Prisma Social revista de ciencias sociales, No. 52
Enero 2026 e-ISSN 1989-3469. pp 542-559
DOI: https://doi.org/10.65598/rps.5986

Cámaras trampa para la conservación y la comunicación ambiental en la Amazonía ecuatoriana

Camera Trapping for Biodiversity Conservation and Environmental Communication in the Ecuadorian Amazon

Juan David Bernal Suárez[1], Diego Ortiz-Jaramillo[1], Leonardo Román[2]
[1]Media & Innovation Lab - Universidad Hemisferios, Ecuador
[2]GIBS Ad Austra – Universidad Politécnica Salesiana, Ecuador

KEYWORDS
Photo-trapping
Ecuador
Conservation
Communication
Amazon
Environment
Species
Biodiversity

ABSTRACT
The Imago project, conducted within the Hemisferios Biodiversity Reserve, seeks to employ camera traps as tools for the conservation of 2,168 hectares of montane forest in the Ecuadorian Amazon. This study presents preliminary findings derived from camera trap images collected in the area. In accordance with the WWF Camera-Trapping Guidelines (Wearn & Glover-Kapfer, 2017), five cameras were strategically placed along a two-kilometer trail near the scientific station, allowing for daily checks over a period of fifteen nights, which is the minimum duration required for detecting rare Amazon species (Silver et al., 2004; Espartosa et al., 2011). During phase 1, the camera traps documented five mammal species and two bird species. Notably, among the recorded species is Tapirus pinchaque, which is classified as Endangered on the IUCN Red List of Threatened Species. The identification of two individuals of *Canis lupus familiaris* (domestic dogs) is a notable concern, as their presence poses a significant threat to the native fauna through predation, competition, and disease transmission. Camera-trapping technologies have enabled scientists to monitor ecosystems, track wildlife populations, and educate global audiences with remarkable precision and efficiency. These findings not only corroborate the ecological richness of Napo province, as previously suggested by Cuesta et al. (2017) and Kleemann et al. (2021), but also present new opportunities for the communicative application of this information, particularly in strategies aimed at raising environmental awareness. The study concludes that the collected data not only serves as a fauna registry but also facilitates the development of educational and communication strategies to promote environmental stewardship.

PALABRAS CLAVE
Foto trampeo
Ecuador
Conservación
Comunicación
Amazonía
Medio ambiente
Especies
Biodiversidad

RESUMEN
El proyecto Imago, llevado a cabo dentro de la Reserva de Biodiversidad Hemisferios, busca emplear cámaras trampa como herramientas para la conservación de 2,168 hectáreas de bosque montano en la Amazonía ecuatoriana. Este estudio presenta hallazgos preliminares derivados de las imágenes obtenidas por cámaras trampa en la zona. De acuerdo con las directrices para cámaras trampa de WWF (Wearn & Glover-Kapfer, 2017), se colocaron estratégicamente cinco cámaras a lo largo de un sendero de dos kilómetros cerca de la estación científica, permitiendo inspecciones diarias durante un periodo de quince noches, que es la duración mínima requerida para detectar especies raras de la Amazonía (Silver et al., 2004; Espartosa et al., 2011). Durante la fase 1, las cámaras trampa documentaron cinco especies de mamíferos y dos especies de aves. De manera destacada, entre las especies registradas se encuentra Tapirus pinchaque, clasificada como En Peligro en la Lista Roja de Especies Amenazadas de la UICN. La identificación de dos individuos de Canis lupus familiaris (perros domésticos) es un motivo de especial preocupación, ya que su presencia representa una amenaza significativa para la fauna nativa debido a la depredación, competencia y transmisión de enfermedades. Las tecnologías de cámaras trampa han permitido a los científicos monitorear ecosistemas, rastrear poblaciones de fauna silvestre y educar a audiencias globales con notable precisión y eficiencia. Estos hallazgos no solo corroboran la riqueza ecológica de la provincia de Napo, como se sugirió previamente en Cuesta et al. (2017) y Kleemann et al. (2021), sino que también presentan nuevas oportunidades para la aplicación comunicativa de esta información, particularmente en estrategias orientadas a aumentar la conciencia ambiental. El estudio concluye que los datos recolectados no solo funcionan como un registro de fauna, sino que también facilitan el desarrollo de estrategias educativas y comunicativas para promover el cuidado ambiental.

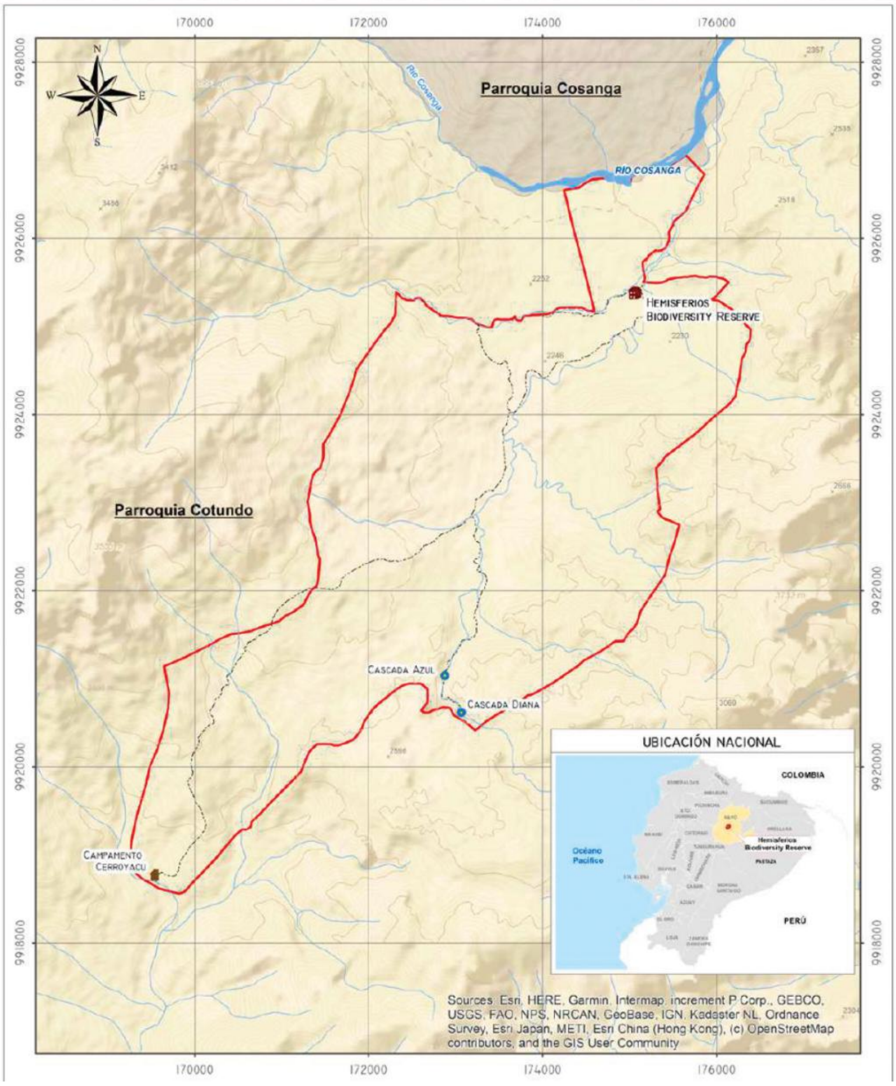
RECIBIDO: 08/11/2025
ACEPTADO: 19/01/2026

