REGEN REGISTRY

ERA Biodiversity Stewardship Token Review

Expert Review R1

R#2

June 29, 2023

CONTENT referenced by reviewer's comment *e.g. Section number + paste exact text*	**REVIEWER'S COMMENT** *Please paste the comment from the reviewer*	**AUTHOR'S RESPONSE** *Please describe how the comment was addressed and include new content in quotations*	**Reviewer's Conclusion** [PASSED/ REJECTED *WITH COMMENTS*]
e.g. 2.1 - "approximately 25%	***e.g. Replace** with "adequate"*	*e.g. This was changed to **"The majority of the material must have a moisture content of 25% or less, as measured in the field."***	*PASSED*
1.1 - Habitat area	***Why does "habitat" include only forest? It should likely include other biomes used by jaguar including grassland, wetland, etc.***	The Habitat area definition was updated in according to Krausman & Morrison (2016): "*The Habitat Area is defined as any spatial boundary where the resources and conditions present in an area produce occupancy, which may include survival and reproduction by a given organism. Habitat is organism-specific and is more than vegetation or vegetation structure*".	*PASSED*

1.3 - "The interactions between these elements of an ecosystem are called ecosystem functions and these functions generate ecosystem services."	***The interactions themselves are not functions, but the interactions are responsible for functions. Also, typically "interactions" refers to biotic ones, not those with abiotic elements. I'd rephrase like this: "Interactions between organisms are responsible for ecosystem functions, which generate ecosystem services."***	Done as suggested.	*PASSED*
1.3 - P4	***Start new sentence after "compensated"***	Done as suggested.	*PASSED*
1.3 - Fig 1	***Please add a reference to Fig 1 in the text***	Updated reference.	*PASSED*
1.4 - P1	***Please remove "flora and fauna" because it is limiting (does not include fungi, bacteria, etc.)***	Done as suggested.	*PASSED*
1.4 - P1	***Change to "However, within this network"***	Done as suggested.	*PASSED*
1.4 - P2 - "The USp can be used to … determine the composition, structure, and process of ecosystems."	***How can USp be used to determine composition, structure, and process of ecosystems? In my mind, conservation of the USp helps conserve other species, but the USp themselves cannot help determine anything about the ecosystem. Perhaps the presence of the USp can be correlated with ecosystem functions, etc., but as the ranges are usually big I am not so sure, as they***	Deleted phrase - not applicable	*PASSED*

	will overlap with many ecosystems and no particular correlations should be very strong. Also, what does "process of ecosystems" mean? I am not familiar with this term.		
1.4 - P3 - "Most of the USp are included on the Red List …"	***How do we know this? Are all USp recognized? I doubt we have a list of all USp (aren't we still deciding new ones?), so this statement would be overreaching a bit. I would say, "Many recognized USp are included in the Red List..."***	This sentence was removed and the text changed.	*PASSED*
1.4 - P3 - "Therefore, their conservation includes…"	***Rephrase to: "As they tend to have large ranges, protecting endangered USp also indirectly conserves the habitat of many other species."***	Done as suggested.	*PASSED*
1.4 - P4	***We have not established that USp are good indicators of env quality. At least one sentence should establish this.***	Done as suggested.	*PASSED, but now you have quality 2 times in this sentence — please rephrase.*
1.4 - P4 - "However, the bottleneck…"	***The bottleneck is the sustainability? This sentence needs to be rethought because I don't think it makes much sense as written. Please be clear about what you are trying to say.***	The sentence was updated.	*PASSED*
1.4 - P6	***All of a sudden, many acronyms are***	Done as suggested.	*PASSED*

	used that were not introduced. Please define these acronyms first. Even though they are listed in the beginning of the doc, you need to define them in the text to keep the reading smooth and avoid confusion.		
1.4 - P12	***Please hyphenate when you use two nouns as an adjective (e.g., "technology-driven monitoring").***	Done as suggested.	*PASSED*
1.4 - P13	***Here is a list of data-collection techniques, but it ends with the things you observe and not the technique that gets the data (i.e., the observation itself). Rephrase the end to: "observation of footprints and birth dens and nests".***	Done as suggested.	*PASSED*
1.5 - P2	***This is not an accurate definition. I think you mean, "an organism that acts as a representative for the entire ecosystem."***	Yes, rephrased as suggested.	*PASSED*
1.5 - P2 - "Therefore, USp promote…"	***Rephrase to: "Conservation actions targeting the USp help promote functional diversity of the ecosystems within its range and thus improve ecosystem service provisions."***	Done as suggested.	*PASSED*
1.5 - P3	***Rephrase to: "The USp focused on for this methodology are birds and mammals listed in the IUCN Red List***	Done as suggested.	*PASSED*

