

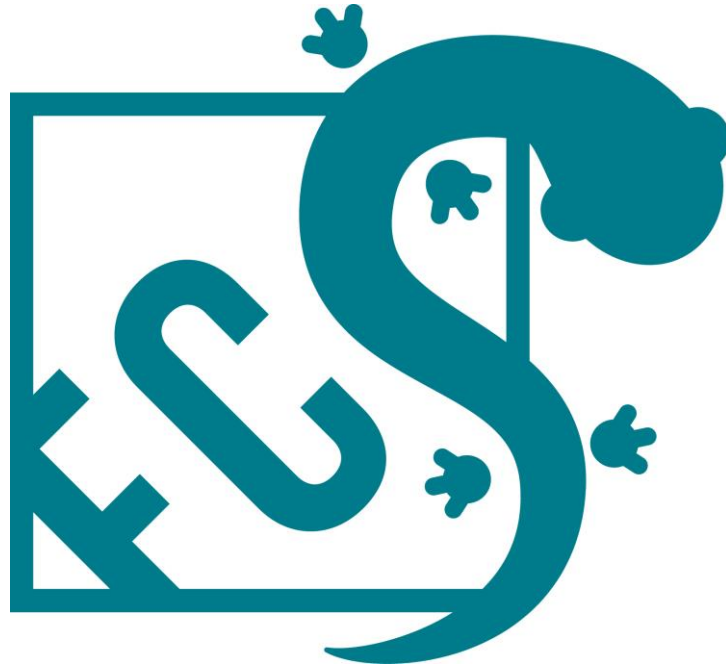


Fundación Atelopus  
por la conservación de Anfibios y Reptiles

**Ensuring the endemic salamander conservation *Bolitoglossa savagei* through community-based conservation actions in Sierra Nevada de Santa Marta (SNSM) Key Biodiversity Area, Colombia**



