little to no conservation value. This status has been created and assigned by Ramboll ecologists specifically for this Metric.

Table 8. Metric conservation priority categories and multipliers

Conservation priority	Conservation status	Conservation multiplier (score) assigned
Very high	GX, GH, G1, G2	8
High	G3	6
Medium	G4	4
Low	G5, GNA, GNR	2
Very low	Unassigned[15]	1

6.5. Strategic significance

Strategic significance is 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, or on lower-level habitat conservation status or State or Provincial conservation status rank (Table 9). Strategic significance should be assigned for each habitat parcel during the baseline assessment, planning or alternatives analysis phase, and post-development/habitat intervention assessment.

Table 9. Strategic significance

Strategic significance category	Multiplier	Description
Very high	1.20	Where specific habitat association (Level 7 of NVC) is rare, or where assigned State or Provincial conservation status is aligned with higher-priority global conservation status ranks.
High	1.15	Where the location has been identified within a conservation or biodiversity action plan, strategy, or policy as ecologically important for establishing or maintaining a given habitat type or where a given habitat has been identified as important to the local ecology.
Medium	1.10	Where there is no relevant conservation or biodiversity action plan, strategy, or policy in place, professional judgement or expert guidance may be used to justify the use of the medium strategic significance category. Professional judgement may consider the importance of a given habitat in supporting connectivity between other strategic locations or habitat types, and the extent to which a given habitat supports locally rare species.
Low	1	If the habitat is not included in local conservation or biodiversity action plans, strategies or policies, and there is no evidence to indicate that a given habitat is of greater significance.

When the very high strategic significance category is selected, the assessor must provide sufficient evidence to support the classification of a rare habitat association (Level 7 of IVC) or reference State or Provincial conservation status rank. When the high strategic significance category is selected, the assessor must reference relevant documents which may include the following, among others:

- Biodiversity action plans
- Forest action plans
- Pollinator protection plans
- Wildlife action plans
- Land preservation and recreation plans
- Species and protected areas conservation strategies
- Local or regional comprehensive plan/master plan
- Local climate action plan

[15] Habitats with a conservation status of "Unassigned" include hardscaped areas such as roads, paved parking areas, traditional building footprints, and other impervious surfaces with little to no conservation value. This status has been created and assigned by Ramboll ecologists specifically for this Metric.

- Local environmental guidance document
- Watershed action plans
- Green infrastructure strategies
- Tree strategies

6.6. Risk multipliers

Risk multipliers have been incorporated into the biodiversity unit calculations for habitat interventions (i.e., creation and enhancement). These multipliers are intended to account for the difficulties associated with any restoration project, recognizing that habitats that are more difficult to create, take longer to reach target conditions, and/or are not local to the impact are less likely to succeed.

In this way, the Metric acts in alignment with the mitigation hierarchy to disincentivize damaging habitats that are difficult to create or take longer to establish, incentivize the creation or enhancement of habitats in advance of proposed losses such as those identified in land-use and development plans, and incentivize creation or enhancement local to a potential impact. Consequently, larger areas of habitat improvement are needed to offset losses or damage.

Multipliers associated with difficulty risk, temporal risk, and spatial risk are discussed below.

6.6.1. Difficulty risk – habitat creation and enhancement difficulty

Difficulty risk, or habitat creation and enhancement difficulty ratings, were assigned based on a set of constraining criteria that describe the ecological and management context of a given habitat (Table 10). The selection of these criteria was informed by Natural England's Biodiversity Metric 4.0 technical supplement and the professional judgement of Ramboll and NatureServe scientists. Difficulty scores were assigned based on the inherent ecological properties of a given habitat and expert judgement. Each habitat was given a score for each of the categories in Table 10. Difficulty risk categories and associated multipliers are automatically assigned by the Metric based on the selected habitat and proposed intervention (i.e., creation or enhancement).

Table 10. Creation and enhancement difficulty factors

Score	1	2	3	4	5
Landscape setting	Generalist	Somewhat specialized	Highly specialized		
Wetland status	Terrestrial	Marsh, emergent wetland, scrub swamp, floodplain	Forested swamp	Seep, vernal pool	Bog, fen
Restoration knowledge	Abundant	Moderate	Limited		
Creation or enhancement approach	Abandonment	Limited preparation	Minor design and engineering	Significant design and engineering	
Establishment intensity	Low intensity/ Natural succession	Moderate intensity	High intensity		
Management Intensity	Low intensity	Moderate intensity	High intensity		

6.6.1.1. Landscape setting

Landscape features, including elevation, slope, aspect, microclimate, and soil type, often play a crucial role in determining the locations where a habitat can be created or restored. Some specialized habitats require specific landscape settings (such as aspect, elevation, and moisture levels) to thrive. On the other hand, some habitats can prosper under a variety of conditions within their typical range and are considered generalist habitats.

For example, the California Coastal Redwood Forest is a specialist habitat, flourishing under specific geographic, landscape, and climatic conditions. These forests form a narrow belt along the Pacific coast of northern California and southern Oregon. While they thrive in a Mediterranean climate characterized by relatively low rainfall, their unique survival strategy involves a reliance on dense coastal fogs within the coastal fog belt.

In contrast, tallgrass prairie habitats are more adaptable and can flourish in a range of landscape settings. They are suited to a mesic and temperate climate, demonstrating their ability to thrive under diverse conditions.

6.6.1.2. Wetland status

The status of a wetland can determine the simplicity or complexity of creating or restoring a habitat, considering the unique biological and ecological needs of these ecosystems. Complex wetlands, like fens, that have intricate hydrologic conditions and require a groundwater component, take at least a century to develop and are considered harder to restore than wetlands with less complex hydrologic conditions, such as emergent wetlands. Vernal pools, on the other hand, are considered moderately difficult to restore because natural vernal pool hydrology is considered difficult to replicate.

6.6.1.3. Restoration knowledge

The degree of knowledge about the best restoration approaches for specific habitats can profoundly influence the success of restoration efforts. This knowledge, encompassing both traditional ecological knowledge and scientific methodologies, is instrumental in identifying reference ecosystems, particularly when historical data is lacking. It also guides the selection of species and sites, and informs management strategies, thereby boosting the success of implementation. Furthermore, it enhances the social acceptability of the restoration project, improves its economic feasibility, and enhances the ecological viability of the restored habitat. Habitats with a high degree of restoration knowledge (e.g. tall grass prairies) are considered abundant knowledge, while habitats with incomplete knowledge (e.g. taiga) are considered limited.

6.6.1.4. Design phase intensity

Habitats that necessitate substantial preparation, design, engineering, and construction to meet desired conditions are deemed more challenging to create or restore. On the other hand, some habitats can be established by simply discontinuing previous management practices and allowing them to recuperate naturally or with minimal intervention.

6.6.1.5. Establishment intensity

Establishment intensity is dependent on the materials and techniques required to establish or restore a habitat. Areas where natural succession can occur without intervention are the easiest to restore. In contrast, areas that require extensive earth work, import of soil or other materials, grading, hydrologic controls, and extensive seeding, and plant material installation with follow-up maintenance are difficult to restore.

Habitats that can naturally regenerate under the right conditions, without the need for human intervention, have a higher likelihood of successful restoration and are assigned a low score. Habitats that require limited soil preparation followed by seeding and planting moderately challenging to restore and are given a ‘medium’ score. Habitats that necessitate earth work, hydrologic controls, and/or extensive seeding and planting are the most challenging to restore and are therefore assigned a high score.

