Biodiversity Benefit Accounting

Landscape Assessment

PACIFIC INSTITUTE

UN GLOBAL COMPACT CEO WATER MANDATE

LimnoTech

The Nature Conservancy

Second Nature ECOLOGY + DESIGN

PROJECT TEAM

Gregg Brill
Deborah Carlin
Giuliana Moreira
Klaudia Schachtschneider
Pacific Institute | www.pacinst.org
United Nations Global Compact CEO Water Mandate | www.ceowatermandate.org

Laura Weintraub
Michelle Platz
Heather Bourne
Wendy Larson
Tim Dekker
LimnoTech | www.limno.com

Marissa Balfour
Kari Vigerstol
Naabia Ofosu-Amaah
The Nature Conservancy | www.nature.org

Megan Wheeler
Robin Grossinger
James Barnes
Second Nature Ecology + Design | www.secondnatureeco.com

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Glossary

Due to the significant size of the glossary, specific terminology used in this landscape assessment has been placed in Appendix A.

Abbreviations

BIAF	Biodiversity Impact Assessment Framework
BioBA	Biodiversity Benefit Accounting
BNG	Biodiversity Net Gain
ENCORE	Exploring Natural Capital Opportunities, Risk and Exposure
ESRS	European Sustainability Reporting Standards
EU	European Commission
GBF	Global Biodiversity Framework
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
ISSB	International Sustainability Standards Board
IUCN	International Union for Conservation of Nature
MEL	Monitoring, Evaluation and Learning
NBSAPs	National Biodiversity Strategies and Action Plans
NGO	Non-governmental organization
NPWI	Net Positive Water Impact
SBTs	Science Based Targets
SBTN	Science Based Targets Network
SDG	Sustainable Development Goals
STAR	Species Threat Abatement and Restoration
TNFD	Taskforce on Nature-Related Financial Disclosures
TNC	The Nature Conservancy
UNDRIP	UN Declaration on the Rights of Indigenous Peoples
VWBA	Volumetric Water Benefit Accounting
WQBA	Water Quality Benefit Accounting
WRC	Water Resilience Coalition

Executive Summary

Prioritizing biodiversity as a key component of corporate water management and stewardship strategies has never been more crucial. More than half of the global gross domestic product (GDP) is moderately to highly dependent upon nature (WEF, 2020), indicating that biodiversity loss is a major risk for the private sector, yet business operations often contribute to biodiversity declines. As corporations increasingly engage with water stewardship activities, there are clear opportunities to synergize efforts with positive biodiversity impacts. Biodiversity and water are deeply connected. Biodiversity loss is a global concern, and the corporate sector has a growing responsibility to invest in ecosystem stewardship alongside water stewardship. While a plethora of useful, corporate-focused biodiversity resources exist, there is a lack of specific guidance and standardized approaches for how corporations should characterize biodiversity-related outputs, outcomes and impacts from investments made in corporate water stewardship projects.

The Pacific Institute, CEO Water Mandate, LimnoTech, The Nature Conservancy (TNC) and Second Nature Ecology + Design are partnering to develop standardized methods for accounting for terrestrial and aquatic biodiversity benefits of water and ecosystem stewardship activities. The objective is to publish a standardized methodology for biodiversity benefit accounting (BioBA) that is technically robust yet pragmatic and feasible to implement. The forthcoming BioBA resource is intended to guide the development and implementation of a monitoring and reporting program for characterizing biodiversity-related outputs, outcomes and impacts from investments made in corporate water stewardship projects. Specifically, BioBA guidance is intended to provide 1) decision support on identifying appropriate variables, indicators and metrics to measure and effectively integrate biodiversity into corporate water stewardship, 2) a collection of methods to measure, calculate or estimate those metrics and 3) scientifically backed recommendations on when and for how long monitoring needs to be conducted, depending upon the type of activity implemented, to characterize biodiversity changes associated with corporate water stewardship activities.

> **“ As corporations increasingly engage with water stewardship activities, there are clear opportunities to synergize efforts with positive biodiversity impacts.**

The landscape assessment presented below critically reviews existing relevant resources with implications for biodiversity benefit quantification in the water stewardship realm. The objective was to identify existing baseline information on biodiversity commitments, frameworks and approaches and support the development of the BioBA methodology in the next phase of work. Several key resources on biodiversity measurement methods were reviewed, and opportunities for alignment with corporate water stewardship initiatives were explored. These included:

- Global, regional and national biodiversity commitments and frameworks
- Frameworks and approaches for corporate biodiversity measurement, action and disclosure
- Project-scale guidance and best practice documents

- Indicators and metrics for measuring biodiversity impact
- Biodiversity measurement approaches, scale and associated claims

It is anticipated that the BioBA methodology will provide valuable linkages to other important water stewardship programs and initiatives such as replenishment targets and volumetric water benefit accounting (VWBA), water quality benefit accounting (WQBA), Benefit Accounting of Nature-Based Solutions for Watersheds, Water Resilience Coalition (WRC) Net Positive Water Impact (NPWI), Freshwater Science-Based Targets (SBTs) and established or emerging reporting frameworks. The forthcoming BioBA resource will seek to align with the impact pathway developed throughout previous corporate water stewardship benefit accounting methodologies (e.g., VWBA and WQBA), while recognizing that biodiversity, and its associated quantification methods, are vastly more complex to characterize than water volume or quality and that standardized approaches to biodiversity accounting are rapidly evolving but not yet widely accepted.

AUDIENCE

The primary audience for the BioBA guidance is intended to be the private sector, specifically corporations implementing water stewardship programs and projects. Secondary users may include the public sector, non-governmental organizations (NGOs) and the larger biodiversity science field. The primary anticipated use case of this methodology is for water stewardship practitioners to quantify the terrestrial and aquatic biodiversity benefits associated with corporate water stewardship projects. BioBA will be most applicable for projects with an aim towards value creation through water stewardship rather than impact mitigation or compliance with regulatory requirements. It is also anticipated that BioBA will primarily serve the need for quantifying the multi-benefits of these water stewardship projects. These quantified benefits may or may not be reported in the context of a company's formal biodiversity goal or target.

SCOPE

This landscape assessment synthesizes existing and emerging guidance, frameworks and approaches on biodiversity impact measurement and accounting. An effort was made to focus and streamline the landscape assessment effort to include a review of only materials directly relevant to the intent of the BioBA methodology development. The table below summarizes a general breakdown of resources considered (in scope) and not considered (out of scope).

Elements considered and in scope for landscape assessment	Elements not considered and out of scope for landscape assessment

• Global biodiversity commitments
• Public corporate biodiversity commitments
• Biodiversity disclosure frameworks, standards and reporting
• Frameworks, methodologies and approaches
• Biodiversity methods and indicators
• Scale of monitoring
• Claims related to biodiversity outcomes
	• Regulations on biodiversity
	  • National biodiversity strategies and action plans
	  • Green development standards
	• Academic literature

EXPECTED OUTCOMES

The outcomes of this landscape assessment provide foundational information to guide Phase 2 efforts focused upon developing a standardized approach for biodiversity benefit accounting. This BioBA methodology will support corporations that want to characterize the impacts of their corporate water stewardship efforts on biodiversity at the project scale. Forthcoming BioBA guidance will focus upon identifying project-specific benefits and tradeoffs of voluntary, primarily off-campus, corporate water and ecosystem stewardship activities that have already been implemented, are being implemented or are planned. BioBA guidance is not intended to characterize a company-wide influence or impact upon biodiversity. It will also not apply to projects legally required for mitigation purposes. BioBA will also guide claims that can or cannot be made in public-facing communications about biodiversity impacts aligned with the stewardship project type, objective and timeline. It is anticipated that relevant indicators and metrics identified in the landscape assessment will be incorporated into BioBA. Additional indicators and metrics beyond those captured in the landscape assessment may also be included. BioBA will provide the corporate water stewardship community with a standardized approach to integrate biodiversity into externally focused water stewardship programs and general guidance on how to incorporate biodiversity considerations into their water management strategies. It will help assess the biodiversity benefits related to corporate water stewardship projects, ensuring that corporate water stewardship impacts upon biodiversity are transparent and, where possible, measurable.

Introduction

Biological diversity (biodiversity) is foundational to healthy ecosystems, economies and communities. As defined by the Convention on Biological Diversity (1992), biodiversity is the variety of life on Earth and can be studied at the genetic, species and ecosystem levels. As displayed in Table 1, there are many integral ecosystem services that biodiversity supports, including fundamental services like photosynthesis, the provisioning of goods like food and medicine, regulating services like water purification and nonmaterial cultural services such as recreation. A range of key terminology is used when discussing biodiversity; these are defined in Appendix A.

TABLE 1: ECOSYSTEM SERVICES THAT ARE SUPPORTED BY BIODIVERSITY (MILLENNIUM ECOSYSTEM ASSESSMENT, 2005)

Supporting Services	Provisioning Services	Regulating Services	Cultural Services
• Photosynthesis • Nutrient cycling • Soil formation	• Food • Fuel • Fibers • Medicines	• Air purification • Water purification • Climate stabilization • Disease regulation • Pest regulation • Flood control • Pollination	• Recreation • Education • Spiritual and religious values • Aesthetics • Cultural diversity • Traditional and formal knowledge systems

Biodiversity loss is now considered the third most severe threat that humanity will face over the next ten years (WEF, 2024) and is primarily caused by habitat conversion, overharvesting, climate change, pollution and invasive species (Kurth *et al.*, 2021). Recent reports have detailed the extent of this biodiversity loss. For example:

- The IPBES (2019a) reports that human actions have significantly altered 75 per cent of the Earth's land surface and 66% per cent of the marine environment; more than half of the global wetlands have been lost; and between one million and two million plant and animal species are currently threatened with extinction.
- The Swiss Re Institute (2020) estimates that about one-fifth of the world's countries are at risk of ecosystem collapse.
- The WWF's Living Planet Index (2022) shows an average 69 per cent decrease in monitored wildlife populations between 1970 and 2018.

Importantly, biodiversity loss and ecosystem degradation have significant implications for global economies. More than half of the global GDP is moderately to highly dependent upon nature (WEF, 2020), and ecosystem services alone are estimated to be worth more than $150 trillion annually (Kurth *et al.*, 2021). For example, the global decline in pollinators could impact up to $577 billion in global crop production annually (IPBES, 2016; Deutz *et al.*, 2020). Further,

current declines in ecosystem functionality are costing more than $5 trillion annually (Kurth *et al.*, 2021). In short, economies and communities only thrive when biodiversity does.

BUSINESS AND BIODIVERSITY: THE ROLE OF THE PRIVATE SECTOR

Companies in the food and beverage, infrastructure and transportation, energy, fashion, pharmaceuticals and technology sectors are among the top contributors to biodiversity loss (BCG, 2021). Yet companies within these sectors and others are also heavily reliant upon biodiversity and therefore have much to gain from its protection (Adler, Mansi and Padandey, 2018). The corporate community has a responsibility to better understand biodiversity loss drivers and consider actionable response strategies to reduce biodiversity loss and/or contribute to restoration. Businesses face three main risks related to biodiversity loss:

1) **Direct and indirect supply chain disruptions from declines in ecosystem health.** Biodiversity loss is certainly a risk for those industries that directly depend upon natural resources, including agriculture, tourism and pharmaceuticals. However, as global ecosystems experience impacts to regulating services that affect society (i.e., carbon sequestration, flood mitigation), almost all industries are likely to be impacted in some way (Kurth *et al.*, 2021).

