Final Evaluation Report

Your Details	
Full Name	Rodolfo Cervantes Huerta
Project Title	Structural characteristics of the roads linked to the topography determining the presence and mortality of fauna
Application ID	26640-1
Grant Amount	£ 4960
Email Address	rodocervantesh@hotmail.com
Date of this Report	21st May 2021

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Determine the effect of vegetation type, the structural attributes of the road and the inclination and roughness of the land where it was built on the presence and mortality of fauna				The analysis of the data obtained has taken longer than planned, however, the data obtained are abundant and of high quality.
Identify confounding factors for the correct estimation of road effects.				
To evaluate the effect of the road on wildlife, a square kilometre will be sampled on each side of the selected sites to know the distance of propagation of the effect of the road				Sampling was completed in full, although with logistical problems due to the current COVID-19 pandemic.
Low speed vehicle tours will be made in search for signs of wildlife remnants on the road.				Sampling was completed in full, although with logistical problems due to the current COVID-19 pandemic.
Develop a method to improve mitigation measures				The delay in the analysis has slowed progress on this objective.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

The price of fuel increased considerably, so fuel costs were higher than budgeted.

Conditions caused by the current pandemic made sampling difficult:

- The site considered for overnight stays was not available during 2020. This resulted in the need to return to the city of Durango every day for overnight stays.
- The use of institutional vehicles was not possible, so I used my own vehicle for field trips. Although I made an effort to keep it in good condition, it had some major breakdowns. Due to reduced mobility on the road, an extra companion was needed to watch over the vehicle.
- The closure of the institute has delayed the analysis of the data as I was not able to be together with the other members of the work team.

3. Briefly describe the three most important outcomes of your project.

The presentation of part of the results at the II IBERO-AMERICAN CONGRESS OF BIODIVERSITY AND ROAD INFRASTRUCTURE CIBIV (congress memories available at: https://escuela-ids.itm.edu.co/ecologia-carreteras-infra-verde/index.html?fbclid=IwAR05Ct4JmswbsYKMmxZZPlVeaKQLIG6EUf5s8AsbwhSaOMbr4VKqdn1qXFQ). During this event, the academic relationship with the Latin American and Caribbean Transport Working Group began.

- A seminar was given with some of the results of the work at the 3rd Road Ecology Workshop, organised by the University of Sinaloa and Wildlands Network.

- The undergraduate student who supported the work team during the field trips has completed his professional residency report, so he is ready to obtain his bachelor's degree in biology.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

We began by locating the ejido authorities and landowners where the data collection took place. We visited the ejidos and properties to introduce the work team and gave a brief summary of the work to be carried out. For the third data collection, we revisited the ejido authorities and landowners to reaffirm our agreement to work on their lands.

At the end of the last data collection, photographs of the fauna present on their lands were printed and given to ejido authorities and landowners to present at their meetings and we made a commitment to present the results when possible. The ejidal commissioner of Pueblo Nuevo and the owner of Centro Turístico Carreta del Fuerte, were enthusiastic about the results and asked us to return to work on their land, as well as further support for projects on their property.

Presentations of the results to landowners and ejido authorities were suspended due to the COVID-19 contingency.

5. Are there any plans to continue this work?

The project is still underway and when it is completed, we plan to conduct more studies in the area to improve the accuracy of the results.

In addition, is about to begin the construction of a railroad that will connect the same cities that the highway already connects, which will have a greater impact on the habitat studied. We plan to collaborate in this project and investigate the new effects.

6. How do you plan to share the results of your work with others?

To share the results of the work, preliminary results were presented at the II IBERO-AMERICAN CONGRESS OF BIODIVERSITY AND ROAD INFRASTRUCTURE CIBIV (congress memories available at: https://escuela-ids.itm.edu.co/ecologia-carreteras-infra-verde/index.html?fbclid=IwAR05Ct4JmswbsYKMmxZZPlVeaKQLlG6EUf5s8AsbwhSaOMbr4VKqdn1qXFQ).

Work has begun with the Latin American and Caribbean Transport Working Group. As a result of this collaboration, a seminar was held at the 3rd Road Ecology Workshop, organised by the University of Sinaloa and Wildlands Network.

We have collaboration agreements with a researcher from the University of Sinaloa and hope to continue collaborating with Wildlands Network.

The information collected will be part of a doctoral thesis that, once completed, will be freely accessible. Additionally, we are working on the publication of three indexed scientific articles.

A commitment was made with ejido authorities and landowners to share the results of the research. However, the presentations of the results to landowners and ejido authorities were suspended due to the COVID-19 contingency.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The period foreseen for the use of the GSR was from April 2019 to January 2021. During this period the four field trips planned from the beginning were carried out and we are currently working on the scientific papers to be published. Originally this time was considered sufficient to publish most of the results in two scientific articles, however, the analysis of the data has taken longer than expected.