6.6.1.6. Management intensity

Active management is often necessary to maintain high-quality biodiverse habitats. In general, habitats requiring low intensity management (e.g., semi-annual mowing) are considered easier to establish through creation or restoration and are given a low score. Habitats that require high-intensity management (e.g., prescribed burning) to maintain the desired ecological conditions are considered more difficult to establish through creation or restoration over the long term and are given a high score.

6.6.1.7. Difficulty risk scoring

The habitat creation and enhancement difficulty categories scoring scale was informed initially by the quartiles of possible scores (6-22) based on the scoring matrix (Table 10) then refined based on expert ecological judgment. Habitat creation and enhancement difficulty scores, categories and multipliers are presented in Table 11, and Table 12, respectively.

Table 11. Creation difficulty scores and associated categories and multipliers

Habitat creation difficulty score	Difficulty category	Multiplier
N/A	Very high	0
>15	High	0.33
11 to 15	Medium	0.67
<11	Low	1

Table 12. Restoration and enhancement difficulty scores and associated categories and multipliers

Habitat enhancement difficulty score	Difficulty category	Multiplier
>18	High	0.33
11 to 18	Medium	0.67
<11	Low	1

6.6.2. Temporal risk – time to target condition

The temporal risk multiplier, known as "time to target condition," represents the time lag (years) between the start of habitat creation or enhancement and the target outcome (habitat type and condition). This multiplier is intended to capture the inherent risk relative to intervention timescales whereby interventions that occur over longer timescales, such as converting a lawn to a forest, are more likely to be impacted by an environmental or anthropogenic setback such as a pest or disease outbreak, unfavorable climatic conditions, wildlife damage, or a lack of or change in management regime.

Time to target condition is also related to the extent to which restoration efforts change the condition status and the complexity of the intervention required, and the time needed for target biological communities to establish.

Assignment of the temporal risk multiplier was largely based on the difficulty risk multipliers (i.e., difficulty of creation and enhancement scores), inherent ecosystem properties, and expert judgement. Values for time to target condition are fixed within the Metric and vary depending on the habitat type, habitat condition and whether the habitat is created or enhanced. A list of habitats and their associated temporal risk multipliers is available in the 'Temporal multipliers' and 'Enhancement temporal multipliers' sheets.

6.6.2.1. The discounting rate

The times to target condition have a 'discounting rate' applied to generate the risk multiplier value used in the metric when considering habitat interventions. 'Discounting' over time is an economic temporal cost/benefits analysis technique based around the principle that, generally, people prefer to receive goods and services now rather than later. The Metric extends this principle to biodiversity (i.e., biodiversity benefits from shorter habitat target conditions return periods).

Where time discounting is used, a standard discount rate is typically applied. The Americas Biodiversity Metric has adopted the framework utilized in the Natural England Biodiversity Metric 4.0 whereby a 3.5%, standard discount rate is used. This is the value recommended in the UK Treasury Green Book. Table 13 shows the multipliers for time periods between one and 30 years, using a discount rate of 3.5%.

The Metric assumes a quality 'jump' from the baseline condition to the target condition once the relevant number of years have elapsed. Metric calculations do not consider incremental increases in quality of the habitat and do not need to be re-calculated annually. Consistent with the UK Treasury Green Book, the Metric sets a limit of 30+ years, the maximum time frame that most projects and plans can realistically account for in planning.

Table 13. Time to target condition multipliers

Time (years)	Multiplier	Time (years)	Multiplier	Time (years)	Multiplier	Time (years)	Multiplier
0	1.00	8	0.752	16	0.566	24	0.425
1	0.965	9	0.726	17	0.546	25	0.410
2	0.931	10	0.700	18	0.527	26	0.396
3	0.899	11	0.676	19	0.508	27	0.082
4	0.867	12	0.652	20	0.490	28	0.369
5	0.837	13	0.629	21	0.473	29	0.356
6	0.808	14	0.607	22	0.457	30	0.343
7	0.779	15	0.586	23	0.441	30+	0.320

6.6.2.2. Advanced or delayed habitat creation or enhancement

The Metric is designed to account for habitats that are either established or improved before a loss occurs, or when the initiation of habitat creation or enhancement is deferred. These features are relevant for both on-site and off-site implementations, across habitat categories.

Instances where the 'Creation in advance' function may be utilized include habitat banks, or scenarios where project phasing leads to compensation preceding losses. If the 'Habitat created or enhanced in advance' years function is employed, it is necessary to provide evidence demonstrating that the target condition of the pre-emptively created habitat is being achieved.

The 'Delay in commencing habitat creation or enhancement' years function should be applied when there is a lag between the loss of habitat and the initiation of habitat creation and enhancement activities. This could occur, for example, if the land designated for habitat creation only becomes available upon the completion of construction.

When these functions are applied, it is mandatory to provide both justification and evidence to the governing body or permitting agency. Assessors, for instance, should make reference to project phasing plans or supplementary agreements.

6.6.2.3. Temporary losses

A temporary loss refers to a situation where a habitat is restored to its original type and condition within 2 years from the initial date of habitat loss, and restoration occurs at the same location. In such cases, the habitat may be classified as 'retained' within the Metric.

Habitats experiencing temporary losses can be categorized as 'enhanced,' however, it is important to apply a 1- or 2-year temporal risk multiplier using the 'Delay in commencement of habitat creation or enhancement' function.

6.6.3. Spatial risk

In instances where a project is unable to achieve a net increase in biodiversity units on-site, the use of off-site units is permissible. All off-site units should be recorded in the corresponding sections of the Metric.

The spatial risk multiplier is the correlation between the location of biodiversity loss and the location of off-site habitat compensation. This multiplier influences the number of biodiversity units allocated to a project by imposing penalties on proposals where the off-site habitat is situated at a significant distance from the site of impact (Table 14).

Table 14. Spatial risk multiplier

Score	Spatial description
1.0	Compensation within the USGS HUC 14 of impacted site
0.75	Compensation outside the USGS HUC 14 of the impacted site but within an adjoining USGS HUC 14
0.5	Compensation outside the USGS HUC 14 of impacted site and adjoining USGS HUC 14

U.S. Geological Survey (USGS)
Hydrologic Unit Code (HUC)

7. Habitat interventions

The Metric allows for the consideration of the following habitat intervention scenarios:

- Habitat retention
- Habitat enhancement
- Habitat creation

For each proposed or completed intervention, the assessor must evaluate the biodiversity impact by first selecting the correct intervention scenario based on the descriptions below.

7.1. Habitat retention

Habitat retention occurs when the baseline habitat is retained in its baseline condition and there is no action to impact or enhance the habitat. Habitat retention can also be used when a habitat impacted by development will return to its original baseline habitat type and condition within two years of the habitat loss.

Retained habitats may require ongoing management to maintain their baseline condition.

7.2. Habitat enhancement

Habitat enhancement occurs when:

- There is an improvement in condition as compared to the baseline condition, or
- A habitat is changed to a higher conservation priority habitat within the same broad habitat group as compared to the baseline.

When habitats are identified in the Metric baseline tab for enhancement, a corresponding record will automatically be created in the enhancements tab. This will allow the assessor to input the target habitat and target condition for the enhanced habitat.

7.3. Habitat creation

Habitat creation occurs when one habitat is replaced with another, and is associated with:

- A loss of the baseline habitat and its replacement with another.
- Reinstatement of a habitat that is not expected to return to its original habitat type and condition within two years.
- A change in broad habitat group such as shifting from shrub and herb vegetation to forest and woodland vegetation.

When baseline habitats are to be replaced, the user must create a record in the creations tab to document the post-intervention habitat type and target condition.