# FCSal Funding Update



**Grant Recipient**

**Jose Luis Pérez-González - Fundación Atelopus**






**Date Funding Awarded**

**28/02/2023**

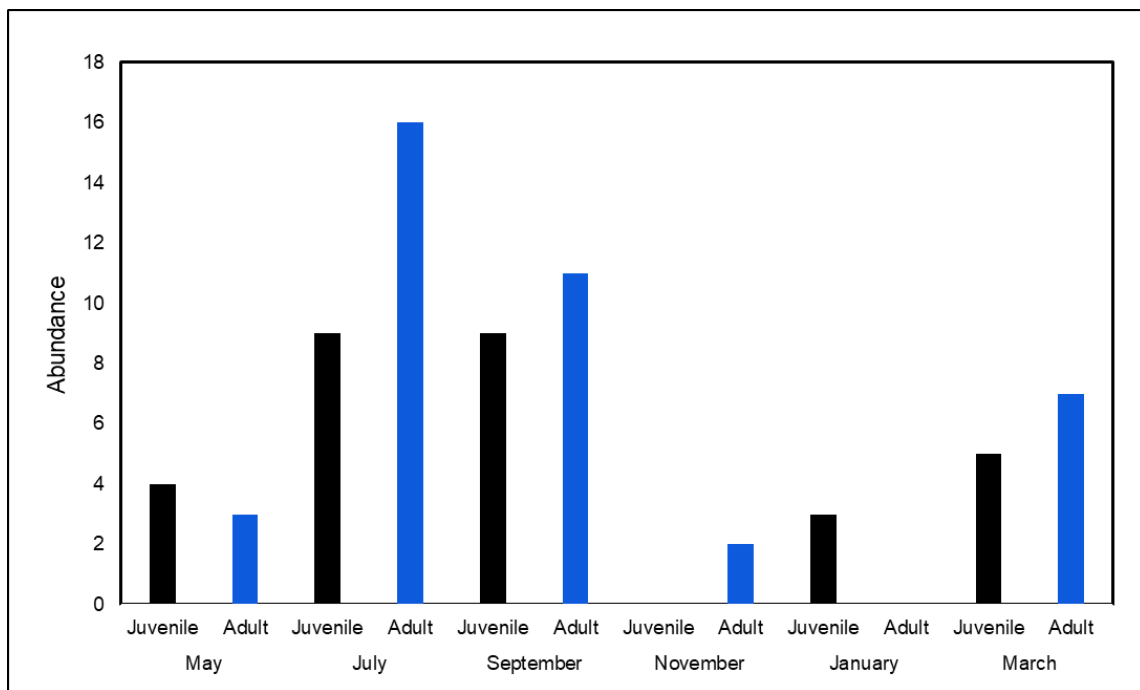
**Date of Update**

**24/03/2024**

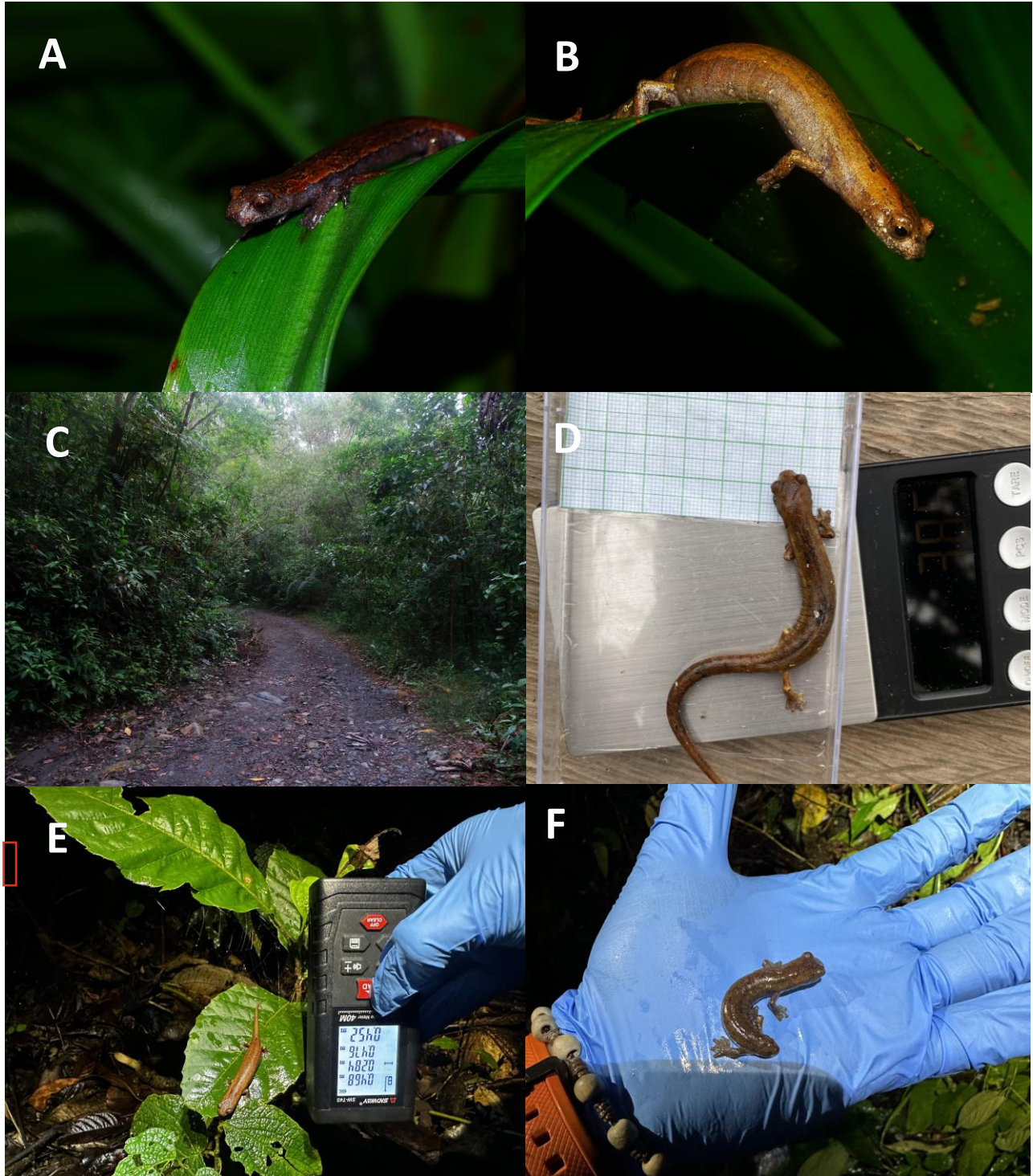
Project Title:	Ensuring the endemic salamander conservation <i>Bolitoglossa savagei</i> through community-based conservation actions in Sierra Nevada de Santa Marta (SNSM) Key Biodiversity Area, Colombia
Principal Investigator (PI) name: Job title: Institution: Address:  Phone: Email address:	Jose Luis Pérez González Principal Investigator Fundación Atelopus 
Amount of Grant Award:	\$ 5000
Collaborator name: Job title: Institution: Address: Phone: Email address:	Jose Daniel Barros Castañeda Environmental Education Coordinator Universidad del Magdalena 
Collaborator name: Job title: Institution: Address: Phone: Email address:	Aldair Alberto Barros Granados Communications Coordinator Fundación Atelopus 