2) **Potential costs from new regulations aiming to protect biodiversity.** While government intervention is necessary to curb biodiversity loss, such initiatives will likely result in stricter legislation along the lines of operating restrictions, the taxation of harmful activities or the levying of fines against companies that fail to adjust their business (Kurth *et al.*, 2021).

3) **Diminished reputation and social license to operate.** Consumers and other stakeholders have increasing concerns about biodiversity and environmental health that have real implications for which companies they trust and where they want to spend their money (Kurth *et al.*, 2021).

> **“ The corporate community has a responsibility to better understand biodiversity loss drivers and consider actionable response strategies to reduce biodiversity loss and/or contribute to restoration.**

Meanwhile, companies that prioritize reducing their biodiversity impacts often see a variety of benefits from helping to address biodiversity loss, such as:

- **Profits from the development of new goods, services or business models.** The World Economic Forum (2020) projects that nature-positive transitions could lead to $10 trillion in annual business opportunities and create 395 million jobs by 2030.
- **Improvements to brand image and customer loyalty.** Just as not investing in biodiversity can lead to a diminished reputation, the opposite is true. Companies that are committed to biodiversity may benefit from increased customer loyalty and revenue, particularly in industries like fashion and food (Kurth *et al.*, 2021).
- **Access to capital and operational synergies.** Biodiversity is becoming increasingly important for investors; research shows that companies going above and beyond their rivals to address ESG topics are receiving higher valuations. Also, governments around the world are likely to introduce green stimulus packages that provide subsidies and cost-saving measures to companies that are promoting biodiversity. Lastly, companies that improve their resource-use efficiency can reduce their impacts to biodiversity while decreasing costs (Kurth *et al.*, 2021).

The private sector is often seen as a crucial ally to the government in conservation efforts. Many CEOs are committed to protecting nature, often contributing funds to conservation NGOs and making investments to support biodiversity. However, they are unlikely to invest in conservation or environmental projects that do not offer economic returns. This distinction is key – philanthropy distributes profits while investing aims to generate them. Deliberately investing at a loss is not a viable business strategy. Therefore, to unlock the private sector's potential for investing in nature protection and conservation, governments must implement policy measures such as tax incentives, de-risking guarantees and regulatory requirements to encourage such investments (Deutz *et al.*, 2020).

CORPORATE REPORTING FOR BIODIVERSITY

Corporate reporting (across both voluntary and mandatory commitments) is a means to gain insights into business responses to biodiversity concerns and, through enhanced transparency, to hold them accountable for their impact upon biodiversity (Jones and Solomon, 2013; Boiral & Heras-Saizarbitoria, 2017). The result is more companies are looking at developing nature or biodiversity commitments. To achieve these commitments, some organizations in the private sector still need to properly understand how nature is material to their operations, potentially across their entire supply chains, as well as how their actions impact natural systems.

Corporate disclosure is commonly used as a means of governance, with demands for biodiversity reporting becoming increasingly prevalent. The key challenge is ensuring robust data collection on management actions that are credible, accessible to a wide range of stakeholders and support changes in biodiversity impacts. Ideally, properly verified reporting should enhance transparency and build trust among stakeholders and investors. Furthermore, it can empower companies to make informed decisions, set meaningful biodiversity goals and contribute to global efforts to address biodiversity loss (Elliot *et al.*, 2024). It is useful for companies to therefore understand the interdependencies of corporate sustainability targets and biodiversity in general and to acknowledge that in some cases many biodiversity benefits are not being tracked across targets. Water replenishment projects can have significant biodiversity benefits, which is the scope of the BioBA guidance.

As the demand for increased disclosure of sustainability risks and opportunities rises among investors and stakeholders, various frameworks for non-financial reporting have emerged. Companies responding to biodiversity risks through investment in projects to protect or restore ecosystems depend upon appropriate quantification methods and disclosure platforms to demonstrate progress. Despite the existence of various reporting regulations, they do not converge on a common standard for estimating or quantifying biodiversity outcomes. Instead, they address different aspects of corporate biodiversity impact and adopt different conceptions of materiality (Elliot *et al.*, 2024). There is a pressing need to determine what constitutes best practice in BioBA and establish a framework that ensures clarity on the indicators and calculation methods that can help elucidate biodiversity outcomes and impacts from corporate water stewardship and provide companies with a coherent and evidence-based starting point for alignment with mandatory and voluntary frameworks on water and biodiversity action and disclosure.

BIODIVERSITY BENEFIT ACCOUNTING IN CORPORATE WATER STEWARDSHIP

Water is essential for all life on Earth, and biodiversity, in turn, influences water quality and availability. Healthy ecosystems help regulate water flow and maintain water quality, ensuring that water resources remain sustainable and resilient to environmental changes. For businesses, these ecosystems offer a valuable buffer against water-related risks, making them a crucial asset in corporate water stewardship efforts.

The corporate sector plays a significant role in the stewardship of global water resources. Companies rely upon water for their operations, whether for manufacturing, agriculture, energy production, transportation or the provision

of goods and services. In doing so, they impact local and global water systems, potentially putting pressure upon water resources. Recognizing this, many companies have initiated water stewardship programs aimed at responsible water use, efficient water management, restoration and replenishment of water supply systems, water access to communities and safeguarding of water-related ecosystems. However, these efforts often do not account for the profound connections between water and biodiversity, leading to missed opportunities to enhance environmental, societal and business outcomes. A stronger understanding of these connections can help establish the business case for investments in biodiversity and water stewardship.

As businesses worldwide recognize the growing water challenges associated with scarcity, quality and access, the need to prioritize biodiversity as a key component of corporate water management and stewardship strategies has never been more crucial. Corporate water stewardship goals have historically focused on achieving volumetric goals and quantifying the volumetric water benefits of water stewardship activities to track progress against the goals. There is an increased interest in watershed health improvement and goals related to water quality as well as other benefits, including biodiversity.

Emergent frameworks and reporting requirements, including the European Sustainability Reporting Standards, Taskforce for Nature-related Financial Disclosures (TNFD), Science-based Targets Network (SBTN), Global Reporting Initiative (GRI), Corporate Sustainability Reporting Directive, International Sustainability Standards Board (ISSB) and others are beginning to define this responsibility and increase the need for careful planning, execution and accounting of water stewardship project benefits related to biodiversity. A standardized methodology for BioBA that is technically robust yet pragmatic and feasible to implement will help address an important need for the water stewardship community.

DRIVERS FROM A CORPORATE SECTOR PERSPECTIVE

At the initiation of Phase 1 of the BioBA project, water stewardship professionals from eight corporations from the food and beverage, technology and manufacturing sectors were interviewed. The purpose of the interviews was to provide directionality and boundaries for the development of the BioBA methodology. Five key takeaways from these interviews were identified and have been outlined below, and a full summary is provided in Appendix B:

1. While the eight companies do not currently have public-facing biodiversity goals or targets, biodiversity is embedded to various degrees in their corporate sustainability programs and environmental policies.
2. Most corporate sponsors are engaging in biodiversity-related projects to some degree and tracking a set of biodiversity-related benefits.
3. The primary drivers for BioBA guidance are cross-functional and include 1) quantifying biodiversity as multi-benefit, 2) benchmarking and 3) identifying impacts and dependencies.
4. The BioBA guidance should provide standardized methods to measure progress and impacts, support target setting and connect the dots between programs and benefit accounting frameworks.
5. The corporate sponsors anticipate a range of uses for the BioBA guidance, including monitoring and reporting, project planning and meeting disclosure requirements.

The interviews confirmed that these companies view biodiversity as a key part of a corporate water stewardship journey. It will serve as a useful linkage between water and biodiversity initiatives, regardless of whether a company has a public-facing biodiversity goal. This effort is timely because many companies are at an early stage of considering water and biodiversity as multi-benefits within a single project, and a clear set of appropriate methods and metrics is not in practice. The initiative is viewed as a 'connector' that will help support a more holistic view of water stewardship and facilitate a connection among various programs and benefit accounting initiatives such as VWBA, WQBA and the WASH Benefits Accounting Framework.

Current State of Play

This section reviews current public- and private-sector approaches to measuring biodiversity impacts and improvements. Approximately 40 resources were reviewed for potential relevance to the development of the BioBA methodology (see Appendix C). These resources included commitments, goals, frameworks, guidance, indicators and metrics. A screening and synthesis process was conducted to catalog these resources and identify those of greatest relevance to the development of the BioBA methodology. The review is organized into four parts:

- Global, regional and national biodiversity commitments and frameworks
- Frameworks and guidance for corporate biodiversity measurement, action and disclosure
- Indicators and metrics for measuring biodiversity impacts
- Biodiversity measurement approaches, scales and associated claims

GLOBAL, REGIONAL AND NATIONAL BIODIVERSITY COMMITMENTS AND FRAMEWORKS

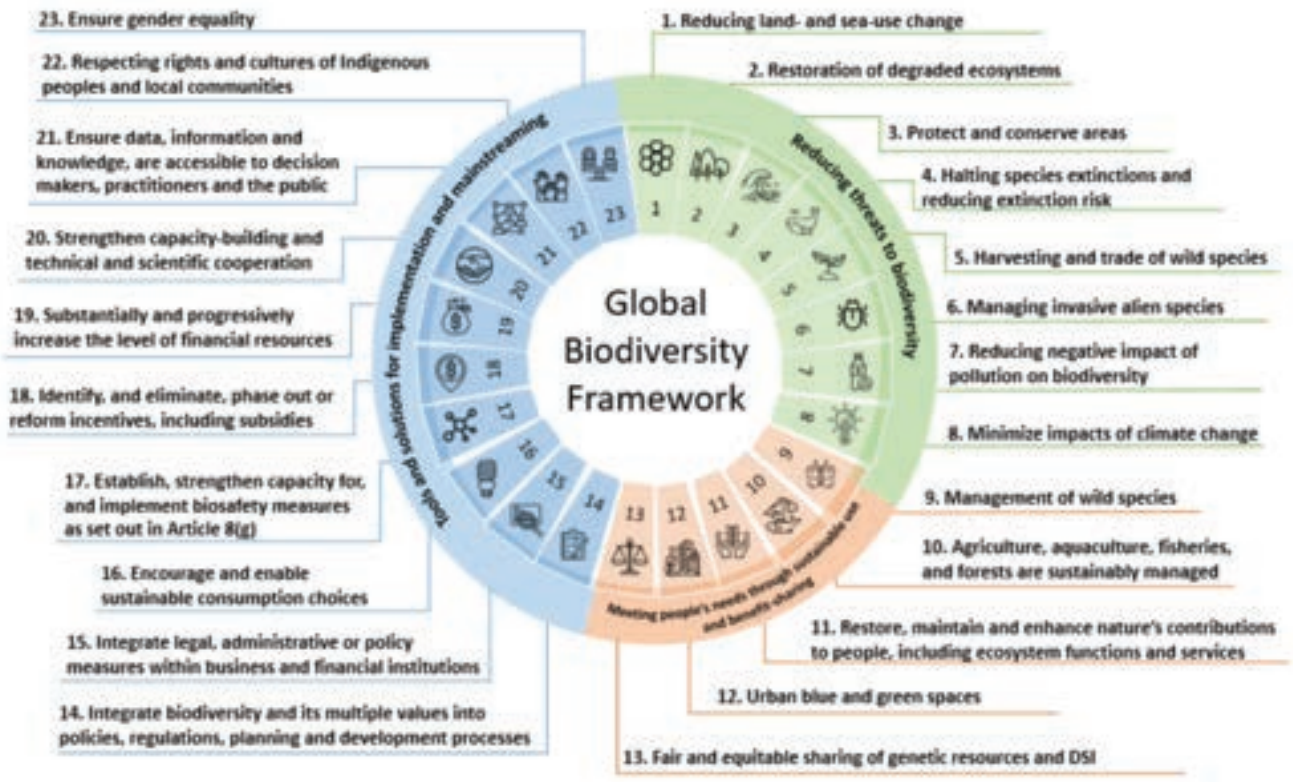
Global and national policies are increasingly emphasizing sustained or improved biodiversity as a critical goal, alongside climate mitigation and adaptation, water security and other life-sustaining ambitions. Aligning corporate biodiversity targets, investments and monitoring metrics with these goals can ensure that companies are contributing to the ambitions of national and global institutions and simplify communication with stakeholders who are familiar with these public commitments.