8. Applying the Metric in unique habitats

8.1. Applying the Metric to altered sites

When assessing sites that have been cleared, destroyed, or degraded, an earlier (i.e., prior to alterations) baseline should be used. Within the Metric, assessors should follow these steps:

1. Utilize historical records, imagery, and field surveys to delineate and define pre-disturbance habitat types as the site's baseline.
2. Clearly document the method used to determine this habitat type and its condition.

3. Factor in the time elapsed between the habitat loss and compensation using the temporal risk function.
4. When assigning habitat condition scores, adopt a precautionary approach. For instance, apply higher condition scores in the absence of contrary evidence.

8.2. Recording habitat mosaics

Habitat mosaics are frequently observed, where multiple habitat types coexist within an area. Some habitat classifications incorporate several types as part of their primary definition, while other habitats require separate mapping into distinct components. When using this Metric, assessors should consider whether a given area matches a habitat mosaic classification or if it should be mapped into its individual components.

Mapping areas into individual components can aid in understanding a habitat parcel—for instance, by providing information on the structural complexity of a mosaic. This decision must be clear and well-documented. One method for mapping the component parts is by estimating the proportion of each habitat component. For example, if a 10-acre (4-hectare) habitat mosaic is estimated to be 50% mixed shrub and 50% forest, this should be recorded as 5 acres (2 hectares) of mixed shrub and 5 acres (2 hectares) of forest. This method should be documented within reporting if used.

8.3. Waterbodies

Waterbodies are defined as ponds, lakes, and reservoirs and are recorded as different habitat types depending on the area.

- Ponds are waterbodies (man-made or natural). Waterbodies less than or equal to 4 acres (1.6 hectares) are classified as ponds.
- Lakes are natural waterbodies greater than 4 acres (1.6 hectares).
- Reservoirs are man-made waterbodies over 4 acres (1.6 hectares) that are created by dams and often provide water and hydroelectricity for human needs.

8.4. Watercourses

Watercourses include priority rivers, priority sections of river, other rivers and streams, ditches, and culverted sections of the above. A module to evaluate biodiversity value of watercourses is in development and will be included in future versions of the Metric.

8.5. Green roofs

When there is an overlap between a building footprint and a green roof, record only the green roof in the metric for that overlapping area. However, if green roofs overlap with other habitats, both can be recorded.

8.6. Assessing individual trees

The broad habitat type ‘Individual trees’ may be used where a tree (or a group of trees) over 3 inches (7.62 cm) diameter at breast height (DBH) does not meet or contribute toward the definition of another broad habitat type (e.g., forest and woodland).

Individual trees can be found in a range of locations but are commonly associated with gardens and landscaping adjacent to building infrastructure and along streets, highways, railroads, and ditches, within buffer strips, or may occur as isolated shade trees in lawns and fields.

Individual trees should not be recorded separately where they occur within habitat types characterized by the presence of trees, such as forest and woodland, but can be recorded where they do not form part of a primary habitat description. For instance, if tree groups within the urban environment do not align with the descriptions for woodland, they could be evaluated as a collection of individual urban trees.

8.6.1. Recording individual trees

Once the size, number, and condition of trees is known, assessors should generate an area equivalent value using the 'tree helper' available on the main menu sheet of the Metric (Table 15). The 'area equivalent' is used to represent the area of individual trees. This value is a representation of canopy biomass and is based on the root protection area formula[16] utilized by the Biodiversity Metric 4.0 developed by Natural England.

Table 15. Tree helper

Tree helper						
Tree size	Number of trees and are (ha) for each condition state					
	Poor	Area	Moderate	Area	Good	Area
Small		0.0000		0.0000		0.0000
Medium		0.0000		0.0000		0.0000
Large		0.0000		0.0000		0.0000
Total	0	0.0000	0	0.0000	0	0.0000

Assessors should account for the size class (Table 16) of each individual tree within a group or block. The number of individual trees present within a group or block should be entered into the tree helper (Table 15) to calculate the area equivalent. Do not reduce any area generated by the tree helper even if tree canopies overlap.

Table 16. Individual tree size classes

Size class	DBH (in/cm)	Metric RPA radius (ft/m)	Metric area equivalent (ac/ha)
Small	Greater than 3 in (8 cm) and less than or equal to 12 in (30 cm)	12 ft (3.6 m)	0.01 ac (0.0041 ha)
Medium	Greater than 12 in (30 cm) and less than or equal to 36 in (91 cm)	35 ft (10.7 m)	0.09 ac (0.0366 ha)
Large	Greater than 36 in (91 cm)	50 ft (15.2 m)	0.19 ac (0.0764 ha)

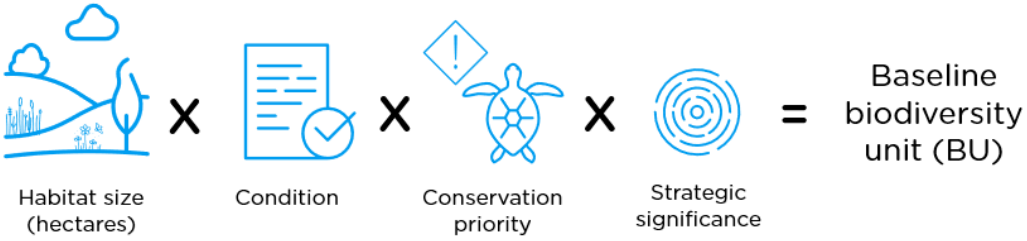
Once the area equivalent has been calculated within the tree helper tool, the habitat type, area equivalent and condition of the individual trees should be input into the baseline tab of the Metric.

Once you have entered the data into the metric, note in the user comments how many trees contribute towards the total area.

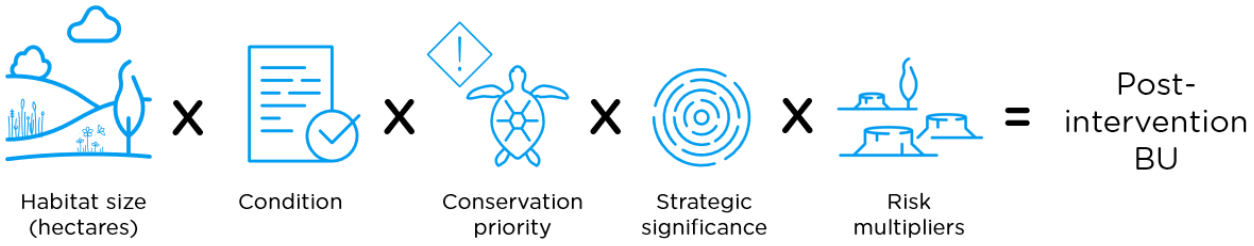
[16] British Standards Institution. 2012. BS 5837:2012. Trees in relation to design, demolition and construction. Recommendations. April 30, 2012

9. Equations and functions

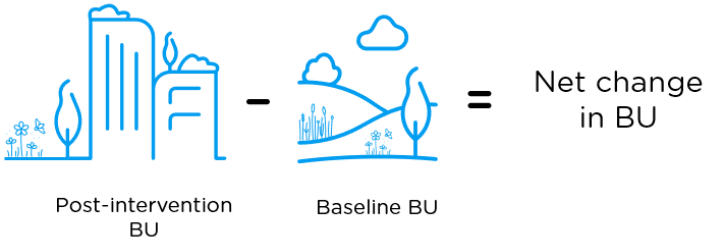
9.1. Biodiversity baseline equation

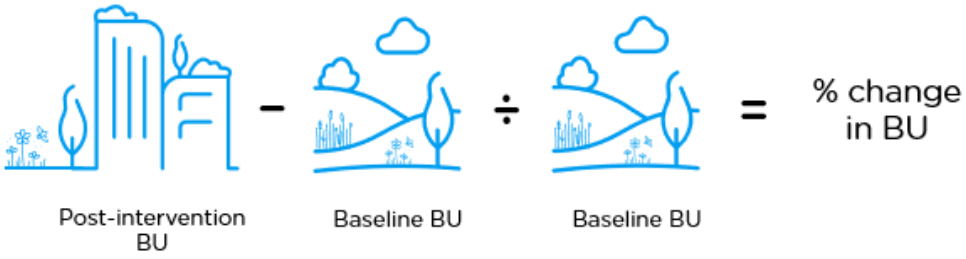


9.2. Post-intervention biodiversity equation



9.3. Calculating change





10.Metric results

10.1. Headline results

Upon entering data into the Metric, the results are calculated and presented in the Metric results pages. To facilitate data interpretation and transparency, results (Figure 1) are broken out by the project phase (i.e., baseline and post intervention), and location (i.e., on-site and off-site). The final, summarized result is presented in the final results table (Figure 2).