Cómo citar este artículo / Referencia normalizada: (Norma APA 7ª)
Bernal Suárez, J.D., Ortiz-Jaramillo, D., Román, L. (2026). Foto trampeo y comunicación visual: registro de siete especies en la Reserva de Biodiversidad Hemisferios, en la Amazonía acuatoriana. *Prisma Social revista de ciencias sociales*, *52*, 542-559. https://doi.org/10.65598/rps.5986

1. Introducción

The Hemisferios Biodiversity Reserve is a conservation area spanning 2,168 ha of extension in Napo Province, located in the foothills of the Eastern Andes, bordering the Antisana National Park to the west. Its altitudinal range extends from 2,000 to 2,600 m above sea level within an ecosystem known as the Eastern Montane Forest or the Upper Amazon Rainforest. Its location in the foothills of the Eastern Andes and adjacency to Antisana National Park enhances ecological connectivity and habitat continuity, supporting species migration and genetic exchange (Barragán et al., 2024). As part of the Upper Amazon Rainforest, the reserve contributes to important ecosystem services such as carbon sequestration and soil conservation in the Amazon region, as seen in Image 1 (Tirira & Cevallos, 2024).

Image1. Map of the Hemisferios Biodiversity Reserve.



Ecuador and Latin America account for approximately 40% of the global biodiversity, making them strategic areas for global conservation (Kleemann et al., 2021). However, the advance of deforestation and the expansion of extractive activities have reduced vegetation cover by 17% in the last two decades (Red Amazónica de Información Socioambiental Georreferenciada, 2023). This scenario has created a challenge for governments and international organizations seeking effective strategies to curb ecological degradation.

In addressing these challenges, the Ecuadorian government has initiated strategic conservation measures. The National Biodiversity Strategy 2015-2030, for example, constitutes a central component of these efforts, encompassing 20% of the national territory through the establishment of protected areas (MAE, 2015). Furthermore, the creation of ecological corridors, such as the Napo-Pastaza corridor, has resulted in a 12% reduction in habitat fragmentation between 2000 and 2015 (Cuesta & Peralvo, 2016). International collaboration has been crucial, enhancing environmental monitoring and leading to a 40% improvement in the effectiveness of protection within these areas (Sistema Nacional de Áreas Protegidas, 2023). Nevertheless, 32% of the protected areas in the Ecuadorian Amazon remain vulnerable due to the expansion of mining and oil activities (World Wildlife Fund Ecuador, 2022). To mitigate this threat, the Andean Community has formulated regional strategies to integrate conservation plans across the region (Secretaría General de la Comunidad Andina, 2019). The creation of economic incentives for the sustainable use of natural resources has proven effective. Initiatives such as ecotourism and payments for environmental services have been instrumental in ensuring that conservation is prioritized not only ecologically but also as a means of development for local communities.

To support the preservation of these areas and the local communities residing in the region, this study presents the initial phase of the IMAGO project, which employs camera trapping technology in the Hemisferios Biodiversity Reserve to achieve two primary objectives: first, to document preliminary species presence through a 15-day camera trapping examination; and second, to investigate the potential of camera trap imagery as a tool for environmental education and communication. Camera traps provide a non-invasive method to monitor elusive wildlife, offering valuable ecological data while generating compelling visual content that can enhance public engagement and foster environmental stewardship. By integrating scientific monitoring with educational communication strategies, this research aims to contribute both to biodiversity conservation and to the development of innovative communication approaches that raise awareness about the ecological and socio-cultural significance of the Ecuadorian Amazon.

1.1. ECOLOGICAL PERSPECTIVE AND CLIMATE CHANGE

Andean and Amazonian ecosystems play a crucial role in carbon sequestration, with an estimated storage of up to 150 tons of carbon per hectare (WWF Ecuador, 2022). However, deforestation has affected this capacity, generating annual emissions of 2.4 million tons of CO_2 in Napo Province (MAE, 2021). This environmental deterioration has increased the region's vulnerability to climate change.

The Intergovernmental Panel on Climate Change (IPCC) report (2023) indicates that a temperature rise exceeding 2°C may endanger up to 28% of Amazonian species. Such a temperature increase is likely to disrupt the hydrological cycles and diminish the ecological resilience of the region. In response to this issue, Ecuador has adopted mitigation strategies, including reforestation initiatives and the Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism, which have collectively resulted in a 15% reduction in forest loss (FAO, 2023).

Globally, the adoption of policies based on natural solutions is the key to addressing climate change (Seddon et al., 2020). In Ecuador, reforestation and ecological restoration has enabled the recovery of more than 200,000 ha since 2015. However, a greater commitment in terms of funding and government support is required to scale up the impact of these initiatives. In this context, local communities have proven to be key players in ecosystem protection. Their ancestral knowledge of soil regeneration and biodiversity is crucial to the implementation of sustainable conservation projects.

1.2. SOCIOECOLOGICAL AND CULTURAL APPROACH FOR CONSERVATION STUDIES

60% of Ecuador's montane forests are managed by indigenous communities whose agroforestry practices have allowed the conservation of more than 120 plant species of high ecological value (FAO, 2023). The interaction between ancestral knowledge and modern science has facilitated the creation of sustainable management models that guarantee forest regeneration. In the Ecuadorian Amazon region, the Waorani and Kichwa people have led community conservation processes by prioritizing the balanced use of natural resources. However, these communities are facing growing challenges. Since 2010, indigenous territories have decreased by 8% due to deforestation and oil expansion (MAE, 2023). Additionally, 45% of park rangers in Yasuni Reserve have reported threats from illegal groups linked to mining and drug trafficking (The Guardian, 2023).

Legal recognition of indigenous territories and their inclusion in the formulation of public policies are fundamental steps in strengthening environmental management in the region. In response to this problem, programs such as Socio Bosque have managed to reduce deforestation by 38%, offering economic incentives to communities to protect their forests (MAE, 2023). The role of indigenous communities is not only key in conservation but also in environmental education and in raising awareness of the importance of biodiversity. Protecting their rights is an essential strategy for guaranteeing long-term ecological balance.

1.3. CONSERVATION TECHNOLOGY: AN APPROACH TO PHOTO-TRAPPING CAMERAS

Conservation technology encompasses the application of technological tools for biological conservation (Akindele, 2024). Its implementation enhances data collection and processing (Gracanin et al., 2022), thereby increasing the efficiency of conservation programmes by providing precise and accurate data. Among these technologies, the most prevalent are drones, biotelemetry and GPS, acoustic sensors, AI algorithms, and photo-trapping, among others (Arts et al., 2015; Wilson et al., 2015; Teixeira et al., 2024; Silvestro et al., 2022), with the latest being the focus of this research.

Photo-trapping is a noninvasive sampling method (Mills et al., 2016) that involves placing one or more cameras in strategic locations. These cameras contain motion and heat sensors that capture the presence of animals. When cameras are activated upon witnessing an animal, they trigger a photograph and subsequently enter sleep mode until they detect the presence of another animal (Apps & McNutt, 2018; Welbourne et al., 2016).