Multiple global goals related to biodiversity have direct relevance for the private sector and the outcomes they may seek to achieve through water stewardship projects, including:

- Sustainable Development Goal (SDG) 6.6 aims to "*protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes*" while SDG 15 aims to "*protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss*". The SDGs were established with a 2030 timeline.
- The Kunming-Montreal Global Biodiversity Framework (GBF) was established in 2022 at the 15th Conference of the Parties (COP15) of the UN Convention on Biological Diversity (see Figure 1 below for the GBF themes and targets). Since its establishment, supporting frameworks and financial commitments have been put into place, including a monitoring framework with a set of biodiversity metrics. Countries have been developing their own National Biodiversity Strategies and Action Plans (NBSAPs) to align with this framework. Examples of NBSAPs include those from Australia and Canada, currently under development. The GBF includes action-oriented 2030 targets, 2030 intermediate outcomes and 2050 long-term goals – all of which have linkages to private sector action in some way. Specifically, Target 15 of the GBF focuses

upon the assessment, disclosure and reduction of biodiversity-related risks and negative impacts by large and transnational companies and financial institutions. Additionally, the private sector should consider how Target 18 can impact businesses via governments adapting subsidies and legislations. Countries that are Parties to the Convention on Biological Diversity will need to enact legislation to guide and require these disclosures. Target 14 is also relevant for enabling linkages between water stewardship activities and biodiversity; it strives to ensure its integration within planning, development and environmental assessments to support alignment of public and private activities and financial flows with the GBF.

FIGURE 1: GLOBAL BIODIVERSITY FRAMEWORK THEMES AND TARGETS



Source: Environment and Climate Change Canada, 2023.

Other global, regional and national goals, policies or plans dictate or influence the actions companies may take to address key biodiversity threats and opportunities through water stewardship projects, including the following:

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- International conventions related to biodiversity include the Convention on International Trade in Endangered Species (CITES), The Convention on the Conservation of Migratory Species of Wild Animals, the Convention on Wetlands (the Ramsar Convention), the World Heritage Convention and others. These outline sensitive species and locations that may require specific considerations by projects that could affect them or may provide guidance on conservation actions that can be taken.
- National or regional regulations exist in some jurisdictions that require compensatory mitigation (or offsetting) to protect biodiversity and ecosystems. These regulations can have an impact upon business investments and operations. Examples include the U.S. Endangered Species Act, the U.S. Clean Water Act

(which requires compensatory mitigation for wetlands), the U.K.'s Biodiversity Net Gain Rule (requiring all development projects to result in a 10 per cent net gain of native habitat) and Australia's Nature Repair Market that incentivizes environmental protection and ecosystem restoration to improve biodiversity outcomes.

- Many countries have laws protecting threatened and migratory species and critical habitat areas. Activities within and affecting protected areas are also generally regulated by law.
- The European Union's (EU) Taxonomy Delegated Acts were approved by the EU Commission in 2023 and define criteria for economic activities that make a substantial contribution to a range of environmental objectives, including the protection and restoration of biodiversity and ecosystems.
- Traditional Indigenous Territories encompass up to 22 per cent of the world's land surface, and they coincide with areas that hold 80 per cent of the planet's biodiversity (World Bank, 2008). Indigenous livelihoods are intrinsically tied to the biodiversity of their lands and territories, and protecting indigenous peoples' right to self-determination, as enshrined in the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), includes protecting the biodiversity they steward.

The above-mentioned goals, targets and policies serve as strong foundations and potential drivers for a corporation to invest in water stewardship projects that benefit biodiversity. In some cases, they provide guidance on actions that companies may need to take from a regulatory standpoint, and in others, they provide a framework for considering actions that may be most effective for conservation and restoration outcomes. However, many of these commitments and frameworks do not provide practitioners with standardized methods, indicators or metrics for quantifying benefits at the project scale.

"The goal is to help characterize biodiversity changes associated with corporate water and ecosystem stewardship activities.

BioBA aims to provide decision support on identifying appropriate variables, indicators and metrics to measure, as well as provide a collection of methods to measure, calculate or estimate those metrics. BioBA also plans to provide scientifically backed recommendations on when and how long monitoring needs to be conducted, depending on the type of activity implemented. The goal is to help characterize biodiversity changes associated with corporate water and ecosystem stewardship activities.

FRAMEWORKS AND GUIDANCE FOR CORPORATE BIODIVERSITY MEASUREMENT, ACTION AND DISCLOSURE

Corporations are an essential element in meeting national and global targets for biodiversity conservation. Accordingly, numerous frameworks and systems are being developed to structure and guide corporate action and disclosures around biodiversity. These frameworks complement EU policies, UK policies and global conventions/commitments, and they suggest approaches for evaluating corporate biodiversity impact, identifying and implementing change to reduce impact and disclosing impact.

Several key frameworks in place or in development may inform and guide biodiversity benefit accounting for water stewardship projects. While none of these frameworks specifically addresses the corporate water stewardship audience, understanding and creating alignment with these systems is a goal of the methodology development that will be conducted in Phase 2 of this project. Key frameworks include:

- **Taskforce on Nature-Related Financial Disclosures (TNFD):** Recommended disclosures around corporate governance, strategy, risk and impact management and metrics and targets associated with biodiversity and other components of nature. Includes the LEAP method (Locate, Evaluate, Assess, Prepare) to assess corporate nature impact.
- **The Science Based Targets Network (SBTN) Science Based Targets for Nature:** Guidance for corporations developing science-based targets to enable companies to effectively set validated goals for nature (freshwater, land, oceans and biodiversity) in alignment with the planetary boundaries and measure progress. Guidance on target setting for biodiversity is forthcoming.
- **GRI 101: Biodiversity 2024:** Disclosure standard for corporations reporting on biodiversity impact.
- **Natural Capital Protocol:** Framework to identify and value corporate impacts and dependencies on nature, including biodiversity. Sector-specific guidance is also available. For example, The Economics of Ecosystems and Biodiversity AgriFood Evaluation Framework is meant to provide practical guidance on how businesses in the agrifood sector can evaluate and realize interactions of eco-agri-food systems upon which their businesses rely.

> **“ Corporations are an essential element in meeting national and global targets for biodiversity conservation.**

- **System of Environmental Economic Accounting - Ecosystem Accounting**: Accounting methodology used by the UN to support policy and decision-making. Includes thematic accounting for biodiversity. Can be used at the national to subnational scale.
- **Aligning Accounting Approaches for Nature (Align Project)**: Supported by the European Commission, this initiative has developed multiple outputs to build harmonization for the measurement of business biodiversity impacts and dependencies.
- **Nature Positive Initiative**: A coalition of leading conservation organizations, institutes and private sector coalitions working to drive alignment around the use of the term ‘nature positive’ including building consensus on the *State of Nature* metrics for land, freshwater and oceans.
- **Multiple corporate nature resources from Business for Nature and partners**: Resources include the High-level Business Actions on Nature (the ACT-D Framework - Assess, Commit, Transform, and Disclose), sector guidance documents (more currently in development by WBCSD and WEF) and the Nature Strategy Handbook, which has been developed to be consistent with the requirements of leading nature-related frameworks and regulations.

Water stewardship efforts are primarily focused upon achieving water benefits; however, project selection, execution and reporting should be conducted with these emerging biodiversity frameworks in mind to ensure corporations can most efficiently meet cross-cutting sustainability goals. In Phase 2 of this project, we will build from the key guidance from these frameworks that applies to corporate water stewardship and seek to provide a pathway to navigating benefit quantification aligned with broader biodiversity thinking.

As corporations conduct restoration and nature-based projects for water stewardship or other goals, they will need to effectively measure site- and project-scale biodiversity impacts and the outcomes of associated interventions. Guidance from the biological conservation and ecological restoration disciplines encourages the selection of meaningful indicators that can be feasibly measured through high-value performance monitoring programs. Examples of project-scale guidance include:

- **International Principles and Standards for the Practice of Ecological Restoration** (Society for Ecological Restoration)**:** Provides key principles for the process and desired outcomes of ecological restoration, plus standards of practice for planning and design, implementation, monitoring and reporting and maintenance.
- **Standards of Practice to Guide Ecosystem Restoration** (Food and Agriculture Organization of the United Nations, Society for Ecological Restoration, International Union for Conservation of Nature (IUCN): Guidance on the application of 10 guiding principles for restoration, with more than 300 recommended best practices. Builds upon SER's principles and standards.
- **Biodiversity Net Gain** (UK Department for Environment, Food & Rural Affairs): UK-specific methodology for calculating and reporting the impact of development projects on biodiversity via changes in quantity and quality of habitat, based upon existing datasets within the UK.
- **Open Standards for the Practice of Conservation** (Conservation Measures Partnership): A decision-support document to guide users through the steps of developing, implementing and reporting on conservation projects.
- **Framework for monitoring biodiversity in protected areas and other effective area-based conservation measures** (International Union for Conservation of Nature): Guidance on designing and implementing effective project monitoring.

Resources guiding corporate biodiversity efforts are rapidly evolving and proliferating, with large international coalitions and individual consultancies and NGOs continuing to develop new resources and approaches. Examples of forthcoming corporate-facing biodiversity guidance at the time of this assessment include:

- **International Sustainability Standards Board** (ISSB): Currently embarking on a research project on biodiversity, ecosystems and ecosystem services, ISSB will evaluate how to build upon the TNFD guidance.
- **Accelerating Transformation for Nature** (A-Track): A new initiative that will develop resources for the private sector in support of better flows of biodiversity information and mainstreaming of natural capital accounting.
- **Nature Positive Initiative**: Guidance on metrics for nature positive resources in development.
- **Taskforce for Nature-Related Financial Disclosures** (TNFD): Further guidance on *State of Nature* metrics is forthcoming.
- **Aligning Accounting Approaches for Nature**: Exploring measurement solutions for nature-positive commitments.

INDICATORS AND METRICS FOR MEASURING BIODIVERSITY IMPACT

Of the approximately 40 guidance resources reviewed, 26 were identified that included specific guidance on biodiversity monitoring indicators and metrics; however, only 12 of those provided guidance relevant to the project or site scale. Because many individual corporate water stewardship projects can be small-scale, this landscape assessment focused heavily upon these 12 resources (Table 2). While not an exhaustive representation of all the guidance developed to date, this review provides a representative sample of the most recent and relevant guidance on biodiversity impact measurement approaches and potential indicators and metrics.

