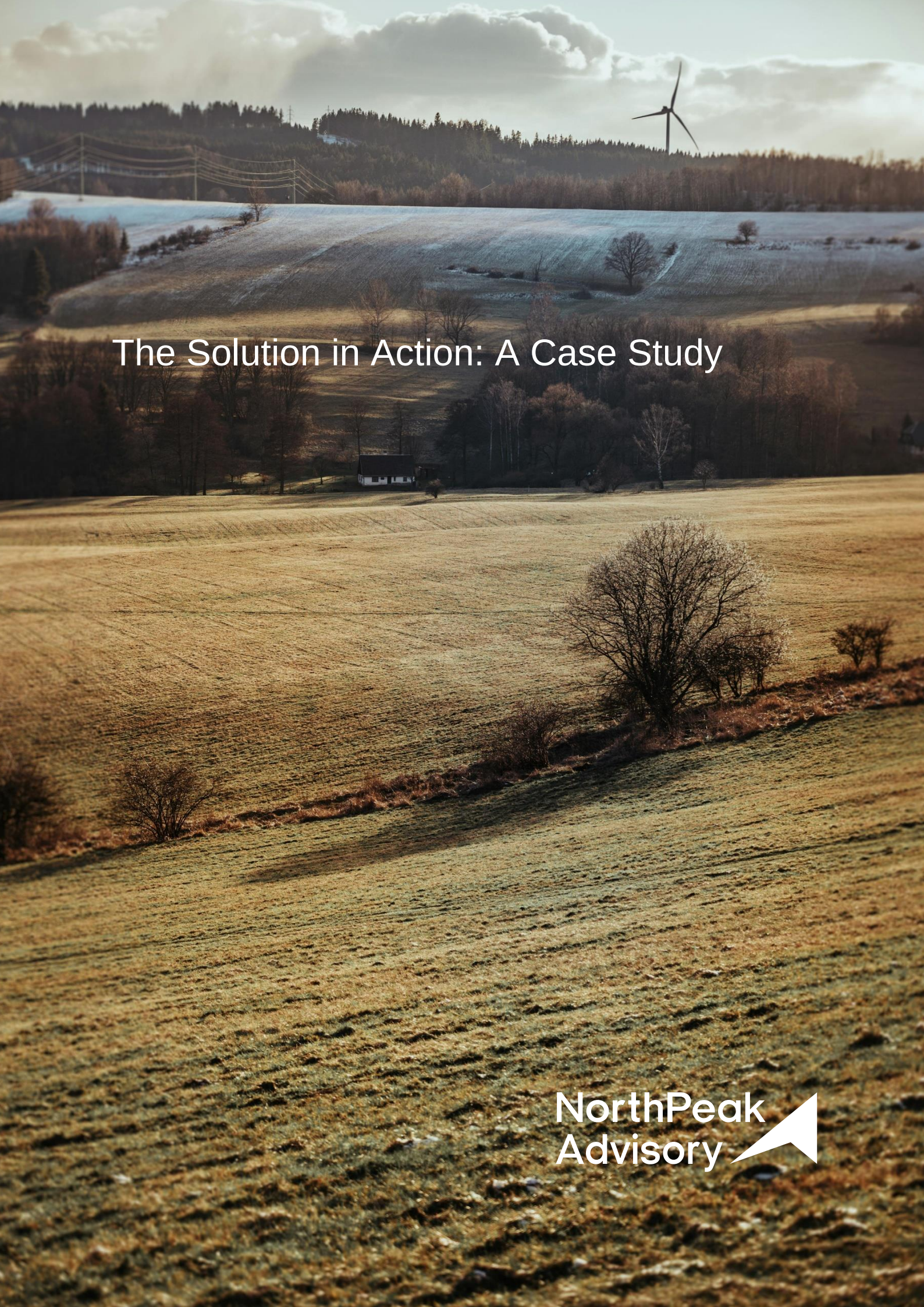


The Solution in Action: A Case Study

NorthPeak Advisory

The Solution in Action: A Case Study

This paper is the fourth and final instalment in our biodiversity series, featuring a case study on the implementation of our proprietary Biodiversity Measurement & Reporting Framework. As highlighted in our previous paper, "*The Solution: NPA's Framework & eDNA*", our Framework **simplifies and quantifies key biodiversity metrics, providing a standardized approach to assessing biodiversity patterns across various spatial scales and species**.