The inception of cameras designed to capture wildlife images can be traced back to the early 20th century. George Shiras, an American photographer, is recognized as the pioneer of this technique and is often referred to as the father of photo-trapping (Carreira, 2024). He developed a method that employs a tripwire and flash system, enabling animals to photograph themselves. The animals were attracted to bait, such as cheese for raccoons and carrion for vultures (Kucera & Barrett 2011). This technique was groundbreaking as it facilitated the capture of wildlife images without direct human involvement.

Shiras' photographs were published in the National Geographic magazine in 1906; 74 photographs were taken since 1896 (Brower, 2008). This event made animal photo-trapping popular, inspiring enthusiasts to explore this medium. His work not only showed the beauty of wildlife but also contributed to the understanding of animal behavior and wildlife conservation (Nichols et al., 2011; Kucera & Barrett 2011).

Around the 1990s, the first cameras with infrared activation were designed, such as the one used by Karanth and Nichols in 1998 and the TRAILMASTER TR150 model from Goodson and Associates (Lenexa, Kansas, USA). Since then, the camera-trap market has gained considerable relevance. Currently, there are camera-trap models with extended batteries, built-in solar panels, and ample storage capacity (Rajeswari et al., 2023).

1.3.1. ADVANTAGES AND LIMITS OF THIS TECHNOLOGY

The principal benefit of this technology lies in its ability to facilitate non-invasive monitoring techniques, thereby allowing the observation of wildlife within their natural environments without the disruptive presence of humans (Mills et al., 2016). Additionally, the use of micro-SD memory cards extends the operational duration of cameras (Apps & McNutt, 2018), whereas infrared sensors and LEDs enable recording of nocturnal animal activities (Corva et al., 2022).

Similarly, photo-trapping is used to study animal behavior, such as marking, courtship, hunting, feeding, births, and other biological activities (Janisch et al., 2016; Janisch et al., 2021). This advantage is linked to the detection of elusive and nocturnal species, which are difficult to study owing to their elusive nature (Kelly, 2008; Mills et al., 2019).

Another advantage related to the use of cameras is the generation of ecological data, such as species richness and density, as well as distribution patterns within a specific area (Cole Burton et al., 2015; Rich et al., 2016). In addition, biologists seeking to assess the presence of a specific animal use susceptible baits or attractants for the target animal, so photo-trapping can be beneficial for these study objectives (du Preez et al., 2014).

An important advantage of photo-trapping is its capacity for effective communication, as the final output is visual and comprises photos and videos. Visual content tends to be more readily accepted by the community than written reports because it captures greater interest and attention among the audience, local and global. Consequently, photo-trapping effectively integrates scientific research with communication for conservation purposes (Nichols et al., 2011), with a particular emphasis on the development of digital wildlife museums (Wearn and Glover-Kapfer, 2019).

Despite the aforementioned considerations, the placement of such cameras or the utilization of bait may affect the detection of certain species. However, employing a randomized sampling design can mitigate spatial biases (Cusack et al., 2015). Additionally, refraining from excessive bait use may prevent alterations in the natural behavior of the species. A common limitation is that some species lack distinctive visual characteristics, which complicate image identification (Kelly & Holub, 2008). Nevertheless, contemporary recognition and artificial intelligence programs, such as WildID and MegaDetector, utilize AI to perform morphological comparisons, ensuring species identification with a certainty of up to 95-99% (Nipko et al., 2020; Leorna & Brinkman, 2022; Vélez et al., 2023).

1.4. ENVIRONMENTAL (EDU)COMMUNICATION FOR AUDIENCE ENGAGEMENT

Research on environmental communication centers on three primary aspects: the creation of messages, their content, and their impact on audiences (Hansen, 2011). The first aspect plays a crucial role in shaping audience opinions and actions, as demonstrated by visual communication used to enhance environmental impact assessments (Oliveira et al., 2023), narrative message design aimed at establishing strong corporate social responsibility associations in environmental contexts (Kim and Chon, 2022), and the construction of cultural paradigms within audiences (Corbett, 2006).

Content is another crucial aspect in understanding the communicative dimensions of the environmental field beyond the scientific community. Research indicates that the mere inclusion of binding moral content may not effectively foster pro-environmental engagement across the political spectrum (Feinberg & Willer, 2012; Kim et al., 2023). Also, it has been demonstrated that infographics that integrate visuals and text can enhance audience engagement with environmental messages (Lazard & Atkinson, 2014; Degeling & Koolen, 2021). In this order, environmental messages conveyed through various media formats, such as text, images, and audio, play a crucial role in shaping stakeholders' perceptions regarding ecosystem protection.

Audience impact represents the third critical aspect as it determines the efficacy of environmental communication. Authors emphasized the necessity of addressing barriers to audience engagement at multiple levels simultaneously, considering factors such as sense of agency, sociocultural dimensions, and scientific literacy for improved recognition of environmental messages (Wibeck, 2013; Ke et al., 2021). Ultimately, the objective is to influence public discourse and cultural understanding of ecological issues with the aim of motivating the public to adopt more environmentally conscious behaviors, despite the existing challenges in measuring such behavioral changes (Podkalicka et al., 2024).

Environmental communication encompasses the creation, content, and audience impact of messages, each playing a vital role in shaping perceptions and behaviors toward ecological issues. Addressing barriers to participation requires a multifaceted approach that considers agency, sociocultural factors, and scientific literacy in order to enhance message recognition and influence public discourse. The principles underscore the significance of proposing educommunicational activities pertinent to the current subject of investigation: utilizing camera trap images for educating audiences on environmental issues. To achieve this, it is crucial to recognize that educommunication is defined as an interdisciplinary dialogue between education and communication (Ortiz Jaramillo, 2023). Within the audiovisual domain, this field intersects with visual narratives to transform educational processes. It enables students and educators to collaboratively construct meanings from visual and auditory stimuli through the creation of messages, their content, and their impact on audiences, as previously observed, in horizontal communication processes (Freire, 1970), which entailed collective reflection and social transformation. Via this approach, the learning process can transcend the imposition of knowledge and establish an educational environment in which communication facilitates the construction of shared knowledge (Freire, 1973). Also, rather than concentrating on the content being transmitted or the behavioral outcomes, the emphasis is placed on facilitating the development of cognitive capacities and social consciousness among individuals and groups (Kaplún, 2002, p.17). Empirical research has demonstrated a practical implementation of these concepts.

Studies has elucidated that the integration of Freirean principles with audio and radio techniques enhances active participation in both educational and community contexts (Alarcón Niño, 2014), developing a better relationship between media literacy and visual studies in an interconnected world (Barbas Coslado, 2012; Vieira Ribeiro, 2022). In this context, the utilization of photo-trapping technologies in conservation efforts offers a unique opportunity to bridge the gaps between education, communication, and environmental protection. These unobtrusive devices, strategically placed in natural habitats, capture candid moments of wildlife behavior that would otherwise remain unseen. By providing visual evidence of species presence, population dynamics, and ecological interactions, camera traps can generate a wealth of data that can be transformed into compelling educational material.