TABLE 2: PRIORITY GUIDANCE RESOURCES IDENTIFIED IN THE LANDSCAPE ASSESSMENT

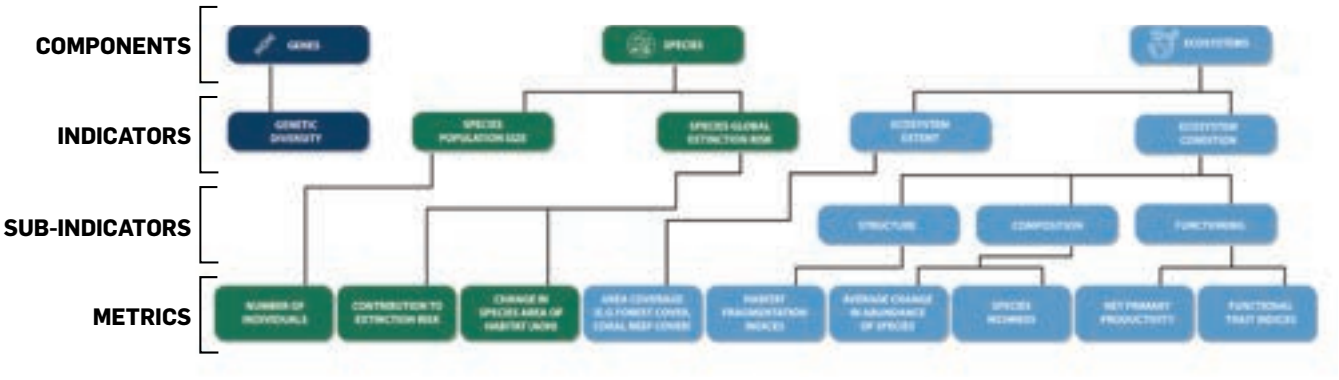
Resource	Organizations
European Sustainability Reporting Standards (ESRS) E4: Biodiversity and Ecosystems	European Union, European Financial Reporting Advisory Group
Biodiversity In the First Release of SBTs For Nature and An Approach For Future Methods: Biodiversity Short Paper	Science Based Targets Network (SBTN)
Guidance on the identification and assessment of nature-related issues: the LEAP approach	Taskforce on Nature-related Financial Disclosures (TNFD)
Recommendations for a standard on corporate biodiversity measurement and valuation, Aligning accounting approaches for nature	UNEP-WCMC, Capitals Coalition, Arcadis, ICF, WCMC Europe
Integrating Biodiversity into Natural Capital Assessments	Capitals Coalition
GRI 101: Biodiversity 2024	Global Reporting Initiative
International Principles and Standards for the Practice of Ecological Restoration	Society for Ecological Restoration
Standards of Practice to Guide Ecosystem Restoration	Food and Agriculture Organization of the United Nations, Society for Ecological Restoration, International Union for Conservation of Nature
America's Biodiversity Metric	Ramboll and Nature Serve
UK Environmental Act of 2021 (Biodiversity Net Gain)	UK Department for Environment, Food & Rural Affairs
The Road to Restoration: Guide to Identifying Priorities and Indicators for Monitoring Forest and Landscape Restoration	World Resources Institute, Food and Agriculture Organizations of the United Nations
LandScale Assessment Framework v1.0	Rainforest Alliance, Conservation International

The goal of this review was to identify key biodiversity indicators that are being recommended in global biodiversity quantification guidance, understand emerging areas of agreement among them and synthesize a subset of this broader biodiversity accounting guidance which applies to the corporate water stewardship scope and scale to inform the development of the future BioBA methodology. BioBA will be specifically focused upon corporate water stewardship applications, and a key element of Phase 2 work will be to provide guidance and linkages to scientifically robust yet

practical indicators and metrics through which to characterize biodiversity change. It is anticipated that additional indicators and metrics beyond those captured below may also emerge as part of Phase 2 work.

Three major components of biodiversity emerged through which to assess biodiversity impacts: genetics, species and ecosystems. These focal areas are consistent with standardized definitions of biodiversity (Convention on Biological Diversity, 1992) which highlight that biodiversity is understood as a variety of species (encompassing all of the millions of plants, animals, microbes, etc. identified to date) and genetic differences within each of those species as well as a variety of ecosystems across which those species live (wetlands, deserts, forests, rivers, lakes, agricultural fields, etc.). For this landscape assessment, the term indicator is defined as "*a characteristic of an ecosystem that is related to, or derived from, a measure of biotic or abiotic attributes that can provide quantitative information on ecological condition, structure, and function.*" Those specific, quantitative "*measures of biotic or abiotic attributes*" are defined as "metrics." Further, multiple metrics can be combined into biological indices to provide a more comprehensive quantification of an ecosystem or community. Figure 2 depicts one such example of these three biodiversity components (genetics, species and ecosystems), associated indicators and metrics from which to assess them.

FIGURE 2: COMPONENTS OF BIODIVERSITY AND FACTORS TO CONSIDER WHEN SELECTING MEASUREMENT APPROACHES



Source: UNEP-WCMC, Capitals Coalition, Arcadis, ICF, WCMC Europe (2022).

Genetic-Level Guidance

Review of guidance resources indicated a broadly held recognition of the importance of genetic diversity in assessing biodiversity impacts. However, this sentiment was consistently accompanied by an acknowledgement of the gap in standardized, trusted and feasible monitoring methods and metrics for assessing genetic diversity. While technologies such as eDNA have greatly improved reliability and capability over the last decade alongside the establishment of metabarcoding and open-source libraries of genetic information, guidance documents indicated that most of these tools are still too expensive or time-intensive to be feasibly applicable to corporate-scale assessments of biodiversity impacts upon genetic diversity. Also, in corporate applications, eDNA methods are mainly used to detect species presence rather than to assess genetic diversity within populations, which requires a much higher level of data granularity and coordinated monitoring efforts.

Species-Level Guidance

The most frequently recommended species-level biodiversity indicator was population dynamics (67 per cent of resources recommended), with species diversity being the most recommended metric (58 per cent of reviewed guidance documents). Further, half of the reviewed resources recommended assessing indicators of species threat risk, with the status of threatened/endangered species being the most frequently cited metric (42 per cent).

Generally, guidance surrounding species-level indicators tended to focus upon the collection and analysis of original, primary data or data that is measured directly within the habitat of interest. These include metrics such as species presence, richness, composition, population size, cover and survival rate. One notable exception to this, however, was threatened/endangered species status. Recommendations for assessing metrics related to threatened/endangered species status usually included the use of an index of extinction risk, such as the Red List Index or Species Threat Abatement and Restoration (STAR) metric.

Ecosystem-Level Guidance

Of the three scales across which biodiversity occurs (genetics, species, ecosystems), the literature suggests that species-level indicators are the most frequently characterized (Convention on Biological Diversity, 1992). However, this landscape assessment uncovered that in the context of corporate-facing, site-level guidance, ecosystem-level indicators are the most frequently recommended for measuring biodiversity impacts. For example, 93 per cent of the resources reviewed recommended monitoring indicators of ecosystem quality and/or ecosystem quantity. Regarding ecosystem quality, metrics associated with characterizing ecosystem conditions were most recommended (94 per cent of resources recommended). Similarly, 83 per cent of resources recommended monitoring habitat extent metrics. Some 42 per cent of guidance resources recommend assessing metrics associated with ecosystem function/ecosystem service provision. However, as was discussed above regarding genetic diversity, methods through which to characterize ecosystem function are extremely complex, and time and resource-intensive and thus expensive to characterize in a reproducible and objective way.

“ This landscape assessment uncovered that in the context of corporate-facing, site-level guidance, ecosystem-level indicators are the most frequently recommended for measuring biodiversity impacts.

Guidance on ecosystem-level indicators utilized modeled metrics and/or secondary data layers (often geospatial). Examples of modeled ecosystem-level metrics included the Ecosystem Integrity Index, Ecosystem Intactness Index, Local Biodiversity Intactness Index, Mean Species Abundance, Species Habitat Index, Protected Area Representativeness & Connectedness Indices, Global Ecosystem Restoration Index (GERI) and Species Protection Index, among others. Recommended secondary data layers assessed changes in area (e.g. ecosystem extent, restored area and protected area) and changes in spatial configuration (e.g. habitat connectivity or fragmentation).

While the majority of documents assessed independent indicators and metrics across these three biodiversity components, several guidance frameworks, including the Biodiversity Impact Assessment Framework (BIAF), Biodiversity Net Gain (BNG), Americas Biodiversity Metric and Exploring Natural Capital Opportunities, Risk and Exposure (ENCORE), also recommend equation-based methods to generate a biodiversity number or score. Additional details associated with these biodiversity components, indicators and associated metrics are summarized in Table 3. For specific information regarding which guidance resources are recommending which indicators and metrics, frequency of recommendation and data types, please see Appendix D.

TABLE 3: SUMMARY OF BIODIVERSITY COMPONENTS AND ASSOCIATED INDICATORS AND METRICS IDENTIFIED IN RESOURCE REVIEW

Biodiversity components	Indicators	Metrics*	Spatial scales
Genetics	Genetic diversity	N/A	Local
Species	Population dynamics	Species diversity	Local
		Species abundance	Local
		Species distribution/evenness	Local to regional
	Threat status	Status of threatened / endangered species	Regional to global scale
		Status of indicator species	Regional to global scale
		Threat reduction	Local to global scale
Ecosystems	Ecosystem quality	Ecosystem condition	Local to global scale
		Habitat spatial configuration (connectivity/ fragmentation)	Local to global scale
		Ecosystem function/service provision	Local to regional scale
	Ecosystem quantity	Habitat availability/extent	Local to global scales (depending upon data type)
		Habitat significance/priority	Local to global scales (depending upon data type)

Note: Included metrics are listed in order of most frequently recommended to least for each of the three biodiversity components.
* Metrics are applicable across both terrestrial and aquatic ecosystems

In the next phase of work, the project team will crosswalk frequently recommended biodiversity monitoring metrics identified through this landscape assessment with existing standard operating procedures and applicable spatial scales to critically evaluate which are the most technically robust yet feasible, given the target audience of this initiative. This exercise will thus inform recommendations on the selection of indicators and metrics through which to assess biodiversity changes associated with corporate water stewardship activities.

BIODIVERSITY MEASUREMENT APPROACHES, SCALES AND ASSOCIATED CLAIMS

An important element of the BioBA methodology will be clear programmatic guidance on how to credibly report biodiversity benefits based upon direct measurement, modeling or other methods. Quantification and claims should be considered at the most appropriate scale. Various resources were reviewed to help inform this topic before the initiation of Phase 2 methodology development. There is much that we still do not know about the planet's biodiversity; it is inherently complex and contains many aspects that are not easily measurable, such as genetic diversity or ecosystem function. Even metrics that are directly measurable require significant effort. For example, measuring species presence could require a complete inventory across all taxonomic groups, including soil microorganisms, plants, birds, mammals and insects. But is a full inventory necessary? What should be measured, and why? When considering biodiversity monitoring, a key step is to determine what to measure through the development of a

monitoring, evaluation and learning (MEL) program for any given project.

Guidance on developing MEL programs, including metrics selection, is available and highlighted in Appendix D; key resources include the Open Standards for the Practice of Conservation, the IUCN Framework for monitoring biodiversity in protected areas and other effective area-based conservation measures and, in the case of monitoring involving Indigenous Peoples and local communities, the Introduction to community-based environmental monitoring: practical guidance for monitoring of natural resources.

