March 2026

# 2025 Update: Osa Ridge to Reef program

Field Partner: Osa Conservation

We wanted to thank you again for your support for this project and update you on what was accomplished in 2025.

First, the overview: Through a fusion of restoration, connectivity, community engagement, enforcement support, and science, Osa Conservation is demonstrating how integrated conservation strategies can reduce fragmentation, accelerate ecosystem recovery, strengthen local stewardship, and guide replicable solutions for biodiversity and climate resilience across tropical Central America.

2025 highlights:

- **Restoration delivered at landscape scale:** 294,971 trees were planted in 2025 (166,971 terrestrial and 128,000 mangrove). This was Osa Conservation's biggest planting season to date. The cumulative total since 2022 is 839,414 trees planted.
- **Farms for Nature** validated a finance-meets-biodiversity pathway: The **debt-for-biodiversity** approach progressed from concept to on-the-ground implementation (farms selected, funds disbursed, designs completed, restoration implemented), laying groundwork for a scalable model that rewards measurable biodiversity outcomes.
- The **arboreal bridge** program expanded to 36 total bridges with six newly installed in 2025. Monitoring has documented 15+ species using bridges—including sensitive and threatened primate species.
- **Community stewardship scaled through citizen science**: The AmistOsa Biodiversity Survey strengthened local monitoring capacity via iNaturalist: 7 workshops in 5 communities engaged 158 participants, generating 10,529 new biodiversity entries and 593 newly recorded species.
- **Enforcement support and environmental justice**: Osa Conservation delivered training with a practical guide for environmental crime reporting, including a workshop for 44 park rangers. Training included real-time documentation via EarthRanger of trespass and threats like illegal gold-mining and illegal fishing.
- **Sustainable livelihoods that reinforce protection**: Ridge-to-Reef work worked to develop locally led economic pathways. 68 youth received practical training in ecotourism skills that strengthens employability while deepening stewardship of natural resources. 72 local fishing association members were contracted as restoration partners in Térraba-Sierpe for paid work in wetland recovery and mangrove honey beekeeping.
- **Science**: Osa Conservation published 15 peer-reviewed scientific papers, transforming on-the-ground conservation into proven, shareable approaches. This growing body of science strengthens our ability to scale what works across the tropics by converting field learning into tested methods that partners can confidently replicate.

- **Major wildlife capture milestones**: This year, Baby (young male jaguar), Suxo (female puma), and Mami (female ocelot) were captured and collared—a breakthrough for understanding predator movement, habitat selection, and coexistence in highly competitive, human-modified landscapes.

## Ridge to Reef, going forward

Biome is proud of the truly amazing progress and accomplishments of the Ridge to Reef program. We have supported it and a precursor project since 2018.

As of early 2026, following recent leadership changes, Biome conducted a review and, at this time, does not yet have a clear understanding of the direction of the new leadership. As a result, the responsible course of action is to pause funding until there is greater clarity. We remain hopeful that we will gain the information needed to have full confidence that the program will continue to operate at a high level, and we may re-engage in the future.

**Thank you for your support for this project!** Please let us know if you have questions or would like to discuss this project or receive further information.

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*An appendix with photos follows...*

# APPENDIX

***Figure 1:*** *Restoration crews discuss baseline soil sampling with a Farms for Nature farm manager and family. The program provides micro-loans to support biodiversity-friendly practices over five years, with progress tracked through biodiversity credits that can reduce or forgive loan debt based on results.*


***Figure 2:*** *Local farmers participate in a hands-on workshop on planning, land-use capacity, and the value of natural resources. Participants brainstormed and co-developed practical, sustainable farm plans that support both production and ecosystem health.*

***Figure 3:*** *Native, threatened, and rare trees are planted on a Restoration Network farm to control erosion, improve water quality, and increase shade and biodiversity. Stakes are placed beside each tree to make future maintenance and monitoring easier.*

***Figure 4:*** *Bird's-eye view of the Osa Verde Native Plant Nursery—one of six nurseries strategically located along an elevational gradient across our working landscape. Osa Conservation propagates more than 315 native tree species and maintains nursery inventories of over 100,000 seedlings year-round.*