When integrated into educommunication strategies, the imagery and information obtained from camera traps can significantly enhance public engagement in conservation issues. In this regard, research has demonstrated that the use of camera traps in citizen education projects increases public engagement and wildlife awareness (Green, 2020). These visual narratives can be used to create interactive exhibits, online platforms, and educational programs that directly bring the reality of wildlife conservation to diverse audiences. Moreover, by making invisible visible, camera traps have the potential to spark curiosity, foster empathy for wildlife, and cultivate a deeper understanding of ecosystem dynamics among students and the public (Hanisch et al., 2019). This approach not only supports scientific research but also creates a powerful tool for raising awareness and inspiring actions to support biodiversity conservation activities.

2. Methodology

Before outlining the methodological framework of this research, it is important to emphasize that the project is in its initial phase; therefore, the results presented are preliminary. The research corpus consisted of images collected using five camera traps from November 1 to 15, 2024. The cameras were installed near the Scientific Station of the Hemisferios Biodiversity Reserve in Napo Province, within the Amazon region of Ecuador. The pilot phase of the IMAGO project was designed as a rapid inventory, integrating logistical feasibility, equipment security, and the scientific value of the data. According to the WWF Camera-Trapping Best-Practice Guidelines (Wearn & Glover-Kapfer, 2017), when the objective is to verify the presence of fauna and establish an initial baseline, deploying between one and ten cameras strategically along an easily accessible transect is sufficient, particularly when resources and budget are constrained.

This is contingent upon the sampling period covering at least two weeks to ensure reasonable detection probabilities in tropical rainforests. Within this framework, we deployed five cameras along a two-kilometer trail adjacent to the scientific station at the Hemisferios Reserve. The proximity to the operational base not only minimized the risk of theft and facilitated daily review but also ensured that each station remained active for fifteen consecutive nights, meeting the minimum recommended threshold for species with low detectability in Amazonian environments (Silver et al., 2004; Espartosa et al., 2011) .

The images were compiled, classified, and subsequently described by biologist Leonardo Román at both the taxonomic (species identified by scientific name) and common name levels. The cameras used for data collection include the GardePro E5 Trail Camera, with a resolution of 48 MP and 1296p, featuring an ultra-fast motion activation time of 0.1 seconds and night vision capability up to 100 feet. All the records were facilitated and coordinated by the IMAGO project team from the International Faculty of Communication and Cultural Industries at the Universidad Hemisferios.

Beyond capturing images, in this Phase, the project aimed to ensure the reusability of the resulting information. Consequently, we adopted the guidelines from the outset of the GBIF guide (Reyserhove, Norton & Desmet, 2023) on camera trap data management and publication. This guide emphasizes that the primary bottleneck is no longer the quantity of photographs obtained but rather the curation and archiving of standardized metadata, which allows records to be integrated into open repositories and comply with FAIR (Findable, Accessible, Interoperable, Reusable) principles.

This study also compares its findings with those of the Biotic Study of Hemisferios Biodiversity Reserve (Tirira & Cevallos, 2024), a document that was developed as a hypothesis of the biodiversity of the area. These initial findings corroborate and expand the validity of this preliminary study.

3. Results

During Phase 1 of this preliminary photo-trapping project conducted in the Hemisferios Biodiversity Reserve, the data predominantly consist of small bird and mammal species, including Tapirus pinchaque, Syntheosciurus granatensis, Canis lupus familiaris, Didelphis pernigra, Zentrygon frenata, and Buteo platypterus. It is noteworthy that the activity patterns of these species vary; however, the medium-sized species (Tapirus pinchaque, Canis lupus familiaris) documented tend to be active in the late afternoon and evening.

Image 2. Didelphis pernigra, Andean white-eared opossum record.

Image 2 shows the movement of a Didelphis pernigra individual recorded at 05:04 h, approximately one hour before sunrise, with an ambient temperature of 10 °C. The observations were made along a corridor that is part of the reserve's trail network, located approximately 500 m from the main scientific station.

Image 3. Record Zentrygon frenata, White-tailed Partridge Pigeon.

Image 3 shows the presence of Centrigon frenata (White-tailed Partridge Pigeon) along one of the main trails of the reserve. The individuals were recorded using a camera trap at 17:05 h, approximately 45 min before sunset, at an ambient temperature of 9 °C. The birds moved alone at the time of capture.

Image 4. Tapirus pinchaque, Andean lowland tapir record

Image 4 captures two individuals of Tapirus pinchaque recorded using a camera trap at 20:13 h at an ambient temperature of 15 °C. A presumed male appears in the foreground, followed by a female in the background, whose eyes are visible owing to infrared illumination. Based on expert assessment by a field biologist, the observed behavior may correspond to courtship activity. The direction of movement suggests that the individuals crossed the main trail from a secondary path, likely originating near the river, which may indicate access to a deeper section of the forest and a potential water source.

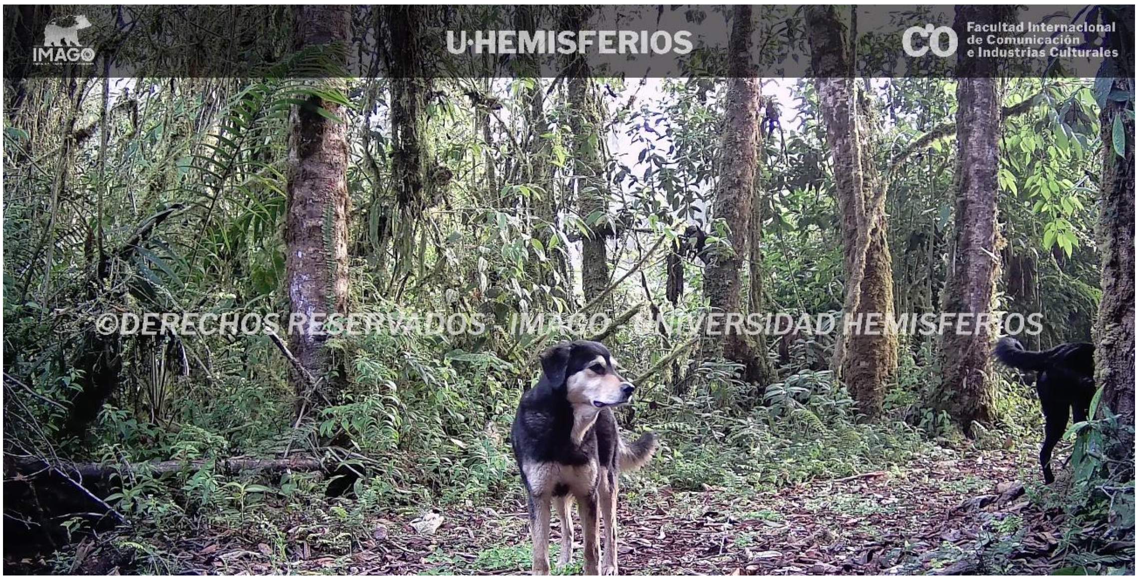
Image 5. Record of Buteo platypterus, Broad-winged Hawk-Eaglet

Image 5 depicts an individual Buteo platypterus (a raptor species) ingesting a giant earthworm, a relict species whose lineage dates back to the Jurassic period and is present within the reserve. This image is classified as a double-capture image because it documents the presence of two animal species. The event was recorded at 10:00 h at an ambient temperature of 24 °C along one of the reserve's main trails.