The planned period includes the current year; however, the resources have already been fully spent. Only the publication of the results in scientific articles is pending, which is already under development, and the presentation of the results to the communities has been suspended due to the COVID-19 contingency.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Feeds	563	860	+297	The food was not fully financed by external means as it was used for other aspects.
Fuel	1329	2503	+1174	The cost of fuel increased considerably and, as external resources covered the vehicle rental, part of the budget assigned to this item was redirected to cover the cost of fuel.
Photo printing for landowners		104	+104	The printing of photographs was not considered in the budget because it was thought that it would be covered by external means. However, this was not possible.
Lodging		100	+100	Due to the distance of the study site from the city where I live. It was necessary to make a stopover in an intermediate city. This was planned to be covered by external means. However, it could not be paid in full by external means as the money was used for other purposes.
Material and equipment		49	+49	It was necessary to purchase some equipment such as reflective vests, flags, a turret to make the vehicle visible when stopped on the road, and spray paint to cover the remnants of roadkill as well as possible.
Payment for field assistant	411	797	+386	An extra assistant in the field was needed to monitor the vehicle and provide field support due to road safety.
Toll	1086	850	236	Part of the toll budget was financed by external means. The remaining money was redirected to other items.
Transportation		205	+205	The cost of transportation was

				foreseen to be covered by external means. This included lodging in an intermediate city. However, this could not be paid in full by external means because the money was used for other purposes.
Car rental	1336		-1336	The budget for vehicle rental was redirected to other items because this item was covered by external means.
Camping in El Tecuán ecological park	235		-235	The budget for the stay at the El Tecuán ecological park was redirected to other items because this item was covered by external means.
Total	4960	5468	+508	£1.00= 25.1049 MXN

9. Looking ahead, what do you feel are the important next steps?

- Make suggestions for the correct signage of the places with the highest incidence of roadkill.
- Perform a monitoring study of the use of transverse structures as safe passageways for wildlife.
- Carry out redirection experiments of fauna to crossings to test its functionality on this road and its subsequent large-scale implementation.
- Provide environmental education to the citizens who use this road about the fauna present, their trampling and the possible consequences of this. A new railroad project will bring new impacts to the studied habitat. We will seek ways for the knowledge generated in this project to contribute to the mitigation of the impact that will be generated.
- Suggest and follow up on good environmental practices by the concessionaire in charge of the road. It is common to find waste and materials in the vicinity of the road.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during your work?

Yes, the RF logo was used on all field trips. A banner was printed warning other drivers of our presence as a low-speed vehicle manned by working researchers. As well as logos on the sides of the vehicle.

Also, in the call for a biology undergraduate student to be a field assistant, it was reported that we had their support.

The logo was used and RF was thanked for the grant in all the presentations made, in the congress attended, in institutional seminars and in the 3rd Road Ecology Workshop, organised by the University of Sinaloa and Wildlands Network. Also, in all publications we write, we include our thanks to the RF for the grant.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Rodolfo Cervantes-Huerta MSc., as project leader, carried out all the data collection and processing, funding applications and support from the Durango state government.

Dr. Miguel Equihua-Zamora, as thesis director, was fundamental in all the planning and development of the project. He also assisted in the application for GSR and other external funding.

Dr. Victor Colino-Rabanal, the most experienced member in the field of road ecology. His participation was key to the development of the project. His contributions in the interpretation and analysis of data is of great importance for the correct development of the research.

Dr. Alberto González-Romero, his knowledge about the fauna present in the area and the habitat, was crucial for the planning of the sampling design. He also participated in helping to identify organisms and developing the sampling methodology.