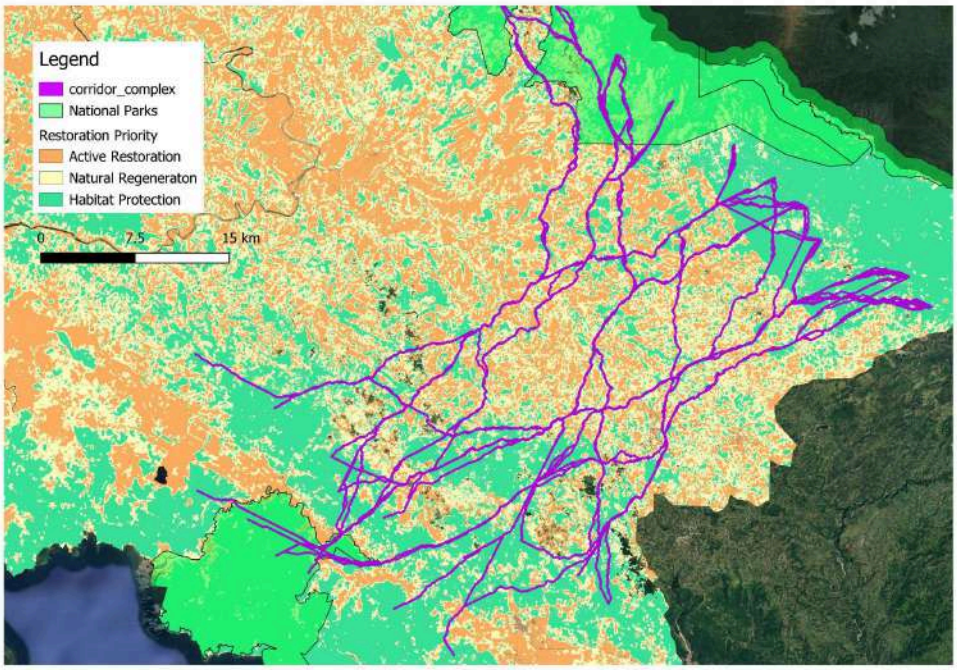


***Figure 5:*** *To increase our efficiency and impact, our new spatial restoration plan includes planting with a 'corridor complex' comprising of multiple individual corridors (purple) optimized to link national parks (light green) with restoration priorities, including: active restoration sites; (orange); natural regeneration areas (yellow); and standing high quality forest (dark green).*

***Figure 6:*** *Local restoration field crews remove negraforra fern in preparation for mangrove propagule planting. These dense patches of negraforra increase sedimentation, alter hydrology, and decrease biodiversity.*

***Figure 7:*** *Local fishing associations, contracted as restoration partners, plant mangrove propagules in the Térraba-Sierpe National Wetland—creating local jobs while advancing long-term wetland recovery and coastal resilience.*

***Figure 8:*** *Christian Peralta, Osa Conservation Mangrove Co-Coordinator, and Orlando Salazar, Restoration Team & Community Monitoring Leader, stand in the first ever Osa Conservation mangrove restoration site, planted in 2018. The mangroves here now fill the canopy and are self propagating.*

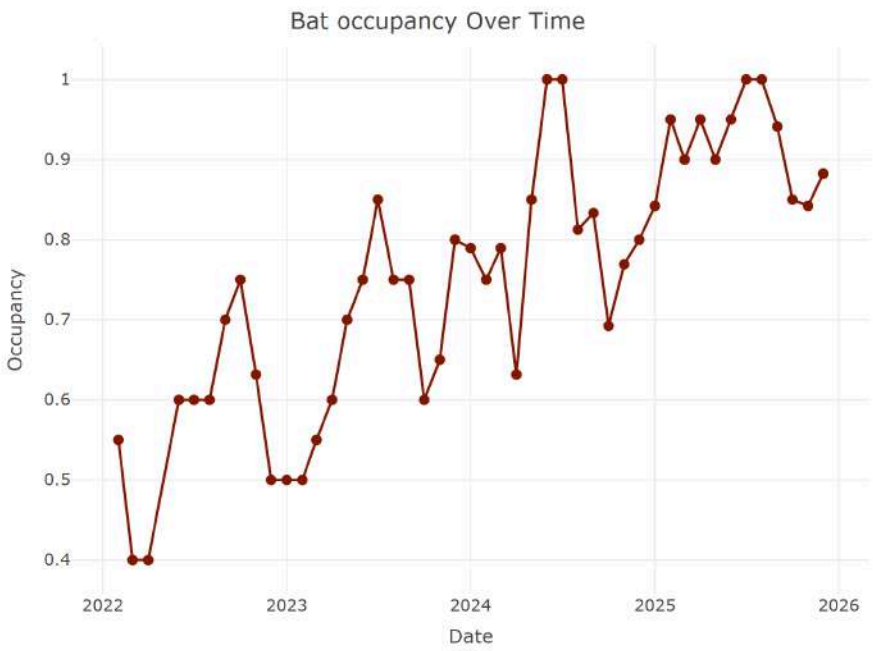


***Figure 9.*** *Overall bat occupancy through time of bat boxes in our restoration plot experiment near Piro Biological Station (Osa). Data from January 2022 to December 2025 show an upward trend in occupancy, indicating increasing use of artificial roost structures by local bat populations. Continued evidence of presence and reproduction demonstrates the value of artificial roost structures in supporting bat populations and advancing ecosystem restoration and rewilding.*