Image 6. Syntheosciurus granatensis, Red-tailed squirrel record

Image 6 shows an individual of Syntheosciurus granatensis (Red-tailed Squirrel) recorded at 15:06 h, at an ambient temperature of 17 °C. A notable aspect of this capture is the potential identification of the nesting site or den of the species. In the upper left corner of the image, a structure resembling a nest or burrow is visible, suggesting that this location may serve as a regular habitat for the observed individual and possibly for a group of squirrels.

Image 7. Registration Canis lupus familiaris, Domestic dog



Finally, Image 7 records two domestic dogs (Canis lupus familiaris), captured by the camera trap COM-3 at 17:34 h, with an ambient temperature of 9 °C, along one of the main trails of the reserve. This observation is one of the most concerning findings of this preliminary study of the faunal biota of the Universidad Hemisferios Reserve. The presence of these animals, classified as invasive species, is particularly alarming because of the territorial marking behavior displayed by one of the individuals (the second from the right), which may indicate potential hostility toward native wildlife. Although no human settlements exist within a five square kilometer radius of the recording site, this event suggests possible anthropogenic interference and raises urgent concerns regarding invasive species management and the implementation of more robust conservation and early detection strategies within the reserve.

4. Discussion

The integration of scientific conservation, technology, and communication has deepened significantly in the 21st century, transforming our approach into an environmental challenge. In our field of investigation, the studies conducted by Mea et al. (2016) and Wearn et al. (2019) have demonstrated that the use of technologies such as camera traps can be more effective in communicating actions for environmental protection, as well as in the development and implementation of public policies in this area.

Camera-trapping technologies have empowered scientists to monitor ecosystems, track wildlife populations, and educate global audiences with remarkable precision and efficiency. These advancements have not only enhanced our understanding of complex ecological processes but have also enabled the development of more targeted and effective conservation strategies. Scholars such as Ahumada et al. (2020) suggest that camera traps help “wildlife managers and other stakeholders have little information to effectively manage, understand, and monitor wildlife populations.”

Simultaneously, the rapid progress of communication technologies has profoundly transformed the way scientific knowledge is disseminated and how public engagement with conservation issues is fostered. Social media platforms, mobile applications, and interactive websites have created new avenues for scientists to share their findings with a global audience (Gatewood et al., 2019; Thapliyal et al., 2024), thereby increasing awareness of critical environmental issues and rallying support for conservation efforts (Wu et al., 2020). This synergy is further amplified by the use of camera traps, allowing researchers to directly engage with targeted audiences through audiovisual materials captured in wildlife settings (Green et al., 2020). In our study, the initial data obtained from deploying camera traps in the Hemisferios Biodiversity Reserve revealed a notable diversity of mammals (five species) and birds (two species) within a minimally disturbed humid montane ecosystem. The images captured in this preliminary exploratory sample highlight the presence of key species essential for ecological balance, some of which exhibit nocturnal or terrestrial behavior. These findings not only confirm the ecological richness of Napo province, as previously suggested by Cuesta et al. (2017) and Kleemann et al. (2021), but also offer new opportunities for the communicative application of this information, particularly in strategies aimed at raising environmental awareness.

In alignment with documented experiences in other contexts (Welbourne, 2015; Thomas et al., 2020), the findings from the Hemisferios Reserve corroborate the efficacy of phototrapping as a tool for recording elusive fauna, which is challenging to monitor through traditional methods. However, this study introduces an innovative dimension: the potential communicative value of visual records, consistent with contemporary approaches to educommunication and transmedia communication. Photographs not only serve the purpose of scientific documentation but also possess significant narrative and symbolic potential, facilitating the construction of narratives that emotionally engage diverse audiences, ranging from local communities to educational settings and digital platforms (Bubnicki et al., 2023; Lutkenhaus et al., 2019).

The obtained visual wealth can be transformed into a powerful didactic tool, generating messages that link scientific knowledge with citizen actions. Although such actions have not yet been implemented in this initial part of the study, the research team is developing scientific and community communication work that considers the possible positive impact of photographs on the conservation of local and endemic fauna.

However, this study has methodological limitations that must be recognized. The installation of only five cameras restricted spatial coverage, which may have reduced the detection of arboreal, aquatic, or low-population-density species. In addition, the sampling period did not include seasonal variations that could have modified the activity patterns of the recorded fauna. These methodological restrictions condition the scope of the findings and should be considered in future phases of the project.

This investigation further identified the presence of domestic or feral dogs within the facilities of the reserve. Previous studies conducted in analogous environments (Costanzi et al., 2021; Packer et al., 2024) have demonstrated that feral and domestic dogs can function as invasive predators, compete with native wildlife, alter their behavior, and transmit harmful diseases, particularly affecting medium and large carnivores. Their presence in the Hemisferios Biodiversity Reserve presents a significant challenge for population control and necessitates a comprehensive analysis of their behavioral patterns and interactions with other species. Studies conducted in Ecuador have demonstrated a correlation between the presence of feral dogs and the decline of mammal species (Reyes-Puig et al., 2023; Zapata-Ríos & Branch, 2016; Zapata-Ríos & Branch, 2018). In response to this issue—usually addressed within the fields of conservation and ecology in the country—the edu-communicative use of material collected by camera traps has the potential to develop awareness-raising projects about this situation, aiming to educate the public on the negative impacts of pet abandonment in protected areas. At the communication level, we propose the creation of a transmedia narrative centered on the reserve, wherein the images generated by camera traps serve as "narrative nodes" linked to social networks, educational workshops, and interactive materials for schoolchildren. Furthermore, actively engaging a region's youth in the interpretation and dissemination of these records can enhance community participation in conservation efforts, thereby promoting sustainable models of environmental justice.

5. Conclusions

The initial phase of the IMAGO project, conducted over a 15-day period using five camera traps along a transect near the Hemisferios Biodiversity Reserve Scientific Station, identified the presence of five mammalian and two avian species. These preliminary findings affirm the effectiveness of phototrapping as a method for detecting and monitoring species that are challenging to observe using conventional methods, highlighting both the ecological and communicative value of this technique for environmental conservation efforts. The project's success in capturing diverse wildlife within a short timeframe underscores the rich biodiversity of the area and its potential for further discoveries. Expanding this study to cover a larger area and longer duration could provide a more comprehensive understanding of local ecosystem and species interactions. Additionally, the visual evidence obtained through camera traps offers a powerful tool for raising public awareness and engaging stakeholders in conservation initiatives.

Indeed, the strategic utilization of captured images, a critical component of Phase 2 of the IMAGO project, has the potential to significantly enhance environmental awareness and education through visual narratives shared across various digital platforms. Research on educational innovation indicates that the incorporation of new technologies into the learning process enhances students' development of critical thinking skills (Mejía Corredor, 2023). This approach is consistent with the necessity to educate individuals who are aware of the challenges related to the conservation of natural habitats, achieved through the pedagogical application of photographic material obtained via camera traps. These actions can also be categorized as horizontal education processes, as the primary focus is the development of a socio-environmental discourse that arises from identifying local issues that impact everyone and necessitate local knowledge to effectuate meaningful change (Barranco Barroso & Bretones Peregrina, 2025).

