

# Measuring Biodiversity

## *Incentivizing Ecologically Responsible Land Use*

**Capstone Partner:** Applied Ecological Institute

**Capstone Advisor:** Dr. Damien Thompson

**Project Team:** Chris Melançon, Allison Crawley, Wolf Reichard



## Summary

**Applied Ecological Institute (AEI)** is a business incubator for nature-based solutions aimed at addressing the decline of global ecosystems. Two of their portfolio companies, a software company that serves land stewards (StratifyX) and a nature-based credit registry (The Regen Registry), require a biodiversity measurement protocol to further incentivize ecologically responsible land use. AEI currently enables the issuance of carbon credits through sequestration of carbon in the soil. By enabling their customers to measure biodiversity, they aim to expand their portfolio of nature-based credit mechanisms.

Carbon credit markets emerged in the 1990s to incentivize emissions reductions and help mitigate climate change. Those incentive markets have established a framework and infrastructure to enable other nature-based credit markets, including credits for enhancing biodiversity. This project addresses a key requirement for any new credit market: credit fungibility. Achieving a biodiversity measurement unit that can be compared across projects requires distilling the complexity of nature into its core components.

**Through extensive scientific research and consultation with subject matter experts specializing in ecology and conservation biology, we focused the design of this protocol on four core components:**

## **Structure + Food Web + Connectivity + Species Richness**

## Why Now?

**Nature provides the basis for life on this planet, including the resources on which the global economy is dependent. Due to a lack of understanding of the essential services nature supplies:**

**Biodiversity, as represented by wildlife populations, has declined by 69% in the past 50 years.** (Source: WWF (2022) Living Planet Report 2022 – Building a nature positive society.)

**There is a \$700 billion biodiversity financing gap that must be closed to maintain the health of our planet.** (Source: The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability (2020). Financing nature: Closing the global biodiversity financing gap.)

## Key Deliverables

1. A summary of key participants and approaches to measuring biodiversity in nature-based credit markets
2. A review of relevant scientific research to reveal scientific consensus, common language, and proven measurement methods
3. Input from practitioners and subject matter experts in the areas of land use planning and ecological restoration
4. An initial version of the measurement protocol to facilitate pilot programs on land use planning and development sites in 2024

# Methods

## Landscape Analysis

The project team completed a detailed analysis of participants in the emerging biodiversity credit market. They focused specifically on market participants, influencers, registries, and regulators.

## Literature Review

A review of hundreds of biodiversity standards, articles, and academic journals provided details on the state of the art in biodiversity measurement, reporting, and verification. These details helped to ensure a scientifically rigorous and financially sustainable protocol.

## Stakeholder Interviews

Interviews with environmental scientists, industry influencers, corporate executives, and landowners informed the team's analysis and design. Listening to these stakeholders helped the team to develop a cost-effective, scalable protocol.

# The Biodiversity Protocol of "The AEI Regenerative Standard" Design Principles

## Additionality

The protocol incentivizes outcomes that would not have occurred without the implementation of the project.

## Transparency

The protocol facilitates procedures, measurements, and results that are public and auditable.

## Inclusivity

The protocol prioritizes land steward engagement, local & equitable benefits, and safeguards to prevent adverse social impacts.

## Defensibility

The protocol is based on rigorous scientific research and extensive experience in the field.

## Scalability

Implementation of the protocol is cost effective and scalable across geographies and ecoregions.

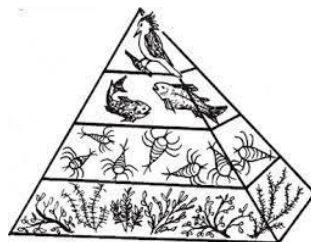
## Metrics for Ecosystem Health

### Structure



+

### Food Web



+

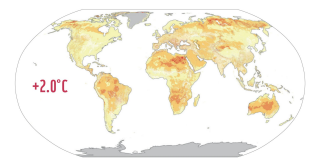
### Connectivity



Remote Sensing & Intelligent Environmental Information Systems

## Species Metrics

### Abundance



### Existential Threats



Acoustic & Video + Human Observations

## Next Steps:

1. Publish Version 1.0 of the Biodiversity Protocol within The AEI Regenerative Standard
2. Gather feedback from the stakeholder community
3. Pilot the protocol in active land development projects within the United States

## References

The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability (2020). Financing nature: Closing the global biodiversity financing gap.

WWF (2022) Living Planet Report 2022 – Building a nature positive society. Almond, R.E.A., Grooten, M., Juffe Bignoli, D. & Petersen, T. (Eds). WWF, Gland, Switzerland.

Structure Image source: <https://printablefreecoloring.com/drawings/nature/forest/>

Food Web graphic source: Pew, et al. (1993) Stream Ecology: A Journal for Action. Missouri Botanical Garden.

Network Icon source: Creative Commons License. WebTechOps, LLP.  
<https://thenounproject.com/icon/connectivity-1422494/>

Abundance Globe Image source: WWF (2022) Living Planet Report p. 19.

IUCN Red List Logo source: <https://www.iucnredlist.org/>

## Thanks and Acknowledgements

The team acknowledges and appreciates the guidance and support of these individuals:

Mr. Steve Apfelbaum – Your wealth of knowledge, devotion to rigor, and depth of curiosity and creativity are an inspiration, and the life blood of this project.

Mr. Jason Carlson – Your technical acumen and expertise in rapidly evaluating proposed solutions, identifying datasets and creating high resolution prototypes brought this project to life.

Ms. Sara Clow – Your strategic, operational, and contextual inputs were always insightful and critically valuable in keeping the project focused and always moving forward.

Dr. Damien Thompson – Your guidance and support was critical in ensuring that we challenged our own assumptions and made sure to ask the right questions at the right time.