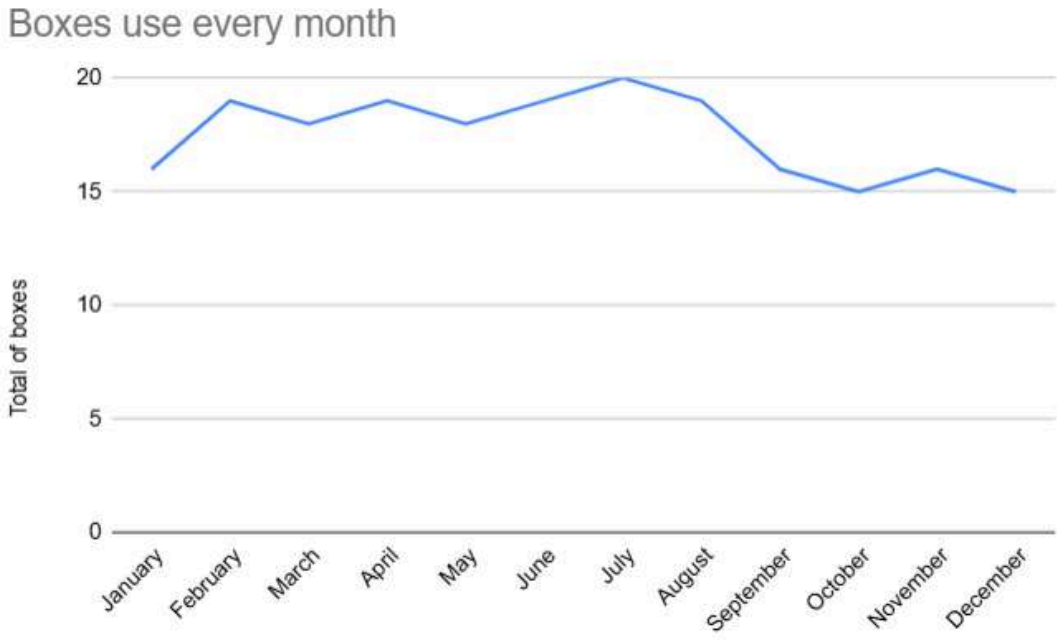


***Figure 10.*** *Overall bat occupancy through 2025 year of bat boxes in our restoration plot experiment near Piro Biological Station (Osa). Showing a potential correlation pattern occupancy between dry and rainy season.*

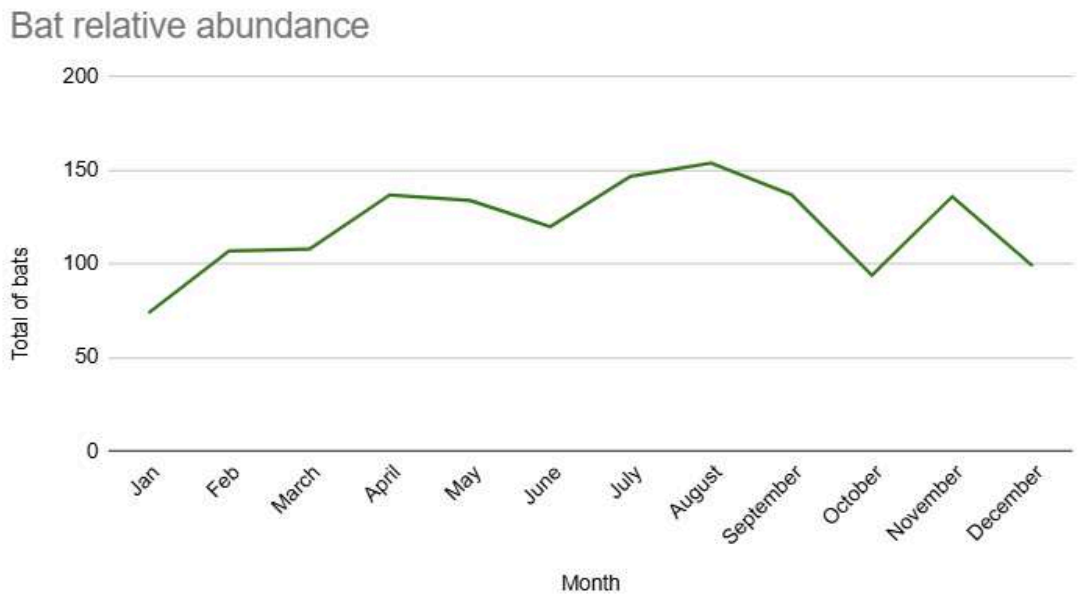


***Figure 11.*** *Overall bat relative abundance through 2025 of bat boxes in our restoration plot experiment near Piro Biological Station (Osa). Continued evidence of presence and reproduction demonstrates the value of artificial roost structures in supporting bat populations and advancing ecosystem restoration and rewilding.*