There is a variety of scales that a company may use to implement water stewardship projects and then measure biodiversity-related indicators. For example, a corporation may use a global biodiversity index at the full company level to estimate the relative pressures associated with different types of economic activities or commodities. As land-use change and habitat loss are key drivers of global biodiversity loss, a company may also use biodiversity data to assess the risks and impacts associated with certain value-chain commodities such as palm oil. Companies taking action to improve practices or restore ecosystems may measure biodiversity at the level of a landscape, such as a supply shed, jurisdiction or watershed, especially if the project is collaborative and if certain metrics are scientifically suited for measurement at these scales. A company may also measure biodiversity at the site level in the case of certain types of water stewardship projects and target outcomes. Given that the area of many individual corporate water stewardship projects can be quite small, the BioBA standardized approach developed throughout Phase 2 will be established on a project-scale basis.

During the application of the BioBA methodology, the water stewardship project timeline, choice of indicators and metrics and scale of measurement will inform the types of claims that can be made about any potential biodiversity benefits as outputs, outcomes or impacts. The ISEAL Joint Landscape Position Papers and Roadmap provides guidance on the use of claims. This paper (ISEAL, 2023) describes the differences between collective, proportional and attribution claims, and it outlines when it is appropriate for companies to use these varying types of claims (Table 2). Deciding upon which actions to take in a basin and the kinds of claims that can be made will be dependent upon the context or nature and scale of the biodiversity challenges being addressed. The forthcoming BioBA guidance seeks to inform corporations on which claims can or cannot be made in public-facing communications about biodiversity benefits and ensure that biodiversity-related claims are aligned with the stewardship project type, objective and timeline.

TABLE 4: OVERVIEW OF CLAIMS RELATING TO LANDSCAPE PERFORMANCE OUTCOMES (ISEAL, 2023)

	Collective Claim	Proportional Claim	Attribution Claim
Description	Allows companies to report on the collective performance outcomes of initiatives they contribute to that occur at the scale of landscapes, including watersheds or jurisdictions.	Enables apportioning of broad-scale performance outcomes between companies and other stakeholders that contributed to the outcome.	Indicates that performance outcomes resulted directly and solely from a company's actions or investments. Provides the right of sole ownership of an outcome.
When used	When outcomes are most accurately measured and described at broad scales. Qualitative reporting. Collective quantitative reporting (e.g., 'we contributed to this overall outcome.').	When reporting of individual contribution to landscape performance outcomes is required, e.g. for quantitative reporting on certain commitments or for disclosures. When double counting would not be credible.	For quantitative claims about discrete outputs or short-term outcomes. Requires the highest degree of causality, quantitative accuracy and rigor.
Benefits	Recognizes that large-scale outcomes are the result of collective action by many stakeholders.	Provides contributors with proportional ownership of the outcomes.	Enables a company to claim responsibility for specific outcomes.
Caveats	Does not enable companies to claim individual ownership of specific outcomes.	Must not overstate the role of an individual organization. Can only be used when methodology for apportioning exists.	Not suitable for outcomes measured at the landscape scale. Exception for high-quality jurisdictional REDD+ credits with accepted allocation methodologies.

The exercise of reviewing published information on biodiversity commitments, frameworks, indicators, metrics, measurement approaches, scales and associated claims served as an important step to properly frame the Phase 2 BioBA activities, which will be focused upon methodology development. It is clear from the outcomes of this scene-setting that there is a plethora of useful resources on biodiversity, but few, if any, provide the standardized approach needed by corporations to quantify or estimate the biodiversity-related outputs, outcomes and impacts from investments made in corporate water stewardship projects. The next phases of work will look to synthesize and potentially expand upon many of the relevant indicators and metrics identified in this section and develop the BioBA methodology based upon the most practical and pragmatic options.

Conclusions and Recommendations

Biodiversity loss has significant social and economic implications – more than half of the global gross domestic product is moderately to highly dependent upon nature (WEF, 2020), and ecosystem services are estimated to be worth trillions of dollars annually (Kurth *et al.*, 2021). Without swift and efficient measures to protect biodiversity and promote sustainable use of natural resources, we risk surpassing tipping points[1] that will lead to unprecedented levels of species extinction and severe, detrimental impacts upon the economy.

Corporations are unique players in this space – corporate activities are driving biodiversity loss, but corporations do not thrive without healthy and robust biodiversity (Adler, Mansi and Padandey, 2018). Thus, corporate leadership is necessary to prevent society from surpassing ecological tipping points. While nations around the world are making strides in forming biodiversity frameworks, progress is slow and underfunded. Corporations can drive change within the private sector and ultimately influence governmental prioritization of biodiversity. This is evident from the Convention on Biological Diversity outcomes of COP15 in 2022 and the significant efforts being made by Business for Nature and other organizations. More companies are looking at developing nature commitments, or biodiversity commitments more specifically, as evidenced in the interviews with corporate partners. To achieve these commitments, the private sector needs to understand how nature and elements of biodiversity are material to their operations, potentially across their entire supply chains, as well as how their actions impact natural systems. Many corporations have initiated water stewardship programs aimed at responsible water use, efficient water management, restoration and replenishment of water supply systems, water access to communities and safeguarding of water-related ecosystems. Recognizing the profound connections between water and biodiversity, a stronger understanding of these connections can help establish the business case for investments in biodiversity and water stewardship. The purpose of this landscape assessment was to engage the private sector and provide foundational information to guide Phase 2 efforts focused upon the development of a standardized methodology for a BioBA of corporate water stewardship projects. A review of existing relevant resources—including approaches, datasets, methods, tools and standards—was undertaken to understand the contemporary thinking around measuring biodiversity and to identify key opportunities and challenges faced by decision-makers, practitioners and researchers. The key findings of this landscape assessment provide a path forward for future phases of this project.

“ Recognizing the profound connections between water and biodiversity, a stronger understanding of these connections can help establish the business case for investments in biodiversity and water stewardship.

1 The point at which a series of small changes or incidents becomes significant enough to cause a larger, more important change.

KEY LEARNINGS FROM THIS LANDSCAPE ASSESSMENT

There are several key findings from this assessment that warrant highlighting. These include:

- Global and national policies are increasingly emphasizing sustained or improved biodiversity as a critical goal, alongside climate mitigation and adaptation, water security and other life-sustaining ambitions.
- Current commitments, frameworks, policies, guidance and methods do not provide practitioners with a standardized set of indicators or metrics for quantifying the benefits of biodiversity projects.
- Aligning corporate water and biodiversity targets and investments can ensure companies are contributing to the ambitions of national and global institutions and simplify stakeholder communications.
- The review of guidance specific to biodiversity monitoring indicators and metrics uncovered that, in practice, ecosystem-level indicators are the most frequently recommended for measuring biodiversity impacts.
- It is anticipated that direct measurement of biodiversity benefits may require significant effort or be infeasible, given the objectives of the water stewardship community that will be implementing BioBA. In addition, careful thought on how to develop biodiversity benefit claims on a project or aggregated scale will be required.

CONTINUING WORK

This landscape assessment is the foundation for the BioBA methodology, which will provide a standardized approach for monitoring and reporting biodiversity-related outputs, outcomes and impacts from investments in corporate water and ecosystem stewardship activities. Specifically, BioBA is expected to provide:

1. Decision support on identifying appropriate variables, indicators and metrics to measure and effectively integrate biodiversity into corporate water stewardship.
2. A collection of methods to measure, calculate or estimate those metrics.
3. Scientifically backed recommendations on when and how long monitoring needs to be conducted, depending upon the type of activity implemented, to characterize biodiversity changes associated with corporate water and ecosystem stewardship activities.

While not intended to be used to assess company-side biodiversity impacts, the forthcoming BioBA approach will guide claims that can or cannot be made in public-facing communications about biodiversity impacts that are aligned with the stewardship project type, objective and timeline. This approach will also provide businesses with general programmatic guidance on how to incorporate biodiversity considerations into their water management strategies. Note that the BioBA guidance will not be a target-setting framework but will support the measuring of quantifiable outcomes, thus aiding with future target-setting. It will help assess the multiple benefits of biodiversity conservation and restoration, ensuring that corporate water stewardship efforts are transparent, measurable and impactful.

A primary component of the Phase 2 methodology development will be to leverage the findings from this landscape assessment to define linkages from water-related activities to biodiversity-related benefits as expressed in scientifically robust yet practical indicators and metrics. The outcomes of this work will also provide valuable linkages to other important water stewardship programs and initiatives, such as replenishment targets and Volumetric Water Benefit Accounting (VWBA) quantification, Benefit Accounting of Nature-Based Solutions for Watersheds, WRC's Net Positive Water Impact (NPWI), Freshwater Science-Based Targets (SBTs) and established or emerging reporting frameworks.

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Appendices

APPENDIX A: GLOSSARY

In discussions on biodiversity, a range of terminology is used, sometimes interchangeably. Many of the terms in the table below are drawn from the Taskforce on Nature-related Financial Disclosures (TNFD) Glossary and the IPBES Glossary.

Biodiversity	The variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.	Reference
Biodiversity offsets	Biodiversity offsets are measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground concerning species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity.	Reference 1 Reference 2 Reference 3
Biome	Global-scale zones, generally defined by the type of plant life that they support in response to average rainfall and temperature patterns e.g. tundra, coral reefs or savannas. For metrics, biomes are defined in the IUCN Global Ecosystem Typology as the component of a realm united by a few common major ecological drivers that regulate major ecological functions. Biomes are derived from the top-down by subdivision of realms (Level 1).	Reference 1 Reference 2
Conservation	Actions taken to promote the persistence of ecosystems and biodiversity.	Reference
Critical habitat	Any area of the planet with high biodiversity conservation significance, based upon the existence of habitat of significant importance to critically endangered or endangered species, restricted range or endemic species, globally significant concentrations of migratory and/or congregatory species, highly threatened and/or unique ecosystems and key evolutionary processes.	Reference
Drivers of nature change	All external factors that affect nature, anthropogenic assets, nature's contributions to people and good quality of life. They include institutions and governance systems and other indirect and direct drivers (both natural and anthropogenic).	Reference
Ecological abundance	The size of a population of a particular life form.	Reference

Ecological / habitat / ecosystem connectivity	The degree to which the landscape facilitates the movement of organisms (animals, plant reproductive structures, pollen, pollinators, spores, etc.) and other environmentally important resources, such as nutrients and moisture, between similar habitats. Connectivity is hampered by fragmentation.	Reference
Ecosystem	A dynamic complex of plant, animal and microorganism communities and the non-living environment, interacting as a functional unit.	Reference 1 Reference 2
Ecosystem condition	The quality of an ecosystem is measured by its abiotic and biotic characteristics. Condition is assessed by an ecosystem's composition, structure and function which, in turn, underpins the ecological integrity of the ecosystem and supports its capacity to supply ecosystem services on an ongoing basis.	Reference
Ecosystem extent	Area coverage of a particular ecosystem, usually measured in terms of spatial area.	Reference
Ecosystem function	The flow of energy and materials through the biotic and abiotic components of an ecosystem. This includes many processes such as biomass production, trophic transfer through plants and animals, nutrient cycling, water dynamics and heat transfer.	Reference
Ecosystem health	Used to describe the condition of an ecosystem by analogy with human health. Note that there is no universally accepted benchmark for a healthy ecosystem. Rather, the apparent health status of an ecosystem can vary, depending upon which metrics are employed to assess it, and which societal aspirations are driving the assessment.	Reference
Ecosystem services	The contributions of ecosystems to the benefits that are used in economic and other human activity. Ecosystem services are typically categorized as supporting services, provisioning services, regulating services and cultural services.	Reference 1 Reference 2
Endangered species	Species considered to be facing a very high risk of extinction in the wild.	Reference
Environmental flows (e-flow)	Environmental flows describe the quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend upon these ecosystems.	Reference
Extinction	A population, species or more inclusive taxonomic group has gone extinct when all its individuals have died. A species may go extinct locally (population extinction), regionally (extinction of all populations in a country, continent or ocean) or globally. Populations or species reduced to such low numbers that they are no longer of economic or functional importance may be said to have gone economically or functionally extinct, respectively.	Reference
Habitat	The area, characterized by its abiotic and biotic properties, that is habitable by a particular species.	Reference

