Project Name: Mitigating Pathogen Transmission at the Human-Domestic Animal-Wild Carnivore Interface in the Threatened Tumbesian Dry Forest Ecosystem

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1. Project Summary

The Tumbesian Dry Forest is a Critically Endangered ecosystem, distributed from southern Ecuador to northern Peru. The land use change in certain areas is leading to the coexistence of its native carnivores with free-ranging dogs and cats. Our previous data indicates that a low vaccination rate and ectoparasites are significant health concerns among domestic carnivores in the surrounding rural communities. This study will contribute to determining the exposure of pathogens and ectoparasites in domestic carnivores with implications on native carnivore health. In addition, our sanitary improvement initiative in domestic carnivores will prevent a future cross-transmission with native carnivores.

2. Objectives

- **Objective 1:** Characterize the demographics of domestic dogs and cats, and evidence of interaction with wild carnivores.
- **Objective 2:** Determine the seroprevalence of CDV that may impact the health of native carnivores, circulating in dogs within the rural communities surrounding the Tumbesian dry forest remnants.
- **Objective 3:** Identify the ectoparasites capable of transmitting vector-borne bacterias circulating in domestic dogs and cats within the rural communities surrounding the Tumbesian dry forest remnants.
- **Objective 4:** Execute an intervention strategy designed to enhance the health condition of free-ranging dogs and cats in the rural communities, thereby reducing the potential threat of cross-species transmission between domestic and native carnivores.

3. Performed activities

- **May - June 2025:** a total of 503 households were surveyed across the localities of Salmuche, La Banda, Tecapa, Santonte, and Santa María (Figure 1 a,b).

- **August 2025:** we collaborated with the Municipality of Cascas—the province in which the community of Salmuche is located—to conduct an educational outreach activity aimed at promoting the cultural and ecological value of the region's native fauna, with a particular focus on small and medium-sized carnivores (Figure 2 a,b).

- **October 2025:** the project team participated in the IX Congreso Regional Forestal – COREFOR 2025 – SINIA, held on October 9–11, 2025, (https://sinia.minam.gob.pe/novedades/ix-congreso-regional-forestal-corefor-2025) where we presented the ongoing challenges associated with limited sanitary management of companion animals in rural settings and its potential negative effects on native wildlife (Figure 3).

- **January 2026:** Blood sample collection and ectoparasite assessment in dogs from rural communities (Figure 4 a,b and Figure 5).

- **January - February 2026:** Sanitary vaccination campaign in domestic dogs from rural communities (Figure 6 a,b).

- **February - March 2026:** Processing of blood samples from dogs in rural communities for indirect immunofluorescence testing of CDV.

4. Results

- **Objective 1:**

239 domestic animals were reported, consisting of 167 dogs and 72 cats.

- **Domestic dogs**

Among the dogs, 67% were males and 33% were females. Most dogs in these communities are kept for companionship, security, and herding purposes. Regarding roaming behavior, 45.5% of all dogs were reported to roam freely outside the household at all times, increasing the likelihood of encounters with wildlife. Furthermore, behavioral data collected revealed direct interactions with wildlife. Specifically: 6.9% had been observed hunting birds, 15% hunting lizards, 3.1% hunting opossums, 6.2% hunting native carnivores.

Health-related findings showed that 31.73% of dogs did not have up-to-date vaccinations, and 47.9% presented visible ectoparasites at the time of the survey. These indicators highlight potential risks for pathogen transmission between domestic animals and native carnivore species.

- **Domestic Cats**

A total of 72 cats were identified across the surveyed households, consisting of 32 males and 38 females.

In these communities, cats are primarily kept for companionship and as rodent pest controllers.

Regarding interactions with wildlife, 41% of cats were observed hunting birds, while 20.8% were reported hunting lizards. Additionally, 79% of the cat population had free access outdoors throughout the entire day, increasing the likelihood of encounters with native fauna.

Concerning sanitary status, 91.6% of cats did not have up-to-date vaccinations, and 37.5% presented visible ectoparasites. These conditions represent a significant sanitary risk for native carnivore species, particularly if free-roaming cats access nearby forested areas.

- **Objective 2: CDV Seroprevalence Assessment**

Domestic dogs from communities surrounding the seasonally dry forest ecosystem of Salmuche and San Jose were sampled. Only dogs aged ≥4 months with no history of vaccination against Canine distemper or dogs that had received their last vaccination against Canine distemper at least one year prior to sampling were included in the study, in order to avoid interference with serological results (Figure 2).

A total of 33 out of 72 dogs tested positive, resulting in a seroprevalence of 45.8% (95% CI: 34.4–57.3%). The relatively wide confidence interval reflects the sample size; however, the results still indicate high exposure to the virus in the studied population.

Dogs were categorized into two groups based on their degree of movement restriction: (i) low-risk (confined or supervised dogs), and (ii) high-risk (partially or fully free-roaming dogs). Preliminary results revealed that dogs with free-roaming behavior had approximately 5 times higher odds of exposure to canine distemper virus compared to confined or supervised dogs.

	positive dogs	negative dogs	Total
High-risk	25	15	40
Low-risk	8	24	32

- **Objective 4: Sanitary Improvement Initiative**

  - **Workshops and education activities:**

    On August 25, 2025, we collaborated with the Municipality of Cascas—the province in which the community of Salmuche is located—to conduct an educational outreach activity aimed at promoting the cultural and ecological value of the region's native fauna, with a particular focus on small and medium-sized carnivores. The activity also emphasized the importance of canine rabies vaccination and the need to maintain adequate sanitary care of domestic pets to reduce potential negative impacts on wildlife and improve community public health awareness (Image 5, 6).

