Biodiversity Methodology for Keystone Species Stewardship

Protocol for Ideation, Implementation & Monitoring

ERA CARBON SERVIÇOS AMBIENTAIS LTDA.

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This document is intended to be used in combination with:

- Regen Registry Program Guide

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1. METHODOLOGY OVERVIEW

The Biodiversity Methodology for Keystone Species Stewardship (henceforth called the "Methodology") provides a holistic assessment of ecological state indicators as well as practice-based indicators to incentivize the maintenance of conservation areas, crucial for the perennity and resilience of wildlife and biodiversity.

This Methodology set the basis for the continuous monitoring of Keystone Species on a specific Project Time Frame, which coupled with Environmental Stewardship indicators, creates a favorable net outcome for the chosen Keystone Species and the whole ecosystem under management.

To apply this Methodology to a specific biodiversity conservation project it is necessary to produce and submit evidence of the presence of the chosen Keystone Species (see section 1.5) in the Project Area. This is the main requirement of this methodology. Nevertheless, throughout this document other mandatory parameters and frameworks will be introduced that must be carefully followed. Once the project is validated, data and evidence must be collected and exhibited in the Monitoring Reports to prove KSS has been achieved. These Monitoring Reports will be verified by external auditors to ensure all guidelines have been followed in according with this methodology.

This methodology is not applicable to aquatic ecosystems.

This first chapter provides a general overview of the methodology and its accessory documents, including: (i) definitions & acronyms; (ii) introduction, scope, and structure of the methodology; (iii) definition of a keystone species; and (iv) a general guideline for the development and implementation of this methodology.

1.1 DEFINITIONS

- Adoption Date – Date of the first evidence-backed implementation of Project Activities.
- Baseline Scenario - Hypothetical description of what would have occurred in the absence of the Project Activity.
- Biodiversity Claim – Biodiversity Claims are affirmations by end-use buyers claiming that the acquisition of biodiversity Tokens: (i) finance Project Activities that represent investments of the company or person in SDG 13 or 15, "climate action" or "life of land", respectively; (ii) finance Project Activities as investments of the company or person in biodiversity, nature or ecological investments, with this information disclosed before any agency or organization, public or private, ex: B-Corp Impact Assessment or Taskforce on Nature-Related Financial Disclosures; (iii) finances Project Activities as investments of the company or person in biodiversity, nature or ecological investments, with this information disclosed on the company´s sustainability report.

- Buyers – Buyers of the biodiversity Tokens. Can be end-users making Biodiversity Claims, or not.
- Ecosystem Health (ES) – The framework provided in Chapter 5 for KS conservation projects to maintain monitoring practices of the EH throughout the Project Timeline, creating continuous production of scientific knowledge, enhancing data about the EH, and offering important inputs for conservation strategies across diverse bioregions.
- Environmental Stewardship Indicator (ESI) – As defined in Section 6.1.3., the three following indicators: (i) Property Management; (ii) Social Engagement; and, (iii) Financial Strategy. The ESI are evaluated at the KS Guideline only and chosen based on their possibility of providing a practice-based, systems-thinking, and integrated approach to KS stewardship.
- Habitat Area – The area within a Project Area that is viable habitat for a Keystone Species.
- Host Country – Country where the Project Activities are implemented.
- Keystone Species (KS) – Defined in this Methodology in Section 1.5 as an organism that helps define an entire ecosystem, promoting a functional diversity of the ecosystem and improve the ecosystem service diversity of the whole fauna.
- Keystone Species Guideline (KSG) – A document tailored for the reality and particularities of each KS, ecosystem, and habitat, including specific KSH, EH and ES indicators.
- Keystone Species Health (KSH) – The framework defined in Chapter 4 for KS conservation projects to maintain monitoring practices throughout the Project Timeline, creating continuous production of scientific knowledge, enhancing data about specific KS, and offering important inputs for conservation strategies across diverse bioregions.
- Land Steward – Person or entity involved in the caretaking and maintenance (stewardship) of a Project Area. This can ultimately be the Project Developer or the Landowner.
- Landowner – The individual or organization that holds title to the Project Area. This can be the Land Steward or a third party that rents the land to the Land Steward.
- Monitoring Period – Annual or biannual timeframe in which the monitoring of Project Activities occurs.
- Monitoring Plan – Document with the proposed monitoring, reporting and verification (MRV) for the next Monitoring Periods, including the Project Activities to be implemented in the next Monitoring Period.
- Monitoring Report – Report which contains all data and information related to Project

Activities during the proposed Monitoring Period.

- Project Activity - The applied management or conservation practice that is protecting a Keystone Species and/or producing monitoring data for scientific purposes.
- Project Area – Boundary within which MRV and Project Activities will be implemented.
- Project Developer – Third party involved in the implementation of Project Activities and/or monitoring and reporting.
- Project Entity – On-chain digital representation of the Project Proponent before the Regen Registry.
- Project Plan – Project Design Document with general overview of proposed Project Activities and impact matrix.
- Project Proponent – The Project Developer or Land Steward that is applying to register a project on the registry.
- Project Registration Date – The date the project is registered on-chain.
- Project Start Date – The date of the first proof of existence of the KS within the Project Area, maybe coincide with Adoption Date.
- Project Time Frame – The period during which the Project Proponent will undertake the Proposed Activities.
- Regen Registry – Blockchain registry operated by the Regen Network Inc.
- Regen Network Scientific Community – Decentralized scientific community providing feedback to projects and methodologies registered in the Regen Registry.
- Stakeholder – Party of interest involved and/or affected by Project Activities.
- Tokens – Digital unit representing the KS Stewardship Project Activities.
- Validation – The systematic, independent, and documented process for the evaluation of the Project Plan against the criteria of the Methodology.
- Verification - The systematic, independent, and documented process for the evaluation of the Monitoring Report of the Project Activities and the observance of the validated Project Plan and Monitoring Plan against the criteria of the Methodology.
- Verifier – Responsible Third-Party auditor that will perform Validation and Verification process. Verifier will validate and verify the Project Plan, Monitoring Plan, Monitoring Reports, and evidence of Project Activities.

1.2 ACRONYMS

- AFOLU - Agriculture, Forestry and Other Land Use.
- CBD - United Nation´s Convention on Biological Diversity.
- CICES - Common International Classification of Ecosystem Services
- GBF - Global Biodiversity Framework
- IPCC - Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental body of the United Nations that provides the world with objective, scientific information relevant to understanding the scientific basis of the risk of human-induced climate change.
- KPI – Key performance indicator
- RND - Regen Network Development, Inc., the entity developing and operating Regen Registry.
- SDG - The United Nation´s Sustainable Development Goals.
- MRV – Monitoring, Reporting, and Verification activities.
- PES – Payments for Ecosystem Services, as defined by the financial compensation offered to individuals and/or entities that maintain essential ecosystem services such as carbon storage and removal, pollination, water resources and many others.

1.3 INTRODUCTION

Nature is composed of ecosystems that harbor high diversity of biotic and abiotic elements. According to the Convention on Biological Diversity (CBD), biodiversity can be explained as the variability of living organisms of all origins. The interactions between these elements of an ecosystem are called ecosystem functions and these functions generate ecosystem services.

Ecosystems services are the benefits that nature provides for humanity. These services are of great importance for human well-being and economic activities. According to the Common International Classification of Ecosystem Services (CICES), three categories are considered: (ii) provision; (ii) regulation; and, (iii) cultural. Human actions that favor and enhance the conservation or improvement of ecosystems and maintenance of ecosystem services are known as environmental services.

The Payment for Ecosystem Services ("PES") is a crucial concept and mechanism that is in the dawn of its wide-scale implementation. In order to truly usher an ecological economy, providers of ecosystem services must be duly acknowledged and incentivized for their conservation practices and stewardship of habitats.

Nevertheless, biodiversity stewardship is seldom recognized or compensated, in fact, in our carbon-centric PES global agenda, it is usually relegated to the background as a preferrable outcome for nature-based solutions, but rarely as the main goal of projects.

Our planet stands on the brink of a sixth mass extinction event, despite the attempts to create a world-wide consensus on the theme. Notwithstanding, considering the CBD and the failure to achieve the Strategic Plan for Biodiversity 2011-2020 (including the so-called Aichi Targets), our global multi-lateral organizations have generally reached a stalemate on biodiversity. The CBD now prepares the Post-2020 Global Biodiversity Framework ("GBF"), with the following stated theory of change:

"The framework is built around a theory of change (see figure 1) which recognizes that urgent policy action globally, regionally and nationally is required to transform economic, social and financial models so that the trends that have exacerbated biodiversity loss will stabilize in the next 10 years (by 2030) and allow for the recovery of natural ecosystems in the following 20 years, with net improvements by 2050 to achieve the Convention's vision of "living in harmony with nature by 2050". It also assumes that a whole-of-government and society approach is necessary to make the changes needed over the next 10 years as a steppingstone towards the achievement of the 2050 Vision. As such, Governments and societies need to determine priorities and allocate financial and other resources, internalize the value of nature, and recognize the cost of inaction."[1]

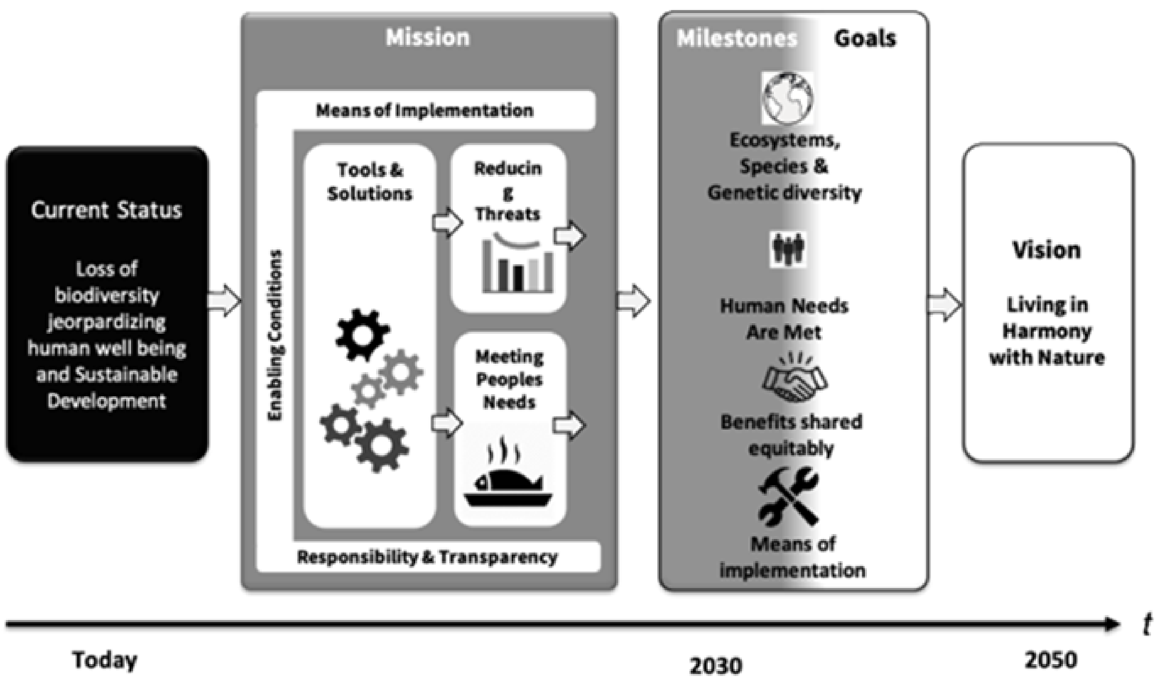

Figure 1 *Extracted Theory of Change figure from the first draft of the Post-2020 Global Biodiversity Framework*

The above citation showcases the urgency for reliable and actionable tools to promote the allocation of resources for biodiversity protection and regeneration. Biodiversity loss needs to be stabilized by 2030, an ambitious yet crucial measure for avoiding ecological collapse in this century.