In this case study, our Framework was applied to the operational site of a Canadian company, New Protein International ("NPI"), who wanted an **accurate method of verifying that the construction and operation of their production plant would not inhibit the natural restoration of the site that it is located within**. The next section offers a brief overview of the company and the project, followed by a discussion of data collection and genomic lab analysis. Finally, we present and discuss the biodiversity results from this analysis and how our metrics meet the CSRD reporting requirements.

Overview of the Company, Site and Construction Project

New Protein International (NPI) is an Ontario-based company which has developed a propriety extraction process to produce a wide-range of hexane-free, food-grade soy proteins on a commercial scale. The company is currently building a soy protein isolate (SPI) plant in the TransAlta Bluewater Energy Park, Sarnia, Ontario, Canada. The facility is a state of the art 184,000 square feet plant for the large-scale production of clean-label, hexane-free soy protein.

The TransAlta Bluewater Energy Park is a **remediated brownfield site aiming to host clean technology industries and create green employment opportunities for surrounding communities**, including the Aamjiwnaang First Nation. A due diligence study of the site revealed that, due to its history as a chemical manufacturing site for Dow Chemicals and its decades long use for intensive industrial manufacturing activities, it is **neither a key biodiversity area nor a protected zone**.

Figure 1 – TransAlta Bluewater Energy Park

However, NPI's business model is **centred on a commitment to environmental responsibility**. As part of this commitment, NPI decided to undertake this assessment to obtain an **accurate, scientific baseline of the site's "state of nature", which can be measured periodically, and reported to relevant stakeholders such as investors and regulators**. This initiative presented a clear opportunity to demonstrate a strong commitment to the continued protection and restoration of natural environments. As a result, NPI was a natural fit for implementing NPA's Biodiversity Measurement & Reporting Framework.

Going back to Paper 2, *"The Problem: Current Data Collection & Analysis Practice"* we highlight that for companies currently measuring and reporting on their biodiversity dependencies and impact, the **most accessible information to report is mainly location-based information related to the site and the quality of the company's management**.

However, for any of this information to be **truly relevant, it needs to be qualified with a "state of nature" measure, without which, it is impossible to credibly evidence the biodiversity impact of NPI's operations and effectiveness of their management approach**. This is exactly what NPA's Biodiversity Measurement & Reporting Framework solves for.

eDNA Collection and Analysis

The start-to-finish process for collecting and analysing eDNA was both **quick and cost-efficient**, taking under 2 months to complete and costing less than £5000. eDNA samples were first collected by a member of the NPI team, following specific guidelines provided by **Applied Genomics, one of NPA's many eDNA lab partners**.

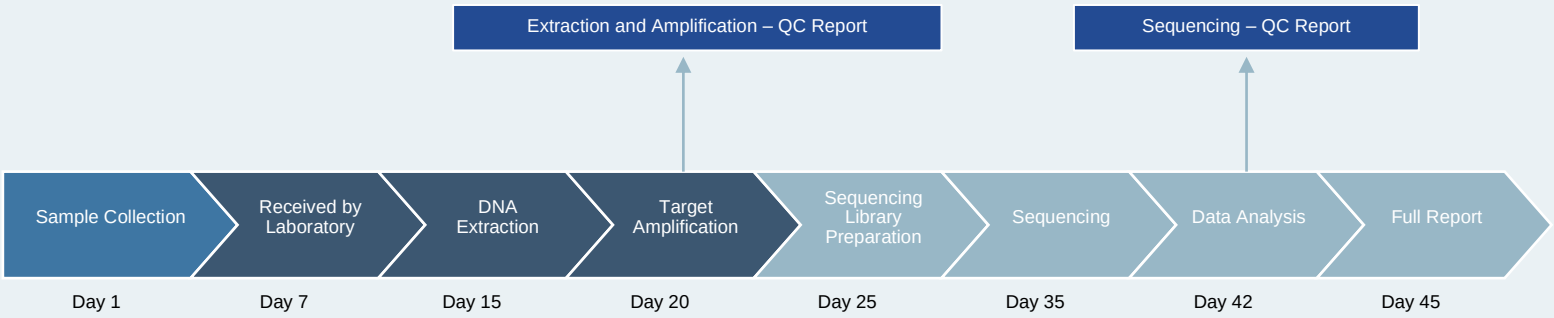
Figure 2 – Example of eDNA collection kit

> "We were pleasantly surprised at how easy the soil sampling was to complete. The **instructions were straightforward, and the sample kit was simple to use**. The kit contained all the material necessary to both take the samples and return them for testing."
> – New Protein International

Applied Genomics offers eDNA-based sampling equipment and analysis services for biodiversity detection, monitoring, and management. As a **leader in the eDNA sampling field, they have successfully completed more than 500 projects globally and analysed over 7,500 eDNA samples**. Like all of NPA's eDNA lab partners, Applied Genomics holds ISO 9001 certification, an international standard that reflects their commitment to establishing, maintaining, and continuously improving quality management systems.