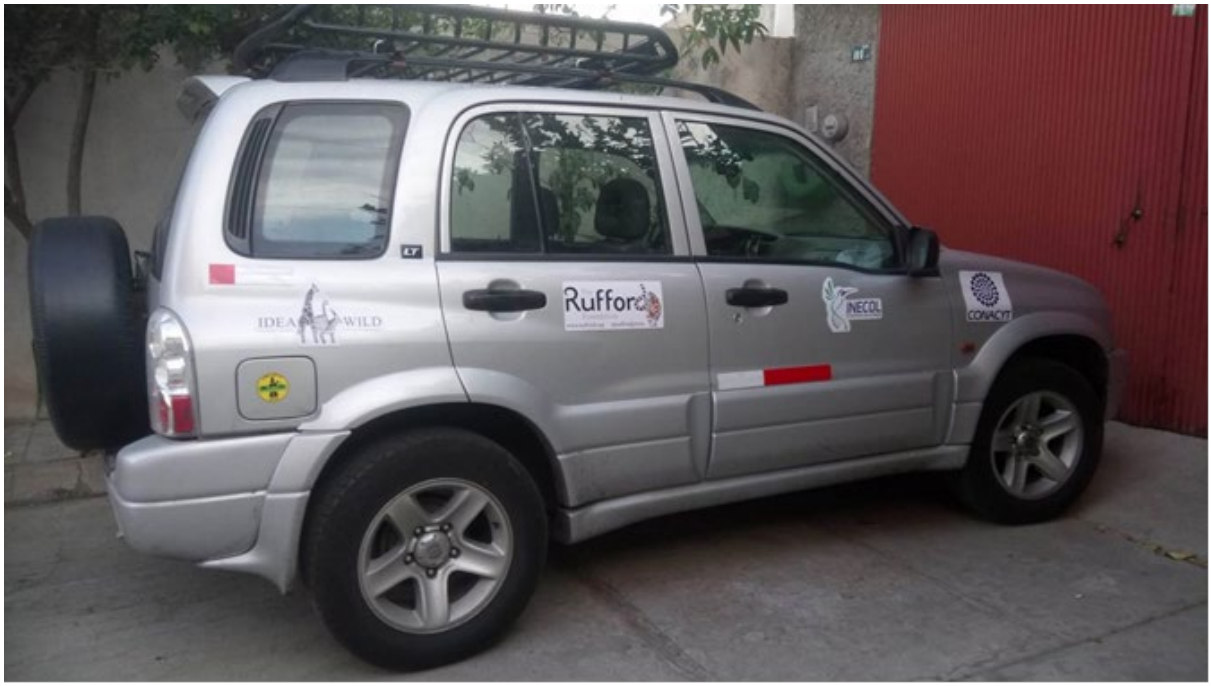
Jessica Durán-Antonio MSc., a crucial part of the field trips. Her field experience was of exceptional help in locating traces and roadkill. She also contributed greatly to the planning of the study and interpretation of results.

12. Any other comments?

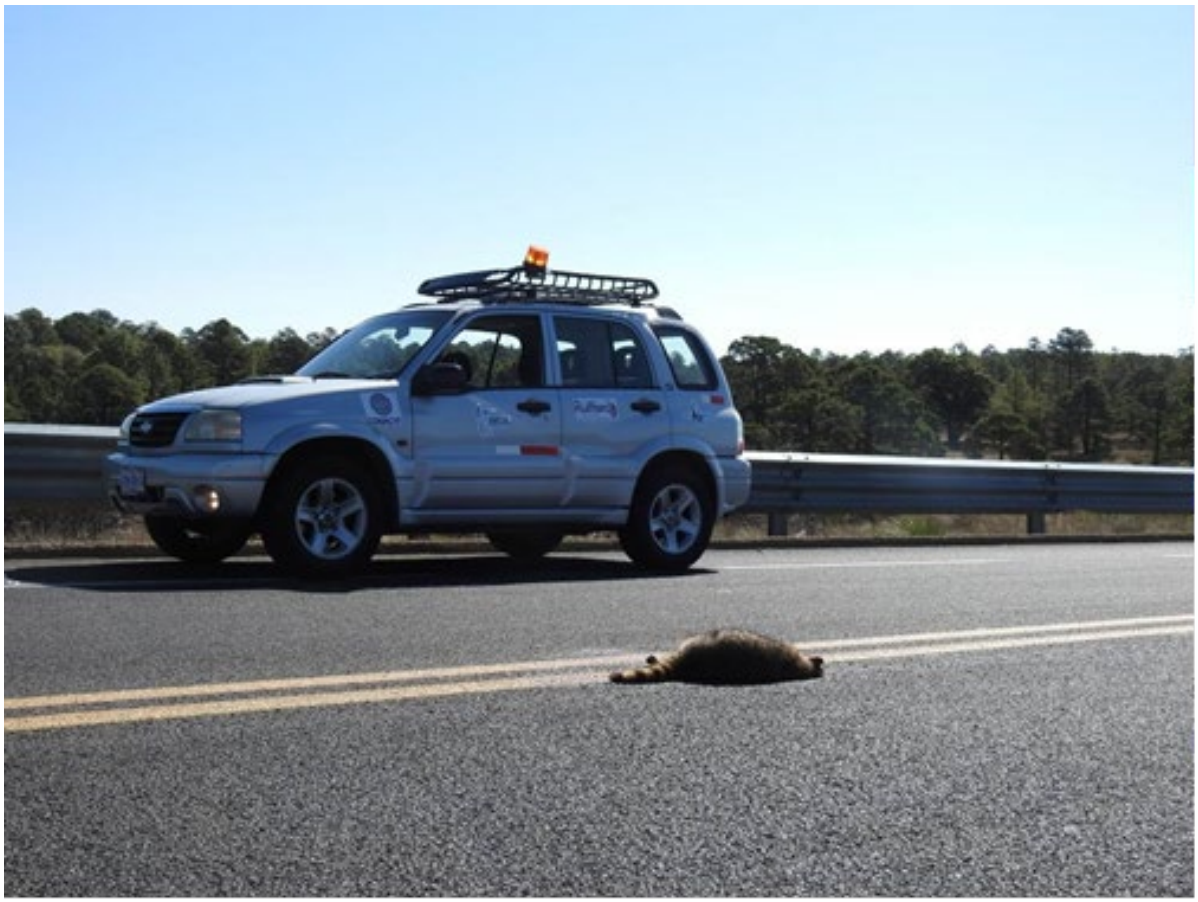
We sincerely thank RF for funding this project. With their support, we were able to carry out this research in the best possible way. We believe that the contribution to the knowledge of road ecology will be extensive and of great use in understanding and mitigating the impacts of roads on wildlife.