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[1] Accessed at: First draft of the post-2020 global biodiversity framework (cbd.int)

Considering these premises, we need the development of a PES framework specifically dedicated to solving this conundrum. Therefore, this methodology is intended to aid Milestones A.1 and A.2 of Goal A and D.1, D.2 and D.3 of Goal D of the GBF, as stated, in order:

(a.1) Net gain in the area, connectivity, and integrity of natural systems of at least 5 per cent.

(a.2) The increase in the extinction rate is halted or reversed, and the extinction risk is reduced by at least 10 per cent, with a decrease in the proportion of species that are threatened, and the abundance and distribution of populations of species is enhanced or at least maintained.

(d.1) Adequate financial resources to implement the framework are available and deployed, progressively closing the financing gap up to at least US $700 billion per year by 2030.

(d.2) Adequate other means, including capacity-building and development, technical and scientific cooperation, and technology transfer to implement the framework to 2030 are available and deployed.

(d.3) Adequate financial and other resources for the period 2030 to 2040 are planned or committed by 2030.

The intent of this Methodology is to create a mechanism that will significantly increase the number of protected hectares of habitat for a given Keystone Species ("KS"), providing a general framework to incentivize the monitoring and assessment of Keystone Species Health ("KSH") and Ecosystem Health ("EH") in various biomes, so that Land Stewards can receive PES for becoming stewards of a chosen KS occurring in the Project Area. KSH and EH monitoring will be coupled with Environmental Stewardship Indicators ("ESI") that can provide improvements to the KSH and the EH of the Project Area, besides building and improving interactions between humans, communities, and KS.

1.4 SCOPE

All species of fauna and flora of an ecosystem maintain direct or indirect relationships with each other and are important for the existence and balance of a given environment. However, during this network of relationships there are some specific species that directly or indirectly establishes fundamental connections with others and become a cornerstone for the balance and maintenance of the ecosystem. These species are known as Keystone Species and play a vital role in the structure, function, and productivity of the ecosystem.

By the standards of scientific literature, KS are species that have low functional redundancy in such a degree of interaction with other species that their absence from the system inhibits major ecological processes. If a KS disappears from the system, no other species would be able to fill its ecological niche. Therefore, KS conservation and management projects are known to be successful in balancing and restoring biodiversity, since these species significantly influence other species of animals and plants that compose the ecosystem.

KS, such as the iconic jaguar or the wolf, are recognized worldwide for conservation projects that have succeeded in re-establishing the species ecological processes to restore and maintain the entire ecosystem. For example, in Yellowstone National Park in the United States of America, the reintroduction of wolves continues to showcase ripple effects of direct and indirect consequences throughout the ecosystem, even 30 years after the first efforts of re-establishment of the species in the region. In the Iberá Province of Argentina, the re-establishment of a viable jaguar population brought so many ecosystem benefits that the surrounding community was able to realize beneficial economic activities for nature and sustainable development in the region, becoming a great example of a conservation and sustainable development project for an entire biome.

Indeed, projects that assess ecosystem health with a focus on species that are good indicators for environmental quality have the advantage of numerous indirect benefits. However, the bottleneck of conservation projects is the sustainability of long-term actions that ensure stable, positive changes in the environment, thus guaranteeing the occurrence of a multitude of species and the ecosystem services they provide.

This Methodology is intended to be a practice-based methodology (one which will be referred as "Environmental Stewardship"), understanding that biodiversity stewardship is a complex and holistic endeavor, which can be deployed and fulfilled through a mix of indicators that make use of quantitative and qualitative data, using a holistically assessed and technology driven monitoring approach.

This Methodology is intended to provide a general framework for the monitoring of KSH and EH, as well as the assessment of ESI, so that *Land Stewards* can receive PES for becoming stewards of a chosen Keystone Species occurring in the Project Area.

The Keystone Species Health (KSH) indicator detailed in Chapter 4 has the following mandatory and optional parameters:

- ✔ Ecosystem Distribution (hereby called the "Habitat Area")
- ✔ Taxonomic diversity
- ✔ Size of the population
- ✔ Density of the population
- ✔ Occupancy
- ✔ Demographic parameters

The Ecosystem Health (EH) indicator detailed in Chapter 5 has the following mandatory and optional parameters:

- ✔ Ecosystem Vigor
- ✔ Ecosystem Organization
- ✔ Improved habitat integrity and connectivity (ecological corridors)

- ✔ Protection of riparian forests and water sources
- ✔ Ecosystem Resilience

Each KS will have a specific Keystone Species Guideline document ("KS Guideline"), tailored for the reality and particularities of each KS, ecosystem, and habitat. Any Project Proponent can draft a KS Guideline, provided the document is based on best practices, peer-reviewed literature, and/or government or environmental agencies public guidelines, for public policy purposes (for more information, refer to Chapter 7).

The KSH and EH are evaluated both in the general methodology and KS guideline. At the KS Guideline, additional factors are evaluated together with the ESI, providing a system of continuous improvements to the KSH and EH of the Project Area, besides building and improving interactions between humans and animal communities, especially considering the KS. These additional indicators used at the KS Guideline are intended to allow for a holistic assessment of the Project Area beyond the KSH and EH monitoring.

With regards to the practice-based approach of the Methodology, three Environmental Stewardship Indicators ("ESI") were defined: (i) Property Management; (ii) Social Engagement; and, (iii) Financial Strategy, chosen based on their possibility of providing a practice-based, systems-thinking, and integrated approach to KS stewardship. The ESI are evaluated at the KS Guideline only.

Figure 2 illustrates the structure of the methodology, showcasing the two main documents that must be followed: (i) this main methodology document herein, with the Keystone Species Health and Ecosystem Health indicators; and, (ii) in the KS Guideline, which also contains additional KSH and EH indicators as described herein, although with specific focus and prescribed actions for the KS Species selected, plus the Environmental Steward Indicators, as described above.

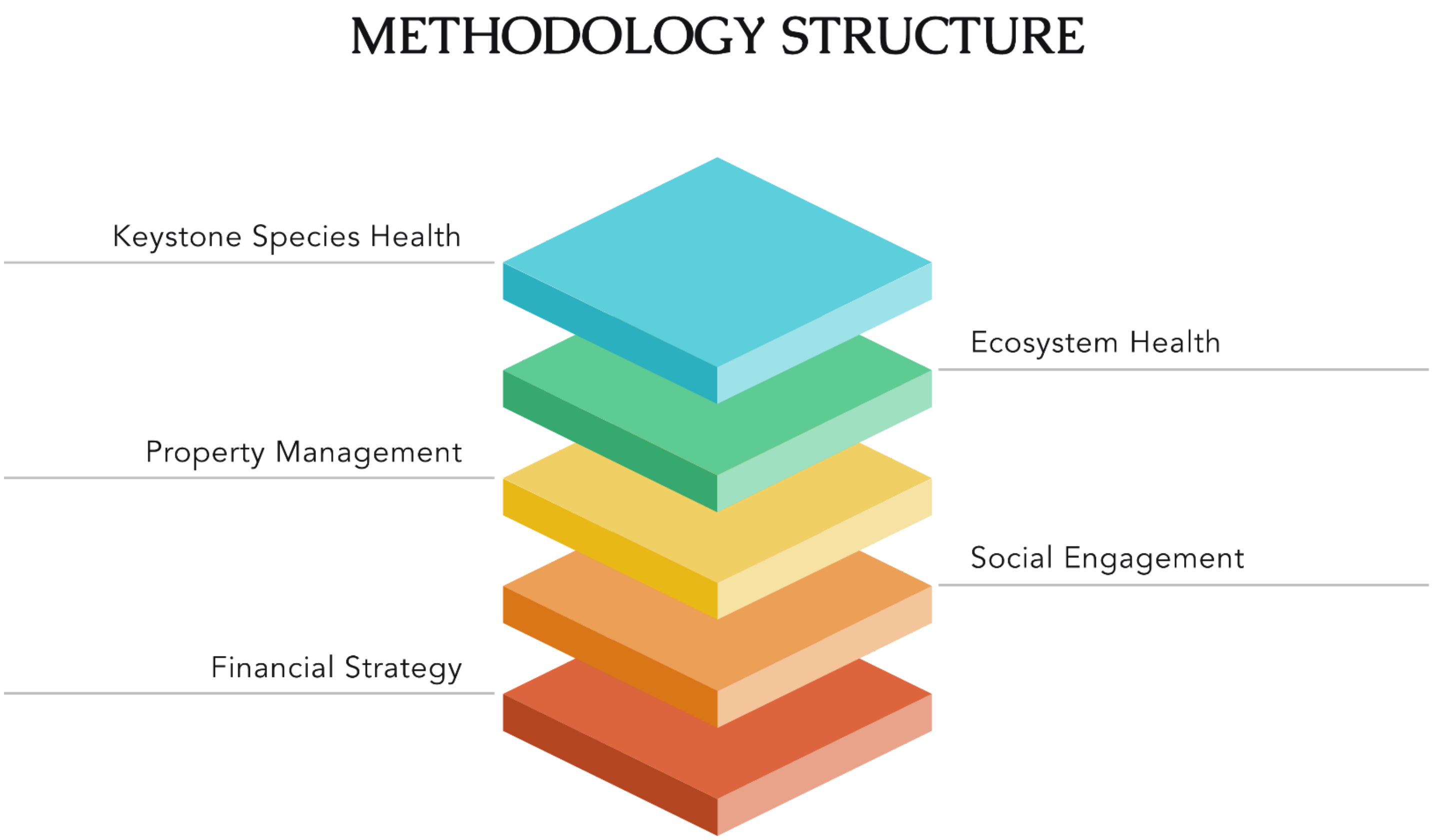

Figure 2 *Illustrative representation of the structure of the Biodiversity Methodology for Keystone Species Stewardship*.

This general guidance of the Methodology is intended to assist *Project Proponents* in applying scientifically rigorous and technology driven MRV focused on maximizing data and estimates on KSH and presence in a Project Area, while minimizing MRV efforts and costs.

Field monitoring activities will be coupled between ongoing remote sensing data and innovative technology such as camera traps, radio, and GPS collars. When necessary, field samples and observation methods such as recordings of sightings and vocalizations, feces collecting, fur-traps, footprints, birth dens and nests, will also be used to assess KSH while remote MRV data and peer reviewed literature will provide an assessment for species health.