The workflow, from sample collection to receiving the full report, is illustrated in Figure 3, showing the number of days each step took, whilst the appendix contains further detail around the collection, and analysis process.

Figure 3 – Implementation Timeline



New Protein International Results

The results from NPA's Biodiversity Framework and the eDNA analysis, as shown in the table below, provided NPI with a comprehensive overview of the "state of nature" within the site.

Looking at this data, **Fungi have the highest alpha diversity, meaning that they are the most abundant organisms within the site**. Fungi play a crucial role in breaking down organic material and contributing to soil structure and nutrient cycling, which can be essential during the early stages of ecosystem restoration. The **high species richness for Fungi and Bacteria, relative to Metazoa (animals), also indicates that microbial communities have successfully colonized and are actively contributing to soil health and nutrient cycling**. These organisms tend to be early colonizers, vital for breaking down contaminants and aiding in the bioavailability of nutrients.

However, relatively **low total functional diversity** reflects the fact that whilst these species are present, there may **not yet be a full spectrum of ecological functions that have been restored**. Therefore, the data implies that the **site is in a recovery phase, with promising signs of ecological function returning, but more time and ecological succession are needed for full biodiversity recovery**.

Although the information reflects our likely suspicion of the site's current ecological integrity, its real value lies in the fact that it sets a **credible, scientific baseline for NPI to verify that its operational activities are not preventing the natural restoration of this rehabilitated brownfield site**.

Table 1 – New Protein International Biodiversity Metrics

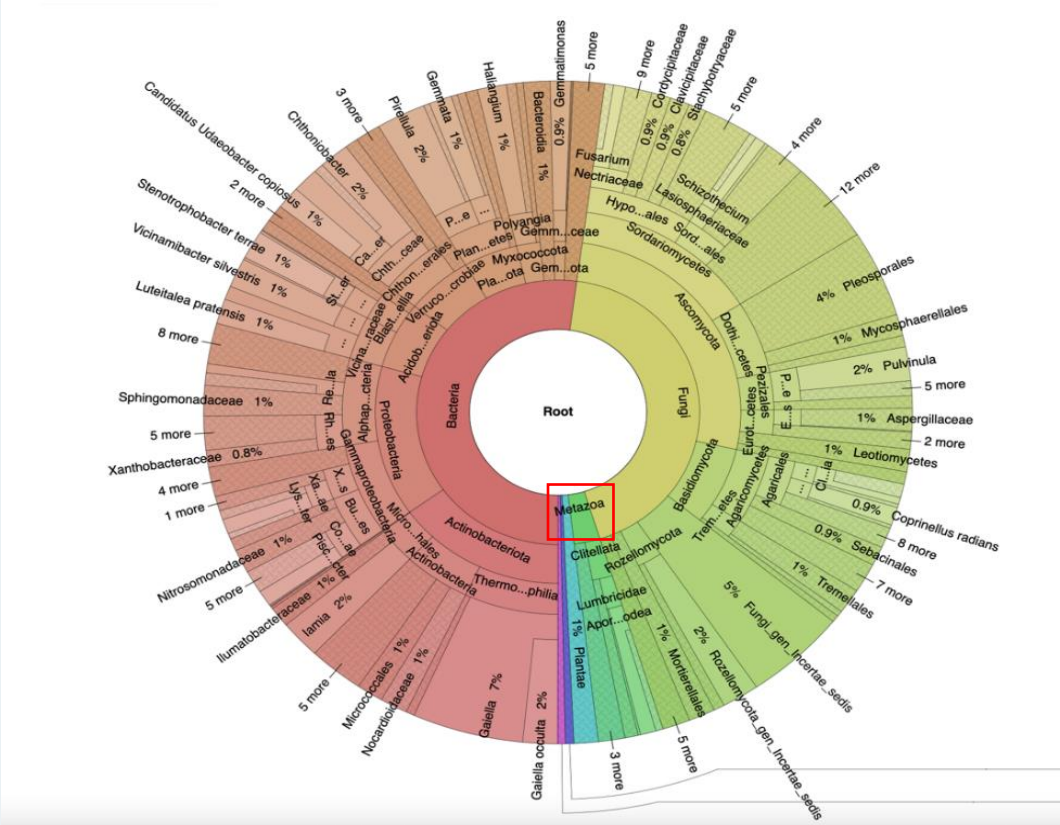
Markers	Alpha Diversity	Gamma Diversity	Species Richness	Endangered Species	Invasive Species[1]	Functional Diversity
Metazoa	1.59	3.06	29	-	-	1.74
Fungi	2.4	3.0	750	-	-	0.67
Bacteria	1.4	3.0	947	-	-	0.6
Total	1.77	3.0	1817	-	-	0.58

Beyond the results themselves, the eDNA analysis and raw data from this project is presented using a Krona chart, a tool used to visualise complex metagenomic data. The chart utilises multilayer pie charts to highlight the most abundant members of a sample while also providing detailed information on the least abundant species.

