

# Zooterra

Collect and protect habitats and wildlife  

## White Paper v2.0

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## 1. Abstract

Planet Earth is going through the biggest mass extinction since dinosaurs vanished 66 million years ago. Innumerable species are currently seeing significant population declines in short periods of time. Habitat loss is probably the greatest threat to the variety of life on this planet as it is a key factor affecting 85% of all species described in the IUCN's Red List. With human activity increasingly encroaching on natural areas, even natural protected areas are not safe. A recent study published in Science magazine shows that 33% of protected land, which is the primary defense against biodiversity loss, has been highly degraded.

There are many well-known conservation techniques for saving habitats and wildlife. However, these current techniques are insufficient and failing to stem the tide due to limited scope and funding. Despite nature's precarious situation and the potential impact from its continued degradation on the planet and humanity, people are not compelled to contribute enough money towards wildlife and habitat conservation. In 2017, individuals in the US contributed \$390B in annual charity donations, yet only \$9B went towards environmental causes with low contribution levels from younger audiences. This low level of financial support happens even though environment degradation and climate change are considered the main global issue among millennials. For individuals, nature degradation can be seen as too big to tackle and current engagement models are impersonal, lack transparency and do not tap into high engagement techniques such as those used by the gaming industry, which are very appealing among younger audiences.

Zooterra is working to bridge these gaps. Zooterra is reimagining how we support nature through a patent-pending product that gives users a direct, transparent and fun way to help protect wildlife and natural habitats. On the platform, users can buy a digital token called terra associated with 1-hectare of natural area and wildlife from around the world. The proceeds from terra sales go to projects linked to the areas and wildlife selected. Zooterra transforms the existing user experience for people who want to support nature conservation by providing:

- Ownership and gamification through digital collectibles called terras linked to specific natural areas and wildlife
- Transparency by funding specific projects
- Understanding impact through project updates and habitat status satellite imaging
- Personalization through a unique experience for each user

By associating defined areas of natural land into unique collectibles, Zooterra gives people a window into nature and a stake into its survival. This empowers individuals and helps us deliver on our mission to democratize engagement and action around habitat and wildlife conservation so that everyone has a stake in nature.

## 2. Background

### 2.1 A Planet in Peril

Planet Earth is going through the biggest mass extinction since dinosaurs vanished 66 million years ago. Innumerable species are currently seeing significant population declines in short periods of time. For example, cheetahs have declined from a population of 170,000 in 1900 to a current population of around 7,000. In another example, giraffes have declined from 157,000 in 1985 to 98,000 today. According to the WWF, by 2020 we could lose two-thirds of global wildlife populations compared to the 1970s.

Habitat loss is probably the greatest threat to the variety of life on this planet as it is a key factor affecting 85% of all species described in the IUCN's Red List. With human activity increasingly encroaching on natural areas, even natural protected areas are not safe. A recent study published in Science Magazine shows that 33% of protected land, which is the primary defense against biodiversity loss, has been highly degraded.

There are many well-known conservation techniques for saving habitats and wildlife. However, these current techniques are insufficient and failing to stem the tide due to limited scope and funding. The United Nations Development Program (UNDP) estimates annual needs around biodiversity maintenance of anywhere between \$150-440B/yr. of which only about \$52B/yr. are currently funded.

WWF, on its Living Planet report, estimates the economic value generated by renewable natural assets at \$125 trillion per year. Yet, the public in general has little understanding of the significant value generated by nature and of the funding shortfall to preserve it without easy means to visualize the ongoing degradation of the habitats generating this economic benefit.

### 2.2 Limitations of Current Engagement Model

The most common ways for people to directly fund nature conservation efforts is through charities and donations. Despite nature's precarious situation and the potential impact from its continued degradation on the planet and humanity, people are not compelled to contribute enough money towards wildlife and habitat conservation. In 2017, individuals in the US contributed \$390B in annual charity donations, yet only \$9B went towards environmental causes with low contribution levels from younger audiences. This low level of financial support happens even though environment degradation and climate change are seen as the main global issue among millennials.

There are several reasons driving these behaviors which we explore below.

#### 2.2.1 Nature Loss Has Become a Statistic

The environmental issues in front of us are so big and systemic that it is easy for individuals to feel like they cannot intervene and have an impact. This is especially true under the current donation-centric system where most donations are commonly pooled into a general donation bucket. This approach does not break these issues into more consumable bite-size opportunities which people can engage with.