## Progress Report to Date

During a total of six field trips, we recorded a total of 69 individuals, consisting of 30 juveniles and 39 adults. The abundance of individuals decreased due to the dry season that occurred between the last and first months of the year (between October and February). Unfortunately, this year, we experienced a more prolonged El Niño phenomenon, which delayed the schedule of some field trips. In the dry season, we did not observe any variation in the species' microhabitat usage; they continued to be observed in native forested areas. However, due to the dry wind prevalent in these zones, they preferred places like bromeliads that could provide refuge against dehydration. The number of individuals found in November, January, and March corresponds to 25% of the total, while in the other three months, May, June, and September, 75% were found. This information is valuable as it can help us better describe the activity pattern and fundamental aspects of the reproductive phenology and population demography of *B. savagei* (Fig. 1). Regarding the collected data on the species' natural history, we found that individuals perched between 23.2 – 147.8 cm, using microhabitats such as the herbaceous stratum, bromeliads, and shrubs. Additionally, the largest individuals were found in the month of May. Furthermore, during the monitoring periods, specimens with apparent tail limb mutilation were recorded, which may have been the result of a predation event (Fig. 2F).



**Figure 1.** Abundance of *Bolitoglossa savagei* individuals during the sampling months.



**Figure 2.** Individuals found in the bromeliad microhabitat (A, B), sampling location in the San Lorenzo sector of the Sierra Nevada de Santa Marta (C), weighing of an individual (D), measuring perch height in the shrub microhabitat (E), and *B. savagei* individual found with tail limb mutilation (F).

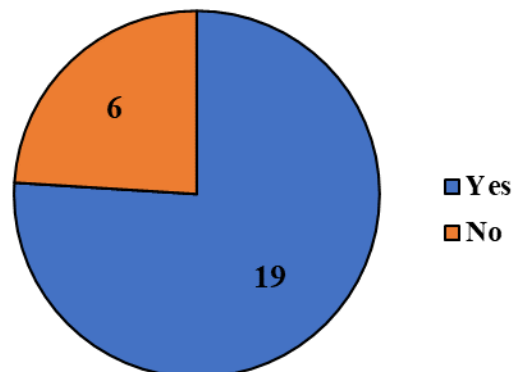
## Education workshops with local adults to raise awareness about the importance of protecting the habitat of *Bolitoglossa savagei*



**Figure 3.** Realización de encuestas y entrevistas sobre sensibilización de conservar *Bolitoglossa savagei*.

During our third workshop, we gathered with business owners, farms, and properties where the mountain salamander inhabits (Fig. 3). This took place in the Vista Nieves locality, Sierra Nevada de Santa Marta, with a total of 26 individuals interviewed and participating in the workshop to raise awareness about the ecological, cultural, and conservation importance of the *Bolitoglossa savagei* salamander (Appendix 1). Remarkably, 76% of the surveyed individuals are familiar with this salamander and consider water to be fundamental for it as it belongs to the amphibian group (Fig. 4). Additionally, 68% are aware that it is endemic and only found in the Sierra Nevada de Santa Marta (Fig. 5). Moreover, 60% of the surveyed individuals recognize the main microhabitat where *B. savagei* is found (Fig. 6).