	with the following conservation statuses:"		
1.5 - P5 - "...since these tend to have a wide variety of environements…"	***Rephrase to: "since these tend have large ranges that encompass a wide variety of environments"***	Done as suggested.	*PASSED*
1.6 - P1	***Change to "and is characterized by two activities"***	Done as suggested.	*PASSED*
1.6 - P3	***Why only photographic evidence? Why is scat or fur only secondary? Some species are hard to detect, so scat or fur collection, etc., may get a positive hit more quickly. These also have associated coordinates.***	The paragraph was updated to include other evidence besides photographic.	*PASSED, but fix "photographi evidence" — missing a "c"*
Fig 3	***Please use "USp" for umbrella species as in the text. Also, if photographic evidence is mandatory, please be clear in the diagram that other kinds of evidence are secondary (they are now all lumped together).***	Figure 3 and section 1.6 were updated to clarify this item.	*PASSED (but remove space in "aforementione d")*
3.1 - Habitat area	***Again, the restriction to forest is a bit limiting. Habitat should be defined according to the requirements of the USp, which may include other biomes (e.g., beavers need wetlands and forest), forest in specific growth stages (i.e., some species prefer secondary forest, others need old-growth), etc.***	The Habitat area definition was updated in according to Krausman & Morrison (2016): "*The Habitat Area is defined as any spatial boundary where the resources and conditions present in an area produce occupancy, which may include survival and reproduction by a given organism. Habitat is organism-specific and is more than vegetation or vegetation structure*".	*PASSED*

3.2 - P3 - "Therefore, the proposal to submit monitoring reports in short periods of time (annual or biannual) …"	***What do you mean by "short periods of time"? Annual or biannual monitoring leads to low-frequency data, and involves long periods of time, but is more cost-effective (effort and money). However, with camera traps or drones, annual / biannual monitoring is much too low for a minimum — it is very easy to get weekly or monthly data using these methods. I'd encourage higher frequency monitoring. Also, I would say "Monitoring and Verification frequency must be at least annual or biannual." This may encourage landowners to monitor more as they see fit, which can only lead to higher detection rates.***	In Section 3.2 we are referring to the submission of Monitoring Reports for the issuing of credits, which can occur annually or every two years. The implementation of fauna monitoring actions is described in chapter 4.	*PASSED*
4 - P1 - "Ecology defines individuals as being of the same species."	***Not sure what this is supposed to mean. Do you mean "Individuals identified as the focal USp are considered to be of the same species (i.e., not subspecies of different genetic lineages)."? If so, change to this wording please.***	Deleted phrase - not applicable	*PASSED*
4 - P2 - "All the data produced…"	***Rephrase to: "All the data produced on USp shall be reported …"***	Done as suggested.	*PASSED*
4.1 - P2 - "It can be used…"	***Change to "They can be used…"***	Done as suggested.	*PASSED*
4.1 - P4	***"Presence or absence" and "size of the population" should be***	This was changed in the document as suggested.	*PASSED*

	categorized under the "Species populations" EBV, not "Species traits". Therefore, please add "Species populations" to the list of EBVs you are collecting.		
4.1.1 - P1	***I really think that you should specify the growth stage or disturbance level of the forest, because "native forest" could be recent regrowth after clearcutting, which would be not amenable to many species as suitable habitat.***	This paragraph was updated: "This methodology considers that an eligible Habitat Area can include all the useful areas of the USp in different biomes and in the specific growth stages of the vegetation: ●Native vegetation in an old-growth stage. ●Water resources. ●Regenerative agroforestry systems. ●Natural or assisted regenerating areas in a regrowth stage (young forest) or in a canopy transition stage (mature forest). ●Ecological corridors."	*PASSED (but change "This methodology considers that an eligible Habitat Area can include all the useful areas…" to "all the suitable areas…")*
4.1.1 - P3	***Viewing satellite imagery alone usually cannot determine the growth stage of the forest. This data should be supported by on-the-ground measurements of metrics like canopy cover, total edge length, etc. that can describe how disturbed forest is. Under these criteria, a very disturbed forest could qualify as "habitat".***	Growth forest stages can also be classified using remote sensing and land use and cover databases. On-site data collection is not necessary to understand vegetation dynamics over time. In this Methodology, the characterization of the Habitat Area must be presented through remote sensing by satellite images in association with Environmental Information Vector Database. The date of the satellite images should be as	In that case, please add one sentence explaining *how* forest growth stages will be identified with remote sensing images and land use/cover