However, it is advisable to extend the monitoring both temporally and spatially in subsequent phases to achieve a more comprehensive and representative record of the local biodiversity. This should include not only an increased number of camera traps but also an analysis of diurnal/nocturnal and seasonal patterns to identify factors that may influence research outcomes in the area. Additionally, it is imperative to assess the impact of anthropogenic factors, such as the presence of domestic or feral animals, given their potential to adversely affect ecological dynamics within protected areas.

References

Akindele, S. O. (2024). Exploring Trends of Digitalization in Natural Resources and Bio-Conservation Management. In *e-Proceedings of the Faculty of Agriculture International Conference* (pp. 9-18). https://journals.unizik.edu.ng/faic/article/view/3443

Ahumada, J. A., Fegraus, E., Birch, T., Flores, N., Kays, R., O'Brien, T. G., … Dancer, A. (2020). Wildlife Insights: A Platform to Maximize the Potential of Camera Trap and Other Passive Sensor Wildlife Data for the Planet. *Environmental Conservation, 47*(1), 1–6. doi: 10.1017/S0376892919000298

Alarcón Niño, G. (2014). *La educación como un proceso comunicativo: entre la bancarización, la persuasión y la dialogicidad. El caso de los estudiantes y docentes de grado cuarto del Colegio Distrital INEM "Francisco de Paula Santander", de la ciudad de Bogotá*. Pereira: Universidad Tecnológica de Pereira. https://hdl.handle.net/11059/5261

Apps, Peter J., & McNutt, J. (2008). How camera traps work and how to work them. *African Journal of Ecology 56*(4): 702-709. https://doi.org/10.1111/aje.12563

Arts, K., Van der Wal, R., & Adams, W. M. (2015). Digital technology and the conservation of nature. *Ambio, 44*, 661-673. https://doi.org/10.1007/s13280-015-0705-1

Barbas Coslado, Á. (2012). Educomunicación: desarrollo, enfoques y desafíos en un mundo interconectado. *Foro de Educación, 14*, 157-175. https://www.redalyc.org/pdf/4475/447544618012.pdf

Barragán, D.; Reyes, M.; Sulen M., Villarreal, A.; Ayala, K. & Zambrano, R. (2024). Generación de sistema para levantamiento exploratorio de información sobre la flora en la Hemisferios Biodiversity Reserve. *Revista Ibérica de Sistemas e Tecnologias de Informação E70*: 72-86. https://dialnet.unirioja.es/servlet/articulo?codigo=9886355

Brower, M. (2008). George Shiras and the circulation of wildlife photography. *History of photography, 32*(2), 169-175.

Bubnicki, J. W., Mann, C., Ossi, F., Liefting, Y., Linnell, J. D. C., Hendry, H., Baskauf, S. J., Fiderer, C., Casaer, J., Wieczorek, J., Stachowicz, I., Rowcliffe, M., Luskin, M. S., Tobler, M. W., Desmet, P., Kays, R., Hofmeester, T. R., Forrester, T. D., Seidenari, L., Milotic, T. (2023). Camtrap DP: an open standard for the FAIR exchange and archiving of camera trap data. *Remote Sensing in Ecology and Conservation, 10*(3), 283–295. https://doi.org/10.1002/rse2.374

Cole Burton, A., Neilson, E., Moreira, D., Ladle, A., Steenweg, R., Fisher, J. T., ... & Boutin, S. (2015). Wildlife camera trapping: a review and recommendations for linking surveys to ecological processes. *Journal of applied ecology, 52*(3), 675-685. https://doi.org/10.1111/1365-2664.12432

Báez, S., & Rosero, P. (2020). *Políticas públicas y gestión ambiental en Ecuador: Análisis y perspectivas*. Quito, Ecuador: Editorial Abya-Yala.

Barranco Barroso, R., & Bretones Peregrina, E. (2025). La participación educativa como herramienta para la reducción de desigualdades . *Revista Prisma Social*, (50), 79–101. https://revistaprismasocial.es/ps/article/view/5837

Carreira, S. (2024). Photography and biodiversity awareness. The use of images in conservation. *Mètode Science Studies Journal, 14*. https://doi.org/10.7203/metode.14.24705

Comisión Económica para América Latina y el Caribe. (2023). *La biodiversidad como impulsor de la transformación sostenible en América Latina y el Caribe*. http://bit.ly/43TAbch

Corbett, J. (2006). *Communicating Nature: How We Create and Understand Environmental Messages*. Island Press

Corva, D. M., Semianiw, N. I., Eichholtzer, A. C., Adams, S. D., Mahmud, M. A. P., Gaur, K., Pestell, A. J. L., Driscoll, D. A., & Kouzani, A. Z. (2022). A Smart Camera Trap for Detection of Endotherms and Ectotherms. *Sensors*, *22*(11), 4094. https://doi.org/10.3390/s22114094

Costanzi, L., Bassano, B., Masoero, L., Gennero, M. S., Dondo, A., Brambilla, A., Goria, M., & Di Blasio, A. (2021). Beware of dogs! Domestic animals as a threat for wildlife conservation in Alpine protected areas. *European Journal of Wildlife Research, 67*(4). https://link.springer.com/article/10.1007/s10344-021-01510-5

Cuesta, F., & Peralvo, M. (2016). Corredores de conservación: una oportunidad para la biodiversidad. http://hdl.handle.net/10644/9063

Cuesta, F., Peralvo, M., Merino-Viteri, A., Bustamante, M., Baquero, F., Freile, J. F., Muriel, P., & Torres-Carvajal, O. (2017). Priority areas for biodiversity conservation in mainland Ecuador. *Neotropical Biodiversity,* 3(1), 93–106. https://ikiam.researchcommons.org/neotropical-diversity/vol3/iss1/9

Cusack, J. J., Dickman, A. J., Rowcliffe, J. M., Carbone, C., Macdonald, D. W., & Coulson, T. (2015). Random versus game trail-based camera trap placement strategy for monitoring terrestrial mammal communities. *PloS one*, *10*(5), e0126373. https://doi.org/10.1371/journal.pone.0126373

Day, B. y Monroe, M. (Eds). (2000). *Environmental Education & Communication for a Sustainable World: Handbook for International Practitioners*. Academy for Educational Development. https://unesdoc.unesco.org/ark:/48223/pf0000135105.locale=es

Degeling, D., & Koolen, R. (2021). Communicating Climate Change to a Local but Diverse Audience: On the Positive Impact of Locality Framing. *Environmental Communication*, *16*(2), 243–261. https://doi.org/10.1080/17524032.2021.1998177

du Preez, B. D., Loveridge, A. J., & Macdonald, D. W. (2014). To bait or not to bait: a comparison of camera-trapping methods for estimating leopard Panthera pardus density. *Biological Conservation, 176*, 153-161. https://doi.org/10.1016/j.biocon.2014.05.021

Espartosa, K. D., Pardini, R., & Pinotti, B. T. (2011). Performance of camera trapping and track counts for surveying large mammals in rainforest remnants. *Biodiversity and Conservation, 20*(12), 2815–2829. https://link.springer.com/article/10.1007/s10531-011-0110-4

FAO. (2023). *Conservación y uso sostenible de la diversidad biológica en América Latina*. http://bit.ly/3T1tX3J

Feinberg, M., & Willer, R. (2012). The Moral Roots of Environmental Attitudes. *Psychological Science, 24*(1), 56–62. https://doi.org/10.1177/0956797612449177

Freire, P. (1970). *Pedagogy of the Oppressed*. New York: Continuum.