### Do you know the serrana salamander?



**Figure 4.** Question regarding awareness of the existence of *Bolitoglossa savagei*.

### Do you know what an endemic species is?

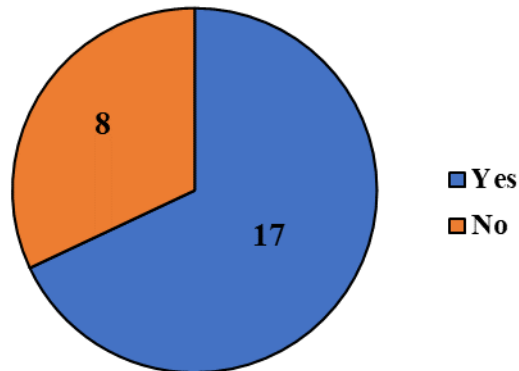


Figure 5. Question about the understanding of what an endemic species means.

### Where do you see more salamanders?

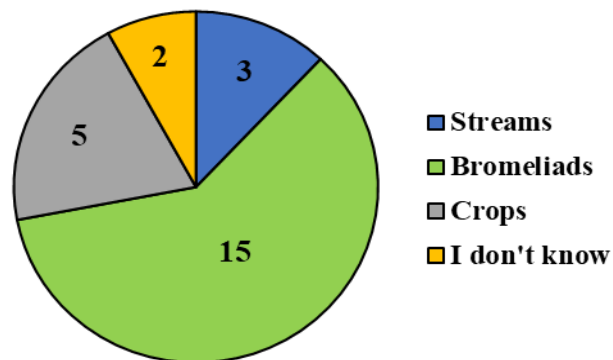
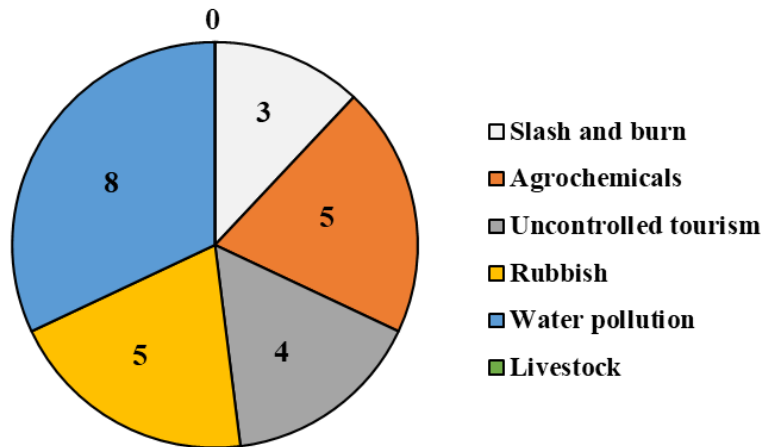


Figure 6. Question about the location of occurrence of *Bolitoglossa savagei*.

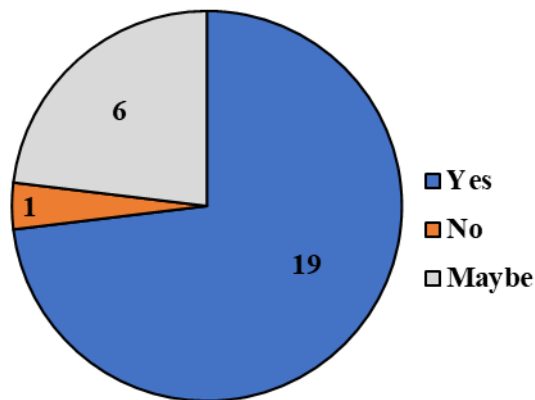
Throughout the establishment of the Fundación Atelopus and our work before the NGO was created, we have observed certain issues in the area. For this reason, we wanted to ask locals what they considered a direct threat to the salamander. The most voted threat was water pollution, with 32%, however, there wasn't much difference with the other threats, which apparently indicates a challenging landscape for the conservation of *B. savagei*. Waste and agrochemicals each received 20% of the votes, followed by uncontrolled tourism with 16%, logging and burning with 12%, and the presence of cattle with 0% (Fig. 7). In the last 3 years, tourism has significantly increased with the construction of a road that facilitates access for people. Therefore, we also focused on questions related to the issue of mass and uncontrolled tourism. 73% of locals believe that tourists pollute natural spaces (Fig. 8a), and 93% say that tourist access to the area should be controlled (Fig. 8b).