Figure 2. Headline results showing biodiversity units of the on-site and off-site baselines, and post-intervention, and combined net change in units. Combined net unit change is the sum of on-site and off-site unit change before spatial risk multiplier deductions.

Result	Habitat units
On-site baseline	0.00
On-site post-intervention (including habitat retention, creation & enhancement)	0.00
On-site net change (units & percentage)	0.00
Off-site baseline	0.00
Off-site post-intervention (including habitat retention, creation & enhancement)	0.00
Off-site net change (units & percentage)	0.00
Off-site unit change (with spatial risk multiplier applied)	0.00
Combined net unit change (including all on-site & off-site habitat retention, creation & enhancement)	0.00
Spatial risk multiplier (SRM) deductions	0.00

Figure 3. Headline results showing total net biodiversity unit and percent change for the project, including combined on-site and off-site habitat interventions and spatial risk deductions. The 'Trading rules satisfied?' box indicates whether established trading rultes have been met. No net loss and/or biodiversity net gain cannot be claimed unless trading rules are resolved.

Final results	Habitat units
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	0.0
Total net % change (including all on-site & off-site habitat retention, creation & enhancement)	0.0
Trading rules satisfied?	Yes ✓

10.2. Habitat trading summary

Trading rules have been established to govern the type of habitat interventions allowable within the Metric. A separate sheet is available in the results section of the Metric to view the trading summary and how habitats and associated conservation priority bands are contributing toward the application of trading rules.

Figure 4. Trading summary based on conservation priority group. A 'Yes' will appear in the right-hand column if trading rules are met. If trading rules are not met, a 'No' will appear.

Trading summary		
Conservation priority	Trading rule	Trading satisfied?
Very high	Custom compensation likely to be required	Yes ✓
High	Same habitat required (=)	Yes ✓
Medium	Same broad habitat or a higher conservation priority habitat required (≥)	Yes ✓
Low	Same conservation priority or better habitat required (≥)	Yes ✓

Figure 5. Separate trading summaries are provided for each distinctiveness band and how each is contributing toward the application of the trading rules. A more detailed look at how trading rules have been applied by habitat type and broad habitat group is also available.

Medium conservation priority summary	
Medium conservation priority units available to offset lower conservation priority deficit	0.00
Medium conservation priority broad habitat deficit to be offset by trading up	0.00
Higher conservation priority surplus units minus medium conservation priority broad habitat deficit	0.00
Cumulative surplus of units	0.00

10.3. Detailed results

The detailed results sheet provides a breakdown of biodiversity unit change by broad habitat group and includes automatically updated graphs and charts to facilitate data interpretation and reporting.

Figure 6. Detailed results broken out by broad habitat group. On-site change is shown in this table.

Trading summary						
	Baseline		Post-development on-site		On-site change	
Habitat group	On-site existing area	On-site existing value	On-site proposed area	On-site proposed value	On-site area change	On-site unit change
Forest and woodland	0.00	0.00	0.00	0.00	0.00	0.00
Shrub and herb vegetation	0.00	0.00	0.00	0.00	0.00	0.00
Desert and semi-desert	0.00	0.00	0.00	0.00	0.00	0.00
Polar and high montane	0.00	0.00	0.00	0.00	0.00	0.00
Aquatic vegetation	0.00	0.00	0.00	0.00	0.00	0.00
Open rock vegetation	0.00	0.00	0.00	0.00	0.00	0.00
Agriculture and developed	0.00	0.00	0.00	0.00	0.00	0.00
Hydrography	0.00	0.00	0.00	0.00	0.00	0.00

11. The process

11.1. Biodiversity baseline

The following is an outline of the recommended steps to complete the biodiversity baseline process.

11.1.1. Step 1: Desk-based study

Assess available online resources or other sources of information to understand the ecological context of your site as it relates to environmental stressors, restoration opportunities, and local priorities. This step may include identification of local and regional biodiversity action plans and conservation strategy documents, a review of protected species and sites occurring in the vicinity of your site, and an evaluation of key drivers of biodiversity loss. This step is key to assigning the strategic significance rating.

11.1.2. Step 2: Remote sensing & GIS analysis

This step is optional but highly recommended. During this step remote sensing and GIS technology may be used to preliminarily classify habitats and identify habitat boundaries. This step is intended to inform and improve the efficiency of field-based data collection (Step 3).

11.1.3. Step 3: Field-based data collection/validation

Collect baseline habitat data to classify habitats and/or validate habitat classification (Step 2), assign habitat condition scores using the habitat assessment criteria, and refine habitat boundaries as necessary. Field data may be collected using the included habitat field form.

11.1.4. Step 4: GIS refinement

Refine habitat classifications and boundaries based on the results of Step 3 and add habitat condition scores to the dataset.

11.1.5. Step 5: Evaluate baseline

Input site data (i.e., habitat type, size, condition, strategic significance) into the baseline tab (A1 On-site habitat baseline) of the Americas Biodiversity Metric tool.

11.1.6. Step 6: Validate and disclose

All baseline data should be reviewed and validated by a trained ecologist or biodiversity specialist, and a report prepared to disclose methods and results.

11.2. Land-use planning and development

The following is an outline of the recommended steps to consider biodiversity in the context of land use and development. Consider applying the best practices for development throughout the land use planning and development process (Section 5.4).

11.2.1. Steps 1-6: Biodiversity baseline

Complete steps 1 through 6 above to establish a biodiversity baseline for your site.

11.2.2. Step 7: Evaluate land-use/development plans

Use land-use and development plans, or project designs to evaluate net impact to biodiversity by comparing baseline conditions to proposed post-development conditions using the Americas Biodiversity Metric tool.

11.2.3. Step 8: Alternatives analyses and selection

If necessary or desired, use the Metric to evaluate different land-use and development scenarios to inform the decision-making process. Evaluating alternatives facilitates alignment with the mitigation hierarchy by allowing developers to identify and select options to avoid or minimize impacts to high conservation priority habitats and select habitat creation or enhancement options to offset biodiversity impacts. On-site and off-site habitat interventions may be considered. Select the alternative that minimizes impacts to biodiversity.