1.5 KEYSTONE SPECIES DEFINITION

The "Keystone Species" concept was first defined in Ecology as a species of high trophic status whose activities exert a disproportionate influence on the pattern of species diversity in a community[2]. Species that play this role in ecosystems may be trophic generalists or specialists, rare or common. It may be a carnivore, omnivore, or herbivore, albeit the importance is that the occurrence of this species must be an indicator of ecological pristineness, improvement, or

[2] Davic, Robert D. Linking Keystone Species and Functional Groups: A New Operational Definition of the Keystone Species Concept. Conservation Ecology 7, no. 1 (2003). Accessed at: http://www.jstor.org/stable/26271938

potential in the Project Area or adjacent areas (e.g., if the Project Area is an important ecological corridor between conservation areas or national parks).

A **Keystone Species** is defined in this methodology as **an organism that helps define an entire ecosystem**. Without its KS, the ecosystem would be drastically different or cease to exist altogether. **KS have low functional redundancy**. This means that if the species were to disappear from the ecosystem, no other species would be able to fill its ecological niche. The ecosystem would be forced to radically change, allowing new and possibly invasive species to populate the habitat. Therefore, KS promote a functional diversity of the ecosystem and improve the ecosystem service diversity of the whole fauna.

Examples of KS as required by this Methodology:

When defining a KS for the Project, the Project Proponent should consider only mammals and birds that meet <u>all</u> the three <u>requirements</u> below:

1. **Classification according to feeding habits**: carnivores, herbivores, and omnivores can be considered KS in this Methodology.
2. **Trophic levels**: A KS is often, but not always, a predator, such as wolves or jaguars. Secondary, tertiary, and top-of-chain consumers can be considered KS in this Methodology.
3. **IUCN Red List Categories:** species that are classified as critically endangered, endangered, and vulnerable status according to the IUCN list can be considered KS in this Methodology.

The figure below illustrates the path to be taken, according to the guidelines above, to define a KS suitable to this Methodology.

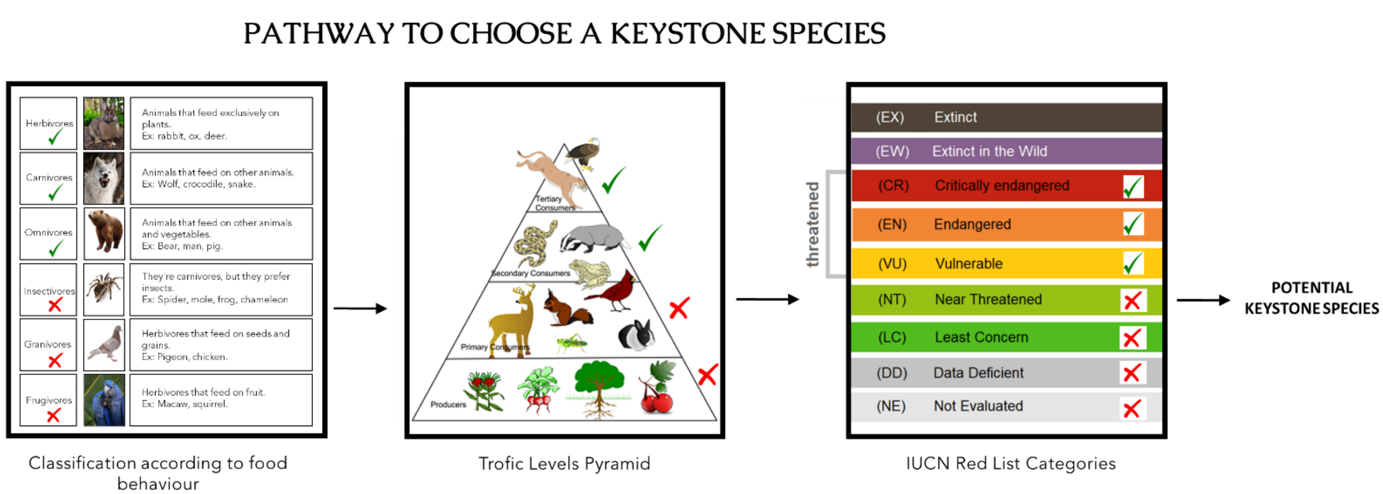

Figure 3 *The image represents which species can be a KS according to this Methodology.*

Flagship species may or may not be a KS. The identification of a flagship species relies heavily on the social, cultural, and economic value of a species. A flagship species acts as a symbol for an environmental habitat, movement, campaign, or issue, being effectively mascots for entire ecosystems.

An indicator species is not necessarily a KS species. An indicator species describes an organism that is very sensitive to environmental changes in its ecosystem, providing useful ecological and environmental data.

1.6 GENERAL FRAMEWORK AND METHODOLOGY STEPS

A general framework for the Methodology is presented in Figure 4. The initial Project Activities, Monitoring Plan and its associated technology is deployed to the field, in a scenario where no activities exist (i.e., the "Baseline"). The Project Proponent creates a basis of continuous improvement of monitoring of KSH/EH and development of the activities associated with the ESI, following the minimum requirements of this Methodology. This approach allows for a significant reduction in the level of technology and commitment of Project Activities that's needed to be applied in the Baseline year, permitting exponential continuous improvement in the following years, with the reinvestment of biodiversity token´s revenue in monitoring and ESI improvement.

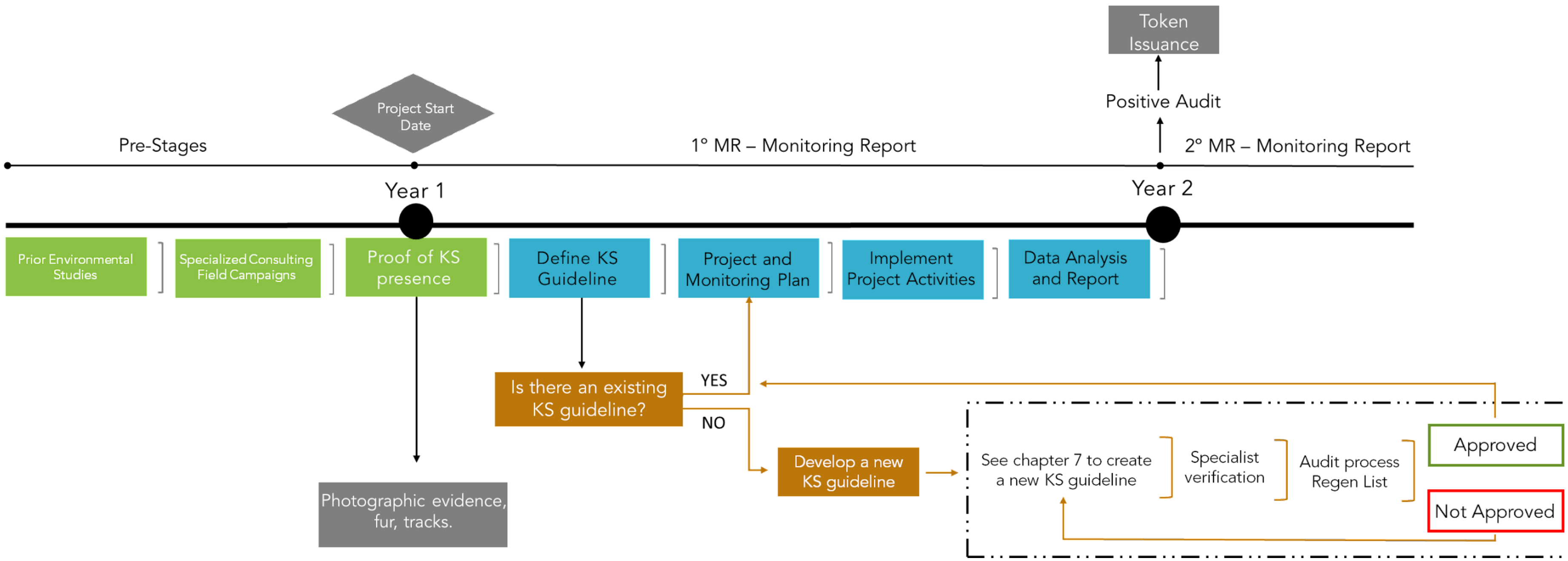

Figure 4 *Illustrative representation of the methodology framework.*

To implement the Methodology in the Project Area, the following steps are required:

1. Carry out a prior biodiversity campaign to assess the Project Area (optional).
2. Choose KS and prove presence in Project Area.
3. Define the KS Guideline, if available.
4. If a KS Guideline is not readily available, the Project Proponent has the option of drafting one according to Chapter 7.
5. Develop the Project Plan and Monitoring Plan.
6. Implement the Project Plan and Monitoring Plan, by deploying monitoring technology and implementing Project Activities for the Project Area according to Chapter 4 to 7.
7. Develop the Monitoring Report.
8. Validation and verification of data and evidence of the Monitoring Report by an approved Verifier for token issuance.

2. PROJECT ELIGIBILITY

Project proponents must describe in the Project Plan how each of the following eligibility criteria are met, with evidence to support the claims.

2.1. ECOSYSTEM TYPE CLASSIFICATION

Application: This Methodology can be developed in any biome in the world.

Definition: Biome is a biological unit or geographic space whose specific characteristics are designated by macroclimate, vegetation class, soil, and altitude, as well as other criteria. They can be defined as types of ecosystems, habitats, or biological communities within a certain level of homogeneity.

2.2. LAND OWNERSHIP TYPE

This Methodology accepts projects with all land ownership types, including private, public, and tribal, provided the Project Proponent demonstrates adequate documentation for proof of ownership and/or approval by landowners.

2.3. PROOF OF OWNERSHIP

Landowners and/or Project Proponents will prove land ownership or title with the available legal documents as per the host country´s legislation. Landholders and/or Project Proponents will need to prove at least basic and documented land tenure rights, in order to avoid double-counting, double-claiming, and improve permanence aspects of the Project Activities.

2.4. PERMANENCE OF PROJECT ACTIVITIES

Project proponents and Land Stewards must prove the minimum project Timeframe is sustained by an irrevocable and legally enforceable agreement between the Project Proponent, Land Steward and/or any other relevant parties that ensures that the Project Activities will be undertaken, or any other legal or regulatory remedy, public or private in nature, that entails this specified outcome.

2.5. PROJECT START DATE AND ADOPTION DATE

<u>Project Start Date:</u> The date of the first proof of existence of the KS within the Project Area, may coincide with Adoption Date.

<u>Adoption Date</u>: This Methodology will accept an Adoption Date that goes back up to 5 years prior to the Project Registration Date. In order to claim an Adoption Date before the Project Start Date and the Project Registration Date, the Project Proponent must have maintained clear historical records to prove KS existence during all years and monitoring efforts of KSH and EH, implementation of the KS Guideline and overall eligibility to this Methodology.

2.6. CREDITING TERM

The Crediting Term for this Methodology for the issuance of tokens is 10 years, from the moment of Project Registration Date, this does not include issuances that are claimed prior to this date. Each renewal period will be 10 years and there is no limit to the number of renewals.

3. PROJECT AREA BOUNDARY

This chapter presents the definitions of spatial boundaries and temporal boundaries of the defined Project Area.