**What do you consider to be the direct threats to the survival of the salamander?**

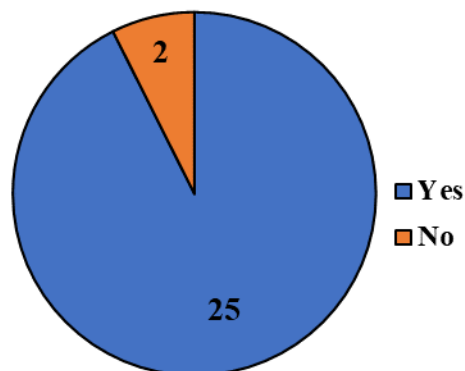


**Figure 7.** Possible threats identified in the locality of *Bolitoglossa savagei*.

**a Do you think tourists pollute natural areas?**



**b Do you think that the entry of tourists to the region should be controlled?**



**Figure 8.** a: Local opinion on mass tourism and waste. b: Opinion on controlling tourism in areas important for amphibian conservation.



## Workshop on mapping threats with the local community of Vista Nieves village, Sierra Nevada de Santa Marta.

To understand the different threats and conservation priorities for *Bolitoglossa savagei* and its habitat, we conducted community spatial mapping exercises to identify, map, and characterize activities and threats associated with the various habitats where the species is found (Fig. 9). This activity revealed that agricultural crops and tourism are the most common activities in the area, primarily due to the community's economic activities. As we continue to work with local communities and analyze population dynamics data, we will identify the impact of these land uses on *B. savagei* populations. Furthermore, based on this reference information, we are collaborating with the community to develop an action plan or roadmap to mitigate these threats and improve the protection of habitats crucial for the species' survival. Some of the strategies proposed in the plan include implementing sustainable and environmentally friendly activities such as ecotourism, organic fertilizers, water filtration systems for coffee, reforestation, etc., to ensure the conservation of the unique biodiversity of the Sierra Nevada de Santa Marta.

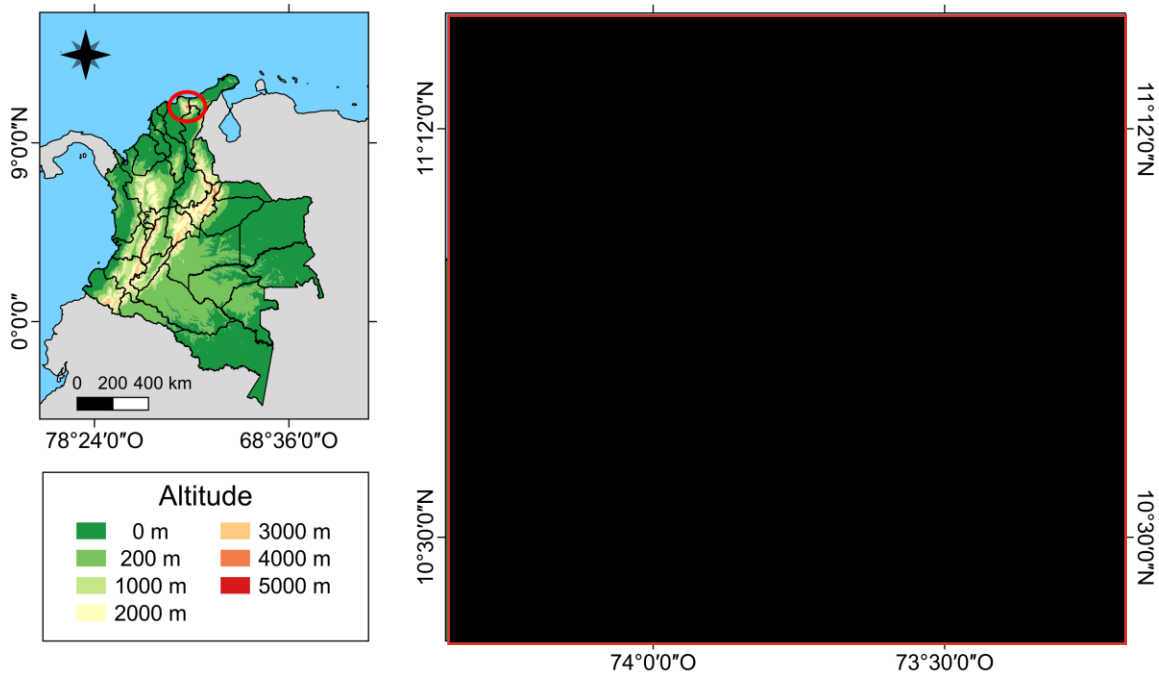


**Figure 9.** Community spatial mapping workshops to determine the activities that have an impact on the habitat of the mountain salamander *Bolitoglossa savagei*.