Habitat fragmentation	A general term describing the set of processes by which habitat loss results in the division of continuous habitats into a greater number of smaller patches of lesser total and isolated from each other by a matrix of dissimilar habitats. Habitat fragmentation, which leads to a barrier effect, may occur through natural processes (e.g. forest and grassland fires, flooding) and through human activities (e.g. forestry, agriculture, urbanization).	Reference
Habitat loss	The reduction in the amount of space where a particular species or group of species can survive and reproduce.	Reference
Indicator	A quantitative or qualitative factor or variable that provides a simple, measurable and quantifiable characteristic or attribute responding in a known and communicable way to a changing environmental condition, to a changing ecological process or function or to a changing element of biodiversity.	Reference
Index/Indices	When measuring biodiversity, an index is a quantitative measure that reflects how many different types (such as species) there are in a dataset (a community). These indices are statistical representations of biodiversity in different aspects (richness, evenness and dominance).	Reference
Indigenous (=native) species	A species or lower taxon living within its natural range (past or present) including the area which it can reach and occupy using its natural dispersal systems.	Reference
Invasive alien species	Species whose introduction and/or spread by human action outside their natural distribution threatens biological diversity, food security and human health and well-being. 'Alien' refers to the species having been introduced outside its natural distribution ('exotic', 'non-native' and 'nonindigenous' are synonyms for 'alien'). 'Invasive' means tending to expand into and modify ecosystems to which it has been introduced. Thus, a species may be alien without being invasive or, in the case of a species native to a region, it may increase and become invasive without being an alien species.	Reference 1 Reference 2
Key Biodiversity Area	A site contributing significantly to the global persistence of biodiversity.	Reference
Metric	Quantitative measures of biological indicators; can provide information on both the present and past effects of anthropogenic stress on ecological systems. To gain a more comprehensive view of an ecological community, multiple types of metrics are combined into a biological index.	Reference
Metabarcoding	Metabarcoding is a DNA analysis technique that allows for the simultaneous identification of many taxa within the same sample. This allows for rapid sample processing and data yield. Metabarcoding clarifies species composition at the community level using mixed bulk samples, such as water. Previous barcoding practices focus upon individual organisms, making it inefficient for processing bulk samples.	Reference
Natural capital	The stock of renewable and non-renewable natural resources (e.g., plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people.	Reference
Nature	The natural world, with an emphasis upon the diversity of living organisms (including people) and their interactions among themselves and with their environment.	Reference

Nature loss	The loss and/or decline of the state of nature. This includes, but is not limited to, the reduction of any aspect of biological diversity e.g., diversity at the genetic, species and ecosystem levels in a particular area through death (including extinction), destruction or manual removal.	Reference
Nature-based solutions	Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems that address societal, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.	Reference
Nature Positive	Nature Positive is a global and societal goal defined as 'Halt and Reverse Nature Loss by 2030 on a 2020 baseline and achieve full recovery by 2050'. Put more simply, it means ensuring more nature in the world in 2030 than in 2020 and continued recovery after that. Three key categories of metrics have been developed by which to measure nature-positive contributions and outcomes. They are retaining and restoring 1) species, 2) ecosystems and 3) natural processes at all scales (global, national and landscape levels). Examples of these metrics include richness, distribution, abundance and extinction risk of species, extent and ecological integrity of habitat, hydrological integrity, migration patterns and carbon sequestration and storage. Further guidance on measuring the Nature Positive goal is in preparation by the Nature Positive Initiative.	Reference
Protected area	A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.	Reference
Realm	Major components of the living, natural world that differ fundamentally in ecosystem organization and function: terrestrial (land), freshwater, marine (ocean), subterranean and atmospheric. The TNFD's framework is based upon four realms – land, freshwater, ocean and atmosphere. The subterranean realm is included within the land, freshwater and ocean realms.	Reference
River catchments and watersheds	A water catchment (also known as a watershed or basin) is an area of land where all water flows and is directed into a single stream or river. Natural boundaries of water catchments can vary in scale and can be very small for a single stream or river or very broad for a large river such as the Amazon or Congo Rivers. Land and freshwater use in a watershed can affect the entire length of river depending upon the intensity of the use and impact.	Reference
Species	A fundamental category for the classification and description of organisms, defined in various ways but typically based upon reproductive capacity, i.e. the members of a species can reproduce with each other to produce fertile offspring but cannot do so with individuals outside the species.	Reference
Species composition	The array of species in a specific sample, community or area.	Reference
Species richness	The number of species within a given sample, community or area.	Reference
State of nature	The condition and extent of ecosystems and species population size and extinction risk, including positive or negative changes.	Reference

Stressed watersheds	Watersheds where the water demand exceeds the available amount during a certain period or when poor quality restricts its use. Water stress causes freshwater resources to deteriorate in quantity (aquifer overexploitation, dry rivers, etc.) and quality (eutrophication, organic matter pollution, saline intrusion, etc.).	Reference
Threatened ecosystem	Ecosystems are assessed as facing a high risk of collapse in the medium term.	Reference
Threatened species	Species are assessed as facing a high risk of extinction in the wild in the medium term. This includes flora and fauna listed in the IUCN Red List.	Reference
Threshold (ecological)	The point at which a relatively small change in external conditions causes a rapid change in an ecosystem. When an ecological threshold has been passed, the ecosystem may no longer be able to return to its state using its inherent resilience.	Reference
Water quality	The biological, chemical and physical properties of water, often assessed against a usage standard, such as whether its quality can support freshwater biodiversity or be used for drinking water for people or irrigation. Note that standards and definitions of water quality vary across use cases.	Reference
Water scarcity	Refers to the volumetric abundance, or lack thereof, of freshwater resources. Scarcity is human-driven; it is a function of the volume of human water consumption relative to the volume of water resources in each area. As such, an arid region with very little water but no human water consumption would not be considered scarce but arid. Water scarcity is a physical, objective reality that can be measured consistently across regions and over time. Water scarcity reflects the physical abundance of freshwater rather than whether that water is suitable for use. For instance, a region may have abundant water resources (and thus not be considered water scarce) but have such severe pollution that those supplies are unfit for human or ecological uses.	Reference 1 Reference 2

APPENDIX B: INTERVIEW RESULTS

This summary provides key takeaways from the interviews held with eight companies funding the BioBA initiative. This is not a full synthesis of all the responses, but an overview of information gathered during the interviews. The purpose of the interviews was to provide directionality and boundaries for the development of the BioBA guidance. Interview questions were provided in advance (see scoping questionnaire below).

Key Takeaways

1. **While the eight companies do not currently have public-facing biodiversity goals or targets, biodiversity is embedded to various degrees in corporate sustainability programs and environmental policies.**
    - Companies anticipate that their existing nature-related policies, such as forest-product-sourcing policies and land-conservation targets, will lead to improvements in biodiversity.
    - Across sustainability programs, the respondents view water goals as having the strongest relationship to biodiversity. Some noted a strong linkage between biodiversity and water quality and a desire to keep water quality and biodiversity intertwined moving forward. Others noted that biodiversity is not considered material to operations (and therefore not a driver for corporate goals), but that water is material, and biodiversity is therefore of interest by association.
    - While some companies are considering future corporate-wide biodiversity goals, they also recognize that local context-based targets may be more appropriate.

2. **Most of the corporate sponsors are engaging in biodiversity-related projects to some degree and tracking a set of biodiversity-related benefits.**
    - In general, companies consider themselves to be at the early stage of the biodiversity/water journey. However, several companies reported engagement in projects related to biodiversity including enhanced green space, forest conservation and species-specific (e.g., monarch) habitat.
    - Companies usually look to their implementing partners to structure water stewardship projects for them to view outcomes through a holistic lens (e.g., watershed health) and ensure that the projects have a biodiversity component.
    - Typical metrics that companies use to track biodiversity include acres of habitat restored, number of trees planted, number of species, water quality metrics and metrics related to environmental flows. Companies are interested in being less anecdotal and getting more intentional in their reporting, and they aim to improve upon these existing metrics and look at biodiversity impacts in a more standardized way.

3. **The primary drivers for the BioBA guidance are cross-functional and include 1) quantifying biodiversity as a multi-benefit, 2) benchmarking and 3) identifying impacts and dependencies.**
    - Because biodiversity shows up across multiple pillars and dimensions of corporate sustainability, companies are interested in more integration and scaling across their organizations.
    - Many expressed an interest in elevating biodiversity benefit quantification to a primary multi-benefit (rather than as a co-benefit).
    - Companies identified other drivers for this work, which include the need for benchmarking and measurement of progress, as well as a desire for greater alignment with best practices or available science. Some also noted increased regulation and scrutiny as drivers.

- Respondents discussed an interest in a direct correlation of biodiversity with ecosystem services, including the need to understand the implications of sourcing water from an ecosystem with high biodiversity versus one with low biodiversity. Linking biodiversity to water availability and quality can help make the business case to business leaders.
- In general, companies view biodiversity as a key part of the corporate water stewardship journey. Some reflected that the outcomes of this initiative can help identify impacts and dependencies (including at their sites), help make connections to costs and benefits and help make biodiversity more visible and show the importance of water.

4. **BioBA guidance should provide standardized methods to measure progress and impacts, support target setting and connect the dots between programs and benefit accounting frameworks.**
   - Companies view this initiative as a 'connector' that will help ladder up to the bigger picture and connect the dots between various programs and benefit accounting efforts.
   - They anticipate that the BioBA guidance will provide a standard framework for monitoring and reporting progress related to a company's impacts, risks and opportunities at both the site and basin scales. The guidance can also support target setting and reporting for onsite and offsite initiatives and ensure consistency across different projects.
   - Some noted that businesses are feeling overwhelmed with the plethora of existing benefit frameworks and initiatives and hope this guidance will help companies prioritize where to focus their efforts and how to consider trade-offs.
   - In general, respondents view this initiative as an opportunity to advance their vision to a set of clear guiding principles and expand beyond the current state to a more robust and consistent set of metrics and methods.

5. **The corporate sponsors anticipate a range of uses for BioBA guidance, including monitoring and reporting, project planning and meeting disclosure requirements.**
   - Respondents anticipate that the guidance may be used to conduct effective monitoring and reporting of biodiversity outcomes in areas with funded projects. Companies may also use the guidance to help identify and plan new projects that will maximize biodiversity outcomes. Companies hope to share and refer to this guidance as a common methodology that represents industry best practices. They also aim to use this guidance as an aid in reporting to meet biodiversity targets and disclosure requirements.
   - In terms of geographic focus for the application of the guidance, some companies are directing biodiversity efforts to regions of high water stress as part of their water stewardship strategies. Some are focusing on areas of high conservation value and regions of high biodiversity loss. Companies have a strong interest in protecting terrestrial and aquatic habitats, as well as agricultural landscapes, at both the watershed and project scales.