3.1. SPATIAL BOUNDARIES

Project Area: The Project Area spatial boundary encompasses all the Landowner´s land (anthropized or natural) in which the Project Proponent will undertake the MRV and Project Activities, including Habitat Area.

Spatial boundaries defining the Project Area and Habitat Area should be provided by the Project Proponent with any parcels or stratification schemes defined. Data formats may include polygon shapefiles, KML/KMZ files, or other GIS vector files.

Habitat Area: Habitat Area spatial boundaries are defined as the forest cover or native vegetation used as a functional ecosystem by KS. Habitat Area may include agroforestry plots, forest and native vegetation that are legally protected and/or surplus forest that could be legally converted to multiple uses (e.g., agriculture, pasture, infrastructure). Furthermore, it's the main datapoint for the calculus of the KSH indicator, as per chapter 4.

3.2. TEMPORAL BOUNDARIES

The Project Timeframe is the period during which the Project Proponent will undertake the Proposed Activity.

Current available data from scientific literature on permanence aspects of biodiversity projects are scarce. Although there are mathematical models for predicting the potential for restoration and conservation of biodiversity few projects have sufficient longevity and permanence to change the pattern of biodiversity distribution, or the structuring of ecosystems. Therefore, it is very important to understand what the feasible temporal window is to identify changes in the community and effects on the conservation status of the species.

Many projects have the challenge of raising funds for the maintenance of conservation activities. Therefore, the proposal to submit monitoring reports in short periods of time (annual or biannual) allows the validation and verification of Project Activities, which may result in the increase of the score, and consequently, the generation of tokens based on the fulfillment of the criteria described in the KS guidelines.

Therefore, the Monitoring Period and frequency defining the temporal boundaries should adhere to the following guidelines:

- The minimum Project Timeframe must be 10 years.
- Monitoring Periods and Verifications must be annual or biannual.

4. EVALUATING KEYSTONE SPECIES HEALTH AND DEVELOPING A MONITORING PLAN

This chapter presents the mandatory and optional parameters of the KSH indicator, as well as the suggested *best practices* for the use of technologies in monitoring and conservation of biodiversity. The overall scoring method is provided at the end of this section.

This Methodology provides the framework for KS conservation projects to maintain monitoring practices throughout the Project Time Frame, creating continuous production of scientific knowledge, enhancing data about specific KSH, and offering important inputs for conservation strategies across diverse bioregions. All the data produced considering KSH shall be reported annually or biannually in the Monitoring Reports.

The Monitoring Plan should include the following objectives:

a) Describe how changes in a chosen population of KS will be monitored, as well as other communities, which could serve as an indicator of habitat quality and disturbance.
b) Describe the methods that will be used to monitor KS health. The methods should be repeatable, minimally susceptible to observer bias, and achievable with minimal training and equipment.

4.1. BASELINE MONITORING PARAMETERS

There are two initial mandatory KSH datapoints that must be measured in the field to compose the baseline calculation for the number of tokens that will be issued.

These two initial mandatory datapoints selected are based on the Essential Biodiversity Variables ("EBV"), which assess biodiversity change over time in different dimensions and across multiple scales. It can be used to monitoring progress with respect to the sustainable development goals, or determine adherence to biodiversity policy, and to track biodiversity responses to disturbances and management interventions[3]. The EBVs summarize a minimum set of essential measurements to capture the main dimensions of the change in biodiversity, complementary to other initiatives to observe the change in the environment.

The GEO BON (part of GEO, The Group on Earth Observations) indicates six EBV Classes[4]:

- ✔ Genetic composition
- ✔ Species populations

[3] Pereira, H.M., Ferrier, S., Walters, M., Geller, G.N., Jongman, R.H.G., Scholes, R.J., Bruford, M.W., Brummitt, N., Butchart, S.H.M., Cardoso, A.C., Coops, N.C., Dulloo, E., Faith, D.P., Freyhof, J., Gregory, R.D., Heip, C., Hoft, R., Hurtt, G., Jetz, W., Karp, D.S., McGeoch, M.A., Obura, D., Onoda, Y., Pettorelli, N., Reyers, B., Sayre, R., Scharlemann, J.P.W., Stuart, S.N., Turak, E., Walpole, M., Wegmann, M., 2013. Essential biodiversity variables. Science 339, 277–278. Accessed at: https://doi.org/10.1126/ science.1229931.
[4] Accessed at: https://geobon.org/ebvs/what-are-ebvs/

- ✔ Species traits
- ✔ Community composition
- ✔ Ecosystem structure
- ✔ Ecosystem function

From these classes, two specific EBVs were chosen to allow for ease of use, providing the Methodology with an accessible framework for monitoring:

a) From the *Ecosystem Structure EBV Class* – the Ecosystem Distribution indicator, which henceforth in this Methodology, as per the definition in the preamble and Section 3.1, will be called the "Habitat Area".

b) From the *Community Composition EBV Class* – the "Taxonomic Diversity" indicator.

4.1.1. HABITAT AREA

Habitat Area will be used as a primary datapoint and is defined as the area within a Project Area that is viable habitat for the selected Keystone Species. Typically, this area is an intact native ecosystem, which is supporting the life and health of a Keystone Species. It will be quantified based on the number of hectares (ha) of protected ecosystem habitat, and the area will be calculated using georeferenced points, which will be transformed into a shapefile and subsequently remotely monitored via satellite.

4.1.2. TAXONOMIC DIVERSITY

Taxonomic Diversity will be used as a binary measurement which indicates the presence or absence of the chosen KS. This parameter is understood as the basic and obligatory datapoint that confirms if KS is present or not in the Project Area. Confirmation of the KS presence may be obtained via many types of accessible methods such as camera-traps, drones, radio/GPS collars, bioacoustics and/or field samples such as feces collection, fur-traps, identification of footprints and birth dens/nests.

Expert advisory reports or GPS-located evidence presented by the Project Proponent will be accepted as proof of the presence of the KS in the area. Regardless of the size of the Project Area and Habitat Area, the presence of a single individual of KS will be valid for access to the Methodology and eventual issuance of Tokens.

It is mandatory to record the presence of the KS in the Project Area and Habitat Area in the first Monitoring Report. After this period, it is permitted by the Methodology that the KS is not registered in the area for up to 3 years, still being eligible for the Methodology in this time frame. However, it is mandatory for the Project Proponent to implement a system of continuous improvement in the application of the ESI (as described further in Chapter 7), where the Project

Proponent must be implementing new strategies and Project Activities in each Monitoring Report as defined in this Methodology and the KS Guideline.

4.2. SUBSEQUENT MANDATORY PARAMETERS

The Methodology delineates the following subsequent mandatory monitoring parameters to further the scientific knowledge about KSH, and by doing so, the Land Steward and/or Project Proponent will earn additional points in the scoring, thereby receiving more Tokens. Expert consultants, ecologist and biologist should be used to monitor and report on these parameters.

4.2.1. CONTINUOUS IMPROVEMENT THROUGH THE PROJECT LIFETIME

The following subsequent mandatory parameters should be implemented throughout the Project Time Frame, in a manner that until the end of the Project, all parameters have been applied to monitor KSH.

The Monitoring Plan should address how the Project Proponent will implement at least one new monitoring parameter after the completion of 20% of the Project Time Frame. For example, if the Project Time Frame chosen is the minimum requirement of 10 years, then the Project Proponent shall implement the KSH parameters described in 4.2.2, 4.2.3, 4.2.4 and 4.2.5 every two years subsequently.

4.2.2. SIZE OF THE POPULATION

This parameter will analyze the size of the KS population in the Project Area. The Project will yield a higher overall score if the Land Steward chooses to engage in the application of this analysis.

Size of population is understood as the total number of individuals in a population. The larger the population, the greater its generic variation and, therefore, its potential for long-term survival. The increase in population can, however, lead to other problems, such as excessive use of resources, causing a population to collapse.

For moving individuals, such as mammals and birds, a technique called the "marking and recapture method" is often used to determine the population size of a given species. In the first capture the individual is marked (the capture and marking can only be performed by a specialized and authorized technical team, with legal permission from environmental authorities to do so) and released. In the second campaign, the individuals captured with marking are not counted as new individuals, and new individuals are marked.

Some studies of terrestrial fauna for the monitoring of populations are using drones as an important tool for counting individuals, as well as monitoring nests.

To calculate the size of the population it is suggested to use the following equation:

$$N = \frac{nM}{x}$$

Where:
N= population size
n= total number of individuals caught in the second campaign
M= number of individuals tagged in the first campaign
x= number of new individuals tagged in the second campaign

Compliance with this parameter scores 0.25 points, regardless of the absolute value resulting from the application of the above equation. It is suggested to report on the progress and development of this parameter throughout the Project Time Frame. Expert consultants and biologists should be used to quantify this parameter and should be filed in a specialized monitoring report.

4.2.3. DENSITY OF THE POPULATION

This parameter will analyze the density of the population in the Project Area. The Project will yield a higher overall score if the Land Steward and/or Project Proponent chooses to engage in the application of this analysis. Density of the population is understood as counting the number of individuals in the population per unit of area.

Many platforms exist for abundance/density analyses, but it can be divided into two main groups: (i) traditional approaches, such as field observations; and, (ii) Spatial Capture Recapture ("SCR"). This Methodology recommends the use of SCR approaches, because these represent a major improvement over traditional approaches, especially for species like the jaguar that occurs at low densities and moves over large areas.

Compliance with this parameter scores 0.25 points. It is suggested to prove the development of this item through a specialized consulting report. It is suggested to report on the progress and development of this parameter throughout the project lifetime. Expert consultants and biologist should be used to quantify this parameter and should be filed in a specialized monitoring report.

4.2.4. OCCUPANCY

This parameter will analyze the occupancy of the population in the Project Area. The Project will yield a higher overall score if the Land Steward chooses to engage in the application of this analysis.
Occupancy is understood as a variable that indicates whether a sample unit is occupied by the species of interest. Occupancy surveys consist of detection/non-detection surveys conducted at several sample units (e.g., a grid cell or habitat fragment) over repeated visits. Occupancy should be complemented by SCR studies to estimate abundance in key areas and establish a baseline for numerical trends and demographic patterns[5].

[5] Polisar, J., Matthews, S., Sollman, R., Kelly, M., Beckmann, J.P. and Sanderson, E.W., 2014. Protocol of jaguar survey and monitoring techniques and methodologies. Available at: https://www.researchgate.net/publication/305083327_Protocol_of_jaguar_survey_and_monitoring_techniques_and_methodologies

Occupancy surveys can be used to evaluate the spatial distribution or estimate the proportion of a given area occupied by KS and it preys[6]. Its analysis refers to the detection of a species during repeated visits to a particular site, whereas SCR refers to detection of distinct individuals of the target species during repeated surveys at a site.

Compliance with this parameter scores <u>0.25 points</u>. It is suggested to prove the development of this item through a specialized consulting report. It is suggested to report on the progress and development of this parameter throughout the Project Time Frame. Expert consultants and biologist should be used to quantify this parameter and should be filed in a specialized monitoring report.