## Historical distribution records of *Bolitoglossa savagei* and land use covers in the Sierra Nevada de Marta.

We have utilized historical occurrence and collection records from platforms such as GIBIF, Batrachia (Colombia's amphibian list), and data from previous field trips in projects by the Fundación Atelopus to evaluate a better distribution of *B. savagei*, expanding its distribution compared to previous information and observing in which other localities, communities, and sites it is distributed. This helps us focus future actions on population monitoring of the species. We expanded the distribution records towards the southeast of the Sierra Nevada de Santa Marta (Fig. 10). *B. savagei* shows a wide distribution; however, we do not know the pressures faced by the different populations. On the other hand, a map associated with land use covers in our monitoring and community work area was created. Unfortunately, a large extent of these areas has been intervened for coffee and other uses, generating economic activity in the region. This is related to the threat mapping conducted by the Vista Nieves community (Fig. 11).

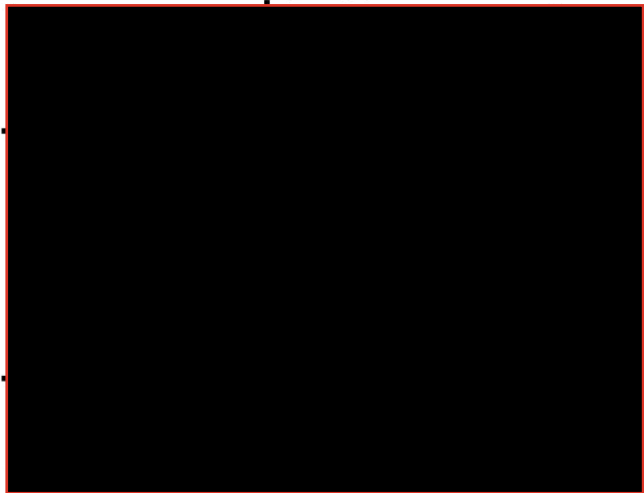
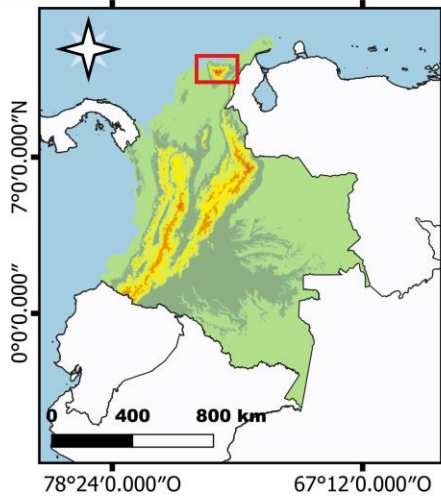
### Distribution of *Bolitoglossa savagei* in the Sierra Nevada de Santa Marta



**Figure 10.** Map of records of the Mountain Salamander in the Sierra Nevada de Santa Marta.



**Coffee areas**      **Rainforests**      **Urban areas**  
**Other intervened areas**      **Badlands**      **★ Sampling point**