During the development of this project, connections were made with other academics interested in the topic and we are now in contact for future collaborations. Together, all the specialists will achieve important results for the conservation of habitats and wildlife affected by roads.

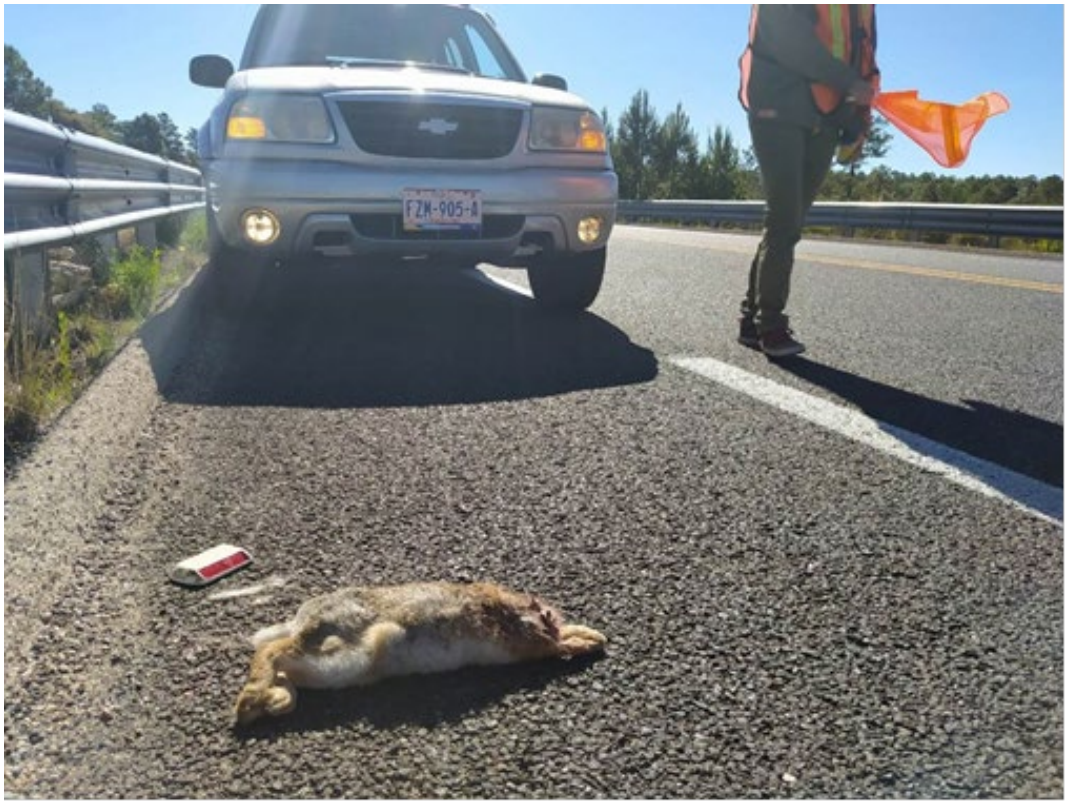
On the other hand, some of the communities with which we had contact in this project have shown interest in continuing to participate in future projects. Therefore, we will seek to carry out more projects in conjunction with the communities to promote the sustainable development of the communities and the region. We hope to count again on the support of the Rufford Foundation for the development of new and larger projects.