4.2.5. DEMOGRAPHIC PARAMETERS

This parameter will analyze the demographic parameters of the population of KS in the Project Area. The Project will yield a higher overall score if the Land Steward chooses to engage in the application of this analysis.

Demographic parameters are understood as statistical factors that indicate population growth or decline. Several parameters are particularly important: population size, density, age structure, fertility (birth rates), mortality (death rates), and sex ratio[7].

Demographic patterns can be estimated using camera traps or telemetry, but in both cases require long-term, data-rich studies. The collection of remotely triggered camera data to estimate occupancy or abundance can, in many cases, be extended to estimate key demographic parameters. The methods for assessing demographic parameters, population ecology, spatial ecology, and dispersal are similar across all KS. Only long-term intensive research can reveal recruitment, mortality, emigration and immigration, and dispersal patterns.

Compliance with this parameter scores <u>0.25 points</u>. It is suggested to report on the progress and development of this parameter throughout the Project Time Frame. Expert consultants and biologist or research projects developed near the Project Area can be used to quantify this parameter and should be filed in a specialized monitoring report.

4.3. IDENTIFYING THREATS TO KEYSTONE SPECIES HEALTH

This section presents the framework for the Project Proponent to identify threats, agents, and causes of habitat destruction or degradation as well as create a plan to address these threats through the implementation of Project Activities in the Project Area.

This Methodology identifies three main systemic causes of direct threats to KS, being: (i) Deforestation and Forest Degradation; (ii) Fires; and, (iii) Poaching. Addressing these causes with assertive and strategic actions will ensure the long-term success of KS conservation projects.

[6] MacKenzie, D. I., J. D. Nichols, J. E. Hines, M. G. Knutson, and A. B. Franklin. 2003. Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. Ecology 84:2200–2207.
[7] Tarsi, K. and Tuff, T. 2012. Introduction to Population Demographics. Nature Education Knowledge 3(11):3.

Project Proponent is free to list more than one of the causes, as deemed fit in accordance with Project´s circumstances.

These three aforementioned items will always be tackled by prescribed actions or conducts in the chosen KS Guideline, **with context-specific scoring methods based on the KS** and may be included in any of the following items described ahead, as a KSH, EH or ESI. The Project Proponent must create an Impact Strategy Outline ("ISO"), as defined by the template below:

Agent or Cause of Threat to KS	Describe agent or cause of threat (ex: logging or mining companies, agricultural activities, wildfires, man-made fires, poachers for exotics wildlife trade).
Negative Impacts Attributed	Describe system short, medium, and long-term negative impacts of agents or causes.
Type of Strategies that Address the Negative Impacts	Describe the Project Activities that address the negative impacts.
Impacted Stakeholders	Describe stakeholders impacted by the Project Activities that address the negative impacts (ex: local communities involved in ecotourism).
Benefits Provided	Describe the positive impacts of Project Activities.
Impact Timeframe	Describe if the Project Activities have short, medium, or long-term positive impacts.

Table 1 – *Impact Strategy Outline*

The ISO above will be duly described and developed in the Project Plan, as per the available template. The ISO will list all necessary Project Activities that address the KS Guideline prescribed actions or conducts for tackling agents and causes of deforestation, degradation, poaching and fires.

Project Activities that are prescribed in the KS Guidelines that address the threats to KS described in this chapter will be mandatory as per the 2nd Monitoring Period of the Project.

Below are some exemplifications of strategies that might be addressed in the KS Guidelines, pertaining to the specificities of the KS and bioregional aspects of such threats under analysis.

(i) Deforestation and Forest Degradation

a Security patrols and surveillance inside the Project Area.
b Use of remote sensing tools to identify deforestation and forest degradation.
c Use deforestation detection technologies such as bioacoustics to identify agents, including machinery sounds, such as tractors or chainsaws.

(ii) Fires

a) Water truck availability.
b) Creation of fire breaks and constant maintenance.
c) Trained local fire brigade with equipment available for use.
d) Observation towers to detect fire outbreaks.
e) Sensors with alerts to detect fire prone conditions.
f) Use of technologies such as drones for fire detection.

(iii) Poaching

a) Security patrols and surveillance inside the Project Area.
b) Environmental education strategies raising community awareness.
c) Insertion of information panels at strategic points of the Project Area showcasing poaching and fauna interference prohibition.
d) Use deforestation detection technologies such as bioacoustics to identify gunshots and other associated sounds.

4.4. MONITORING TECHNOLOGY GUIDELINES

4.4.1. CAMERA TRAPS

Camera traps need to be used to monitor a host of different parameters, especially the ones described in this Methodology in items 4.1.1., 4.1.2, 4.2.2, 4.2.3, 4.2.4 and 4.2.5. Notwithstanding, this technology can offer additional benefits to Project Activities such as:

- The captivating images and videos of KS are effective for public engagement and environmental awareness, contributing to Project Activities in KS Guidelines.

- The camera traps need be used as surveillance tools in the Habitat Area, addressing item 4.3, especially to combat poaching and deforestation, as per each individual KS Guideline.

The benefits of using camera traps are:

✔ Monitors and records for long periods of time.

✔ Relatively non-invasive.

✔ Records undisturbed behavior (in theory).

✔ Produces verifiable data.

✔ Offers a highly repeatable method of data collection.

Camera traps vary a lot in their specifications, and this can have important consequences for how well they perform for a given research objective or on a given type of animal, depending on the context. The best approach to identifying what camera trap to choose is to identify the broad type of camera that you require, and then the specific features required to achieve your study's specific aims. Below are some suggestions:

- Most research and monitoring purposes call for a mid- to high-end camera trap, equipped with an infrared flash, large detection zone and fast trigger speed. Important exceptions to this broad recommendation include: a white flash (in most cases) for capture-recapture studies, and a video or "near-video" mode for studies intending to use random encounter modelling.

- For mammals or small birds, a high-end camera trap with a good infrared sensor and fast trigger speed is required; white flash should be considered to aid species identifications.

- For arboreal camera-trapping, required camera trap features include a large detection zone, fast trigger and recovery speeds, and wide field of view.

- Ectothermic species remain a challenge for most commercial camera traps and must be combined with specific methods (e.g., deployment at certain times of day, or using time-lapse) in order to help overcome this; a setup with a direct trigger (e.g., active infrared sensor or pressure pad) may be more effective.

- Environments with high rainfall, snowfall or humidity will be problematic for most commercial camera traps; a high-end camera trap with good protection against the elements is recommended (e.g., a fully sealed casing and conformal coating on the circuit board).

- In hot environments, passive infrared sensors may fail to detect a difference between the surface temperature of target animals and the background; a camera setup with a direct trigger may be more effective.

- In open environments, and when camera-trapping in trees, a high-end camera trap which is less prone to misfires from moving vegetation will be beneficial (although all camera traps are susceptible to this problem); it may also be helpful to use cameras which allow the sensitivity of the infrared sensor to be reduced.

- For camera-trapping in areas which come with a high risk of theft, consider the security options that are compatible with a given camera trap model (e.g., cable locks and security cases).

- The recommendation is to set as many camera traps as you can, but certainly at least as many as your study demands in order to be robust and useful; you can estimate the minimum number of cameras you'll need based on your sampling design and information about how long it will take to install, move, and collect cameras in the field.

- Published studies comparing camera trap models often become quickly out-of-date; a better option is to reach out to the camera-trapping community to gauge opinions about a specific camera trap model for a given task.

This Methodology entails that camera-trap-based monitoring will provide a foundation for long-term research of numerical trends and demographic patterns.

For more information, this Methodology suggests utilizing the document "Camera-Trapping for Conservation – a guide to best-practices"[8], by the World Wide Fund for Nature (WWF).

4.4.2. TELEMETRY

Telemetry can be used to monitor any of the parameters mentioned in items 4.1.1., 4.1.2, 4.2.2, 4.2.3, 4.2.4 and 4.2.5 of this Methodology. Wildlife tracking technologies have been used to estimate home-range size, daily and dispersal movement distances, and habitat associations. Some large animals have relatively large home ranges which are highly variable and vary with topography, prey availability, and population dynamics, e.g., jaguars and lowland tapirs.

Radiotelemetry, including very-high frequency (VHF) and Global Positioning Systems (GPS), provides the opportunity to monitor and map detailed movements of the most highly mobile and cryptic animals. These data provide the opportunity to answer behavioral and ecological questions and to promote quantitative and mechanistic analyses. Also, tracking technologies have often been used to monitor ecological and population parameters. Telemetry provides the ability to remotely monitor elusive, wide-ranging species while they conduct their normal movements and activities, and, through active, near-continuous tracking, can reveal details that spatially stationary camera-trap stations will not.

The installation of biotelemetry sensors must be preceded by authorization of public environmental authorities and wildlife management and the data collected with the sensors must be included in wildlife management reports submitted to the responsible environmental agencies.

Many capture methods can be used, and these differ according to the characteristics of the environment where the animals are. It is important to emphasize the need for a prior survey of information about the best places to install capture traps and which containment techniques are appropriate for the environment. To use this method, wild animals are captured, manipulated, and carry the transmitter over an extended period. Hence, it is impossible to exclude short- or long-term negative effects of radio collars[9].

It is strongly recommended that all studies involving radiotelemetry of wildlife be subjected to peer and veterinary review before commencement, this review should include consideration of research objectives and methods, assessment of expected ecological effects, approvals and authorization from public environmental authorities, as well as relevant organizations for wildlife management, consulting experienced researchers about transmitter weight, method of attachment and capture protocol. Radiotelemetry use should assure that the animals are affected

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[8] Oliver R. Wearn & Paul Glover-Kapfer. 2017. WWF Conservation Technology Series 1(1). WWF-UK, Woking, United Kingdom. Accessed at: CameraTraps-WWF-guidelines.pdf

[9] Gutema, T.M., 2015. Wildlife radio telemetry: use, effect and ethical consideration with emphasis on birds and mammals. Int J Sci Basic Appl Res, 24(2), pp.306-313.

as little as possible by the transmitter and are handled humanely and efficiently during the transmitter attachment procedures.

4.4.3. DRONES

Telemetry can be used to monitor any of the parameters mentioned in items 4.1.1., 4.1.2, 4.2.2, 4.2.3, 4.2.4 and 4.2.5 of this Methodology. Currently drones have been used as an important technological tool in biodiversity and conservation studies, the use of this technology has reduced monitoring costs and has several possibilities for application. Below are some precautionary principles listed to guide the application of the use of drones in the development of this methodology.

- ✔ Increased care is required in cases involving threatened animals or sensitive habitats.
- ✔ Choose a sensor that allows sufficient data collection from a safe distance.
- ✔ Choose the right drone to reduce sound and visual stimuli to a minimum for both target and non-target organisms. Consider modifying the drone if necessary to reduce noise and interference.
- ✔ Characterize the noise profile of the drone of your interest while also considering the auditory extension of the species surveyed.
- ✔ Test and evaluate the response of the species to the drone and minimize behavioral changes of the drone in the animal.
- ✔ Determine the take-off and landing locations in advance and away from the animals (out of sight if possible).
- ✔ Avoid threatening approach trajectories and develop protocols that minimize interference with your target species and those who live nearby.