In addition, modern life does not provide a natural connection to wildlife and natural habitats. The top two causes to which people contribute on an annual basis are religion and education, which can create a strong ongoing relationship with individuals. Habitat and wildlife conservation often involves supporting remote locations and species which few people can experience or have very limited information about.

Even for those who support environment conservation, the lack of details provided when donating limits them from developing a relationship that is more granular and that strongly builds over time.

### 2.2.2 Lack of Transparency and Personalization

Individuals in the US donate \$9 Billion per year to various environmental-conservation related charities. These charities are a central force in attempts to save natural resources, but they have built-in limitations in their transparency and engagement of consumers. From an engagement standpoint, there is a very limited amount of user interaction with the charities themselves. After individuals donate funds, they may receive a token gift, for example, a t-shirt or sticker, but their involvement often ends there. In other scenarios, consumers can purchase follow-up items, follow the charity on social media, maybe receive a newsletter or other informational follow-up. Therefore, the direct relationship between the individual and conservation efforts typically expires at the donation phase, tends to be generic, or tapers slowly thereafter.

In current charitable scenarios, individuals have no way of knowing or choosing which projects or wildlife they are individually supporting so there is an inherent lack of transparency. Therefore, individuals do not know how their donations are moving conservation projects forward or what impact they are having in helping nature. Consumers will typically donate smaller amounts to multiple charities, further diluting the effectiveness of monetary contributions as all these different charitable organizations have institutional overhead.

When asked, 94% of donors reported giving a general donation. This is what charities call unrestricted funding, which they can spend where they see fit. This approach provides full flexibility for the charity, but it becomes detrimental to the customer experience and creates trust issues. Also, this approach does not deliver on common expectations for people to have transparency and personalization when they use their money. For instance, 82% of donors do not know how their contribution was used and in most of the cases cannot customize their experience to support their preferred projects and wildlife and to get relevant updates (41% get nothing after donating, 45% get a general newsletter).

The current lack of transparency combined with the inability to personalize the experience creates a ceiling on potential engagement even among people who are genuinely interested in supporting environment conservation.

### 2.2.3 High Engagement with the Right Experience

The lack of engagement is particularly noticeable among younger generations which are large untapped markets when it comes to funding environment conservation. For instance, 51% of millennials see nature destruction and climate change as the most serious global issue, but conservation organizations struggle to engage this segment. Yet, this population segment is a major contributor to the \$103B/yr spent globally in digital gaming. Different video games often reach 50M+ unique users each month. The spend and user base in the gaming industry show that a more engaging experience can drive higher engagement from this younger audience. Some of the techniques used by the gaming industry can serve as a blueprint to drive engagement in conservation.

In general, individuals are seeking ways to feel more connected to the causes they care about and remain active as part of their long-term ongoing conservation efforts and interest in nature. With advanced consumer demands and technology trends, there is an opportunity for improved engagement models that address the current gaps.

## 3. The Product

### 3.1 What is Zooterra?

Zooterra is reimagining how we support nature through a patent-pending platform that gives users a direct, transparent and fun way to help protect natural habitats and wildlife.

Nature has never been more vulnerable as we go through Earth's 6th mass extinction, yet people are not compelled to put enough money behind wildlife and habitat conservation. When we consider contributing to nature conservation, we often wonder "where is my money going?" and "how can I tell I've made an impact?"

Zooterra is working to bridge these gaps. On the platform, users become Guardians of Nature by buying digital tokens called terras. Each terra token is a unique collectible associated with 1-hectare of natural area from around the world. Proceeds from each terra directly support a specific project linked to the terra's habitat, wildlife or the local community which can be viewed through geolocation. By collecting terras from around the world, the user builds his/her Guardian history and reaches higher levels, while getting updates on the projects supported and satellite image analysis.

### 3.2 Transforming the User Experience

Tapping into cutting edge technology, Zooterra transforms the existing user experience by directly addressing its gaps. For people who want to support nature conservation efforts, Zooterra provides:

- Ownership of and gamification through digital collectibles called terras linked to specific natural areas and wildlife
- Transparency by funding specific projects
- Understanding impact through project updates and habitat status satellite imaging
- Personalization through a unique experience for each user

By purchasing a terra, individuals have a vested ownership in the collectible and consequently become guardians to the conservation of the natural area and wildlife linked to it. The sale and ownership of the unit is recorded and viewable in the platform which ensures uniqueness and rarity of the collectible.