[1] Endangered Species and Invasive Species showing as "-" indicates that their presence was not identified at this site.

As you can see from the image below, there is **limited presence of Metazoa at the site, which was to be expected given its historical status as a brownfield site**.

Figure 4. Visual representation of all the species detected across bacterial, invertebrate, and fungal communities



The Framework's Applicability – CSRD Reporting and More

In addition to the **strategic advantage and differentiation our Framework offers to companies, it can also strongly compliment corporate sustainability reporting**, which has seen an increased focus on biodiversity. A key example is the Corporate Sustainaiblity Reporting Directive ("CSRD"), estimated to impact 50,000 companies in Europe and abroad. While NPI is not currently under scope for CSRD, many other companies using the Framework will likely be subject to these reporting requirements.

In relation to CSRD and its European Sustainability Reporting Standards ("ESRS"), a major advantage of the Framework is its ability to help reporting entities meet all the essential biodiversity disclosures outlined in **ESRS E4-5 – Metrics Related to Biodiversity and Ecosystems Change**. Specifically, it allows companies to disclose the following**:**

- Metrics that measure the **functional connectivity** (e.g. how well genes or individuals move through land, freshwater and seascape)
- Metrics to manage pathways of **introduction and spread of invasive alien species and the risks posed by invasive alien species**
- Metrics that measure **changes in the number of individuals of a species** within a specific area
- Metrics on species at extinction risk that measure the **threat status of species** and how **activities/pressures may affect the threat status**
- Metrics that measure the **quality of ecosystems** relative to a pre-determined reference state
- Metrics that **measure multiple species** within an ecosystem rather than the number of individuals within a single species within an ecosystem
- Metrics that **reflect structural components of condition** such as habitat connectivity

Additionally, the application of the Framework **further unlocks the value of other disclosures within ESRS E4**. By giving the reporting entity higher quality and more precise information about the "state of nature", it serves to **accurately contextualise the entity's understanding and management of biodiversity, whether it be through policies, actions & resources, as well as targets**.

ESRS 2 – IRO 1[2] - Description of processes to identify and assess material biodiversity and ecosystem-related impacts, risks and opportunities

- The **process to identify material impacts, risks and opportunities** including whether and how the undertaking **identified and assessed actual and potential impacts** on biodiversity and ecosystems at own site locations and in the value chain, including assessment criteria applied

ESRS 2 – SBM 3[3] – Material impacts, risks and opportunities and their interaction with strategy and business

- Providing a **breakdown of sites according to the impacts and dependencies identified** and to the **ecological status of the areas** (with reference to the specific ecosystem baseline level) where they are located
- Whether [the undertaking] has **identified material negative impacts** with regards to land degradation, desertification or soil sealing
- Whether [the undertaking] has **operations that affect threatened species**

ESRS E4 – 2 - Policies related to biodiversity and ecosystems

- Describe whether and how [the undertaking's] biodiversity and ecosystems-related policies relate to its **material biodiversity and ecosystems-related impacts**

ESRS E4 – 3 - Actions and resources related to biodiversity and ecosystems

- Disclose whether [the undertaking] used biodiversity offsets in its action plans… [if so] the aim of the offset and **key performance indicators used**

ESRS E4 – 4 – Targets related to biodiversity and ecosystems

- The **ecological thresholds identified** and the **methodology used to identify such thresholds**
- Whether or not the **thresholds are entity-specific** and if so, **how they were determined**
- How **responsibility for respecting identified ecological thresholds** is allocated in the undertaking

ESRS E4 – 6 – Potential financial effects from biodiversity and ecosystem-related impacts, risks and opportunities

- A description of the effects considered, the **impacts and dependencies** to which they relate and the **time horizons** in which they are likely to materialize

[2] ESRS 2 ("General Disclosures") refers to the cross-cutting standards within CSRD. They constitute key disclosure requirements for entities across different topical standards, thereby ensuring consistency and comparability.
[3] Please see above.