Even though it is a promising technology that promotes cost reduction in a significant way and improves the delivery of results, it is still necessary that legal, regulatory, and ethical issues of use of this technology be considered, such as:

- ✔ Drone use must be in accordance with approved regulatory and institutional licenses.
- ✔ Observe local restrictions and national laws.
- ✔ Keep records of maintenance and flights.
- ✔ Seek flight approval with indigenous or local communities when appropriate.

For more information, this Methodology suggests utilizing the document "Drones for

Conservation – a guide to best-practices”[10], by the World Wide Fund for Nature (WWF).

4.5. KEYSTONE SPECIES HEALTH SCORING METHOD

The tables below are a general overview of the scoring system.

Mandatory Parameters – section 3.1	Acronym	Score
Habitat Area	HA	Number of hectares
Taxonomic diversity	PA	If KS is present then score is 2, if absent then score is 0

Optional Parameters – section 3.2	Acronym	Score
Size of the population	SP	0,25
Density	DE	0,25
Occupancy	OC	0,25
Demographic parameters	DP	0,25

The formula below considers the score obtained in each of the parameters arranged in this chapter in sections 3.1 and 3.2.

The KSH scoring shall be applied within the following equation:

$$KSH = (PA\ x\ HA) + (PA\ x\ HA\ x\ (SP + DE + OC + DP))$$

Whereas:

KSH = Keystone Species Health indicator.
PA = Presence or absence KS. Presence will count as 2 (two) and absence will count as 0 (zero).
HA = Number of hectares (ha) defined in the spatial boundary.
SP = Size of the population.
DE = Density.
OC = Occupancy.
DP = Demographic parameters.

If KSH overall score is zero than the Project will not be eligible to continue in the validation and verification process of this Methodology. This can happen due to the absence of evidence of the presence of the KS in the Project Area, according to the taxonomic diversity (PA) parameter above.

[10] James Duffy1 , Karen Anderson1 , Aurélie Shapiro2 , Felipe Spina Avino3 , Leon DeBell1 , Paul Glover-Kapfer4 . 2020. WWF Conservation Technology Series 1(5). Accessed at: WWF_CT_Drones_2020_web.pdf

5. EVALUATING ECOSYSTEM HEALTH AND DEVELOPMENT OF THE REMOTE SENSING MONITORING PLAN

This chapter presents the mandatory and optional parameters of the EH indicator and scoring method in this section. This Methodology provides the framework for KS conservation projects to maintain monitoring practices of the EH throughout the Project Timeline, creating continuous production of scientific knowledge, enhancing data about the EH, and offering important inputs for conservation strategies across diverse bioregions and landscapes. All the data produced considering EH shall be reported annually or biannually in the Monitoring Reports.

To evaluate the EH indicator, the remote sensing monitoring plan shall utilize the ecosystem vigor, organization, and resilience indicators. This general framework will analyze EH based on structure (organization), function (vigor) and resilience[11], as well as analysis of improved habitat integrity and connectivity and protection of riparian forests and water sources.

All parameters below need to be mandatorily applied. Each scoring category that needs to be measured will yield additional scores as per the "fair/excellent" range described on the following tables.

5.1. EH PARAMETERS

5.1.1. ECOSYSTEM VIGOR

The ecosystem vigor will be analyzed using the Normalized Difference Vegetation Index (NDVI). This index is based on the high absorption of chlorophyll that is observed in the spectral region of red and the high reflectance clarified by the internal structure of the leaves in the near infrared region. It is an important index to evaluate changes in vegetative flora vigor in habitat area. Being one of the most suitable index for monitoring vegetative cover.

The index result is in the range of -1 to 1. Higher values close to 1 indicate greater vegetative vigor of the plants, while values close to 0, indicating little or no photosynthetically active activities. NDVI is calculated using visible (Red) and near-infrared (NIR) light reflected by vegetation according to the equation below:

$$NDVI = \frac{NIR - Red}{NIR + Red}$$

Where:

NIR = Near-infrared Light
Red = Visible Light

[11] Costanza R. 1992. Towards an operational definition of health. In: Ecosystem health: new goals for environmental management

To measure ecosystem vigor for the Project Area, NDVI values for a project must be compared to the values of a conserved forest in the surrounding (e.g., conservation areas such as national parks). The following steps must be followed for the application of the scoring the Ecosystem Vigor of the Project Area:

a) Create a 10km square or circular buffer around the Project Area using the extent of the spatial boundaries <u>OR</u> create a polygon with anarea equivalent to that of the Project Area in a conserved forest area.
b) Download and pre-process one or more satellite images. Image sensing dates must be the same as or as close to dates of the field campaign of the fauna inventories and fauna's monitoring. Any pre-processing methods used should be documented.
c) Calculate NDVI for the 10km buffered zone surrounding the project area using the pre-processed Sentinel-2 images generated <u>OR</u> calculate NDVI for the conserved forest area using the pre-processed Sentinel-2 images generated
d) Calculate the average NDVI value within the Project Area using the QGIS zonal statistics (or equivalent) tool. Next, calculate the average NDVI values within the masked 10km buffer zone <u>OR</u> calculate the average NDVI value within the Project Area using the QGIS zonal statistics (or equivalent) tool. Next, calculate the average NDVI values within the conserved forest area.
e) Compare the NDVI averages between the Project Area and the buffer zone and generate a score based on the scoring chart below <u>OR</u> compare the NDVI averages between the Project Area and the conserved forest area and generate a score bases on the scoring chart below.

The report must include the NDVI results from buffer and Project Areas, and a link to the buffer vector file and the NDVI raster used <u>OR</u> the report must include the NDVI results from the conserved forest area and Project Area, and a link to the conserved forest area vector file and the NDVI raster used.

The scoring method of Ecosystem Vigor NDVI Analysis is:

Scoring Category (mandatory parameter)	Score
<u>EXCELLENT</u>: Project average NDVI is 25% or higher, than the average NDVI of the 10km buffer area. OR Project average NDVI is the same than the average NDVI of the conserved forest area.	1,5
<u>GOOD</u>: Project average NDVI is 10-25% higher than the average NDVI of the 10km buffer area. OR Project average NDVI is 10-25% lower than the average NDVI of the conserved forest area.	1,0
<u>FAIR</u>: Project average NDVI is within an interval of ± 10% the average NDVI of the 10km buffer area. OR Project average NDVI is within an interval of ± 10% the average NDVI of the conserved forest area.	0,5

NEEDS IMPROVEMENT: Project average NDVI is below 10% lower than the average NDVI of the 10km buffer. OR Project average NDVI is below 10% lower than the average NDVI of the conserved forest area.	0 (zero – the Project is not eligible to apply the methodology)

5.1.2. ECOSYSTEM ORGANIZATION

The ecosystem organization will be analyzed using the woody vegetation landscape metric. This is an important metric because it measures the heterogeneity of a landscape structure. Habitats with spatially heterogeneous abiotic conditions provide a greater variety of potentially suitable niches for species of flora and fauna with habitats with homogeneous characteristics. Important conditions for high biological diversity are the abiotic conditions of the site and the geomorphology.

Therefore, to evaluate and monitor the Habitat Area and prove that the environment is suitable for the establishment of KS, it is suggested to use 4 indicators, where two are mandatory and two are optional.

a) Habitat diversity (mandatory): number of habitat types per unit area[12]. A habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant or other type of organism[13]. It is the natural environment in which an organism lives, or the physical environment that surrounds, influences and is utilized by, a species population.
b) Intensity of use land use (mandatory): portions of natural, semi-natural and intensive land uses[14].
c) Topographic analysis (optional): include slope maps using geomorphometric data. Suggested to use Digital Elevation Model (DEM) and Shuttle Radar Topography Mission (SRTM).
d) Intensity of agricultural use (optional): include land-use and land cover maps. Google Earth images may be used for interpretation about area history. Build a modeling by remote sensing of the levels of intensity of use exerted by the pastures, identify the regions whose conservation states are homogeneous or distinct. Rate the intensity of land use according to this model. More details can be found in Calegario et al. 2019[15].

The woody vegetation landscape metric results from the project area must be included in the report.

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[12] Duelli, P. 1997. Biodiversity evaluation in agricultural landscapes: An approach at two different scales. Agriculture, Ecosystems & Environment, 62: 81–91.
[13] Abercrombie, M., Hickman, C.J. and Johnson, M.L. 1966.A Dictionary of Biology. Penguin Reference Books, London.
[14] Duelli, P. 1997. Biodiversity evaluation in agricultural landscapes: An approach at two different scales. Agriculture, Ecosystems & Environment, 62: 81–91.
[15] Calegario, A. et al. 2019. Mapping and characterization of intensity in land use by pasture using remote sensing. Rev. bras. eng. agríc. ambient, 23 (5).

The scoring method of woody vegetation landscape metric is:

Scoring Category	Score
<u>EXCELLENT</u>: Perform analyses of all mandatory parameters and all optional parameters.	3,0
<u>GOOD</u>: Perform the analysis of the mandatory parameters and an optional parameter	2,5
<u>FAIR</u>: Perform the mandatory analysis (Habitat diversity and Intensity of use land use).	2,0

5.1.3. IMPROVED HABITAT INTEGRITY AND CONNECTIVITY

The ecological corridors aim to mitigate the effects of fragmentation of ecosystems by promoting the connection between different areas, with the objective of providing the movement for animals, seed dispersal, increased vegetation cover and greater genetic flow between species. They are instituted based on information such as studies on the movement of species, their area of life and distribution of their populations. Thus, ecological corridors are a strategy to mitigate the impacts of anthropic activities on the environment and aid the planning of human occupation for the maintenance of ecological functions of a given bioregion.

The maintenance of connectivity in fragmented landscapes is a long-standing principle of conservation and assumes that small or isolated populations may face a higher stochastic extinction risk[16].

Movement between the patches of vegetation can only be verified by analyzing landscapes from the perspective of individual species (KS) and making sure that the landscape elements that allow each species to move exist at the necessary scale and spatial pattern. The nature and scale of these elements can differ significantly between species.