		close as possible to the project start date (≤ 6 months) and high resolution (minimum of 0.30 centimeters, maximum of 15 meters).	data.
4.1.1 - P8 - "Remote sensing with…"	***Please also define the maximum resolution, which should probably be about 100 m or so.***	This paragraph was updated: "Remote sensing with current satellite images (≤ 6 months) and with good spatial resolution (minimum of 0.30 cm, maximum of 30 meters) should be used to identify the areas."	*PASSED*
4.1.2	***As stated earlier, this section should be "Species populations".***	This was changed in the document as suggested.	*PASSED (but change "associated with a geographic coordinate" to "with geographic coordinates")*
4.1.2.1	***This section should be called "Presence / absence data".***	This was changed in the document as suggested.	*PASSED*
4.1.2.1 - P3	***Earlier you said that only photographic evidence will be considered as proof of presence, but here, data on presence is expanded to include many more observation types (which is recommended). If these data types are also proof of presence, that negates what was***	Confirmation of the USp presence may be obtained via many types of accessible methods associated with a geographic coordinate, such as camera-traps, drones, radio/GPS collars, bioacoustics and/or field samples such as feces	*PASSED*

	written earlier. In my opinion, they should be accepted as proof of presence, or at least some established frequency of their detection.	collection, fur-traps, identification of footprints and birth dens/nests. This requirement was updated in the section 1.6.	
4.1.2.1 - P4 - "After this period…"	***From this, I understand that failure to detect the species for up to 2 years is permitted within this program, and the landowner can still receive credits. With annual or biannual sampling frequency, perhaps this should be permissible for species that are hard to detect, but with high-frequency sampling, no detection for 2 years with camera traps, etc. likely means the species is locally extinct or has moved elsewhere.***	Two years is a reasonable time period to allow for the lack of photographic evidence of the species.	*PASSED*
4.1.2.2 - P1 - "The larger its population…"	***Genetic diversity of populations can also be maintained through admixing with other populations connected through dispersal, so it might be worth mentioning that population connectivity is also important to prevent local extinctions.***	This consideration was included in the paragraph.	*PASSED (but remove "The" from "The population connectivity")*
4.1.2.2 - P5	***Although telemetry can help estimate population size, I would focus more on approaches that do not necessitate capturing individuals because these can require much less***	Done as suggested.	*PASSED*

	field effort. I would rephrase to: "Captured individuals can be fitted with radio collars, etc., and monitored via telemetry to track movement and improved population estimates. Other alternative approaches for determining population size that do not require capturing individuals can use drones, camera traps, or other high-frequency detection methods. These approaches can produce robust estimates for species that are difficult to detect, but also involve statistical modeling."		
4.1.2.3 - P1	***Please rephrase to: "Movement is necessary for animals to find resources, compete for territory, escape from predators, search for partners for reproduction, and scout for new habitat."***	Rephrased to: "Movement is an elementary process in the life of birds and mammals. Animal movement is motivated by complex interactions of internal and external factors, including food availability, reproduction and risk avoidance, variation in the sex ratio of the population as well as seasonal or annual changes in biotic and climatic features might influence average movement speeds" - *Nathan, R., Getz, W. M., Revilla, E., Holyoak, M., Kadmon, R., Saltz, D., et al. (2008). A movement ecology paradigm for unifying organismal movement research. Proc. Natl. Acad. Sci. U. S. A. 105, 19052–19059. doi: 10.1073/pnas.0800375105*	The current phrasing of the first sentence is not especially informative. Please rephrase to something like this: "Movement is an integral process to consider when monitoring animals,

			particularly for birds and mammals with large home ranges."
4.1.2.3 - P4 - "and what their natural habitats are."	***Rephrase to: "and what relationships they have with the environment that characterize their habitat preferences. Movement is typically measured via telemetry, which requires capture of individuals and application of tracking devices." And after "allow its survival", please add: "Movement of large animals in some habitats can also be monitored with drones or through other forms of remote sensing (e.g., aircraft, satellites)."***	Done as suggested.	*PASSED*
4.1.2.3 - P6	***Rephrase to: "Statistical modeling can be used to estimate range size and habitat preferences based solely on species' occurrence data and environmental variables. Species distribution models can make predictions of habitat suitability for areas and times with no current samples based on estimated relationships between the environment and species' occurrence."***	Done as suggested.	*PASSED*

4.1.2.3 - P7	***Rephrase to: "Species distribution models are typically built with machine learning algorithms that estimate ecological niche relationships between environmental variables (e.g., climate, topography, soils, vegetation cover) and species' occurrence data. Based on existing data, these models can predict the potential distribution of species in a given area of interest, and can even make predictions for areas (and times) with no available sampling data based on the environmental conditions there. Species distribution modeling has many current applications, including estimation of range extents and area for conservation of rare species, prediction of climate change or land-use change impacts to species' ranges, and forecasting invasion potential of alien species."***	Done as suggested.	*PASSED*
4.1.2.3 - P8	***Rephrase to: "Species' occurrence data for species distribution modeling can be collected via direct observations; camera traps; detection of scat or fur, etc.; or via online biodiversity databases."***	Done as suggested.	*PASSED*
4.1.2.3 - P9	***Rephrase to: "The aforementioned mandatory parameters should be implemented throughout the Project***	Done as suggested.	*PASSED*