At the moment of purchase, users have full transparency about the conservation effort to take place. They know the project that is being supported and its conservation goals. They also know the amount that will be contributed and the organization that will receive the funding to execute the project on the ground. Each terra also indicates the types of wildlife that live in that area, so they understand the full context of their support.

Understanding of the impact of the conservation efforts is then enabled through project updates that keep the user informed and connected to the teams working on the project on the ground. Periodic habitat analysis through satellite image analysis or verified habitat reviews becomes a source of truth as the data comes from an objective source and helps align all stakeholders on the progress being made.

Through these different mechanisms, Zooterra personalizes the experience by more directly connecting consumers to natural areas and wildlife. This breaks the degrees of separation between people and

nature and creates the opportunity for more meaningful engagement and to generate more funding for conservation.

### 3.3 Product Features

#### 3.3.1 Ownership of Terra Collectibles

Zooterra is tokenizing natural area around the world and linking them to a digital collectible token. The natural area is divided into hectare units defined by a longitude-latitude coordinate system. Each hectare is then linked to a unique terra collectible for which there is a unique code and digital record of its existence.

The natural area could be a national park, a private natural reserve or any other area that hosts or has the potential to host natural habitats and wildlife and that can benefit from conservation efforts. The area could cover a number of different habitats such as rain forests, deserts, savannahs or any of many other natural habitats. Although the initial focus is on land-based habitats, the areas can be land or marine-based.

Each of these terras is available for purchase and is a unique and one-of-a-kind item. When purchasing, users have ownership of the terra and become Guardians of the area to which it is linked, but the collectible does not grant ownership of the underlying land.

#### 3.3.2 Transparency through Direct Project Support

By purchasing a terra, the user is supporting a conservation project for the broader natural area (e.g. national park) that the terra is part of. The projects are predetermined and disclosed as part of the terra description. The project will be determined by the needs and opportunities of the area and by the availability of suitable partners to execute on the ground.

We look at nature conservation holistically and as multi-factorial, therefore, projects can support the forests/vegetation, wildlife and/or people in a community all of which are interconnected in the success of preserving a natural area. From a forest/vegetation perspective, projects can include restoring, expanding or providing sustainable funding for a forest. Wildlife projects focus on addressing specific needs of species which includes counting and tracking a species or targeted projects needed to help preserve the species. People-related projects focus on needs of the community that is affiliated to the natural area and can include creating sustainable livelihoods or sustainable living (terras for these projects could be located adjacent to natural areas, in the areas where the communities live)

We work with partners on the ground help determine the project linked to the natural area. These local partners are responsible for managing the portion of resources collected dedicated for project funding (70% of the terra purchase price) and generating periodic project updates to be shared with the terra owners. Partners can be governments or NGOs, public or private entities that have the expertise and ability to execute on the projects. Developing a network of partners will help create awareness and transparency on the different projects taking place in different areas and allow Zooterra to become a vehicle for people to engage with these organizations.

#### 3.3.3 Impact through Project Updates and Remote Sensing Analysis

The transparency of the platform enables users to physically explore the area linked to their terra given that they know its location, assuming the area is accessible. Regardless, we will provide to users an

assessment on impact from the projects through two means: project updates and vegetation cover health assessments through satellite image analysis or forest reviews depending of what is technically possible or available in an area.

When generating satellite imaging analysis, this will enable tracking the general and vegetation health of supported natural habitats. These serves three key purposes:

- It engages the users through views of the specific hectare linked to their terra
- It helps NGO partners understand the progress of their efforts
- It creates a common source of truth for all stakeholders involved on the status of the habitat

Zooterra analyzes publicly-available satellite imagery and integrates the analysis in the platform. This includes a baseline analysis so the user can see at terra purchase the current state of the habitat and the trend versus previous years. We will generate analysis updates at least annually as new imagery becomes available to show conservation progress. This is presented in a simple and easy to navigate interface and color system for easy comprehension.