**Figure 11.** Map of land use covers at our sampling point, San Lorenzo sector, Sierra Nevada de Santa Marta.

## Inauguration of a mural in the San Javier community, Sierra Nevada de Santa Marta.

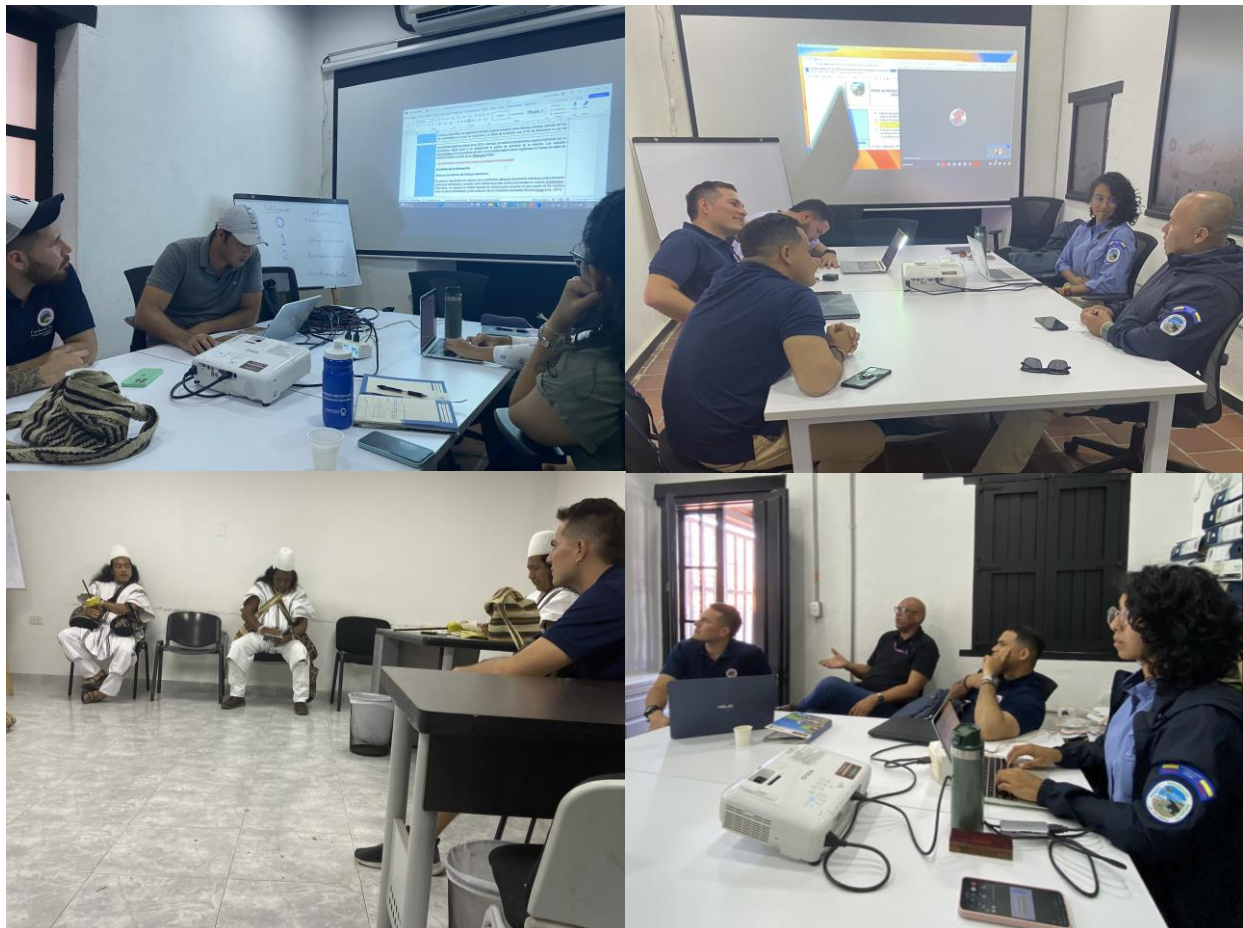
On October 3, 2023, we had the opportunity to inaugurate a mural in the San Javier community, depicting the Mountain Salamander and other endemic and threatened species of the Sierra Nevada de Santa Marta, such as the harlequin toads, glass frog, bearded hummingbird, and mountain toucan. The event saw the participation of members of the community action board, teachers, merchants, and final year students from the local school. The creation of the mural will undoubtedly be key to the regulated ecotourism promotion of the town, which seeks to promote the development of its local economy through biodiversity conservation (Fig. 12).



**Figure 12.** Allegorical mural featuring some threatened fauna species in the Sierra Nevada de Santa Marta.

## Meeting with administrators of the Colombian National Parks entity.

We conducted strategic meetings with environmental authorities in the San Lorenzo area to discuss the main threats to biodiversity identified through the implementation of workshops and environmental education sessions with local communities and rural schools in the area. Among these, pollution of water sources and improper solid waste management, along with the unregulated expansion of tourism, were the main issues to be addressed in the short and medium term. This information will serve as a baseline tool to support the decision-making process of these environmental entities and their implementation in the territory, aiming to ensure the conservation of natural resources and prioritizing efforts on endemic and threatened amphibians in the region as umbrella species, thus supporting the maintenance of natural habitat conditions (Fig. 13).