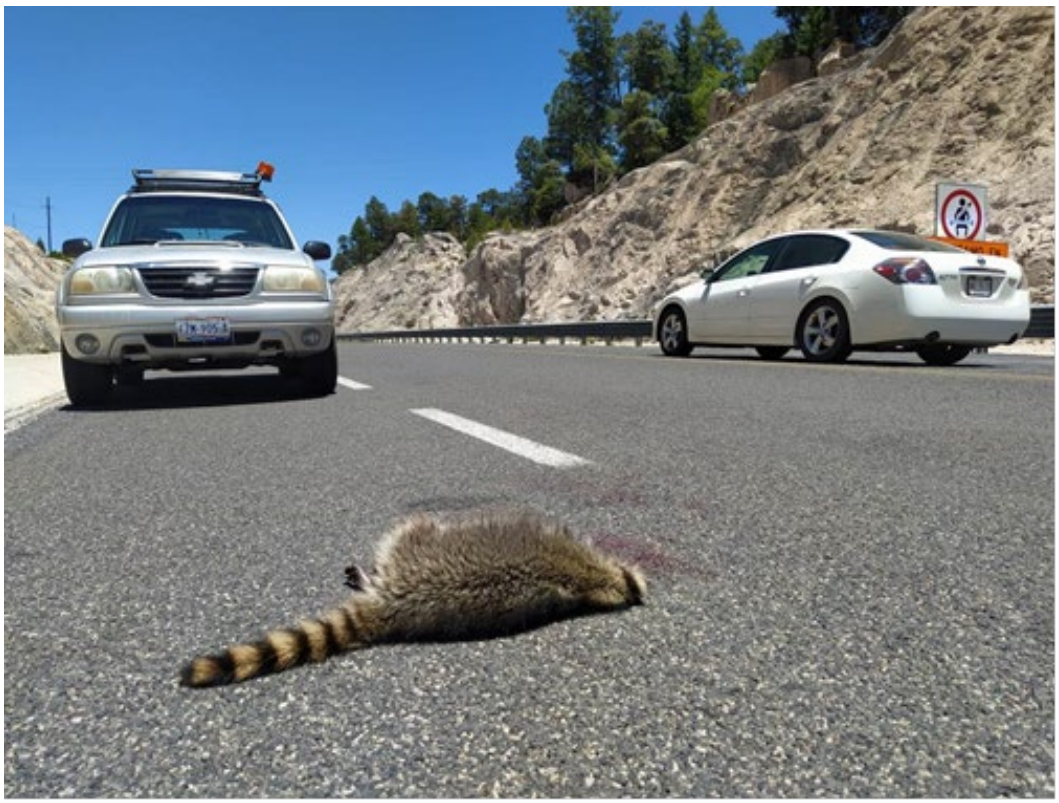
Own vehicle used for field trips.



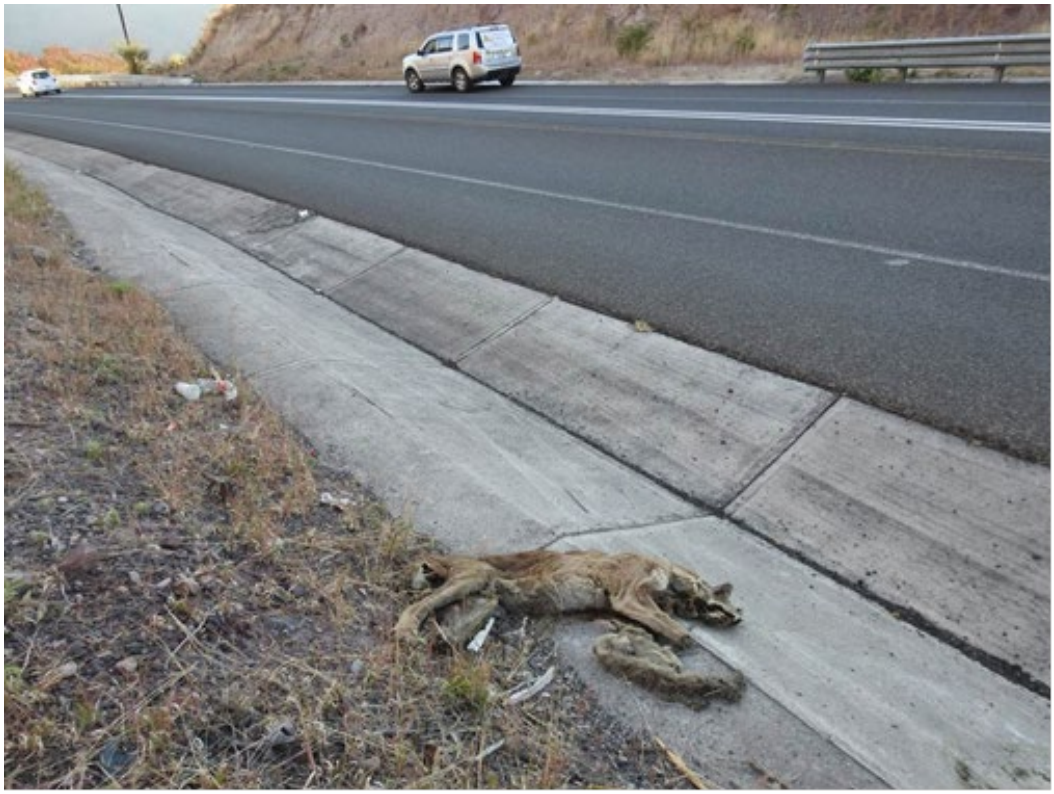
Roadside searches for roadkill. In the photo, raccoon (Procyon lotor) run over just above a safe wildlife crossing.