	Timeframe, so that by the end of the Project, all parameters …"		
*4.1.2.3 - P10 - "**... new strategies implemented, so that by …"***	***Rephrase to: "... new strategies implemented, and that by …"***	Done as suggested.	*PASSED*
4.2.1 - P1 - "has grown in recent times … "	***Rephrase to: "has grown in recent times because it is a noninvasive and cost-effective technique that provides reproducible and high-frequency monitoring data, and it also allows for observation of natural behavior."***	Done as suggested.	*PASSED*
4.2.1 - P1 - bullet 1, 2	***Remove initial "The"***	Deleted phrase - not applicable	*PASSED*
4.2.1 - P2 - bullets	***This section seems redundant with previous section. My suggestion is to remove it, or move all these descriptions from P1 to here.***	This section has been updated. The advantages of using trap cameras for monitoring were included, as well as the usage guidelines of the equipment applied to obtaining the parameters to be monitored.	*PASSED*
4.2.1 - P3 - "for a given type of animal"	***Rephrase to: "for a given species"***	Done as suggested.	*PASSED*
4.2.1 - P3 - "to identifying what camera trap…"	***Rephrase to: "to identifying which camera trap…"***	Done as suggested.	*PASSED*
4.2.1 - P3 - bullet 3	***Rephrase to: "For camera-trapping in trees…"***	Done as suggested.	*PASSED*
4.2.1 - P3 - bullet 4	***Why are ectothermic species in particular hard to detect with***	Rephrased to: "Ectothermic species remain a challenge for most commercial camera traps, as	*PASSED*

	camera traps? This can be made more clear.	they traditionally rely on detecting animal movement through temperature variations. Therefore, specific methods, such as deploying them at particular times of the day or using time-lapse, must be combined to overcome this limitation. A more effective alternative could be a direct-trigger setup, such as an active infrared sensor or a pressure pad".	
4.2.1 - P3 - bullet 9	***I would focus this more on using a good sample design structure. Rephrase to: "It is recommended to use a robust sampling design to capture species detections in a structured way. This design can inform the minimum number of camera traps necessary for a given area and how far apart they should be spaced to avoid pseudoreplication. Considerations of effort required to install, move, and collect cameras in the field is recommended."***	Done as suggested.	*PASSED*
4.2.2 - P2 - "These data provide …"	***Merge these two sentences: "These data provide the opportunity to answer questions about the behavior and ecology of animals, and can be used to measure population parameters."***	Deleted phrases - not applicable	*PASSED*
4.2.3	***Unlike previous sections, the benefits of this technique are not highlighted.***	This section has been updated. The advantages of using drones for monitoring were included, as	*PASSED*

	Please add a sentence or two explaining why drones can be beneficial compared to other monitoring approaches.	well as the usage guidelines of the equipment applied to obtaining the parameters to be monitored.	
4.2.3 - P1	***Rephrase to: "Currently, drones are used as an important monitoring tool in biodiversity and conservation studies. The use of this technology…"***	Done as suggested.	*PASSED*
4.3 - Table	***The fact that only presences are awarded with points seems problematic — recorders would thus be tempted to present presence data only and not absence data, which can be just as valuable. I would suggest awarding points for presence or absence data taken at regular intervals. If there are no presences for over two years, the species is declared absent anyway, so awarding good absence-data collection makes sense.***	The presence/absence data will be collected in each monitoring period and recorded in their respective Monitoring Report. But just the presence will receive point because it is a proof that the management of the Property Area is benefic for the permanence of USp in this area.	*PASSED (okay, understood)*
4.3 - Table	***Are points awarded per year? What is the timeframe of these points?***	All calculations must be done per year even though the verification can be annually or every two years. Section 7.1 was updated.	*PASSED*
4.3 - Table	***How is "Movement" defined here? Can this be measured with camera traps, or only with drones or telemetry? If the latter, some stakeholders without the necessary resources or time (getting experts for***	Movement is defined by the animal's behavior (foraging, resting, and walking) based on tracking data. The USp monitoring methods can be chosen by	*PASSED (thanks for the added text and explanation)*

	application and permits, etc.) would find it very difficult to get movement estimates. Further, this also encourages taking telemetry data on all individuals observed, which can be very invasive. Have you considered these points in your proposal? ***Also, there is no "CA" in the formula, so it should probably be removed. Are consolidated areas or how to measure them included in Section 4?***	the Project Developer and Project Proponent according to the available financial resources and workforce. It is suggested to apply traditional fauna monitoring methods associated with technological techniques. Camera traps, telemetry or drones can be used to determine the Movement of the USp. More details of monitoring methods of the Movement can be found in section 4.2. Compliance with the Movement and Distribution parameter is mandatory as of the third year of monitoring. "CA" was removed from the text and the scores table. The guidance of how to measure Consolidated Area was described in the 4.1.1.1 Ecosystem Distribution.	
5	***Generally, Section 5 is called "Ecosystem Health", but measuring abundance of one taxon and assessing disturbances is hardly estimating "ecosystem health", which is not a technical term anyway. Something more appropriate would be called "Habitat Quality" and it would measure things like canopy cover (taken from satellite imagery or ground observations), mean DBH of trees, animal abundance and diversity to some extent (this can be***	The Chapter 5 was updated. Please, see the new version of the document. The name chapter was changed to "Habitat Quality". The characterization of the Habitat Quality metrics is according to parameters stablished in the Pereira et al. (2013). That is, the Essential Biodiversity Variables (EVBs) article serve as a guideline to choose which variables can be used to evaluate the Habitat Quality through the Community Composition and Ecosystem Functioning.	*PASSED*