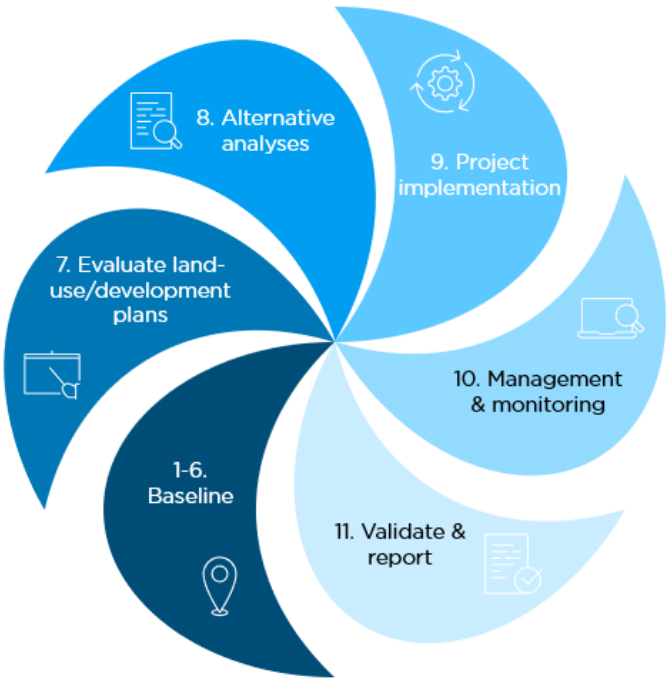
Consideration should also be given to habitat features that cannot be quantified by this metric. For example, if a site is known to be occupied by bats, including bat boxes and foraging habitat such as scrub within landscape designs can support local bat species. This improvement cannot be quantified but should be considered and incorporated into project plans.

11.2.4. Step 9: Project implementation

Implement land-use and development plans and associated habitat interventions to improve biodiversity on your site.

11.2.5. Step 10: Management and monitoring

Establish a habitat management and monitoring plan and implement. Management and monitoring are essential to ensuring the progression and long-term viability of established and restored habitats. Long term monitoring should include a site-wide habitat condition assessment and biodiversity calculation using the Metric following completion of all development project phases.



11.2.6. Step 11: Validate and report

All data should be reviewed and validated by a trained ecologist or biodiversity specialist, and a report prepared to disclose methods and results.

Appendix 1

Habitat definitions

Habitat	Definition
	Formation: Intensive Land Use
Woody Horticultural Crop	Agricultural perennial crops with a sturdy wood-based structure that are cultivated for food, nutritional and medical applications, economic, and other associated aesthetic value. Woody horticultural crops are dominated by shrub and tree vegetation, including orchards, vineyards, and woody berry crops.[17, 18, 19]
Forest Plantation	Forest stands established by planting and/or seeding in the process of afforestation or reforestation and managed for consumptive or non-consumptive uses. Forest plantations may consist of a monoculture of a single native or introduced species, including agroforestry woody crops, that are intensely managed and planted at uniform density.[19, 20]
Woody Wetland Horticultural Crop	Agricultural produce consists of woody plants cultivated in wetland environments, such as bamboo or cranberries.[19]
Row & Close Grain Crop	Agricultural vegetation encompasses a variety of crops grown in rows or densely planted, including corn, soybeans, cotton, various vegetables, and grain crops like annual rye and wheat.[19]
Pasture & Hay Field Crop	Agricultural vegetation, comprising pastures and hayfields, is typically subject to regular mowing, fertilization, grazing, and/or management to uphold a desired structure and composition.[19]
Herbaceous Horticultural Crop	Agricultural plantings predominantly consisting of horticultural produce, including commercial flower cultivation.[19]
Fallow Field & Weed Vegetation	Agricultural landscape including both uncultivated fallow fields where arable land is left without planting for one or more vegetative cycles and early successional nonnative weed growth.[19]
Herbaceous Wetland Crop	Agricultural vegetation found in wetland environments, for example, fields cultivated with watercress, rice, or taro.[19]
Lawn & Recreational Grassland	Closely cropped vegetation, such as, lawns, gardens, sports fields, and golf courses. It also encompasses vegetation growing in urban settings, including on pavement. These areas can range from dry lands to emergent wetlands and may feature a tree canopy ranging from fully shaded to open, depending on the environment.[19]
Horticultural Garden Vegetation	Cultivated plants in gardens, serving ornamental, culinary, and educational purposes, such as fruit trees, shrubs, herbs, or medicinal plants.[19]
Other Developed Vegetation	Plant life found in urban environments, including growth within urban materials like pavement. The tree canopy cover may range from completed shaded to open.[19]
Developed Wetland Vegetation	Managed vegetation found in emergent and woody wetlands, both in urban, suburban, and rural settings. This includes features like small urban ponds with emergent vegetation. The extent of tree canopy cover can vary widely, ranging from fully exposed to densely shaded areas in planted wetlands.[19]
Agricultural Aquatic Vegetation	Submerged and floating vegetation observed in controlled agricultural and developed environments. This encompasses features like farm ponds, urban ponds, and various open water sites located in urban, suburban, and rural areas.[19]

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Habitat	Definition
Developed Aquatic Vegetation	Vegetation that is either floating or submerged can be observed in managed agricultural areas and developed locations. These include farm ponds, urban ponds, and other bodies of water situated in urban, suburban, and rural environments.[19]
Impervious Surface	An impervious surface refers to human-made structures, such as roads, roofs, and compacted soil, that prevent water from seeping into the ground.[21]
Bare Ground	Dry land without any vegetation.
Individual Tree	A large singular deciduous, semi-deciduous, or evergreen perennial plant that comprises less than 25 percent of the main tree stratum.[19] Often present in urban and suburban landscaped settings (e.g., street or shade trees).
Unvegetated Ornamental Feature	A decorative element in landscaping devoid of living vegetation, typically comprising non-living elements such as sculptures, fountains, or architectural structures.[22]
Non-native Ornamental Shrub	A decorative woody plant that is not indigenous to the area it is growing in.[23]
Other Native Ruderal Grassland Vegetation	Native herbaceous plants commonly found in human-disturbed areas lacking recent natural equivalents, and whose current composition and structure are not primarily influenced by ongoing human cultivation practices.[19]
Rain Garden	A shallow, vegetated basin that collects and absorbs and treats stormwater runoff from rooftops, sidewalks, and street.[24]
Pollinator Garden	A type of garden intentionally designed to grow specific nectar and pollen-producing plants. These gardens attract pollinating insects, such as bees, butterflies, and hummingbirds.[25]
Greenroof	A rooftop garden layer with planting medium and vegetation overlaying a traditional roof to improve stormwater management, energy efficiency, increase biodiversity and habitat, and reduce surrounding air and building temperature.[24, 26]

[21] U.S. Geological Survey (USGS) Water Science School. Impervious Surfaces and Flooding. *USGS*. https://www.usgs.gov/special-topics/water-science-school/science/impervious-surfaces-and-flooding

[22] Butcher, B., et al. 2023. UK habitat classifications V2.0 – Advance publication of selected habitat definitions. *UKHab*. https://ukhab.org/

[23] National Audubon Society. 2024. What is the difference between native, non-native, and invasive plants? *Audubon*. https://www.audubon.org/news/what-difference-between-native-non-native-and-invasive-plants

[24] Federal Emergency Management Agency (FEMA). 2021. Building community resilience with nature-based solutions: A guide for local communities. *FEMA*. https://www.fema.gov/sites/default/files/documents/fema_riskmap-nature-based-solutions-guide_2021.pdf

[25] Hartman, M. 2023. Pollinator Gardens. *University of Maryland Extension*. https://extension.umd.edu/resource/pollinator-gardens/

[26] U.S. Environmental Protection Agency (USEPA). 2023. Using green roofs to reduce heat islands. *USEPA*. https://www.epa.gov/heatislands/using-green-roofs-reduce-heat-islands