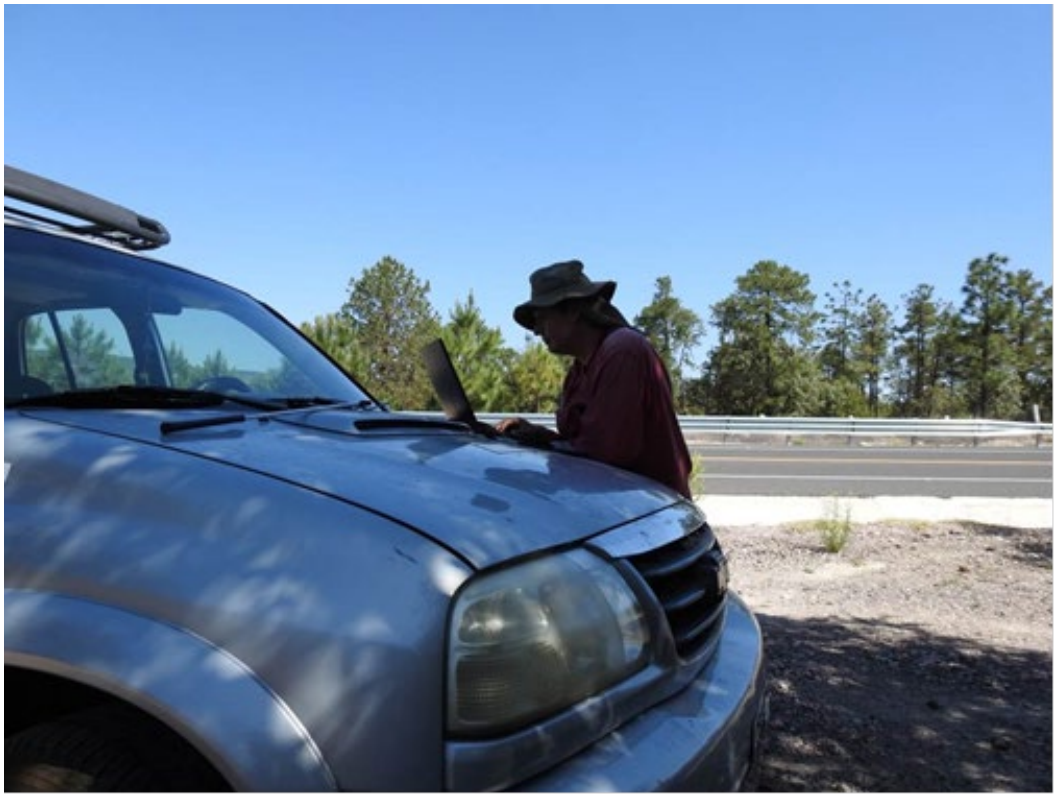
Roadside searches for roadkill. In the photo, Serrano rabbit (Sylvilagus floridanus) run over.



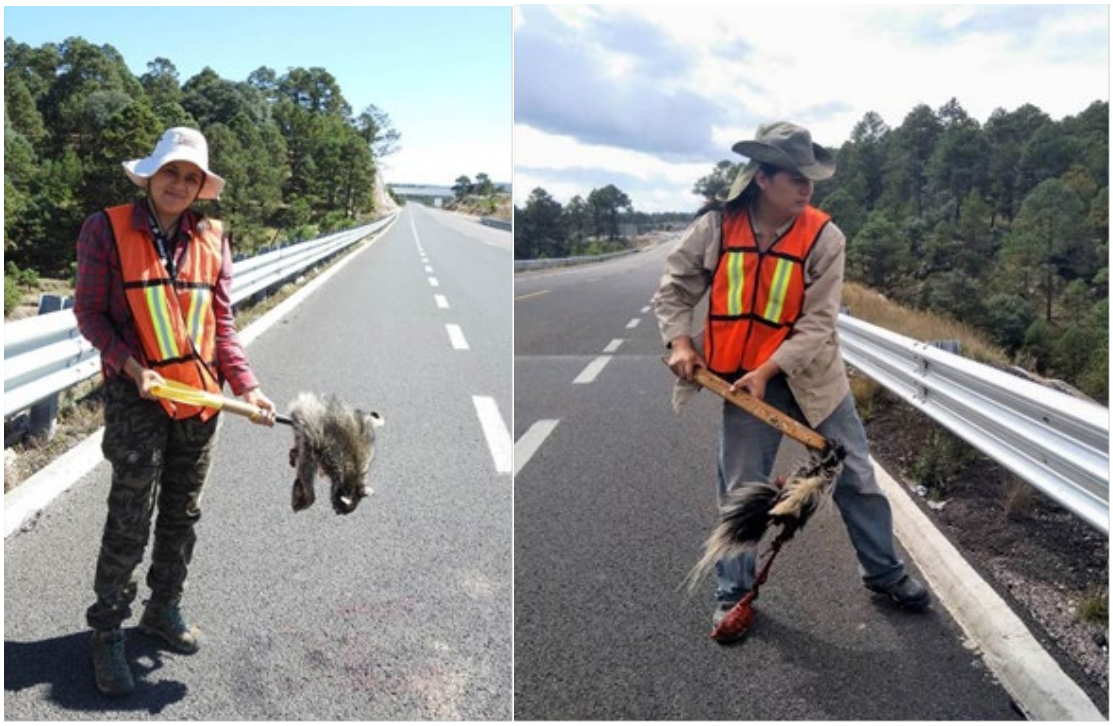
Roadside searches for roadkill. In the photo, raccoon (Procyon lotor) run over just above a safe wildlife crossing.