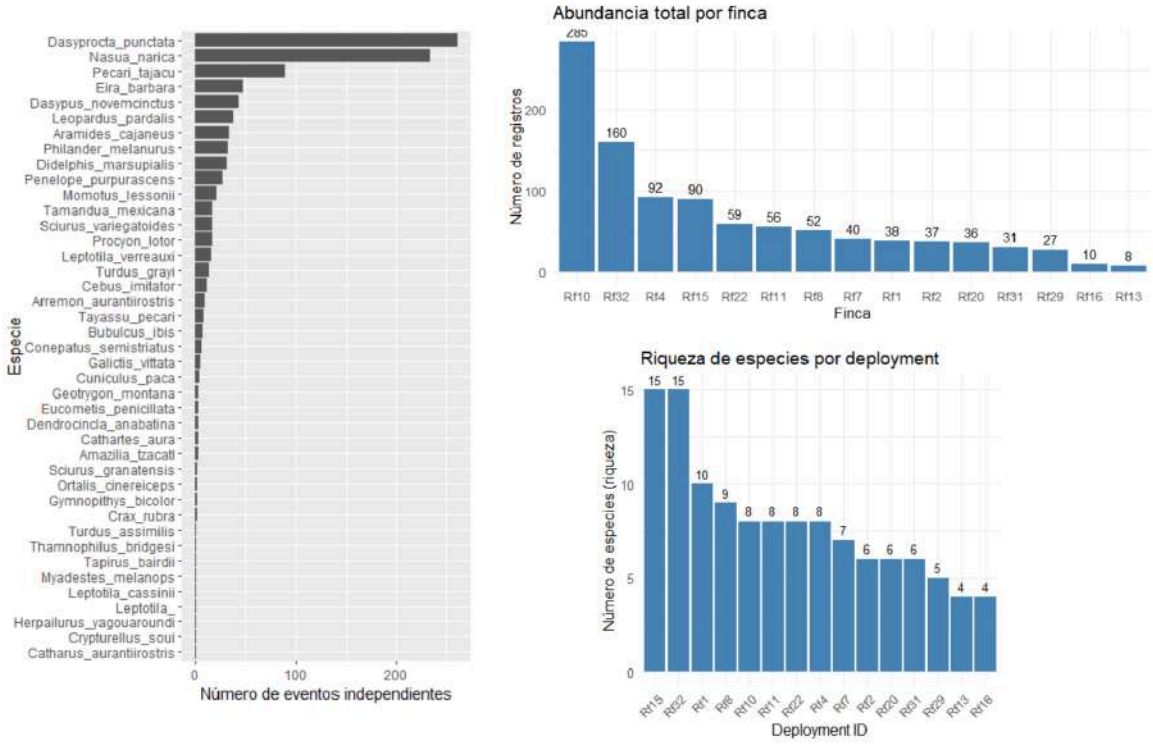


***Figure 12****. Camera trap monitoring on restored farms across the Ridge to Reef landscape (2024–2025) catalogued 4,347 images in Wildlife Insights; 2,511 contained wildlife, documenting 37 mammal and bird species. The most commonly detected species were white-nosed coati and Central American agouti.*


***Figure 13.*** *Infographic created to share with the land owners showcases camera trap results of biodiversity monitoring on one of the farms of the Restoration Farm Network.*

***Figure 14.*** *Wildlife Program Coordinator Paulina Rodriguez setting up and training Osa Conservation caretaker Jose Angel Montiel to install a camera trap for longer term monitoring of terrestrial wildlife.*

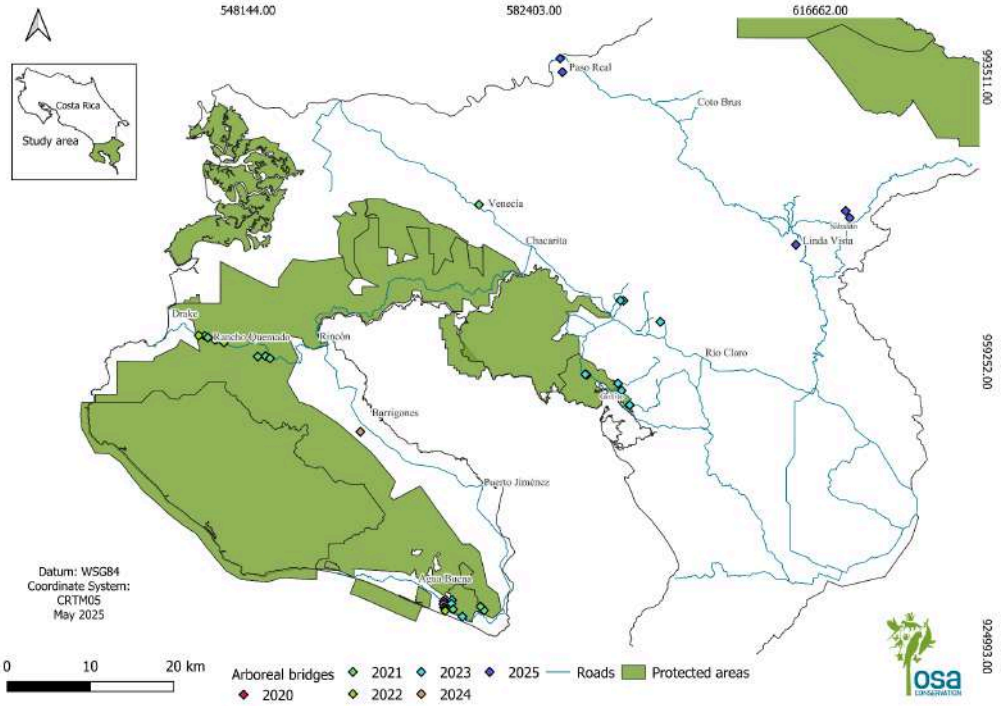


***Figure 15.*** *Arboreal bridges installed over the past years with installments per year indicated in different colors, including the recently installed bridges in the higher elevational region. Six new bridges have been installed this year in higher elevation areas, bringing the total number of bridges in the AmistOsa region to 15 and the overall total to 36 bridges.*