	carried over from the existing framework but should include other taxa besides mammals, especially insects), water quality, number of forest patches and their mean edge length, etc. These metrics are not particularly difficult to measure (can definitely be taken by non-scientists using basic field methods and satellite images or aerial photos) and when combined, would be a good proxy for habitat quality, which I think is really what we want to know. Getting evidence of the aftereffects of natural disturbances and how quickly the vegetation and animals recover is more often called "ecosystem resilience", and this should be included as well when necessary, but disturbances should happen relatively infrequently and thus should not be too costly to document. In sum, this section should include more measurements to get a proper ecosystem assessment and make it match Section 4's level of detail.	In this Methodology, Community Composition will be determined by the taxonomy diversity, and the Ecosystem Functioning per ecosystem disturbances. More details can be found in the updated document. The application of this Methodology will be evaluated again after testing in some pilot projects. If the need to insert new monitoring metrics is verified, the document will be updated.	
5 - P2	***Rephrase to: "Ecosystems are composed of ecological communities and the physical and chemical elements they use and interact with, which include water…"***	Deleted phrase - not applicable	*PASSED*

5.1.2	***This subsection is called "Community abundance" but does not discuss how to measure abundance, nor does it seem to award points based on measurements of abundance. I am also not sure what "community abundance" means and how it relates to species richness and temporal dynamics. Is it total abundance of all species? Mean abundance of some chosen taxa? Also not sure why community abundance is used here as a proxy for community composition. The latter is much easier to get than abundance, so why is a proxy for it used that is more difficult to acquire? Also, surveying only mammals is a bit of a stretch when the goal is to survey the "ecosystem", especially when other low-cost survey methods exist for other taxa like birds and insects.*** ***This subsection begins by discussing the importance of measuring species richness and temporal dynamics, but does not say that these must be measured at the end. The points are awarded for "survey of fauna in the area". This is much more vague than the explicit instructions in Section 4, and seems to overlap with Section 4 requirements. Species richness and***	This section was updated to "Taxonomic diversity". Taxonomic diversity is quantitatively measured using two parameters: 1) species richness, that is, the number of species, and 2) diversity of species, that is, indices that describe the relationship between richness and the distribution of relative abundance of species in the habitat area. Diversity indices assess, in addition to richness, the dominance or rarity of species in the community. This Methodology considers mammal species inventory mandatory to determine the taxonomic diversity. Other groups inventories are optional, for example, arthropods, fish, birds, insects, reptiles, amphibians, can be sampled to estimate the taxonomy diversity of the community. Taxonomic diversity in this Methodology must be determined through the calculation of species richness and by some diversity index of the inventoried species. There are several methodologies to sample each group based on approaches from the scientific literature. Techniques include direct observations by the sighting and listening the animal, and/or indirect evidence by the traces	*Section 5.1: please clarify the difference between "community composition" and "community structure". Otherwise, PASSED.*

	temporal dynamics (collection of time-series data for multiple species) can be estimated with data collected in Section 4. For example, presence-absence data on species can be combined to get richness estimates, and telemetry/camera traps can be used to get time-series data. ***Please reassess what this section focuses on and what kinds of new sampling are required to get that data. If the change from Section 4 to 5 is ecological scale from species to communities, this subsection should focus on biodiversity (species richness, community composition), and maybe include community dynamics (how patterns of presence / abundance change for multiple species over time). This should not require new surveys, but should use data collected in Section 4 as long as it is appropriate (time-series data for dynamics, etc.). If instead this focuses on abundance, whereas Section 4 was simply presence, you need to explain how to sample abundance (this was not covered in Section 4). Also see my idea for renaming this whole section "Habitat Quality" and adding some measurements (above).***	such as feces, fur, feathers, nests, footprints. More details about monitoring methods can be found in the section 4.2 of the Methodology. The minimum sampling effort must be 5 days in each seasonal climatic period. The fauna inventory can be carried out by researchers or specialist professionals together other collaborators, such as, indigenous peoples and people with knowledge of local nature. The report must contain the methodology used for the survey and all results of the taxonomic diversity in the community inventoried. All these information must be included in the Monitoring Reports. The species inventoried must be classified in according to conservation and endemism status in a global and local scale. The IUCN Red List of Threatened Species and official state lists (according to the legislation of each country) can be used to do this classification. These data are of great relevance for the creation of protection and conservation areas. The results must be included in the Monitoring Reports.	