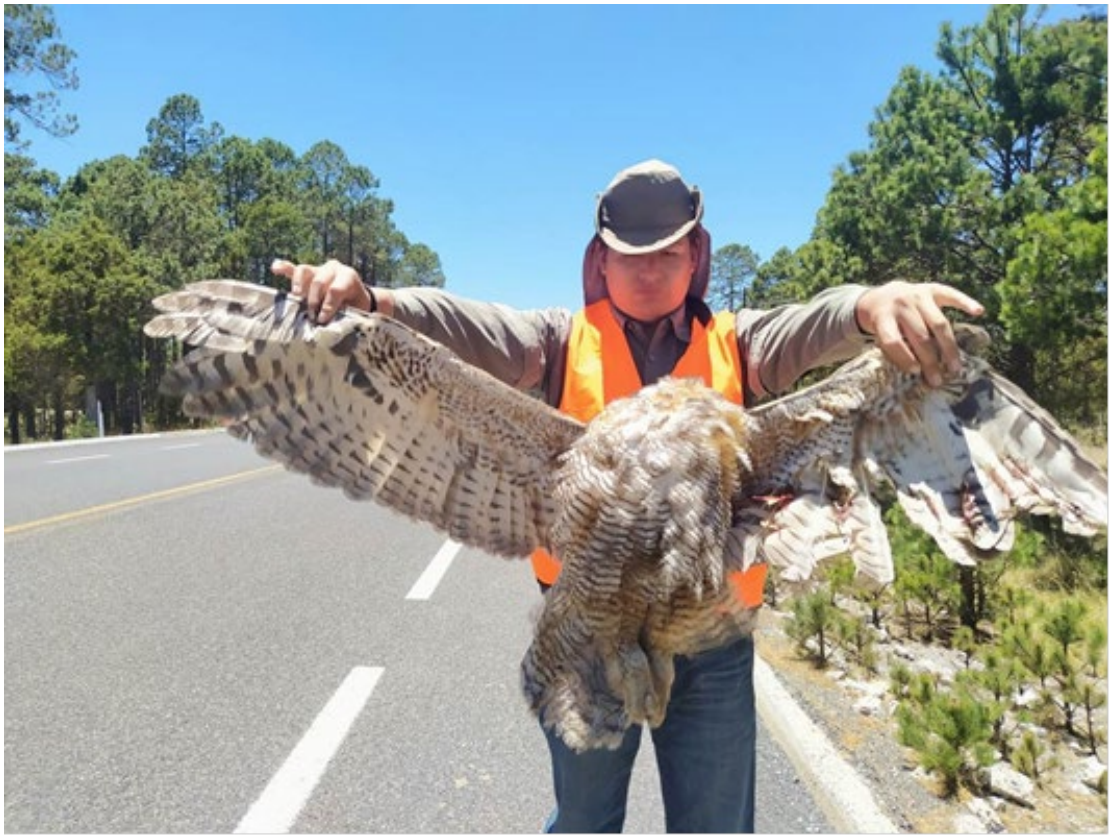
American cougar (Puma concolor) run over at our study site.