APPENDIX C: IDENTIFIED GUIDANCE RESOURCES

TABLE C1: SUMMARY OF FRAMEWORKS AND INITIATIVES REVIEWED, AND THE ORGANIZATIONS INVOLVED WITH EACH RESOURCE REVIEWED

Overall Framework Or Initiative	Resource Title	Organizations Involved
EU Corporate Sustainability Reporting Directive (CSRD)	European Sustainability Reporting Standards (ESRS) E4: Biodiversity and Ecosystems	European Union, EFRAG
	EU Taxonomy	European Union
Science Based Targets Network (SBTN)	Target-setting Guidance for Freshwater (Step 3)	SBTN
	Target-setting Guidance for Land (Step 3) v0.3	SBTN
	Science-based Targets for Nature: Initial Guidance for Business	Science Based Targets Network (SBTN) (Founding partners: CDP, World Resources Institute, WWF, United Nations Global Compact, Conservation International, UNEP-WCMC, World Economic Forum)
Taskforce on Nature-related Financial Disclosures (TNFD)	Recommendations of the Taskforce on Nature-related Financial Disclosures	Taskforce on Nature-related Financial Disclosures (TNFD)
	Guidance on the Identification and Assessment of Nature-related Issues: The LEAP Approach	Taskforce on Nature-related Financial Disclosures (TNFD)
	Guidance on Biomes	Taskforce on Nature-related Financial Disclosures (TNFD)
Nature Positive Initiative	Principles for Nature Positive Measurability	Nature Positive Initiative
	Guidance on Metrics for Nature Positive	Nature Positive Initiative

Overall Framework Or Initiative	Resource Title	Organizations Involved
Biodiversity Impact Assessment Framework (BIAF)	Articulating and Assessing Biodiversity Impact	The Biodiversity Consultancy, WWF
Kunming-Montreal Global Biodiversity Framework (KM-GBF)	Kunming-Montreal Global Biodiversity Framework (KM-GBF)	Convention on Biological Diversity
	Monitoring Framework for the Kunming-Montreal Global Biodiversity Framework	Convention on Biological Diversity
Natural Capital Protocol	Natural Capital Protocol	Capitals Coalition
	Integrating Biodiversity into Natural Capital Assessments	Capitals Coalition
Global Reporting Initiative (GRI)	GRI 101: Biodiversity 2024	Global Reporting Initiative (GRI)
System of Environmental-Economic Accounting	System of Environmental-Economic Accounting	United Nations
Business for Nature	Nature Strategy Handbook	Business for Nature
World Business Council for Sustainable Development	Roadmaps to Nature Positive: Foundations for All Businesses	World Business Council for Sustainable Development
Exploring Natural Capital Opportunities, Risk and Exposure (ENCORE)	Exploring Natural Capital Opportunities, Risk and Exposure (ENCORE)	Global Canopy, UNEP FI and UNEP-WCMC, who together form the ENCORE Partnership, previously known as The Natural Capital Finance Alliance (NCFA)
Aligning Accounting Approaches for Nature (Align project)	Recommendations for a standard on corporate biodiversity measurement and valuation	UNEP-WCMC, the Capitals Coalition, Arcadis, ICF
	Measuring and Valuing Biodiversity at Site Level	WCMC Europe, the Capitals Coalition, Arcadis, ICF, UNEP-WCMC
	Exploring measurement solutions for nature positive commitments	

Overall Framework Or Initiative	Resource Title	Organizations Involved
International Union for Conservation of Nature (IUCN)	Nature Positive for Business	International Union for Conservation of Nature (IUCN)
	Framework for monitoring biodiversity in protected areas and other effective area-based conservation measures	International Union for Conservation of Nature (IUCN)
	IUCN Review Protocol for Biodiversity Net Gain	International Union for Conservation of Nature (IUCN)
	Site-level tool for identifying other effective area-based conservation measures (OECMs)	IUCN, WCPA, Bezos Earth Fund, BfN, UNEP-WCMC, WWF
Ecological Restoration	International Principles and Standards for the Practice of Ecological Restoration	Society for Ecological Restoration
	Standards of Practice to Guide Ecosystem Restoration	Food and Agriculture Organization of the United Nations (FAO), Society for Ecological Restoration (SER), International Union for Conservation of Nature (IUCN)
Integrated Biodiversity Assessment Tool (IBAT)	Integrated Biodiversity Assessment Tool (IBAT)	UNEP-WCMC, IUCN, BirdLife International, CI
Biodiversity Net Gain	UK Environmental Act of 2021 (Biodiversity Net Gain)	UK Department for Environment, Food & Rural Affairs
	America's Biodiversity Metric	Ramboll, NatureServe
United Nations Global Sustainable Development Goals	Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development	UN Inter-Agency and Expert Group on SDG Indicators
LandScale	Assessment Framework v1.0	Rainforest Alliance, Conservation International

Overall Framework Or Initiative	Resource Title	Organizations Involved
Transformative Pathways Initiative	Introduction to community-based environmental monitoring	Chepkitale Indigenous People Development Project (CIPDP), Indigenous Information Network (IIN), Partners for Indigenous Knowledge Philippines (PIKP), Inter Mountain Peoples Education and Culture in Thailand Association (IMPECT), Pgakenyaw Association for Sustainable Development (PASD), The Autonomous Territorial Government of the Wampis Nation (GTANW), CHIRAPAQ, Centro de Culturas Indígenas del Perú, University of Oxford's Interdisciplinary Centre for Conservation Science (ICCS), UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), Asia Indigenous Peoples Pact (AIPP), LifeMosaic, Forest Peoples Programme (FPP)
Conservation Standards	Open Standards for the Practice of Conservation	Conservation Measures Partnership
CDP	CDP Biodiversity Questionnaire 2024	CDP
NBS Benefits Explorer	NBS Benefits Explorer	CEO Water Mandate, TNC, LimnoTech, EY denkstatt
TGBS	The Global Biodiversity Standard: Manual for assessment and best practices	Botanic Gardens Conservation International (BGCI), the Society for Ecological Restoration (SER), the Plan Vivo Foundation, TRAFFIC, the Center for International Forestry Research and World Agroforestry Centre (CIFOR-ICRAF) and Ecosia
ISEAL	Joint Landscape Position Papers and Roadmap	Better Cotton, CDP, Climate Focus, Conservation International, Earthworm, Ecoagriculture partners, Environmental Defense Fund, Gold Standard, IDH, Kaleka, LTKL, Landscale, Lestari Capital, PCI, Proforest, Transitions, Tropical Forest Alliance, WWF

Scoping Questionaire

Biodiversity Benefit Accounting (BIOBA)

Scoping Questionnaire with Corporate Partners

This survey with corporate partners will help the project team better understand the entry points to biodiversity-related efforts, understand current corporate efforts in this space, and ultimately help refine the scope of this project. The outcomes of this survey will be used in the upcoming Landscape Assessment. ***Note: Responses will be synthesized for all funders; however, specific comments will not be attributed to a certain individual or company.***

Company name:

Interviewee/s:

Context Setting
What are the most significant drivers for your organization to make use of biodiversity benefit accounting (BIOBA) guidance?
What are the primary gaps you feel this initiative should help address? For example, might it address any shortcomings with existing approaches, target setting, or reporting disclosures?
How do you anticipate using the BIOBA guidance? (select all that apply) For example: ❑ **Identify the types of water stewardship projects that improve biodiversity to inform project selection** ❑ **Plan new projects to maximize biodiversity outcomes** ❑ **Conduct effective monitoring and reporting of biodiversity outcomes in areas with funded projects** ❑ **Share and refer to a common methodology highlighting industry best practice** ❑ **Use water stewardship projects to meet biodiversity targets and disclosure requirements** ❑ **Other – please describe:**

Current Approach
Do you have corporate ambitions, commitments, goals, and/or targets related to biodiversity? If so, what are they, when and how did you establish them?
Do you currently incorporate biodiversity components or criteria within your corporate water ambitions, commitments, goals, and/or targets? If so, how are you doing that?
Are you currently tracking biodiversity outcomes of on-the-ground water stewardship projects?
If you are tracking biodiversity benefits, what are you measuring? (select all that apply) For example: ❏ Species threat reduction (e.g. mitigating poaching, removing barriers to connectivity) ❏ Species protection (e.g. nesting site creation, species reintroductions) ❏ Number and types of species present ❏ Abundance of species of interest ❏ Area of habitat restored or created ❏ Improvements in habitat connectivity/ecosystem intactness ❏ Number of trees planted ❏ Improved water quality metrics (i.e. salinity, temperature, and bacteria management) ❏ Improvement towards natural stream flow (either as volume per annum, or specific improvements in seasonal flow) ❏ Reduced ecosystem stressors/impacts ❏ Other - please describe
If you are tracking biodiversity benefits, what techniques/tools/methods/data sources are you using to estimate the biodiversity improvements?
What are the geographies in which you currently have, or expect to develop water stewardship projects for which you would want to track biodiversity outcomes?

At what scale are/will you track biodiversity benefits?

- ❏ **Project site**
- ❏ **Watershed/Landscape**
- ❏ **Other – please describe**

Are you interested in terrestrial biodiversity, aquatic biodiversity, or both?
How do you determine which species your projects focus on?

Rank in order, the most relevant project landscapes for **water stewardship projects** you have or may support, where you are also interested in biodiversity outcomes.

Project Landscape	Priority (high, med, low, or NA)
Agriculture (tillage, irrigation, fertilizer management, crop rotation)	
Aquatic habitats (wetland creation, stream or river restoration including riparian areas, invasive vegetation clearing)	
Terrestrial habitats (forest restoration, invasive vegetation clearing)	
Urban (stormwater management, green infrastructure, facility biodiversity improvements)	
OTHER #1	
OTHER #2	

What types of organizations do you partner with to do this work (e.g., NGOs, consultancies, universities, government agencies, partnership platforms in the catchment)?

Case Studies

Do you have example projects you feel would be good illustrations for case study applications? If yes, please describe. Potentially important attributes for case study examples are projects where monitoring data exist, and/or the benefits were quantified, or projects that were adopted and scaled up.

We aim to develop a set of case study examples from a diverse set of geographies, landscape types, and activities.