	Another important question is how does the sampled community relate to USp? They are part of the mammal community, but are stakeholders meant to sample all other mammals too? Some of these mammals? Do all Usp constitute the community? Or are other mammals included too? What is not clear is whether "community" here means "all USp" or "all mammals".		
5.1.2 - P1 - "a set of animal and/or plant species"	***Rephrase to: "a set of species"***	Done as suggested.	*PASSED*
5.1.2 - P1 - "the number of species it includes."	***Add:*** *""the number of species it includes, called species richness."*	Done as suggested.	*PASSED*
5.1.2 - P2 - "how diverse the local ecosystem is, to define the food structure and to know the consumer/predator relationship."	***Rephrase to:*** *"how diverse the ecosystem is and how consumer/predator relationships are defined."*	Done as suggested.	*PASSED*
5.1.2 - P4	***Merge sentences two and three like this: "As some regions have well-defined seasons such as wet and dry (tropical) or hot and cold (temperate), faunal surveys should be carried out to collect samples under these varying conditions to best characterize the dynamics of the community."***	Done as suggested.	*PASSED*

5.1.2 - P5	***Rephrase to: "Change over time of factors such as availability of water, food resources, and breeding sites influences species occurrence and population sizes. Understanding these linkages can help us estimate the dynamics of the community."***	Done as suggested.	*PASSED*
5.1.2 - P6 - "and can address…"	***The jargon here is not necessary. I would rephrase to: "and can target different groups of animals, for example arthropods, fish, birds, reptiles, amphibians, or mammals."***	Done as suggested.	*PASSED*
5.1.2 - P6 - "These fauna studies"	***Rephrase to: "These faunal studies"***	Done as suggested.	*PASSED*
5.1.2 - P7	***Rephrase to: "Although all species are important to biodiversity, the methodology considers mammal surveys mandatory. However, other groups can and should be sampled, and the results can be included in monitoring reports."***	Done as suggested.	*PASSED*
5.1.2 - P8 - "There are several…"	***Rephrase to: "There are several methodologies to sample each group based on approaches from the scientific literature."***	Done as suggested.	*PASSED*
5.1.2 - P9	***What is "Plots of sand"? This is not a term I am familiar with. Is this for collecting footprint data? Please be more specific here.***	Yes, it is a method to collect footprint data. Sand plots are small areas filled with sand. See more details on page 11 of this document:	*PASSED*

		https://repositorio.unesp.br/server/api/core/bitstreams/774d6ea5-cdf8-4711-835a-e5619ca2c887/content	
5.1.2 - P10	***If vulnerability and presence of endemic species is important to include, you need to provide guidelines on how to measure them, similar to Section 4.***	Guideline was included: "The species inventoried must be classified in according to conservation and endemism status in a global and local scale. The IUCN Red List of Threatened Species and official state lists (according to the legislation of each country) can be used to do this classification. These data are of great relevance for the creation of protection and conservation areas. The results must be included in the Monitoring Reports."	*PASSED*
5.2.1 - P2 - "To be characterized…"	***Rephrase to: "To be characterized as a disturbance, the event needs to be abrupt, compared to gradual changes like seasons." (Seasonality also occurs in the tropics)***	Done as suggested.	*PASSED*
5.2.1 - P3 - "insects"	***Change to: "insect outbreaks"***	Done as suggested.	*PASSED*
5.2.1 - P4 - "Ecosystems are also affected by humans…"	***Rephrase to:*** *"Ecosystems are also affected by humans, and examples are pollution, …."*	Done as suggested.	*PASSED*
5.3 - Table	***How is community abundance consolidated into a single number? Is it the measurement of all monitored mammal individuals? This was not***	The community abundance was substituted per taxonomy diversity of the inventoried community. Taxonomic diversity must be	*PASSED*

	explained. Also, how to measure CA or what it means was not explained thus far to my memory.	determined through the calculation of species richness and by some diversity index of the species. The CA represents the Consolidated Area and this parameter was deleted of the equation.	
6.2.1.2 - P4 - "perpetrators"	***Change to: "enactors"***	Done as suggested.	*PASSED*
6.2.1.3 - P1 - "The strategies of this…"	***What does "this" refer to here?***	Rephrased to: "These strategies evaluate whether the project...". Now "these" refer to "Financial Strategies ".	*PASSED*
6.3.1	***It is not clear how "cost", "difficulty", and "results" are to be scored. What is the scoring method here?*** ***Also, how is the final score calculated? It seems each parameter can be scored between 1 and 3, and the average is taken of them, but then how is "score" calculated per row? There seems to be no explanation of this.*** ***Also, is rounding down for the average the best strategy? For example, in the Jaguar case, the average of 3, 2, 3 is 2, whereas it actually is 2.67, which is closer to 3. This way, stakeholders can only get an average of 3 if they have all 3's, else the average bumps them all the***	Section 6.3.1 was updated to clarify these items. Also, the Jaguar US Guideline was also updated to clarify these items. The Guideline document was updated to round the numbers up. The descriptions of the steps were also updated to clarify the need for rounding up.	*PASSED*