There are many types of ecosystem and therefore, we adjust our analysis accordingly. For instance, although a desert natural area might not have a lot of vegetation cover and, therefore, forest cover is not a good indicator of habitat health, we can observe human activity that can disrupt the ecosystem. Also, even for areas with vegetation cover, the vegetation can vary widely (for example grasslands versus forests) and, therefore, we could explore more specific analysis with higher resolution imagery as needed.

Depending on the project, satellite imagery will not always reflect project progress or impact, or a long period of time might be needed before a change in the habitat is observed. To help address this, partners will provide ongoing project updates which are shared with the users. These updates will cover any of these areas:

- Profiles of the people working on the conservation projects
- Information on the communities that live near the natural areas supported
- Information on the wildlife species that live in the area
- Information on the habitat type and plants in the area
- Updates on the conservation project progress
- Iconic landscape pictures of the area supported

The combination of vegetation health assessments and project updates will provide users with an ongoing view on conservation efforts and the impact of their contributions and drive greater engagement.

### 3.4 Future Opportunities for User Engagement

By virtualizing natural resources, Zooterra can become a source of engagement around several aspect of nature conservation. There are several opportunities to build on the user experience, generate additional revenue and drive impact on habitat and wildlife conservation. These could include:

- Tokenization and Gamification: further tokenizing other aspects of conservation activities for users to “buy” on the platform such as cameras that help monitor wildlife or wildlife collectibles



- Use of Blockchain: digital tokens could be linked to Ethereum ERC721 tokens which would enable users to exchange their token on Ethereum collectibles marketplaces
- User Tiers: having user tiers based on engagement that can provide higher levels of engagement including talking directly to the teams on the ground, getting more frequent updates, etc.
- Live Feed: providing direct and live visual access to the areas supported through technologies such as drones or live cameras
- Real World Perks: partner with governments and national parks around the world to give access to unique services such as naming natural areas or have levels of ownership
- Travel: linking travel and ecotourism to the areas and wildlife on the platform for people to experience them
- Content Sharing: sharing of photography and videos by users, partners and professionals linked to the natural areas supported
- Collaboration: sharing conservation data and content for each specific area through the unique identifiers of each of the terras and areas
- Education: providing additional content that can further educate users on their habitats and wildlife holdings
- Data and Analytics: providing data and analytics services using the platform to serve institutional clients

### 3.4.1 Wildlife Collectibles

One of the future opportunities that we are excited about are wildlife collectibles. Each terra would include select wildlife collectibles from that specific location, initially focusing on large vertebrates (e.g. mammals, birds). Like the terras, the wildlife collectibles would be digital tokens. Similar to the terras, users would be able to build their virtual wildlife collection. There would be an opportunity to provide further functionality over time (e.g. generating digital offsprings, tying offspring cycles to the gestation cycle of each species, etc.)

The wildlife collectible could be artistic executions of the respective species. The scarcity of animals in the real world provides a template for how many to generate and have built in scarcity in the virtual space, increasing the rarity of these virtual animals. The emphasis for inclusion would be Red List threatened species from the International Union for Conservation of Nature (IUCN). Red list species are species designated as endangered or in extinction threat locally and/or globally. The species available on the platform would expand as more areas are covered in the platform.

Species of wildlife have captivated humans for thousands of years and their beauty resonates with the human mind on a primal manner. The collectibles wildlife will thus provide a unique opportunity for collection by and fascination for users

## 4. Business Model & Collectible Economy

Zooterra is incorporated as a Benefit Corporation. Environment conservation and transparency are central to its mission; therefore, it is a triple bottom line organization generating a financial value, providing social benefits and protecting the environment.

### 4.1 Business Model

Zooterra's business model is a sustainable business model driven by the collectible token sales. For every token sale, 70% goes to conservation projects and Zooterra keeps 30% of the proceeds. This allocation supports company operations including technology, satellite analytics, marketing, personnel, developing partnerships and innovation to drive engagement around and conservation of nature.

### 4.2 Collectible Economy

Digital goods have seen real-world valuation, but these have typically been limited to the video games realm and lack security or protections. Zooterra is leveraging the scarcity principles used by digital goods to create a hybrid collectible that is digital in nature while having a real-world connection.

Each terra is a one-of-a-kind collectible and linked to a specific hectare of natural area. Terras are issued along with other terras associated with a natural area. Supply of terras for a particular area will be available as partnerships for conservation projects are put in place in the area and linked to terras. Demand grows as more users join the platform and become Guardians.