APPENDIX D: IDENTIFIED BIODIVERSITY INDICATORS (DRAFT)

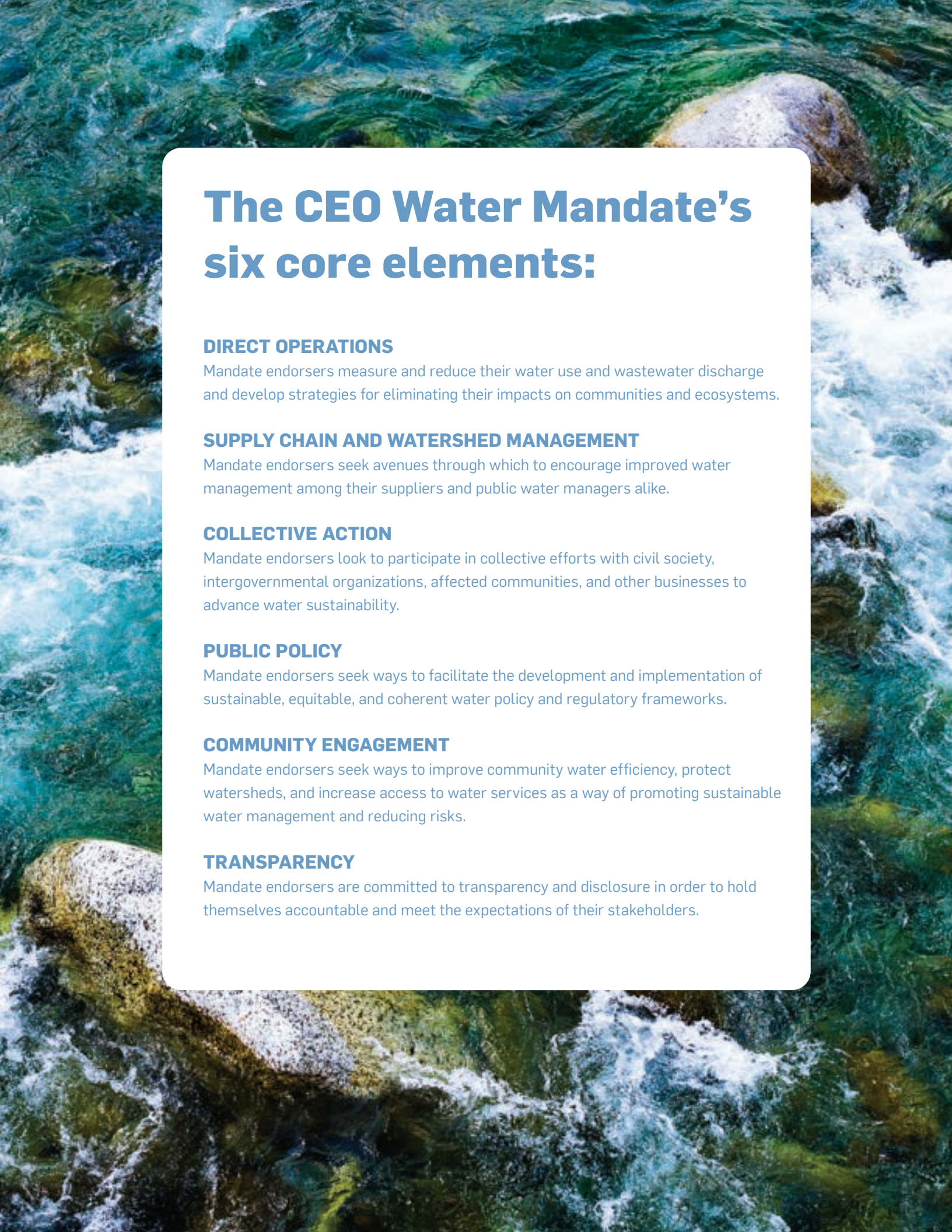
TABLE D1: SUMMARY OF IDENTIFIED SITE/PROJECT-SCALE SPECIFIC BIODIVERSITY INDICATORS (IN HEADER ROW) AND ASSOCIATED METRICS (WITHIN TABLE CELLS)

			Ecosystem Condition/State of Nature/Biodiversity categories/ and indicators												
			Genetics	Species						Ecosystem				
Resource	Framework/ initiative Acronym	Organizations	Genetic diversity	Species diversity	Species abundance	Species distribution	Threat reduction	Status of indicator species	Status of threatened/ endangered species	Condition/ quality	Habitat availability/ extent	Habitat spatial configuration (connectivity/ fragmentation)	Habitat significance/ priority	Ecosystem function/ service provision
European Sustainability Reporting Standards (ESRS) E4: Biodiversity and Ecosystems	CSRD	European Union, EFRAG		Species richness	Species population size; species abundance	Species range			Extinction risk: threat status; changes in threatened species habitat (proxy)	Ecosystem condition: reference to (UN SEEA EA): quality relative to reference state;	Ecosystem extent: habitat cover Area of habitat restored Area of habitat protected	Changes in habitat connectivity / fragmentation		Individual or gene migration
Biodiversity in the First Release of SBTs for Nature and an Approach for Future Methods: Biodiversity Short Paper	SBTN	Science Based Targets Network (SBTN)		Species richness		Species endemism (e.g., range rarity)			Species extinction risk (e.g., Species Threat Abatement and Restoration (STAR)	Ecosystem condition/ integrity (e.g., Ecosystem Integrity Index (EII))			Areas of biodiversity importance (e.g., Key Biodiversity Areas and Protected Areas)	Nature's Contributions to People (NCPs)
Recommendations of the Taskforce on Nature-related Financial Disclosures	LEAP	Taskforce on Nature-Related Financial Disclosures (TNFD)			Species population size				Placeholder indicator: Species extinction risk	Placeholder indicator: Ecosystem condition is the quality of an ecosystem measured by its abiotic and biotic characteristics. Ecosystem condition metrics measure ecosystem quality compared to a reference state.	Ecosystem extent			

			Ecosystem Condition/State of Nature/Biodiversity categories/ and indicators											
			Genetics	Species						Ecosystem				
Resource	Framework/ initiative Acronym	Organizations	Genetic diversity	Species diversity	Species abundance	Species distribution	Threat reduction	Status of indicator species	Status of threatened/ endangered species	Condition/ quality	Habitat availability/ extent	Habitat spatial configuration (connectivity/ fragmentation)	Habitat significance/ priority	Ecosystem function/ service provision
Biodiversity Impact Assessment Framework	BIAF	The Biodiversity Consultancy +WWF							Significance (e.g. Species Threat Abatement and Restoration metric - STAR)	Condition (e.g. Mean Species Abundance (MSA)	Extent (log10km2)			
Recommendations for a standard on corporate biodiversity measurement and valuation, Aligning accounting approaches for nature	Align	UNEP-WCMC, Capitals Coalition, Arcadis, ICF, WCMC Europe	Genetic diversity		Species population size (e.g., number of breeding pairs)					Ecosystem condition (e.g., Mean Species Abundance, Potentially Disappeared Fraction)	Ecosystem extent (e.g., forest cover)			
Integrating Biodiversity into Natural Capital Assessments	Natural Capital Protocol	Capitals Coalition		Species diversity; Potentially disappeared fraction of species (PDF)				Presence of protected species	Risk of extinction (e.g., STAR metric)	Mean Species Abundance (MSA)	Habitat diversity		Presence of protected areas	
GRI 101: Biodiversity 2024	Global Reporting Initiative (GRI)			Species Diversity Potentially Disappeared Fraction of species (PDF)	Species population size; Species cover/ density			Presence of protected, priority, keystone and culturally/ economically significant species	Risk of extinction (e.g., IUCN Red Lists; Potentially Disappeared Fraction)	Ecosystem Integrity Index Mean Species Abundance (MSA)	Ecosystem size / extent	Level of habitat fragmentation and connectivity		Ecosystem services: ENCORE, WRI Corporate Ecosystem Services Review Primary Productivity
International Principles and Standards for the Practice of Ecological Restoration	Ecological Restoration	Society for Ecological Restoration		Species composition			Absence of threats			Physical conditions Structural diversity		External exchanges		Ecosystem function

			Ecosystem Condition/State of Nature/Biodiversity categories/ and indicators												
			Genetics	Species						Ecosystem				
Resource	Framework/ initiative Acronym	Organizations	Genetic diversity	Species diversity	Species abundance	Species distribution	Threat reduction	Status of indicator species	Status of threatened/ endangered species	Condition/ quality	Habitat availability/ extent	Habitat spatial configuration (connectivity/ fragmentation)	Habitat significance/ priority	Ecosystem function/ service provision
Standards of Practice to Guide Ecosystem Restoration	Ecological Restoration	Food and Agriculture Organization of the United Nations (FAO), Society for Ecological Restoration (SER), International Union for Conservation of Nature (IUCN)	Genetic composition and diversity	Species composition			External threats	Rate of survival, reproduction and vigor of planted species and translocated animals		Biophysical conditions Ecosystem structure	Area treated	External exchanges (e.g., landscape connectivity)		Ecosystem function Cultural attributes Socioeconomic conditions; engagement, trust and satisfaction; benefits distribution; value of ecosystem goods and services
America's Biodiversity Metric	BNG	Ramboll and Nature Serve								Habitat condition: primarily based on key indicators included in NatureServe's Ecological Integrity Assessment (EIA) protocol	Habitat size		Conservation priority (such as global conservation status) Strategic significance (i.e., local importance/ relevance for biodiversity)	
UK Environmental Act of 2021 (Biodiversity Net Gain)	BNG	UK Department for Environment, Food & Rural Affairs								Habitat condition Habitat type	Habitat size	Distance from habitat loss	Strategic significance Difficulty of creation or enhancement Time to reach target condition	

			Ecosystem Condition/State of Nature/Biodiversity categories/ and indicators											
			Genetics	Species						Ecosystem				
Resource	Framework/ initiative Acronym	Organizations	Genetic diversity	Species diversity	Species abundance	Species distribution	Threat reduction	Status of indicator species	Status of threatened/ endangered species	Condition/ quality	Habitat availability/ extent	Habitat spatial configuration (connectivity/ fragmentation)	Habitat significance/ priority	Ecosystem function/ service provision
The Road to Restoration: Guide to Identifying Priorities and Indicators for Monitoring Forest and Landscape Restoration	Ecological Restoration	World Resources Institute, Food and Agriculture Organizations of the United Nations		Community composition (e.g., abundance of indicator species)							Protected area coverage (e.g., Area of key biodiversity areas protected)	Connection between habitats (e.g., Mean nearest distance between blocks of a particular habitat type)		
Assessment Framework v1.0	LandScale	Rainforest Alliance, Conservation International					Threats to Species: Changes in threats to threatened species or populations of indicator species			Biodiversity habitat degradation: Area (ha) and percentage (%) of lands identified as important for biodiversity that are degraded	Biodiversity habitat conversion: Area (ha) of natural ecosystem conversion within areas identified as important for biodiversity & percentage (%) of such areas that this represents Biodiversity habitat restoration: Area (ha) & percentage (%) of land under restoration within areas identified as important for biodiversity		Biodiversity habitat protection: Area (ha) & percentage (%) of the area of important biodiversity areas that are designated and managed for long-term protection; Area (ha) & percentage (%) of the area of important biodiversity areas that are under conservation through OECMs	



The CEO Water Mandate's six core elements:

DIRECT OPERATIONS

Mandate endorsers measure and reduce their water use and wastewater discharge and develop strategies for eliminating their impacts on communities and ecosystems.

SUPPLY CHAIN AND WATERSHED MANAGEMENT

Mandate endorsers seek avenues through which to encourage improved water management among their suppliers and public water managers alike.

COLLECTIVE ACTION

Mandate endorsers look to participate in collective efforts with civil society, intergovernmental organizations, affected communities, and other businesses to advance water sustainability.

PUBLIC POLICY

Mandate endorsers seek ways to facilitate the development and implementation of sustainable, equitable, and coherent water policy and regulatory frameworks.

COMMUNITY ENGAGEMENT

Mandate endorsers seek ways to improve community water efficiency, protect watersheds, and increase access to water services as a way of promoting sustainable water management and reducing risks.

TRANSPARENCY

Mandate endorsers are committed to transparency and disclosure in order to hold themselves accountable and meet the expectations of their stakeholders.