Habitat	Definition
	Formation: Hydrography
Ice mass	A large body of glacial ice, including ice sheets or continental glaciers, that covers the surrounding terrain.[27]
Lake	Large, permanent, or intermittent, slowly moving freshwater or tidal deepwater habitats that occupy an inland basin and fed by surrounding watershed drainage areas.[28, 29]
Pond	Small, shallow permanent or intermittent still waterbodies that may support communities of emergent vegetation.[28, 30]
Ornamental pond	Small shallow artificial waterbodies with a closed water circulation system most often created in dense urban environments, especially parks and private grounds such as gardens, for aesthetic enjoyment and to promote human well-being and cultural ecosystem services. Ornamental ponds often lack multifunctionality and may include many non-native species, unless embedded in green infrastructure with a dual purpose to increase biodiversity.[31]
Reservoir	An artificial lake formed by constructing a dam across a river or natural lake to control flooding, storing water for irrigation, recreational use, or consumption, or generating hydroelectric power.[32]

[27] National Geographic. 2024. Glacier. *National Geographic: Education*. https://education.nationalgeographic.org/resource/glacier/

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[29] National Geographic. 2024. Lake. *National Geographic: Education*. https://education.nationalgeographic.org/resource/lake/

[30] Richardson, D.C., et al. 2022. A functional definition to distinguish ponds from lakes and wetlands. *Scientific Reports, 12*. https://doi.org/10.1038/s41598-022-14569-0

[31] Oertli, B, et al. 2023. Ornamental ponds as Nature-based Solutions to implement in cities. *Science of the Total Environment, 888*. https://doi.org/10.1016/j.scitotenv.2023.164300

[32] National Geographic. 2024. Reservoir. *National Geographic: Education*. https://education.nationalgeographic.org/resource/reservoir/

Appendix 2

Area-based habitats technical tables

Group	NatureServe Rounded Global Rank	Source
Hydrography - Ice Mass	GNA	OTHER
Hydrography - Lake	GNA	OTHER
Hydrography - Ornamental Pond	GNA	OTHER
Hydrography - Pond	GNA	OTHER
Hydrography - Reservoir	GNA	OTHER
Intensive Land Use - Agricultural Aquatic Vegetation	GNA	IVCC_FORMATION
Intensive Land Use - Bare Ground	Unassigned	OTHER
Intensive Land Use - Caribbean Forest Plantation	GNA	IVCC_GROUP
Intensive Land Use - Desert Tree Garden	GNA	IVCC_GROUP
Intensive Land Use - Developed Aquatic Vegetation	GNA	IVCC_FORMATION
Intensive Land Use - Developed Wetland Vegetation	GNA	IVCC_SUBFORMATION
Intensive Land Use - Eastern North American Temperate Forest Plantation	GNA	IVCC_GROUP
Intensive Land Use - Fallow Field and Weed Vegetation	GNA	IVCC_FORMATION
Intensive Land Use - Forest Plantation	GNA	IVCC_SUBFORMATION
Intensive Land Use - Greenroof	GNA	OTHER
Intensive Land Use - Herbaceous Horticultural Crop	GNA	IVCC_FORMATION
Intensive Land Use - Herbaceous Wetland Crop	GNA	IVCC_FORMATION
Intensive Land Use - Horticultural Garden Vegetation	GNA	IVCC_SUBFORMATION
Intensive Land Use - Impervious Surface	Unassigned	OTHER
Intensive Land Use - Individual Tree	GNA	OTHER
Intensive Land Use - Lawn and Recreational Grassland	GNA	IVCC_SUBFORMATION
Intensive Land Use - Non-Native Ornamental Shrub	GNA	OTHER
Intensive Land Use - North American Boreal Forest Plantation	GNA	IVCC_GROUP
Intensive Land Use - Other Developed Vegetation	GNA	IVCC_SUBFORMATION
Intensive Land Use - Other Native Ruderal Grassland Vegetation	GNA	OTHER
Intensive Land Use - Pasture and Hay Field Crop	GNA	IVCC_FORMATION
Intensive Land Use - Pollinator Garden	GNA	OTHER
Intensive Land Use - Rain Garden	GNA	OTHER
Intensive Land Use - Row and Close Grain Crop	GNA	IVCC_FORMATION
Intensive Land Use - Temperate Developed Wooded Wetland	GNA	IVCC_GROUP
Intensive Land Use - Tropical Developed Wooded Land	GNA	IVCC_GROUP

Group	NatureServe Rounded Global Rank	Source
Intensive Land Use - Tropical Open Lawn	GNA	IVCC_GROUP
Intensive Land Use - Tropical Pacific Forest Plantation	GNA	IVCC_GROUP
Intensive Land Use - Unvegetated Ornamental Feature	Unassigned	OTHER
Intensive Land Use - Western North American Temperate Forest Plantation	GNA	IVCC_GROUP
Intensive Land Use - Woody Horticultural Crop	GNA	IVCC_FORMATION
Intensive Land Use - Woody Wetland Horticultural Crop	GNA	IVCC_FORMATION
Marine Shelf - North Atlantic Seagrass Bed	G4	IVCC_GROUP
Marine Shelf - Widgeongrass Bed	G4	IVCC_GROUP
Marine Shoreline - North American North Atlantic Intertidal Shore	G4	IVCC_GROUP
Palustrine Wetland - Acadian-Appalachian Red Spruce Acidic Swamp	G4	IVCC_GROUP
Palustrine Wetland - Appalachian-Northeast Wet Meadow and Shrub Swamp	G4	IVCC_GROUP
Palustrine Wetland - Atlantic and Gulf Coast Freshwater Subtidal Marsh	G4	IVCC_GROUP
Palustrine Wetland - Atlantic and Gulf Coastal Interdunal Swale	G3	IVCC_GROUP
Palustrine Wetland - Central Appalachian-Northeast Acidic Swamp	G4	IVCC_GROUP
Palustrine Wetland - Central Appalachian-Northeast Alkaline Fen	G3	IVCC_GROUP
Palustrine Wetland - Central Appalachian-Northeast Alkaline Swamp	G3	IVCC_GROUP
Palustrine Wetland - Central Interior-Appalachian Riverscour Barrens and Prairie	G3	IVCC_GROUP
Palustrine Wetland - Central Interior-Appalachian Seepage Swamp	G3	IVCC_GROUP
Palustrine Wetland - Central Interior-Great Lakes Flatwoods and Swamp Forest	G2	IVCC_GROUP
Palustrine Wetland - Central Interior-Northeast Floodplain Forest	G4	IVCC_GROUP
Palustrine Wetland - Coastal Plain Wet Flats and Basin Swamp	G2	IVCC_GROUP
Palustrine Wetland - Eastern North American Boreal-Subboreal Alkaline Fen	GNR	IVCC_GROUP
Palustrine Wetland - Eastern North American Boreal-Subboreal Bog and Acidic Fen	G4	IVCC_GROUP
Palustrine Wetland - Eastern North American Freshwater Aquatic Vegetation	G4	IVCC_GROUP
Palustrine Wetland - Eastern North American Freshwater Marsh	G4	IVCC_GROUP
Palustrine Wetland - Eastern North American Inland Saline Marsh	G2	IVCC_GROUP
Palustrine Wetland - Eastern North American Ruderal Aquatic Vegetation	GNA	IVCC_GROUP
Palustrine Wetland - Eastern North American Ruderal Flooded and Swamp Forest	GNA	IVCC_GROUP
Palustrine Wetland - Eastern North American Wet Shoreline Vegetation	G4	IVCC_GROUP
Palustrine Wetland - Eastern Ruderal Wet Meadow and Marsh	GNA	IVCC_GROUP
Palustrine Wetland - Laurentian-Acadian Alkaline Swamp	G4	IVCC_GROUP
Palustrine Wetland - Laurentian-Acadian Floodplain Forest	G4	IVCC_GROUP