Therefore, to monitor and evaluate the connectivity and integrity of the habitats that make up the landscape in the Project Area, the use of the following indices is suggested:

a) Proximity Index (mandatory): allows the assessment of patches depending on the functional connection with surrounding habitats. Plays an important role in allowing the movement of a species between patches.
   The proximity index distinguishes sparse distributions of small habitat patches from clusters of large patches. Can use forests as the patch type of interest, but any patchy habitat type could be evaluated. A proximity index value is calculated for each forest patch by identifying each forest patch *(i)* whose edge lies at least partially within a specified number of pixels (proximity buffer) of the patch being indexed. The proximity index is calculated using area (S_i) and the edge-to-edge distance from patch (i) to its

[16] Kettunen, M, Terry, A., Tucker, G. & Jones A. 2007. Guidance on the maintenance of landscape features of major importance for wild flora and fauna - Guidance on the implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC). Institute for European Environmental Policy (IEEP), Brussels, 114 pp. & Annexes.

nearest-neighbor forest patch (z,) of each of the n forest patches identified within the buffer, including the patch being indexed:

$$Proximity\ Index = \sum_{i=1}^{n} \frac{S,}{z,}$$

Where:

n = Forest patches identified within the buffer
$S,$ = Area
$z,$ = The edge-to-edge distance from patch i to its nearest-neighbor forest patch

More details for do this Index can be found in Gustafson & Parker (1994)[17].

b) **Effective mesh size (optional)**: The effective mesh size is based on the probability of two points chosen randomly in a region will be connected. The more barriers in the landscape, the lower the probability that the two points will be connected, and the lower the effective mesh size. It can also be interpreted as the ability of two animals of the same species to find each other.
The probability is converted into the size of a patch, the effective mesh size, by multiplying it by the total size of the region investigated. Thus, the unit of Effective mesh size is that of area (e.g. ha or km^2).
The value of Effective mesh size is between 0 (entirely fragmented or developed) and the size of the region investigated (un-fragmented). This Index is calculated according to the equation below:

$$Effective\ mesh\ size = \frac{1}{A_{total}}\left(A_1^{\ 2} + A_2^{\ 2} + \dots + A_i^{\ 2} + \dots + A_n^{\ 2}\right)$$

Where:

n = Number of patches
A_{total} = Total area of the region investigated
A_i = size of patch i (i = 1, …, n)
More details for do this measure can be found in Jaeger (2006)[18].

c) **Connectivity indices (optional):** The connectivity index is the simplest one, as it measure the nearest neighbor. This Index calculate a nearest neighbor index based on the average distance from each feature to its nearest neighboring feature. Can be used The Average Nearest Neighbor tool in ArcGIS. This analyze returns five values: Observed Mean Distance, Expected Mean Distance, Nearest Neighbor Index, z-score, and p-value.

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[17] Gustafson, E.J., & Parker, G.R. 1994. Using an index of habitat patch proximity for landscape design. Landscape and Urban Planning, 29 (117-331).
[18] Jaeger, J. 2006. Measuring Landscape Fragmentation with the Effective Mesh Size meff. Accessed at: <https://www.concordia.ca/content/dam/artsci/geography-planning-environment/docs/jaeger/publications/more2a-faltblatt_engl.pdf>.

More details for do this measure can be found in Moinalen & Nieminen (2002)[19]

The habitat integrity and connectivity results from the project area must be included in the monitoring report.

The scoring method of improved habitat integrity and connectivity is:

Scoring Category	Score
EXCELLENT: Perform all indexes, mandatory and optional.	3,0
GOOD: Perform the mandatory index plus an optional index (Connectivity indices or Effective mesh size).	2,5
FAIR: Perform the mandatory index (Proximity Index).	2,0

5.1.4. PROTECTION OF RIPARIAN FORESTS AND WATER SOURCES

Riparian forests play important ecological roles in the protection and maintenance of water resources, conservation of the diversity of species of the flora fauna, control of erosive processes and the consequent silting and pollution of watercourses.

In addition to preserving water bodies, preserved riparian forests function as corridors for animals and plants linking fragments of natural vegetation. They are essences for the movement and reproduction of animals and dispersion of pollen and seeds, a fundamental role for the propagation of vegetation.

The assessment of the conservation status and monitoring of water source areas in the Project Area will follow the premises stipulated in all laws, statutes, and norms of the Host Country. Environmental law might consider the marginal strip of riparian forest according to the width of the watercourse, following the environmental legislation relevant to the Host Country where this Methodology will be applied.

Sentinel-2 (10 square meters) or higher resolution is required to map the width of the marginal strip of riparian forest over time. The combination with radar data like Synthetic Aperture Radar (SAR) increases the accuracy of the results. The protection of riparian forests and water sources analysis and results must be included in the report.

The scoring method of protection of riparian forest and water sources is:

Scoring Category	Score
EXCELLENT: The percentage of the marginal strip of the riparian forest is higher >50% of	1,0

[19] Moilanen, A., & Nieminen, M. 2002. Simple Connectivity Measures in Spatial Ecology. Ecology, 83(4), 1131.

that stipulated in the laws, statutes, and norms of Host Country.	
<u>GOOD</u>: The percentage of the marginal strip of the riparian forest is within an interval of ± 30-50% higher of that stipulated in the laws, statutes, and norms of Host Country.	0,5
<u>FAIR</u>: The marginal strip of the riparian forest complies with what is stipulated in the laws, statutes, and norms of Host Country.	0,25
<u>NEEDS IMPROVEMENT</u>: The marginal strip of the riparian forest does not fit the minimum size required by the laws, statutes, and norms of Host Country.	0 (Zero – the Project is not eligible to apply the methodology)

5.1.5. ECOSYSTEM RESILIENCE

Ecosystem resilience will be analyzed using Bare Soil Estimation ("<u>BSI</u>"). BSI is an important indicator as it can be used to monitor and evaluate ecosystem resilience of the Project Area throughout time. Bare Soil Estimation (i.e. [1 - vegetation cover]) is a numerical indicator used to quantify the soil mineral composition and to enhance the presence of vegetation. This index combines blue, red, near infrared and short-wave infrared spectral bands from satellite imagery to capture soil variations. The equation to calculate the BSI using Sentinel-2 imagery is specified below:

$$Sentinel\ 2\ MSI = BSI\ S2 \frac{(Band11+Band4)-(Band8+Band2)}{(Band11+Band4)+(Band8+Band2)}$$

In order to have a relative estimation of the BSI within the Project Area versus the surrounding areas, the following steps are carried out for scoring the ecosystem resilience:

a) Create a 10km square or circular buffer around the Project Area using the extent of the spatial boundaries. Save the results to a shapefile, geopackage, or other GIS vector file.

b) Download and preprocess satellite imagery that falls within ± 1 month from the reported fauna's inventories and monitoring period. Sentinel-2 (10 square meters) or higher resolution is required. Averaging several dates without clouds around the sampling period increases the accuracy of the results.

c) Calculate the BSI for the Project Area and the buffered zone created. The resulting BSI raster must be validated through visual inspection of imagery performed by the Monitor or ground truth data provided by the Project Proponent to find the range of BSI values that accurately reflect only bare soil areas on the ground.

d) Calculate the area covered by bare soil within the Project Area only, using zonal statistics.

e) Calculate the area covered by bare soil within the 10km-buffer area only, using zonal statistics.

f) Estimate the areas covered by bare soil in both the Project Area and the buffer area.

g) Compare the percent bare soil cover between the Project Area and the buffer area and use the scoring chart below to generate a score for ecosystem resilience.

The BSI results from the buffer and project areas must be included in the report.

The scoring method of Ecosystem Resilience using BSI analyses is:

Scoring Category	Score
EXCELLENT: Project Area has a percentage cover of bare soil that is notably lower than the percent bare soil cover in the surrounding zone. The difference is higher than 50%.	1,5
GOOD: Project Area has a percentage cover of bare soil that is lower to the percent cover in the surrounding zone. The difference is smaller than 50% and higher than 20%.	1,0
FAIR: Project Area has a percentage cover of bare soil that is ± 20% of the percent bare soil cover in the surrounding zone.	0,5
NEEDS IMPROVEMENT: Project Area has a percentage cover of bare soil that is higher than 20% with respect to the surrounding zone.	0 (zero – does not apply for methodology

5.2. ECOSYSTEM HEALTH SCORING METHOD

The formula for EH considers the score obtained in each of the parameters arranged in Section 5.1. The table below is a general overview of the scoring system.

Parameters	Acronym	Needs Improv.	Fair	Good	Excellent
Ecosystem Vigor	EV	Not eligible	0,5	1	1,5
Ecosystem Organization	EO	-	2	2,5	3
Improved habitat integrity and connectivity (ecological corridors)	IP	-	2	2,5	3
Protection of riparian forests and water sources	PR	Not eligible	0,25	0,5	1
Ecosystem Resilience	ER	Not eligible	0,5	1	1,5

The equation for EH considers the score obtained in each of the parameters arranged in this chapter:

$$EH = KSH\,x\,\frac{EV+EO+IP+PR+ER}{10}$$

Being,

EH = Ecosystem Health

KSH = Keystone Species Health calculated in Chapter 4

EV = Ecosystem Vigor – section 5.1.1

EO = Ecosystem Organization – section 5.1.2

IP = Improved habitat integrity and connectivity (ecological corridors) – section 5.1.3

PR = Protection of riparian forests and water sources – section 5.1.4

ER = Ecosystem Resilience – section 5.1.5

6. KEYSTONE SPECIES GUIDELINES ASSESSMENT AND APPLICATION

For the implementation and development of this Methodology, in addition to the score and requirements set out in this main overarching document, as per the requirements addressed in Chapters 4 and 5, for KSH and EH, there is the application of specific guidelines for each KS, addressing the complexity and specificity of the challenges that each KS entails.

This chapter presents:

- ✔ Structure of the KS Guidelines, including its indicators.
- ✔ Process of drawing up a KS Guideline.
- ✔ Scoring method for this chapter.

6.1. KEYSTONE SPECIES GUIDELINE STRUCTURE

The KS Guidelines will be developed based on KS-context-specific strategies for KSH and EH, and ESI strategies, as mentioned: (i) Property Management; (ii) Social Engagement; and, (iii) Financial Strategy.

Every Project Plan shall describe a specific Impact Strategy Outline for each Project Activity suggested by the KS Guideline and implemented by the Project Proponent, as shown below. These are duly inserted for guidance in the Project Plan template.

KS Guideline Project Activity	Describe the Project Activities.
Impacted Stakeholders	Describe stakeholders impacted by the Project Activities (ex: local communities involved in ecotourism).
Benefits Provided	Describe the positive impacts of Project Activities.
Impact Timeframe	Describe if the Project Activities have short, medium, or long-term positive impacts.

Table 2 – *KS Guideline Impact Strategy Outline*

The following sections describe in general the rationale of the strategies and their importance.

6.1.1. KEYSTONE SPECIE HEALTH

The strategies listed in the KSH section of each KS Guideline consist specific monitoring strategies for the KS and its prey in the Project Area using technologies such as telemetry, GPS and camera traps, and the reporting of this data to national wildlife datacenters by Host Country, while establishing public and private partnerships with the scientific community.

According to the definition of KS described in section 1.3 of this methodology, the presence of a KS in an area can be considered a good indicator of local environmental quality, so conservation actions for KS and its prey are of great importance to promote ecological balance. The use of new technologies in turn, in addition to reducing costs and time, improve the results of monitoring biodiversity in the field. All these strategies aligned with partnerships with institutions and research projects are important to continue monitoring the fauna, obtaining scientific data and vigor for the project.

It is important to highlight that prey monitoring is a factor considered of significant importance in this Methodology. An ecosystem is formed by a set of communities that live in a given location and interact with each other, that is, the increase or reduction of the population of one or more species of prey can generate or indicate an environmental imbalance, influencing the presence of KS.

6.1.2. ECOSYSTEM HEALTH

EH evaluates the density of vegetation in the property area through strategies such as compliance with environmental legislation, existence of areas of surplus vegetation and ecological corridors and proximity to protected areas.

Habitat fragmentation reduces population size, and the smaller the population size, the greater its vulnerability to extinction. Therefore, measures that reduce habitat fragmentation and/or increase connectivity between fragments of vegetation with a good environmental quality index are so important. Also, the maintenance of native vegetation (especially riparian forests) on the property makes more habitat available for the predator's natural prey.