**Figure 13.** Meetings with departmental and ancestral entities of the Sierra Nevada de Santa Marta.

## Budget Allocation

Budget Category	Item/Amount	Amount spent	Monies remaining
Travel and local transportation (including fuel)	Gas, brake fluid and oil change for car. Each round trip to our sampling sites needs on average 20 gallons of gas.	200	0
Lodging/Food	Lodge for 3 team members for 2 sampling seasons (4 days each) / Three meals per day for 3 team members for 3 sampling seasons (4 days each).	1766	0
Workshops	Workshops, refreshments and transportation in the local school and workshops with community leaders.	930	
Outreach/education activities and materials	Posters, brochures and education materials	370	0
Scientific/ Field equipment and supplies	Waterproof field notebooks Digital Pocket Scale PESOLA Data Logger HOBO 2 Garmin Hand GPS eTrex Touch Lamp Headlight Head Ambidex Disposable Nitrile Gloves. Powdered x 50 Pairs Flagging Tape Plastic Fluorescent	659	0
Equipment/Lab	Cryovials x 500 units 1.000 Swaps x 500 units Analysis of the fungus (Bd)	500	0
Boat/engine/truck (include car hire)	Auto insurance	575	0
<b>Total</b>		<b>5000</b>	<b>0</b>

## Next Steps and Future Directions

Meanwhile, due to laboratory logistical conditions, the samples of Bd taken during the project are still in the analysis phase. Additionally, the latest samples taken during the field trip in March are pending analysis. Therefore, we are still awaiting the results to understand the epidemiological status of the *Bolitoglossa savagei* population. Similarly, we are working to establish new partnerships to expedite the analysis process. The information obtained in this project will be used to mitigate the identified threats with the community in the long term. We will design conservation strategies, then implement and monitor the effectiveness of these strategies.



Appendix 1

Anayde Blanco

**Objetivo: Sensibilizar a las comunidades locales sobre la importancia ecológica, cultural y de conservación de la Salamandra *Bolitoglossa savagei* en la SNSM.**

**1 ¿Qué edad tiene usted?**

15 a 30 años                      30 a 45 años                      mas de 45 años

**2 ¿A qué se dedica?**

Ganadería                      Agricultura                      Turismo

Comerciante                       Otro: \_\_\_\_\_

**3 ¿Su trabajo es amigable con el medio ambiente?**

Sí                       No                      Posiblemente

**4 ¿Cree que los turistas que llegan a la zona contaminan los espacios naturales?**

Sí                       No

**5 ¿Considera que el ingreso de personas o turistas a la región debe ser controlado? ¿Si, no por qué?**

Sí                       No

**6 ¿Cómo es más frecuente ver a turistas?**

Caminando                       Bicicleta                      Motocicletas                      Carros                      Otro: \_\_\_\_\_

**7 ¿Cree Ud. que es buena la calidad de agua disponible para su casa y trabajo?**

Sí                       No                      No lo sé

**8 ¿Le preocupa la disponibilidad de agua en el futuro?**

Sí                       No

**9 ¿Últimamente ha visto las siguientes modificaciones en el paisaje? Puede elegir más de una respuesta.**

Más ganado                      Más vehículos                       Más cultivos

Más Basuras                       Más talas y quemas



**10 ¿Sabe usted qué es una especie endémica?**

Si No

**11 ¿Conoce usted a la Salamandra Serrana?**

Si No

**12 ¿Sabía usted que la especie salamandra que se encuentran en la Sierra Nevada no están en ninguna otra parte del mundo?**

Si No

**13 ¿Dónde cree que es posible observar más salamandras?**

En mi casa Árboles Quebradas  
Bromelias Los Cultivos No lo sé

**14 ¿Cuál considera usted que pueden ser amenazas directas para la supervivencia de la Salamandra Serrana?**

Talas y Quemadas Agroquímicos de Cultivo  Basuras   
Turismo no controlado  Contaminación del agua  Ganadería

**15 ¿En que actividades le gustaría participar para proteger a la Salamandra serrana?**

Jornadas de recolección de basuras  Participación en Grupos de monitoreo comunitario  
Murales de biodiversidad Conciertos de la naturaleza con grupos locales