Group	NatureServe Rounded Global Rank	Source
Palustrine Wetland - Laurentian-Acadian Wet Meadow and Shrub Swamp	G4	IVCC_GROUP
Palustrine Wetland - Laurentian-Acadian-Northeast Riverscour Vegetation	G3	IVCC_GROUP
Palustrine Wetland - Mid-Atlantic and Northern Coastal Plain Swamp	G3	IVCC_GROUP
Palustrine Wetland - Midwest Floodplain Forest	G3	IVCC_GROUP
Palustrine Wetland - Midwest Prairie Alkaline Fen	G3	IVCC_GROUP
Palustrine Wetland - North Atlantic Coastal Bog and Fen	G3	IVCC_GROUP
Palustrine Wetland - North Atlantic Coastal Interdunal Wetland	G2	IVCC_GROUP
Palustrine Wetland - North Atlantic Coastal Plain Pondshore	G3	IVCC_GROUP
Palustrine Wetland - North Atlantic Coastal Tidal Freshwater Marsh	G4	IVCC_GROUP
Palustrine Wetland - North-Central and Northeastern Seep	G4	IVCC_GROUP
Palustrine Wetland - Northeastern Forest Vernal Pool	G3	IVCC_GROUP
Palustrine Wetland - Oak - Sweetgum Floodplain Forest	G4	IVCC_GROUP
Palustrine Wetland - Ontario-Québec Boreal Flooded and Rich Swamp Forest	G4	IVCC_GROUP
Palustrine Wetland - Ontario-Québec Boreal-Subboreal Black Spruce Poor Swamp	G4	IVCC_GROUP
Palustrine Wetland - South Atlantic and Gulf Coastal Plain Pondshore	G3	IVCC_GROUP
Palustrine Wetland - Southeastern Native Ruderal Flooded and Swamp Forest	GNA	IVCC_GROUP
Palustrine Wetland - Southern Ash - Elm - Willow Floodplain Forest	G3	IVCC_GROUP
Polar and Alpine - Northern Appalachian Alpine Tundra	G3	IVCC_GROUP
Supralittoral Freshwater Coast - Eastern North American Inland Strand and Rocky Shore	G4	IVCC_GROUP
Supralittoral Freshwater Coast - Great Lakes Coastal Rocky Shore	G4	IVCC_GROUP
Supralittoral Freshwater Coast - Great Lakes Dune	G3	IVCC_GROUP
Supralittoral Freshwater Coast - Great Lakes Sand Beach	G4	IVCC_GROUP
Supralittoral Marine Coast - North Atlantic Coastal Beach	G4	IVCC_GROUP
Supralittoral Marine Coast - North Atlantic Coastal Dune and Grassland	G3	IVCC_GROUP
Supralittoral Marine Coast - Northern Atlantic Acidic Sand Barrens Scrub and Grassland	G3	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Hardwood Forest	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Hemlock - White Pine - Hardwood Forest	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Red Spruce - Fir - Hardwood Forest	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Rocky Ridge Woodland	G4	IVCC_GROUP

Group	NatureServe Rounded Global Rank	Source
Temperate-Boreal Forest and Woodland - Appalachian-Northeast Alkaline Forest and Woodland	G3	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Central and Southern Appalachian Red Spruce - Fir - Hardwood Forest	G2	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Mesic Forest	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Oak Forest and Woodland	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Pine - Oak Rocky Woodland	G3	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Eastern North American Exotic Ruderal Forest	GNA	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Eastern North American Native Ruderal Forest	GNA	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Laurentian Pine - Oak Forest and Woodland	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Laurentian-Great Lakes Limestone Woodland	G3	IVCC_GROUP
Temperate-Boreal Forest and Woodland - North Atlantic Coastal Forest	G2	IVCC_GROUP
Temperate-Boreal Forest and Woodland - North Atlantic Maritime Forest and Scrub	G2	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Northeast Pitch Pine Barrens	G2	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Southeastern Native Ruderal Forest	GNA	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Southern Appalachian Oak Forest and Woodland	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Southern Appalachian Virginia Pine - Table Mountain Pine Woodland	G4	IVCC_GROUP
Temperate-Boreal Forest and Woodland - Southern Appalachian-Interior Mesic Forest	G4	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Appalachian Mafic Barrens	G2	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Central Appalachian Acidic Scrub and Grassland	G3	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Eastern North American Ruderal Meadow and Shrubland	GNA	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Great Lakes Alvar	G3	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Laurentian-Acadian Acidic Scrub and Grassland	G4	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Laurentian-Acadian-Great Lakes Cliff and Rock Vegetation	G4	IVCC_GROUP
Temperate-Boreal Grassland and Shrubland - Northeastern Erosional Bluff Vegetation	GNR	IVCC_GROUP

Technical difficulty and temporal risk technical table

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Hydrography - Ice Mass	High	Medium	Not possible	Not possible	Not possible	Not possible	Not possible
Hydrography - Lake	High	Medium	30	20	10	7	5
Hydrography - Ornamental Pond	Medium	Medium	5	4	3	2	1
Hydrography - Pond	Medium	Medium	5	4	3	2	1
Hydrography - Reservoir	Medium	Medium	10	7	5	3	1
Intensive Land Use - Agricultural Aquatic Vegetation	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Bare Ground	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Caribbean Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Desert Tree Garden	Low	Low	10	7	5	3	1
Intensive Land Use - Developed Aquatic Vegetation	Low	Low	5	4	3	2	1
Intensive Land Use - Developed Wetland Vegetation	Low	Low	5	4	3	2	1
Intensive Land Use - Eastern North American Temperate Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Fallow Field and Weed Vegetation	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Greenroof	Medium	Medium	5	4	3	2	1
Intensive Land Use - Herbaceous Horticultural Crop	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Herbaceous Wetland Crop	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Horticultural Garden Vegetation	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Impervious Surface	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Intensive Land Use - Individual Tree	Low	Low	30+	30+	25	20	10
Intensive Land Use - Lawn and Recreational Grassland	Low	Low	5	4	3	2	1
Intensive Land Use - Non-Native Ornamental Shrub	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - North American Boreal Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Other Developed Vegetation	Low	Low	5	4	3	2	1
Intensive Land Use - Other Native Ruderal Grassland Vegetation	Low	Low	7	6	5	4	3
Intensive Land Use - Pasture and Hay Field Crop	Low	Low	7	6	5	4	3
Intensive Land Use - Pollinator Garden	Low	Low	5	4	3	2	1
Intensive Land Use - Rain Garden	Low	Low	5	4	3	2	1
Intensive Land Use - Row and Close Grain Crop	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Temperate Developed Wooded Wetland	Low	Low	20	15	10	7	5
Intensive Land Use - Tropical Developed Wooded Land	Low	Low	20	15	10	7	5
Intensive Land Use - Tropical Open Lawn	Low	Low	5	4	3	2	1
Intensive Land Use - Tropical Pacific Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Unvegetated Ornamental Feature	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Western North American Temperate Forest Plantation	Low	Low	30+	25	20	15	10
Intensive Land Use - Woody Horticultural Crop	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Intensive Land Use - Woody Wetland Horticultural Crop	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Marine Shelf - North Atlantic Seagrass Bed	Medium	Medium	20	15	10	5	2