6.1.3. ENVIRONMENTAL STEWARD INDICATORS

6.1.3.1. PROPERTY MANAGEMENT

Property management is evaluated through a system of continuous improvement of property management that prescribes yearly goals, through general objectives that can be achieved through various practices in the Property Area.

Improving property management techniques can be extremely successful in reducing conflict between humans, communities, and KS. Landowners and Project Proponents can implement specifically prescribed actions to reduce or control conflicts, using best practices that ensure harmony between production, conservation, and land stewardship.

6.1.3.2. SOCIAL ENGAGEMENT

Social Engagement is evaluated through a system of continuous improvement of stakeholder engagement that prescribes yearly goals, through general objectives that can be achieved through various practices in the Property Area.

One of main goals for conservation projects must be to influence local productive economic activity, such as mining, infrastructure, agroindustry, cattle ranching, logging, and their financial agents and communities that are involved in such activities, to adopt social and environmental safeguards that include biodiversity conservation requirements. Therefore, developing social engagement activities is essential to raise awareness amongst diverse audiences and ensure the conservation of the species.

Also, involving local community stakeholders (indigenous and traditional communities, as well as smallholder farmers) is key to addressing long term goals of conservation and KS stewardship practices, for these agents act as the best spokespersons and perpetrators of good and effective local wildlife management.

Community involvement develops the concept of "citizen science" that emerged in the 1990s to designate different aspects of public involvement with science. Since the 2000s citizen science initiatives have grown considerably and incorporated more perspectives of interaction with society by increasing engagement in the challenges of biodiversity conservation and ecosystems.

6.1.3.3. FINANCIAL STRATEGY

Financial Strategy is evaluated through a series of financial indicators that are connected to project objectives. The strategies of this and the organization evaluate whether the project has a reserve of funds for the continuity of actions, the elaboration and implementation of a communication program that mobilizes new funds for the design, development, and implementation of a business plan for ecotourism focused on biodiversity on the property.

6.2. DEVELOPMENT OF NEW KEYSTONE SPECIES GUIDELINES

The first step in developing a new KS Guideline is to check if there is a preexistent KS Guideline uploaded to the Regen Registry. In case there is no KS guideline developed, the step-by-step below should be followed for the development of a new guideline.

Note: It is important to carefully read Section 1.3 of this document to verify that the chosen species represents a KS, according to the requirements of this Methodology.

All new KS Guidelines should be elaborated in a participatory process with professionals specialized in KS, ecology, and biodiversity.

For the preparation of new KS Guidelines, it is suggested and necessary to:

- (i) examine existing KS Guidelines, because some strategies are applicable or adaptable for various KS.
- (ii) perform extensive research and understanding of the chosen KS, to develop the strategies necessary and important to ensure the conservation of KS in the Project Area.
- (iii) develop an impact matrix for the KS Guideline, including an evaluation of all strategies elaborated in relation to the cost and difficulty of implementation and result in the conservation of the species, thus rewarding strategies that have the greatest impact

on each KS specific context. The impact matrix below in Section 7.2.1 is a suggest template for such needs.

6.2.1. SUGGESTED IMPACT MATRIX TEMPLATE

Every new KS Guideline should contain KSH, EH and ESI strategies and adopt the principle of continuous improvement in the development of these strategies over the Project Lifetime. See example below.

It is suggested that the matrix should use at least three parameters for impact assessment, for example cost, difficult and results that will ground the analyses These parameters could be scored as 1 to low and 3 to high score. The average of the parameters will support the establishment of the entire specie guideline aiming to 100 points.

			Impact Assessment				
Indicator	**Criteria**	**Metric**	**Cost**	**Diffic.**	**Resul.**	**Aver.**	**Score**
1. Keystone Species Health Indicator	1.1. Survey of the occurrence of KS in the project area.						
	1.2. Survey and monitoring of KS population.						
	1.3. Establishing a partnership with the scientific community.						
	1.4 Monitoring the KS population through telemetry methods and spatial location with GPS.						
2. Ecosystem Health Indicator	2.1 Assess whether the project area complies with local legislation regarding legal reserves.						
3. Property Management Indicator	3.1 Improving property management techniques to reduce conflict.						
	3.2. Fire management: prevention and combat.						
4. Social Engagement Indicator	4.1 Develop and implement an education and communication program.						
	4.2 Implement a stakeholder relations program with rural assistance and extension agencies.						
	4.3. Establish a partnership with inspection agencies.						

5. Financial Strategy Indicator	5.1 Develop an adaptive management plan.						
	5.2 Demonstrate funding for the project budget.						
	5.3. Implement a communication program to mobilize and increase financial resources.						
	5.4. Implement an Ecotourism Program at the project area.						
						Total	**100**

The score of the KS Guideline should adhere to the following rules:

1. Activities must be carried out for each of the 5 indicators defined in this Methodology: KSH, EH and ESI (Property management, Social Engagement and Financial Strategy).
2. A mandatory activity for monitoring KS.
3. A mandatory activity for monitoring prey of the KS.
4. Each activity can be worth a maximum of 5 points.

After the development of a new KS Guideline, such guideline must go through an audit and verification process by the Regen Network Scientific Community and be submitted to the Regen Network approval process[20].

6.3. KS GUIDELINE SCORING METHOD

The scoring method will be the final score value obtained in the KS Guideline, by adding all the points obtained within each criterion. The minimum score of the guideline must be at least 20% of the total score, which is 100 points.

It is important to address the two obligatory activities described above related to the direct survey on the KS and monitoring on preys.

[20] Accessed at: https://registry.regen.network/methodology-review-process/

7. BIODIVERSITY TOKENS ISSUANCE

7.1. OVERALL SCORING METHOD

The biodiversity token emission will be calculated using the formula below:

<u>Final Number of Tokens Issued</u> = KSH Score + EH Score + KS Guideline Score

It is important to remember that:

KSH Score was calculated at section 4.4.

EH Score was calculated at section 5.2.

KS Guideline was calculated at section 7.3.

The figure below has a scheme of the total biodiversity tokens that is possible to emit.

Figure 5 *Biodiversity token calculation summary.*

7.2. TOKEN ISSUANCE NAME TAGGING

Each token batch, as issued annually or biannually, will be tagged with the specific KS name, and registered on the Regen Registry. Project Proponent may choose any regional or commonly used name for the specific species, for example: jaguar token (in English), <u>or</u> *onça pintada* token (in Portuguese). The different names that are applicable to the KS need to be specified in the KS Guideline.

8. VALIDATION AND VERIFICATION

This chapter presents the general guidelines for the validation and verification process.

The application of this Methodology requires that independent Verifiers determine conformance with the Methodology at two stages: validation and verification.

• Validation is understood as the systematic, independent, and documented process for the evaluation of the Project Plan against the criteria of the Methodology.

• Verification is understood as the systematic, independent, and documented process for the evaluation of the Monitoring Report of the Project Activities and the observance of the validated Project Plan and Monitoring Plan against the criteria of the Methodology.

Verification must be performed at least every two years.

Both validation and verification may be jointly assessed in the first annual or biannual audit, as chosen by Project Proponent.

8.1. DATA SUBMISSION PROCESS

Data collection, for both validation and verification, is handled by the Regen Registry.

a) Data may be collected in the field using any qualified procedure specified in Methodology, including on written report or forms when applicable, web/mobile apps, or directly via autonomous Internet of Things ("IoT") devices.
b) Data will not be considered as submitted until it has been received electronically by the Regen Registry.

8.2. VALIDATION OF PROJECT PLAN

The Verifier will address and analyze the Project Plan as per the submission to the Regen Registry.

8.3. VERIFICATION OF MONITORING REPORT

After each Monitoring Period, a Monitoring Report must be submitted to the Verifier through the Regen Registry. The reported results for each section of this Methodology must be accompanied by all the information that supports them. In the case of GIS or remote sending data, it is required that the maps are included as images within the report for illustrative purposes. The original vector and raster files must be kept by the Project Proponent.

8.3.1. DATA VERIFICATION

For each data sample selected, the *Verifier* should verify the veracity of the data based on the type of data submission. The Verifier will sign the data sample indicating that it meets the requirements in one of the following types of data indicators:

8.3.1.1. KEYSTONE SPECIES HEALTH

Refer to this Methodology <u>and</u> the KS Guideline to assess KSH as per the Monitoring Report.

8.3.1.2. ECOSYSTEM HEALTH

Refer to this Methodology and the KS Guideline to assess EH as per the Monitoring Report.

8.3.1.3. ENVIRONMENTAL STEWARDSHIP INDICATORS

a) Property Management

Review property management scores in the KS Guideline and analyze evidence provided to ensure the requirements were met.

b) Social Engagement

Review social engagement scores in the KS Guideline and analyze evidence to ensure the requirements were met.

c) Financial Strategy

Review financial strategy score in the KS Guideline and analyze evidence provided to ensure requirements were met.

9. BIODIVERSITY CLAIMS AND TOKEN RETIREMENT RULES

This chapter describes the general rationale behind how the biodiversity tokens are retired and their nature as digital assets representative of specific attributes of biodiversity conservation, more specifically, KS stewardship activities.

9.1. NATURE OF THE TOKENS

Biodiversity tokens, as per the guidelines of this Methodology, are not credits, therefore, cannot be used as "compensation" for environmental impacts, for legal/regulatory purposes or not. They do not, in any form, represent a biodiversity net gain in the Project Area or any kind of surplus.

The biodiversity tokens herein described are representative of environmental stewardship, more specifically, KS stewardship activities, meaning they showcase the virtues of specific Project Activities that have a net positive impact on a KS of a given ecosystem.

9.2. TOKEN RETIREMENT RULES

Despite some of the aforementioned points regarding the nature of the tokens, they are still subjectable to retirement. Tokens might be held by end-users or not. A party might choose to hold the tokens in the Regen Registry in order to sell them at a later period.

Nevertheless, any end-user buyer that is making a Biodiversity Claim, with regards to the acquisition of the tokens, will need to necessarily retire them and Project Proponent or Seller shall burn them on the Regen Registry.

Biodiversity Claims shall be deemed effective on one or more of the following scenarios:

- a Claiming the acquisition of the tokens and the financing of Project Activities represent investments of the company in SDG 13 or 15, "climate action" or "life of land", respectively.
- b Claiming the acquisition of the tokens and the Project Activities on any biodiversity, nature or ecological disclosure agency or organization, public or private, ex: B-Corp Impact Assessment or Taskforce on Nature-Related Financial Disclosures.
- c Claiming the acquisition of the tokens and the financing of Project Activities on the company´s sustainability report.

The Project Proponent, when selling the Project´s biodiversity tokens, shall mandatorily inquire buyers if a Biodiversity Claim is being made or shall be in a predictable future. If the tokens are not to be immediately retired by Project Proponent upon an event of a sale, Project Proponent shall sign a legally enforceable instrument with buyer in which he declares he is just a trader or intermediary and retirement shall be done in the future on behalf of third party. This responsibility shall be deemed in force and applicable to new owner in the moment the token´s ownership is changed in the Regen Registry.