	way to 2. It would be better to consider decimals. ***Please do not abbreviate the column names if possible. "Diffic." and "Resul."may be confusing.***		
7.1	***"Ecosystem" is misspelled in the figure. Also, change "emit" to "acquire".***	"Ecosystem Health" was changed to "Habitat Quality". "Issue" is used to describe the action of the issuer, and "acquire" is used to describe the action of the person obtaining the biodiversity credits, which could indeed be the final buyer or "user" of the credits. So, we kept "issue".	*PASSED*
9	***"Tokens" is not capitalized everywhere in this section. Should it be? It is in some places.***	Not applicable – "token" was changed to "biodiversity credit".	*PASSED*
9.2 - P2	***Is "burn" the proper term to use for destroying Tokens?***	"Burn" is not an appropriate term, we changed it to "retire".	*PASSED*
9.2 - P4	***Again, I am not a lawyer, but the phrase "sign an instrument" strikes me as odd. Is this the preferred terminology?***	Based on the feedback, the expression "sign" was changed to "execute".	*PASSED*
Jaguar assessment			
P1 - Distribution	***Better to use the geographic terms Central and South America, and not ethnogeographic ones like Latin***	Rephrased to: "Currently the jaguar is officially extinct in the United States, exceedingly rare in Mexico, yet can still be found in Central and	*PASSED (but perhaps mention that*

	America that may or may not include key regions of the range (e.g., Guyana). Also, why the focus on Brazil? Is the jaguar particularly abundant there? If so, please state that.	South America, notably in Brazil, which boasts the world's largest population of jaguars".	*reintroduction efforts are underway in the US)*
P3 - Property Management	***Change "get extinct" to "go extinct"***	Done as suggested.	*PASSED*
P3 - Social Engagement	***"One of the main goals"***	Done as suggested.	*PASSED*
P4 - Social Strategy	***What is an "overlap of land use"? Not familiar with this term and it's unclear what it refers to.***	The terms were corrected to make the concepts clearer. The overlap of land tenure rights or ownership occurs when there is more than one owner with a legal or customary right of land use. It is common in countries like Brazil, which has a history of land acquisition based on grabbing and disputes. In relation to this methodology, overlapping land tenure rights can affect the longevity of the project, or lead to conflicts that undermine habitat conservation. Therefore, legal measures (such as land document analysis) and social measures (such as stakeholder engagement) must be taken to ensure that there are no overlapping land tenure rights.	*PASSED*
P4 - Section 3	***Change "criterion" to "criteria"***	Done as suggested.	*PASSED*
	Change to: "And the documents/materials that provide evidence of the activities and support decisions for scoring".	Done as suggested.	*PASSED*

	Change to: "With the average calculated for each activity, the score is estimated". ***There is no explanation how score is estimated.***	Section was updated.	*PASSED*
	Change to: "...of the activities below, where three of these activities are mandatory: ..."	Done as suggested.	*PASSED*
	Change to: "It is expected for the project to have procedures to establish continued improvement strategies..."	Done as suggested.	*PASSED*
	Change to: "... that the final score in subsequent monitoring periods be..."	Done as suggested.	*PASSED*
P5	***In these sections, the tense changes from, for example, "Use ..." to "Using ...". Please stick to one tense.***	Verb tense was maintained only in the infinitive.	*PASSED*
P6 - 2.1.b	***Change to: "the plan includes..."***	Done as suggested.	*PASSED*
3.1	***Change to: "shapefiles". What is the difference here between "polygons" and "shapefiles"? Does "polygons" mean something that is not electronic data? Please specify.***	Rephrased to: "Report using shapefiles", since a polygon is one of the features of a shapefile.	*PASSED*
4.1.a	***Change to: "especially for big cats..."***	Done as suggested.	*PASSED*
5.1	***5.1.a - 5.1.c seem to contradict each***	Phrase updated to clarify the item.	*PASSED*

	other. Which is it? Does this project have enough money or not enough money?		
5.3.a	***There are only two big cats in Brazil (jaguar and puma), so perhaps change to "focus on the sighting of wild cats".***	Rephrased to: "focus on the sighting of big wild cats".	*PASSED*
Notes	***The only example for jaguar seems to be the "USp Guidelines", but there are none for "USH Score" and "EH score". It seems stakeholders need all three to calculate how many biodiversity tokens they get. Why are there no examples of the other two?***	The scoring method for USH and EH are found in the main methodology document. The guidelines are species-specific - and as for now -the only one available is the Jaguar Guideline.	*PASSED*

Expert Peer Review:

Reviewer's Blind Review Comments to Methodology Authors

The review should provide feedback on the validity of the methodology.