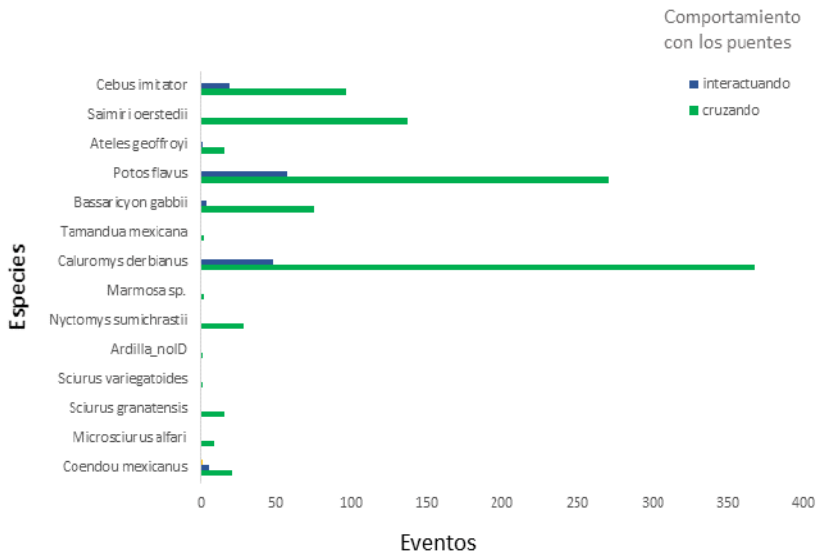


***Figure 16.*** *Use of arboreal bridges by mammal species, classified according to their behavior (in blue: interacting, in green: crossing), based on long-term monitoring with camera traps from 2024 and 2025. Species such as* Caluromys derbianus *and* Ateles geoffroyi *showed the highest crossing rates, while others like* Potos flavus *and* Cebus imitator *were observed both crossing and interacting. These results highlight the importance of arboreal bridges in maintaining canopy connectivity and reducing habitat fragmentation.*

***Figure 17:*** *La Gamba community members take part in a camera-trap workshop, learning setup, data collection, and maintenance to monitor local wildlife. Participants explore why biodiversity matters for healthy forests and livelihoods, fostering long-term stewardship.*


***Figure 18.*** *Infographic showcasing the results of the Global Big Day in La Luchita, one of the key communities participating in Osa Conservation's citizen science program. The monitoring effort documented 73 bird species and over 140 individuals, with contributions from 29 local participants. This infographic was created for and shared with the Gallardo monitoring group to celebrate their achievements and strengthen ongoing conservation efforts.*