Freire, P. (1973). *Education for Critical Consciousness*. New York: Seabury Press.

Gatewood, J., Moore, J. B., Singletary, C. R., Vidrascu, E., & Monks, S. L. (2019). Social Media in Public Health: Strategies to Distill, Package, and Disseminate Public Health Research. *Journal of Public Health Management and Practice, 26*(5), 489–492. DOI: 10.1097/PHH.0000000000001096

Gracanin, A., Minchinton, T. E., & Mikac, K. M. (2022). Estimating the density of small mammals using the selfie trap is an effective camera trapping method. *Mammal Research, 67*(4), 467-482. https://doi.org/10.1007/s13364-022-00643-5

Green, S. E., Rees, J. P., Stephens, P. A., Hill, R. A., & Giordano, A. J. (2020). Innovations in Camera Trapping Technology and Approaches: The Integration of Citizen Science and Artificial Intelligence. *Animals, 10*(1), 132. https://doi.org/10.3390/ani10010132

Gujjar, S. V., & Bhat, U. S. S. (2023). Wildlife Detection Using Convolutional Neural Network. *International Journal of Science Engineering and Technology, 7*. *https://www.researchgate.net/publication/324960511_Wild_Animal_Detection_Using_Deep_Convolutional_Neural_Network*

Hansen, A. (2011). Communication, media and environment: Towards reconnecting research on the production, content and social implications of environmental communication. International *Communication Gazette, 73*(1-2), 7-25. https://doi.org/10.1177/1748048510386739

Hanisch, E., Johnston, R., & Longnecker, N. (2019). Cameras for conservation: wildlife photography and emotional engagement with biodiversity and nature. *Human Dimensions of Wildlife, 24*(3), 267–284. https://doi.org/10.1080/10871209.2019.1600206

IPCC. (2023). *Cambio Climático 2023: Informe de síntesis*. http://bit.ly/4n5JGg5

Jackiw, E., & Haracemiv, S. (2021). Educomunicação e alfabetização midiática: diálogos freireanos na América Latina. *Praxis Educativa, 16*, 1-21. https://doi.org/10.5212/PraxEduc.v.16.16614.031

Janisch, J., Mitoyen, C., Perinot, E., Spezie, G., Fusani, L., & Quigley, C. (2021). Video recording and analysis of avian movements and behavior: insights from courtship case studies. *Integrative and Comparative Biology, 61*(4), 1378-1393. https://doi.org/10.1093/icb/icab095

Kaplún, M. (2002). *Una pedagogía de la comunicación*. La Habana: Editorial Caminos.

Ke, L., Sadler, T.D., Zangori, L. et al. (2021). Developing and Using Multiple Models to Promote Scientific Literacy in the Context of Socio-Scientific Issues. *Science & Education 30*, 589–607. https://doi.org/10.1007/s11191-021-00206-1

Kelly, M. J. (2008). Design, evaluate, refine: camera trap studies for elusive species. *Animal Conservation, 11*(3). https://doi.org/10.1111/j.1469-1795.2008.00179.x

Kelly, M. J., & Holub, E. L. (2008). Camera trapping of carnivores: trap success among camera types and across species, and habitat selection by species, on Salt Pond Mountain, Giles County, Virginia. *Northeastern naturalist, 15*(2), 249-262. https://www.jstor.org/stable/25177104

Kim, I., Hammond, M. D., y Milfont, T. L. (2023). Do environmental messages emphasising binding morals promote conservatives' pro-environmentalism? A pre-registered replication. *Social Psychological Bulletin, 18*. https://doi.org/10.32872/spb.8557

Kim, Y. y Chon, M.-G. (2022). Exploring Effects of Message Framing on Supportive Behaviors Toward Environmental Corporate Social Responsibility. *College of Communication Faculty Research and Publications, 588*. DOI: 10.1108/CCIJ-01-2022-0003

Kleemann, J., Koo, H., Hensen, I., Mendieta-Leiva, G., Kahnt, B., Kurze, C., Inclan, D. J., Cuenca, P., Noh, J. K., Hoffmann, M. H., Factos, A., Lehnert, M., Lozano, P., & Fürst, C. (2021). Priorities of action and research for the protection of biodiversity and ecosystem services in continental Ecuador. *Biological Conservation, 265*, 109404. https://doi.org/10.1016/j.biocon.2021.109404

Kucera, T.E., Barrett, R.H. (2011). A History of Camera Trapping. In: O'Connell, A.F., Nichols, J.D., Karanth, K.U. (eds) *Camera Traps in Animal Ecology*. Springer, Tokyo. https://doi.org/10.1007/978-4-431-99495-4_2

Lazard, A., & Atkinson, L. (2015). Putting Environmental Infographics Center Stage: The Role of Visuals at the Elaboration Likelihood Model's Critical Point of Persuasion. *Science Communication, 37*(1), 6-33. https://doi.org/10.1177/1075547014555997

Leorna, S., & Brinkman, T. (2022). Human vs. machine: Detecting wildlife in camera trap images. *Ecological Informatics, 72*, 101876. https://doi.org/10.1016/j.ecoinf.2022.101876

Lutkenhaus, R. O., Jansz, J., & Bouman, M. P. A. (2019). Toward spreadable entertainment-education: leveraging social influence in online networks. *Health Promotion International, 35*(5), 1241–1250. https://doi.org/10.1093/heapro/daz104

Mea, M., Borja, A., Alonso, C., Newton, A., & Uyarra, M. C. (2016). From Science to Policy and Society: Enhancing the Effectiveness of Communication. *Frontiers in Marine Science, 3*. doi: 10.3389/fmars.2016.00168

Meek, P., Ballard, G., Fleming, P., & Falzon, G. (2016). Are we getting the full picture? Animal responses to camera traps and implications for predator studies. *Ecology and evolution, 6*(10), 3216-3225. https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.2111

Mejía Corredor, C., Said-Hung, E., & Gómez Ardila, S. E. (2023). La investigación en educación: Innovación pedagógica y educación virtual. *Revista Prisma Social*, (41). Recuperado a partir de https://revistaprismasocial.es/ps/article/view/5113

Mills, C. A., Godley, B. J., & Hodgson, D. J. (2016). Take only photographs, leave only footprints: novel applications of non-invasive survey methods for rapid detection of small, arboreal animals. *PLoS One, 11*(1), e0146142. https://doi.org/10.1371/journal.pone.0146142

Mills, D., Fattebert, J., Hunter, L., & Slotow, R. (2019). Maximising camera trap data: Using attractants to improve detection of elusive species in multi-species surveys. *PloS one, 14*(5), e0216447. https://doi.org/10.1371/journal.pone.0216447

Nichols, J.D., Karanth, K.U., O'Connell, A.F. (2011). Science, Conservation, and Camera Traps. In: O'Connell, A.F., Nichols, J.D., Karanth, K.U. (eds) *Camera Traps in Animal Ecology*. Springer, Tokyo. https://doi.org/10.1007/978-4-431-99495-4_4