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Marine Shelf - Widgeongrass Bed	Medium	Medium	20	15	10	5	2
Marine Shoreline - North American North Atlantic Intertidal Shore	High	Medium	10	7	5	3	1
Palustrine Wetland - Acadian-Appalachian Red Spruce Acidic Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Appalachian-Northeast Wet Meadow and Shrub Swamp	Medium	Medium	15	12	10	7	5
Palustrine Wetland - Atlantic and Gulf Coast Freshwater Subtidal Marsh	Low	Low	10	7	5	3	1
Palustrine Wetland - Atlantic and Gulf Coastal Interdunal Swale	Medium	Medium	10	7	5	3	1
Palustrine Wetland - Central Appalachian-Northeast Acidic Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Central Appalachian-Northeast Alkaline Fen	High	High	30+	30+	30+	30+	30+
Palustrine Wetland - Central Appalachian-Northeast Alkaline Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Central Interior-Appalachian Riverscour Barrens and Prairie	Medium	Medium	15	10	7	5	3
Palustrine Wetland - Central Interior-Appalachian Seepage Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Central Interior-Great Lakes Flatwoods and Swamp Forest	Medium	Medium	30+	30	25	20	15
Palustrine Wetland - Central Interior-Northeast Floodplain Forest	Medium	Medium	30+	30	25	20	15
Palustrine Wetland - Coastal Plain Wet Flats and Basin Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Eastern North American Boreal-Subboreal Alkaline Fen	High	High	30+	30+	30+	30+	30+

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Palustrine Wetland - Eastern North American Boreal-Subboreal Bog and Acidic Fen	High	High	30+	30+	30+	30+	30+
Palustrine Wetland - Eastern North American Freshwater Aquatic Vegetation	Low	Low	10	7	5	3	1
Palustrine Wetland - Eastern North American Freshwater Marsh	Medium	Medium	10	7	5	3	1
Palustrine Wetland - Eastern North American Inland Saline Marsh	Medium	Medium	10	7	5	3	1
Palustrine Wetland - Eastern North American Ruderal Aquatic Vegetation	Low	Low	7	6	5	4	3
Palustrine Wetland - Eastern North American Ruderal Flooded and Swamp Forest	Medium	Medium	30+	25	20	15	10
Palustrine Wetland - Eastern North American Wet Shoreline Vegetation	Low	Low	7	6	5	4	3
Palustrine Wetland - Eastern Ruderal Wet Meadow and Marsh	Low	Low	7	6	5	4	3
Palustrine Wetland - Laurentian-Acadian Alkaline Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Laurentian-Acadian Floodplain Forest	Medium	Medium	30+	30	25	20	15
Palustrine Wetland - Laurentian-Acadian Wet Meadow and Shrub Swamp	Medium	Medium	15	12	10	7	5
Palustrine Wetland - Laurentian-Acadian-Northeast Riverscour Vegetation	Medium	Medium	10	7	5	3	1
Palustrine Wetland - Mid-Atlantic and Northern Coastal Plain Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Midwest Floodplain Forest	Medium	Medium	30+	30	25	20	15
Palustrine Wetland - Midwest Prairie Alkaline Fen	High	High	30+	30+	30+	30+	30+
Palustrine Wetland - North Atlantic Coastal Bog and Fen	High	High	30+	30+	30+	30+	30+

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Palustrine Wetland - North Atlantic Coastal Interdunal Wetland	Medium	Medium	10	7	5	3	1
Palustrine Wetland - North Atlantic Coastal Plain Pondshore	Low	Low	7	6	5	4	3
Palustrine Wetland - North Atlantic Coastal Tidal Freshwater Marsh	Medium	Medium	10	7	5	3	1
Palustrine Wetland - North-Central and Northeastern Seep	High	Medium	15	10	7	5	3
Palustrine Wetland - Northeastern Forest Vernal Pool	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Oak - Sweetgum Floodplain Forest	Medium	Medium	30+	30+	30+	25	15
Palustrine Wetland - Ontario-Québec Boreal Flooded and Rich Swamp Forest	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - Ontario-Québec Boreal-Subboreal Black Spruce Poor Swamp	High	Medium	30+	30+	30+	25	15
Palustrine Wetland - South Atlantic and Gulf Coastal Plain Pondshore	Medium	Medium	7	6	5	4	3
Palustrine Wetland - Southeastern Native Ruderal Flooded and Swamp Forest	Low	Low	30+	25	20	15	10
Palustrine Wetland - Southern Ash - Elm - Willow Floodplain Forest	Medium	Medium	30+	30	25	20	15
Polar and Alpine - Northern Appalachian Alpine Tundra	High	Medium	25	20	15	10	5
Supralittoral Freshwater Coast - Eastern North American Inland Strand and Rocky Shore	Low	Low	7	6	5	4	3
Supralittoral Freshwater Coast - Great Lakes Coastal Rocky Shore	Medium	Medium	7	6	5	4	3
Supralittoral Freshwater Coast - Great Lakes Dune	Medium	Medium	15	10	7	5	3
Supralittoral Freshwater Coast - Great Lakes Sand Beach	High	Medium	7	6	5	4	3

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Supralittoral Marine Coast - North Atlantic Coastal Beach	Medium	Medium	7	6	5	4	3
Supralittoral Marine Coast - North Atlantic Coastal Dune and Grassland	Medium	Medium	15	10	7	5	3
Supralittoral Marine Coast - Northern Atlantic Acidic Sand Barrens Scrub and Grassland	Medium	Medium	15	10	7	5	3
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Hardwood Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Hemlock - White Pine - Hardwood Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Red Spruce - Fir - Hardwood Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Acadian-Appalachian Rocky Ridge Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Appalachian-Northeast Alkaline Forest and Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Central and Southern Appalachian Red Spruce - Fir - Hardwood Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Mesic Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Oak Forest and Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Central Appalachian-Northeast Pine - Oak Rocky Woodland	Medium	Medium	30+	30	25	20	15

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Temperate-Boreal Forest and Woodland - Eastern North American Exotic Ruderal Forest	Low	Low	Not possible	Not possible	Not possible	Not possible	Not possible
Temperate-Boreal Forest and Woodland - Eastern North American Native Ruderal Forest	Low	Low	30+	25	20	15	10
Temperate-Boreal Forest and Woodland - Laurentian Pine - Oak Forest and Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Laurentian-Great Lakes Limestone Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - North Atlantic Coastal Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - North Atlantic Maritime Forest and Scrub	High	Medium	30+	30+	30+	25	15
Temperate-Boreal Forest and Woodland - Northeast Pitch Pine Barrens	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Southeastern Native Ruderal Forest	Low	Low	30+	25	20	15	10
Temperate-Boreal Forest and Woodland - Southern Appalachian Oak Forest and Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Southern Appalachian Virginia Pine - Table Mountain Pine Woodland	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Forest and Woodland - Southern Appalachian-Interior Mesic Forest	Medium	Medium	30+	30	25	20	15
Temperate-Boreal Grassland and Shrubland - Appalachian Mafic Barrens	Medium	Medium	15	10	7	5	3
Temperate-Boreal Grassland and Shrubland - Central Appalachian Acidic Scrub and Grassland	Medium	Medium	15	10	7	5	3
Temperate-Boreal Grassland and Shrubland - Eastern North American Ruderal Meadow and Shrubland	Low	Low	7	6	5	4	3

Group	Technical difficulty of creation	Technical difficulty of enhance-ment	Time required for habitat creation				
			Good	Fairly good	Moderate	Fairly poor	Poor
Temperate-Boreal Grassland and Shrubland - Great Lakes Alvar	Medium	Medium	15	10	7	5	3
Temperate-Boreal Grassland and Shrubland - Laurentian-Acadian Acidic Scrub and Grassland	Medium	Medium	15	10	7	5	3
Temperate-Boreal Grassland and Shrubland - Laurentian-Acadian-Great Lakes Cliff and Rock Vegetation	Medium	Medium	20	15	10	7	5
Temperate-Boreal Grassland and Shrubland - Northeastern Erosional Bluff Vegetation	Medium	Medium	20	15	10	7	5