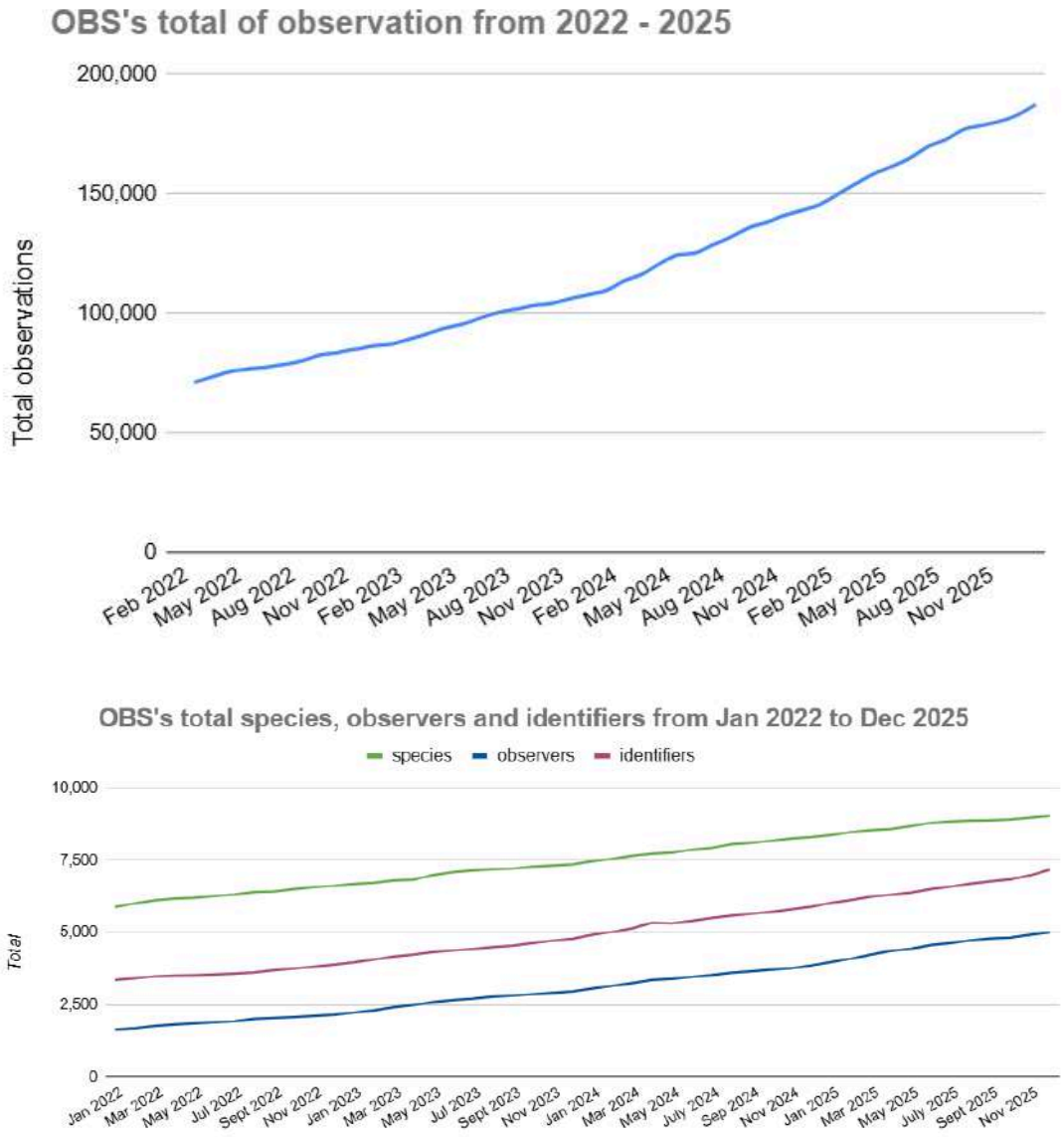


***Figure 19***. *Osa Biodiversity Survey (OBS) is a regional iNaturalist project that strengthens long-term biodiversity monitoring by mobilizing community members, students, and visitors to document wildlife across the landscape. The graphs show steady growth over time in observations, species recorded, observers, and identifiers—evidence of an expanding citizen-science network that improves data quality and increases detection of rare or seasonal species.*

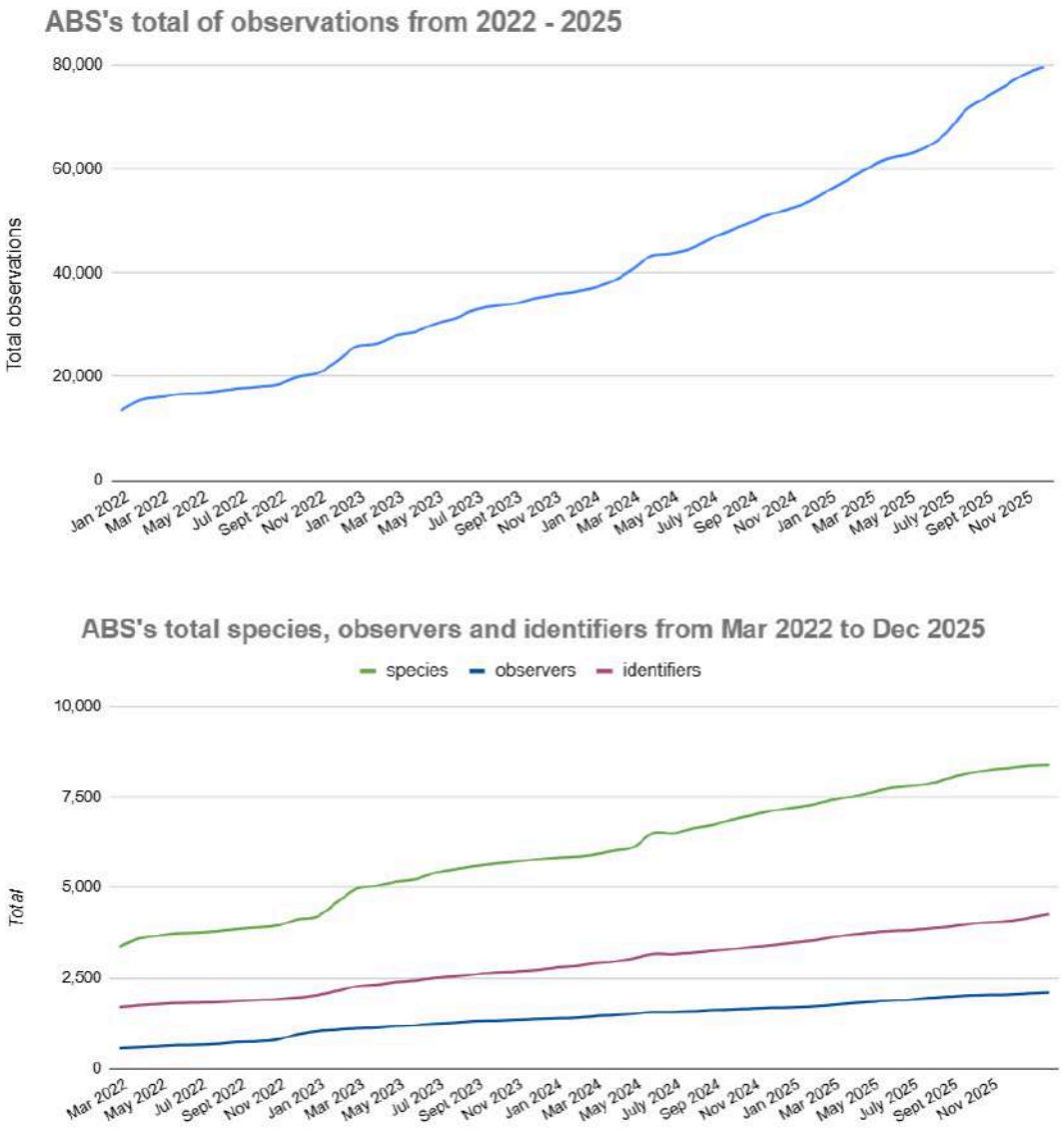


***Figure 20***. *AmistOsa Biodiversity Survey (ABS) observations, species, observers and identifiers. Together, these trends reflect increasing participation across the AmistOsa landscape and stronger validation of records through identification efforts, improving the reliability of biodiversity data used to inform monitoring priorities and guide adaptive management.*