Nipko, R. B., Holcombe, B. E., & Kelly, M. J. (2020). Identifying individual jaguars and ocelots via pattern-recognition software: comparing HotSpotter and Wild-ID. *Wildlife Society Bulletin, 44*(2), 424-433. https://doi.org/10.1002/wsb.1086

Ortiz Jaramillo, D. (2023). La influencia de la Educomunicación y comunicación educativa sobre los temas medioambientales. *Green World Journal,6*(3), 094. http://bit.ly/3FXMFGC

Packer, J., Kohler, M., Dawson, D., Asad, N., von der Borch, R., & Chur-Hansen, A. (2025). Why do people walk their dog where the wild things are? A qualitative content analysis from an urban nature reserve. *People and Nature, 7*, 15–31. https://doi.org/10.1002/pan3.10758

Podkalicka, A., Nilsson, D., & Troon, S. (2024). Popular Environmental Media in Australia: Reflections on Audience Engagement and Impact. *Media International Australia, 0*(0). http://bit.ly/4kP5WsM

Rajeswari, M; Kumari, A.; Geethanjali, P; Gujjar, S. & Bhat, S. (2023). Wildlife Detection Using Convolutional Neural Network. *International Journal of Science, Engineering and Technology, 11*(4). https://www.ijset.in/wp-content/uploads/IJSET_V11_issue4_469.pdf

Reyes-Puig, JP.; Reyes-Puig, C.; Pacheco-Esquivel, J.M; Recalde, S.; Recalde, F.; Recalde, D.; Salazar, J.; Peña, E.; Paredes, S.; Robalino, M.; Flores, F.; Paredes, V.; Sailema, E.; Ríos-Alvear, G. (2023). First insights in terrestrial mammals monitoring in the Candelaria and Machay Reserves in the Ecuadorian Tropical Andes. *Biodiversity Data Journal* 11:e98119. doi: 10.3897/BDJ.11.e98119

Reyserhove, L., Norton, B., & Desmet, P. (2023). *Best practices for managing and publishing camera trap data (Version 1.0)*. GBIF Secretariat. http://bit.ly/44dgNWt

Rich, L. N., Miller, D. A., Robinson, H. S., McNutt, J. W., & Kelly, M. J. (2016). Using camera trapping and hierarchical occupancy modelling to evaluate the spatial ecology of an African mammal community. *Journal of Applied Ecology, 53*(4), 1225-1235. https://doi.org/10.1111/1365-2664.12650

Seddon, N., Berry, P., Turner, B., Chausson, A., Smith, A., & Girardin, C. A. J. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B: Biological Sciences, 375*(1794), 20190120. https://doi.org/10.1098/rstb.2019.0120

Silver, S. C., Maffei, L., Noss, A. J., Gómez, H., Kelly, M. J., Ostro, L. E. T., Wallace, R. B., Ayala, G., & Marsh, L. K. (2004). The use of camera traps for estimating jaguar Panthera onca abundance and density using capture/recapture analysis. *Oryx, 38*(2), 148–154. http://bit.ly/466n1dh

Silvestro, D., Goria, S., Sterner, T., & Antonelli, A. (2022). Improving biodiversity protection through artificial intelligence. *Nature sustainability*, 5(5), 415-424. https://doi.org/10.1038/s41893-022-00851-6

Teixeira, D., Roe, P., van Rensburg, B. J., Linke, S., McDonald, P. G., Tucker, D., & Fuller, S. (2024). Effective ecological monitoring using passive acoustic sensors: Recommendations for conservation practitioners. *Conservation Science and Practice, 6*(6), e13132. https://doi.org/10.1111/csp2.13132

Thapliyal, K., Thapliyal, M., & Thapliyal, D. (2024). *Social Media and Health*. igi global. http://bit.ly/4lkER0J

Thomas, M. L., Baker, A. M., Beattie, J. R., & Baker, L. (2020). Determining the efficacy of camera traps, live capture traps, and detection dogs for locating cryptic small mammal species. *Ecology and Evolution, 10*(2), 1054–1068. https://doi.org/10.1002/ece3.5972

Tirira, D. & Cevallos, D. (2024). *Levantamiento y diagnóstico biótico de la Reserva de Biodiversidad Hemisferios, Napo, Ecuador*. Quito: Universidad Hemisferios.

Vieira Ribeiro, Vera Cristina. (2022). La educomunicación y su aplicación en el contexto audiovisual y digital. *Alcance, 11*(28), 53-70. http://bit.ly/4jVdvgj

Vélez, J., McShea, W., Shamon, H., Castiblanco-Camacho, P. J., Tabak, M. A., Chalmers, C., ... & Fieberg, J. (2023). An evaluation of platforms for processing camera-trap data using artificial intelligence. *Methods in Ecology and Evolution, 14*(2), 459-477. https://doi.org/10.1111/2041-210X.14044

Wearn, O. R., & Glover-Kapfer, P. (2017). *Camera-trapping for conservation: A guide to best-practices (WWF Conservation Technology Series, 1[1])*. WWF-UK. http://bit.ly/447LgoH

Wearn, O. R., & Glover-Kapfer, P. (2019). Snap happy: camera traps are an effective sampling tool when compared with alternative methods. *Royal Society Open Science, 6*(3), 181748. https://doi.org/10.1098/rsos.181748

Welbourne, D. J., Claridge, A. W., Paull, D. J., & Lambert, A. (2016). How do passive infrared triggered camera traps operate and why does it matter? Breaking down common misconceptions. *Remote Sensing in Ecology and Conservation, 2*(2), 77–83. https://doi.org/10.1002/rse2.20

Welbourne, D. J., Paull, D., Lindenmayer, D. B., & Macgregor, C. (2015). The effectiveness and cost of camera traps for surveying small reptiles and critical weight range mammals: a comparison with labour-intensive complementary methods. *Wildlife Research, 42*(5), 414. https://doi.org/10.1071/WR15054

Wibeck, V. (2013). Enhancing learning, communication and public engagement about climate change – some lessons from recent literature. *Environmental Education Research, 20*(3), 387–411. https://doi.org/10.1080/13504622.2013.812720

Wilson, A. D., Wikelski, M., Wilson, R. P., & Cooke, S. J. (2015). Utility of biological sensor tags in animal conservation. *Conservation Biology, 29*(4), 1065-1075. https://doi.org/10.1111/cobi.12486

Wu, Y., Sheng, H., Liu, W., Xie, L., Yuan, Z., & Jiang, S. (2020). Investigating public biodiversity conservation awareness based on the propagation of wildlife-related incidents on the Sina Weibo social media platform. *Environmental Research Letters, 15*(9), 094082. https://iopscience.iop.org/article/10.1088/1748-9326/ab9ed1

Zapata-Ríos, G. & Branch, L. (2016). Altered activity patterns and reduced abundance of native mammals in sites with feral dogs in the high Andes. *Biological Conservation 193*. https://doi.org/10.1016/j.biocon.2015.10.016

Zapata-Ríos, G. & Branch, L. (2018) Mammalian carnivore occupancy is inversely related to presence of domestic dogs in the high Andes of Ecuador. *PLOS ONE 13*(2): e0192346. https://doi.org/10.1371/journal.pone.0192346