Conclusion

NPA's Biodiversity Measurement & Reporting Framework offers a **practical and scalable solution for companies looking to integrate biodiversity metrics into their corporate sustainability strategy and reporting**. As demonstrated in this case study with NPI, the Framework is **easily implementable, allowing seamless data collection, analysis, and reporting, making it highly applicable for corporate use**.

By providing clear, quantifiable biodiversity metrics, the Framework enables companies to address key reporting requirements, including those outlined in the CSRD other global standards like the Taskforce on Nature-related Financial Disclosures (TNFD) and Science-Based Targets for Nature (SBTN). The framework's alignment with these reporting standards ensures that **businesses not only meet regulatory obligations but also demonstrate leadership in biodiversity stewardship**.

It is important to reiterate that this Framework will not single handedly solve the entire biodiversity challenge, nor does it seek to replace other biodiversity measurement approaches (such as ecological surveys) or innovative monitoring tools (like satellite monitoring and remote sensing). However, as demonstrated through this case study, our Framework **provides a standardised approach that simplifies the complex task of measuring biodiversity across various spatial scales and species**. Ultimately, it **provides a clear measure of the impact that investors, corporations, and governments are striving to achieve in their biodiversity conservation and restoration efforts**.

Appendix: eDNA Collection and Analysis Process

Sample Collection

In terms of the actual collection process and analysis, high-capacity soil sample collection kits were also used to maximise the likelihood of detecting “rare” species (those with low concentrations of their genetic material present in the site), as well as to minimize inter-sample variance. The samples were analysed to assess the full biodiversity profile of the soil, focusing on bacterial, invertebrate, and fungal communities. The resulting data for each community were then examined to determine total diversity, species composition, and functional diversity.

DNA Extraction

All samples were processed in a dedicated laboratory to prevent any possibility of cross contamination. DNA from each sample was purified using a standardized methodology optimized for soil DNA, and quantified using high sensitivity fluorimetry. Quality assurance included the use of positive and negative control samples throughout all processing stages.

For DNA analysis, barcode marker genes targeting a wide range of soil communities were employed. Purification of barcode amplicons was performed using magnetic bead separation, followed by quality checks with capillary electrophoresis. Amplicon sequencing libraries were prepared according to established protocols, purified through magnetic bead separation, and quality assessed before sequencing on a high-throughput sequencer using paired-end sequencing chemistry.

Sequencing & Data Analysis

To ensure consistency in sequence detection, we utilized amplicon sequence variants (ASVs), a method that corrects sequencing errors and allows for direct sequence comparison between studies. Taxonomic assignment was carried out using a hybrid algorithm that combines phylogenetic, distance-based, and machine learning methods to reduce errors. Sequences were matched against curated databases, and any sequences that could not be assigned at the species level were excluded. Sequencing read abundance values were transformed into presence/absence data to eliminate metabarcoding biases.

The quality of taxonomic outputs was assessed through confidence scores for taxonomic assignments and false-positive detection analysis. This accounted for uncertainties in taxonomic assignment, historical species occurrence data, and the statistical power of the study.

About NorthPeak Advisory

NorthPeak Advisory is a boutique Sustainability advisory firm supporting asset managers and corporates across all stages of sustainability integration. We partner with our clients to develop industry-leading, streamlined solutions that enhance the efficiency of sustainability efforts, turning data and environmental science into strategic business advantages.

The shifting ESG and sustainability landscape is unpredictable with new challenges are constantly arising. From industry leading double materiality assessments for CSRD, creating bespoke responsible investment strategies and developing a cutting-edge scientific framework for the highest standard in biodiversity measurement and tracking, we stay on the front edge of sustainable transformation and constantly innovate to incorporate the latest data-led approaches into the development of our solutions.

As a signatory to the UN-Supported Principles for Responsible Investment ("PRI"), NorthPeak Advisory is a supporter of "SPRING", a PRI stewardship initiative for nature. We hope that our biodiversity solutions will support the institutional investors in using their influence to halt and reverse global biodiversity loss by 2030.

Benjamin Stone, Associate

Benjamin works as part of the Advisory Team, playing a leading role within client engagements. His areas of focus include conducting investment strategy ESG and Responsible Investment assessments, creating bespoke ESG integration frameworks, leading ESG Training sessions, ensuring alignment with both regulatory and reporting requirements, such as EU SFDR, UN PRI, TCFD, and GRESB. Benjamin has a strong understanding of responsible investment, and his extensive experience allows him to build tailored solutions that are aligned with a client's investment strategy and asset class.

Benjamin holds a first-class BSc in Politics and History from the London School of Economics and Political Science. He also holds the CFA Certificate in ESG Investing.