***Figure 21****. Two bioblitz events at Piro Biological Station engaged community members, staff, and partners in rapid biodiversity inventories. Using iNaturalist, they produced 2,001 observations of 932 species, supported by 101 observers and 471 identifiers, strengthening local monitoring skills and generating high-quality records to inform future surveys and adaptive management.*

***Figure 22:*** *Osa Conservation presented on the use of EarthRanger—the global conservation software platform—during a two-day workshop in San José—as an initiative to centralize data collection and implement real-time informed technology. Costa Rica officals, conservation organizations, and park rangers from across Latin America, including Mexico, Honduras, Belize, Panamá, Colombia, and Ecuador attended the workshop.*

***Figure 23:*** *Live fence posts are planted from cuttings that root and grow into trees, providing durable fencing while increasing shade for livestock, stabilizing soils, improving water retention, and creating habitat and connectivity for wildlife across the farm landscape.*

***Figure 24:*** *Live fence tree growth, showing strong establishment and canopy development. As these living posts mature, they increase structural complexity along pasture boundaries, support natural regeneration beneath the fence line, and contribute to a more resilient production system.*


***Figure 25:*** *Youth identify collected macroinvertebrates from the Piro river to assess river health with the help of Osa Conservation biologist Socoro Avilla, learning how to use a stereoscope and identify different animal species.*

***Figure 26:*** *A local guide leads youth through an ecotourism workshop, sharing practical knowledge about local species, habitats, and ecological relationships through hands-on, place-based learning. The activity highlights ecotourism as a sustainable livelihood that can generate local income and employment while incentivizing the protection of natural resources and strengthening community stewardship.*

***Figure 27:*** *Ridge to Reef Youth Nature Club members participate in a hands-on lesson about sea turtle nesting ecology. After learning how females select nesting sites and excavate nests, students practice the process by pretending to dig a nesting chamber, reinforcing key concepts such as nesting behavior, habitat requirements, and the importance of protecting nesting beaches.*

***Figure 28:*** *During an overnight bootcamp, youth walk through the greenhouse at the Osa Regenerative Farm, learning how controlled growing conditions support healthy crop production, improve food security, and promote sustainable agriculture practices that reduce pressure on surrounding natural ecosystems.*

***Figure 29:*** *Susan Wojcicki Fellow Robert Cassidy collects sea sponge samples. As natural biological filters, sponges capture environmental DNA (eDNA), which can be analyzed to detect and identify marine species present in Costa Rica's South Pacific.*

***Figure 30:*** Princeton Latin America fellow, Bárbara González Fuentes, led a multi-method canopy-tower study at Osa Conservation to measure how mammals, birds, and flying insects use different forest heights across day–night cycles and changing temperatures. Canopy ecosystems remain under-sampled, and climate stress and disturbance can reduce vertical habitat diversity, reshaping communities and increasing extinction risk.

***Figure 31:*** *Princeton Latin America fellow, Chloe Dawson, assessed overall biodiversity at Osa Verde Regenerative Farm across different land-use types using multiple taxonomic groups (including birds, mammals, and beetles), finding that the farm supports biodiversity and that land-use decisions strongly influence which species and communities are present.*

***Figure 32:*** Trained local community members check and maintain a mangrove honey beehive as part of an alternative, sustainable livelihood that complements restoration efforts. By supporting responsible beekeeping in and around mangrove areas, this initiative helps diversify household income while strengthening community stewardship of the wetland and reinforcing the long-term protection of mangrove habitat.

***Attachments***

*Attachment 1. Farm long-term monitoring study design and protocol*

*Attachment 2. Reconexión de los Bosques del Pacifico Sur de Costa Rica Un plan de acción para establecer cruces seguros para la vida silvestre*

*Attachment 3. Video of Two-toed Sloth Using Arboreal Bridge*

*Attachment 4. The Voice of Osa's Future - Ángel's Story*

*Attachment 5. Osa's Future Rainforest Protector - Yareth's Story*

*Attachment 6. "Fast food: GPS tracking reveals behavior-specific habitat selection and cattle farm subsidies of three sympatric neotropical vulture species," December 2025*

*Attachment 7. "Myrcia osaensis, a new species of M. section Calyptranthes (Myrtaceae) from the southern Pacific of Costa Rica," December 2025*

*Attachment 8. "Are morphometric traits cryptic indicators of sexual size dimorphism in 'monomorphic' species? Evidence from the King Vulture (Sarcoramphus papa)," December 2025*

*Attachment 9. "Experimental assessment of large mammal population estimates from airborne thermal videography," October 2025*

*Attachment 10. "The Golfo Dulce yellow sea snake (Elapidae: Hydrophis platurus xanthos) from morphological and molecular perspectives," October 2025*