    As part of the sanitary improvement component of the project, we secured the acquisition of 100 vaccine doses and received a donation of veterinary medications from the NGO ARBA, enabling the implementation of a free sanitary campaign for domestic dogs and cats in the rural communities of the study area. Additionally, the project team participated in the IX Congreso Regional Forestal – COREFOR 2025 – SINIA, held on October 9–11, 2025, (https://sinia.minam.gob.pe/novedades/ix-congreso-regional-forestal-corefor-2025) where we presented the ongoing challenges associated with limited sanitary management of companion animals in rural settings and its potential negative effects on native wildlife. This presentation, delivered before regional environmental authorities, contributed to raising awareness about the need for strengthened community-based animal health programs (image 7).

  - **Preventive vaccination campaign**:

    In January and February, a total of 86 dogs were vaccinated across the study communities as part of targeted sanitary campaigns aimed at reducing the risk of pathogen transmission between domestic animals and wildlife in the seasonally dry forest ecosystem.

5. Main Operational Challenges Encountered

The main challenges we faced included delays in the procurement of laboratory reagents by the Universidad Nacional Mayor de San Marcos. Purchases are made only on specific dates, and the final acquisition of the year takes place in November. As a result, the laboratory materials required for the indirect immunofluorescence tests for Distemper will only arrive in January 2026, making it impossible to conduct sampling beforehand.

Additionally, obtaining ethical committee approval for conducting interviews with local residents and collecting samples from animals was essential before initiating any of

our activities. This process began in November 2024 and was managed by Micaela de La Puente, a professional on our team affiliated with Universidad Peruana Cayetano Heredia. However, due to bureaucratic issues within the institution, the approval letters were only issued on April 14, 2025, which significantly altered our activity schedule.

In San Pedro de Vice (Piura region), the implementation of project activities was affected by limited engagement from local authorities. Despite our initial efforts, there was no formal confirmation of logistical support or institutional backing from the municipality, which constrained the execution of household surveys and planned sanitary campaigns.

6. Appendices

Figure 1.- Survey activities on canine and feline demography and human perceptions of wild carnivores in the Tumbesian dry forest, conducted in rural communities of Salmuche and San José. © Alejandro Pereda, 2025

Figure 2.- Blood sampling and field processing of samples for the study of CDV pathogens. © Alejandro Pereda, 2025

Figure 3.- Workshop with regional authorities (IX Congreso Regional Forestal – COREFOR 2025 – SINIA). © Conservacción NGO, 2025

Figure 4.- Blood sampling and field processing of samples for the study of CDV pathogens. © Alejandro Pereda, 2026

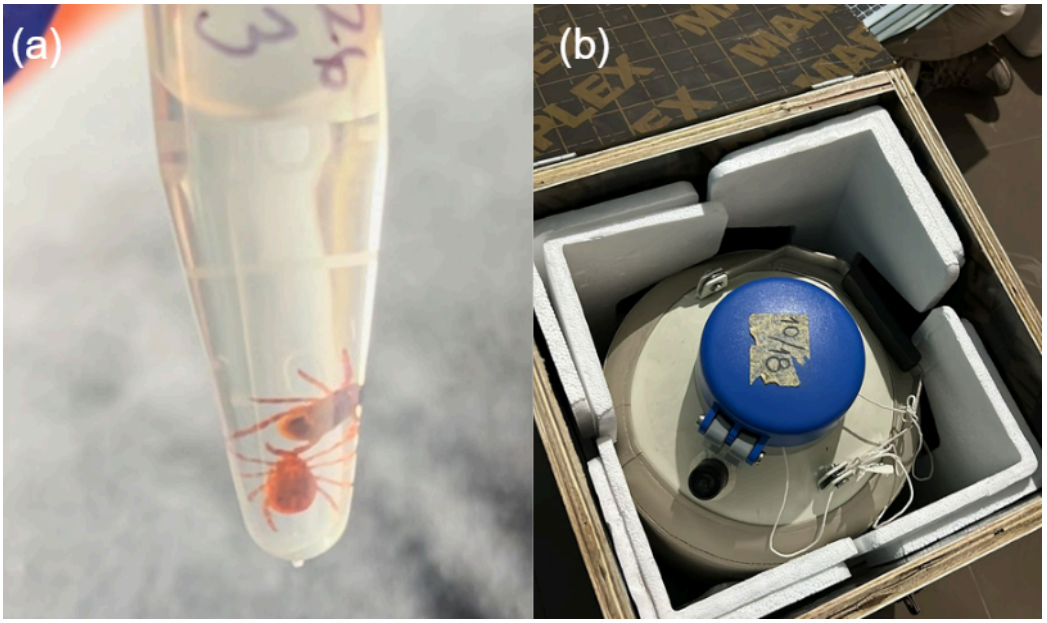

Figure 5.- Ectoparasites were stored in ethanol and serum, plasma, and whole blood samples were stored in liquid nitrogen tanks for cryopreservation and transport to the laboratory. © Conservacción, 2026

Figure 6.- Sanitary vaccination campaign in domestic dogs from rural communities. © Conservacción, 2026