In the future, we will explore enabling users to sell their terras in collectible marketplaces. Like any collectible, terra value could fluctuate and there is no guarantee of appreciation or of having the ability to sell the collectible in a marketplace.

The value of each terra could change based on the supply and demand of terras and the scarcity of nature. It is estimated that the value of the ecosystem services provided by natural areas is \$125T/yr. Therefore, the value of each terra could also be seen as a proxy for the value of that area and its biodiversity and by how well the area is preserved. Therefore, the more an area preserves its natural value, the more the terra could be valued.

## 5. Technology and Analytics Approach

### 5.1 Technical Requirements

Zooterra uses proven web technology. There is a digital record of each token collectible. Each of these tokens has core data that uniquely identifies it including code and geographic coordinates. There is also metadata that further defines the token including ownership and the project that it supports.

To create each terra, we gather park vector files to act as bounding boxes, and then create a one-hectare by one-hectare grid. Terras are square and, therefore, if a square includes part of an area that is outside the natural area boundary, we apply approximately a threshold of 80% overlap with the natural or desired area in order to issue the square as a terra. The terra is then identified with a latitude and longitude coordinate at its center which defines it. Visualization of each image is facilitated through Google Maps.

### 5.2 Remote Sensing Analytics

We will provide to users an assessment of the health of the vegetation in a natural area through satellite image analysis or forest reviews depending of what is technically possible or available in an area.

In areas where remote sensing (satellite image analysis) is possible, each user will see analysis that covers their terra. The analytics are generated using the Google Earth Engine (GEE) platform. The cloud computing power of GEE powers trend analysis and scaling of Zooterra to any natural area in the world. We analyze current images of the habitat, images from the past and images that will be generated in the future. For each analysis period, we assign an overall red, yellow or green color code to the terra based on the health of the vegetation cover at that point in time (for example, vegetation is disappearing or becoming less healthy or more human activity is detected in the area). We will primarily rely on a combination of the Landsat satellite for all historic analyses and Sentinel-2 for more recent analyses.

Satellite imagery quality and availability has improved over the years. Yet, imagery for analysis has limitations based on year of analysis, cloud cover and type of vegetation. Analysis can go back to the mid-80s for Landsat at 30-meters resolution with Sentinel-2 becoming available in 2015 (10-meters). This allows creation of iterative analysis to determine area changes from time A to time B, and to create broader composites by 5 or 10 years for larger trends. For historical imagery, particularly before the mid-90s, certain areas need years of data to create a cloud-free composite and to have enough imagery available, so the analysis might be for a window of time. For example, if the focus year was 1990, the data might be a composite from 1989-1991 to ensure no cloudy pixels. For more recent years, Sentinel-2 satellites have a revisit time of approximately 5-days, which could still require a few images to get a clear view although likely no more than a month or two of images. Also, Planet (3-meters) provides high resolution with a daily return time, with some limitations on image quality. Most places have decent imagery from the early 90s, with some locations having images from the 80s and a few not having data until the mid-90s.

When producing satellite image analysis for an area, the user could see three views for vegetation health: current, past and future. Current views are the analysis of images available around the original time of a terra sale. For the past, we generate views for 2000 and 2010. For the future, we target to generate the analysis once a year to see the trend versus past views. This helps the user understand the health of the environment and how their supported project is helping the area.

Depending on the area, for the analytics, we could apply a wide range of methods from changes in vegetation index to supervised classification, and image segmentation methods. The analysis could range from pixel-based methods to more sophisticated segmentation methods that first break the image into segments, or areas with similar spectral signatures, and then classify those entire segments. This latter method produces less noisy results and is preferred for high resolution imagery.

## 6. Vision & Mission

Our vision is to live in a world where we can enjoy healthy and thriving natural habitats and wildlife

Zooterra changes donors to owners with a direct tangible benefit not only to land being conserved but better serving the interests of the individuals seeking to preserve nature. Token transparency on the platform around verified scarcity and ownership become building blocks to fully deliver on an ownership experience. By associating defined areas of natural land into unique collectibles, we give people a window into nature and a stake into its survival. This empowers individuals and helps us deliver on our mission to enable everyone to have a stake in nature and take action to preserve it.

**Zooterra**