*Attachment 11. "Temporal changes in habitat structure and gastropod community assemblages in response to active restoration of a Central American mangrove," July 2025*

*Attachment 12. "Porcupine (Coendou spp.) geophagy in an Amazonian landscape of fear," June 2025*

*Attachment 13. "Esperanza para un fósil viviente: avances en la conservación de Pleodendron costarricense," April 2025*

*Attachment 14. "Vulture Exclusion Halves Large Carcass Decomposition Rates and Doubles Fly Abundance," April 2025*

*Attachment 15. "Dung beetle communities change quickly following tropical forest restoration: A case study from southern Costa Rica," April 2025*

*Appendix 16. "Detecting illegal activities from the sky: drone-mounted thermal sensors as a tropical rainforests management tool," April 2025*

*Attachment 17. "Arboreal camera trapping reveals diel-vertical migrations in arboreal wildlife of the Peruvian Amazon rainforest," March 2025*

*Attachment 18. "New ecological aspects of the pacarana (Dinomys branickii) in southeastern Peru," February 2025*

*Attachment 19. "Human interference with wildlife surveys: a case study from camera-trapping road underpasses in Costa Rica," February 2025*

*Attachment 20. "Determination of hematologic reference intervals for free-living King vultures (Sarcoramphus papa)," February 2025*

*Attachment 21. "Use of natural and artificial cavities by Neotropical mammals in a tropical wet forest of Costa Rica," November 2024*

*Attachment 22. "Back to the wild: Post-translocation GPS monitoring of a rehabilitated ocelot (Leopardus pardalis) in a forest-agriculture matrix in the Osa Peninsula, Costa Rica, August 2024*

*Attachment 23 "Identifying wildlife road crossing mitigation sites using a multi-data approach - A case study from southwestern Costa Rica." June 2024*

*Attachment 24. "Scouts vs Usurpers- Alternative foraging strategies facilitate coexistence between Neotropical Cathartid Vultures," April 2024*

*Attachment 25. "Increasing Forest Cover and Connectivity Both Inside and Outside of Protected Areas in Southwestern Costa Rica," March 2024*

*Attachment 26. "Future sea-level rise impacts to Olive Ridley (Lepidochelys olivacea) and Green Sea Turtle (Chelonia mydas) nesting habitat on the Osa Peninsula, Costa Rica," March 2024*

*Attachment 27. "Home range and notes about social interactions in the poison frog Phyllobates vittatus (Anura: Dendrobatidae)," January 2024*

*Attachment 28. "Osa Biological Station: Protecting Central America's greatest Pacific lowland rainforest," January 2024*

*Attachment 29. "Mapping climate adaptation corridors for biodiversity—A regional-scale case study in Central America," May 2024*

*Attachment 30. "Remote sensing and citizen science to characterize the ecological niche of an endemic and endangered Costa Rican poison frog," March 2023*

*Attachment 31. "More than one way to count a cat: estimation of ocelot population density using frameworks for marked and unmarked species," February 2023*

*Attachment 32. "Climate-resilient conservation strategies for an endemic forest bird, the Black-cheeked Ant-Tanager," March 2023*

*Attachment 33. "Automated acoustic detection of Geoffroy's spider monkey highlights tipping points of human disturbance," February 2023*

*Attachment 34."Warm Beach, Warmer Turtles: Using Drone-mounted Thermal Infrared Sensors to Monitor Sea Turtle Nesting Activity," July 2022*

*Attachment 35. "Greater Grison (Galictis vittata) predation events upon Paca (Cuniculus paca) suggest a cavity targeted hunting strategy by Greater Grison," February 2023*

*Attachment 36. “The First Ex-Situ Germination and Dispersal Mechanisms of the Rare, Critically Endangered Tree, Pleodendron costaricense,” June 2022*

*Attachment 37. “First evidence for multimodal animal seed dispersal in orchids,” December 2022*

*Attachment 38. “Soundscapes show disruption across the diel cycle in human modified tropical landscapes,” November 2022*

*Attachment 39. "Flight speed and time of day heavily influence rainforest canopy wildlife counts from drone-mounted thermal camera surveys,” October 2022*

*Attachment 40. “Arboreal wildlife bridges in the tropical rainforest of Costa Rica's Osa Peninsula,” April 2022*

*Attachment 41. “Integrating high-resolution remote sensing and empirical wildlife detection data for climate-resilient corridors across tropical elevational gradients,” August 2024*

*Attachment 42. “Fast food: Do cattle farms subsidize King Vulture (Sarcoramphus papa) foraging resources in a mixed forest-agriculture landscape?” October 2025*

*Attachment 43. “Unveiling movement behavioral states using an integrated GPS-accelerometer and camera transmitter: A case study in the King Vulture (Sarcoramphus papa)” October 2025*

*Attachment 44. Private viewing of the Wildlives trailer* ***(Please do not distribute)***

*Attachment 45. Private Viewing of WildLives: Episode 3 - How to Catch a Vulture* ***(Please do not distribute)***

*Attachment 46. Private Viewing of Coexistence Film* ***(Please do not distribute)***

*Attachment 47. Documentary preview - Seed Expedition*