REGEN
REGISTRY

Kindly enter your comments based on these questions in the table below. Also, if referencing specific text, please include text excerpt or row/page no. from the methodology for ease of reference by the methodology authors. All reviewer comments will remain anonymous unless you choose to be named.

Is the methodology clearly written with adequate detail for implementation?	Some parts are clear, while others are either too vague, lacking essential details, or seemingly misguided. Section 5 in particular lacks key details necessary for on-the-ground implementation, the metrics measured are defined only loosely, and the metrics themselves don't seem to reflect accurately what is actually of interest (habitat quality). Section 4 has more methodological detail, which will aid implementation, but it still seems like a big list of things one can do with no guidelines as to which may be preferable for which systems and stakeholders (e.g., considering available funds and human power). Section 6 does not seem to include the scoring method for "cost", "difficulty", and "results", and it's also not clear exactly how the final score is calculated. Please see my detailed comments.

Is the underlying foundation of the methodology clear?	The underlying foundation of assessing an umbrella species and its habitat, and then scoring how well this was done, is clear enough.
Is the methodology feasible?	This is hard to say because the methodology lacks sufficient detail, and especially because the jaguar example provided no examples of how Sections 4 or 5 are to be implemented and scored.
Will the proposed methods achieve the results defined in the methodology?	In general, if the umbrella species (presence, abundance if possible) and its habitat (surrounding ecological community, ecosystem resilience, ideally habitat quality metrics), and the stakeholder is engaged in collaborating and promoting awareness with community members, etc., then the results should be achieved. But there seem to be places where stakeholder can take advantage of the framework or are encouraged to cheat. For example in Section 4, as only USp presences are awarded points and not absences, stakeholders are encouraged to report presence and not absence, which can lead to fabrication of data. I recommend that robust time-series data with sufficient evidence that includes at least one presence be awarded points. After all, these kinds of data are best to

	model species occupancy while accounting for imperfect detection.
Are the sampling and measurement protocols robust?	Section 4 is relatively robust, while Section 5 needs much more detail and some reassessment.
Are there any alternative or additional steps that should be considered?	I outline those above.
Additional comments	Some parts are very detailed in methodology, especially the descriptions of different ways to measure presence and instruments used for surveys in Section 4, and others are very lacking in scientific and methodological detail, like much of Section 5. It would be ideal if the authors reassessed the methods as a whole and ensured that the scientific rigor and logic matches throughout. As I am a scientist and not particularly policy-oriented, I cannot comment on how robust the scoring methods are, but I did have much trouble figured out how the math works from the text in the methodology. The math should be explained in a straightforward way so

	that stakeholders can easily implement the scoring without any confusion. I think it would be excellent if the data collected by stakeholders could be used by scientists for analysis, but in order for this to be possible, the data collection protocols must be outlined in detail. Further, there should be some system of recording this stakeholder data into a database for delivery to others who want to use it for research and/or conservation purposes. Can you include a very simple plan to database this data? Lastly, I highly suggest adding examples of how Sections 4 and 5 are implemented in the jaguar example, and finally how the final score is calculated for awarding of tokens. Please see my detailed line-by-line comments for the particular places I highlight for reassessment.

Reviewers Methodology Ratings

Please rate the following: (1 = Excellent) (2 = Good) (3 = Fair) (4 = Poor)

Is the methodology clearly written with adequate detail for implementation?	
Is the underlying foundation of the methodology clear?	
Is the methodology feasible?	
Will the proposed methods achieve the results defined in the methodology?	
Are the sampling and measurement protocols robust?	
Total Score:	

Reviewer's Confidential Comments to Editor by Section:

<<define any section if needed>>	I think the methodology regarding sampling of USp and ecosystems needs a lot of work. It is hard to believe that the authors consulted with scientists to write the descriptions — much of the material in the introduction sections seems like it was written by non-scientists, and some of it is just plain wrong. I would like to suggest the authors consult with scientists, but I do not want to offend anyone, so I left this out. I think I understand what the authors are trying to assess, and I recommended what should probably be measured in order to properly realize this assessment. I do understand there may

	be reluctance because the stakeholder may be expected to do more work, but one simply cannot get an accurate assessment of “ecosystem health” by sampling mammals and writing qualitative descriptions of how the “ecosystem” responds to disturbances. I really advocate for databasing this stakeholder data for further use, so I encourage the authors to develop some simple plan for enacting this.

Additional Information

Please answer the following questions

Do you want to be named in the review? (Expert Reviewers will be anonymous unless you choose to be named)	Yes / *No*

Recommendation

Kindly mark with an X

Accept As Is:	
Requires Minor Revision:	

Requires Moderate Revision:	
Requires Major Revision:	X
Reject and re-submit:	
Rejection: (Please provide reasons)	