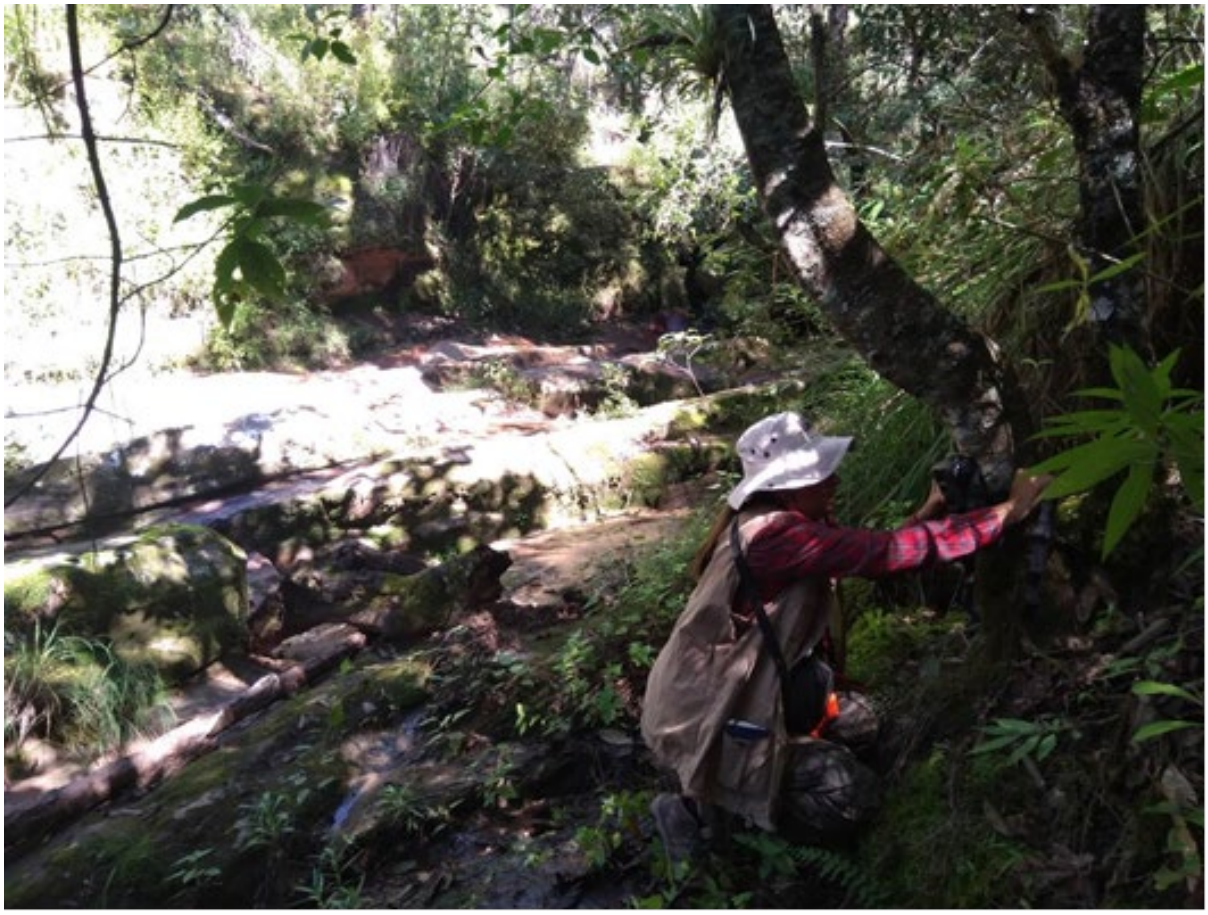
Field work, collecting photographs from camera traps.



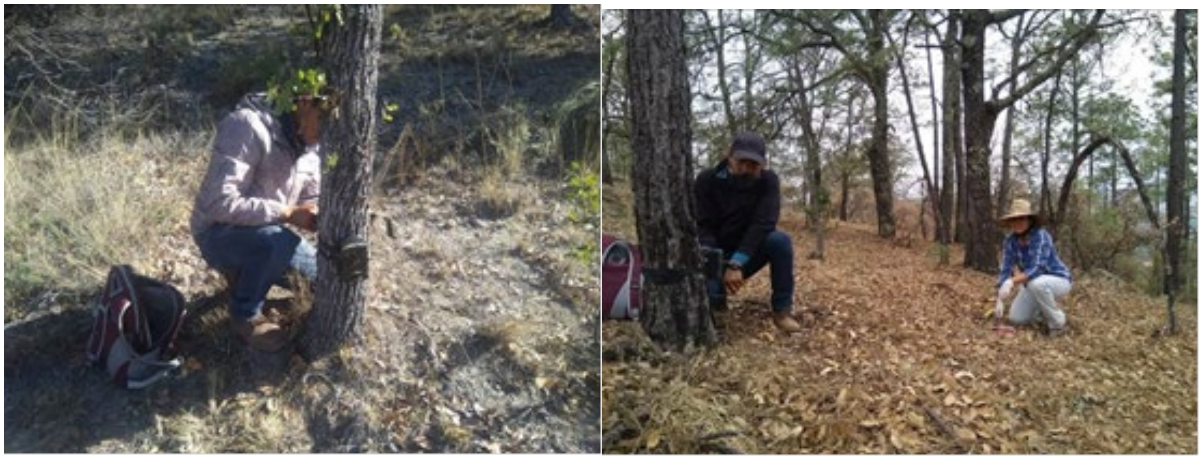
MCs. Jessica Duran-Antonio and MCs. Rodolfo Cervantes-Huerta removing racoon (Procyon lotor) and skunk (Mephitis macroura), both run over just above safe wildlife crossings.



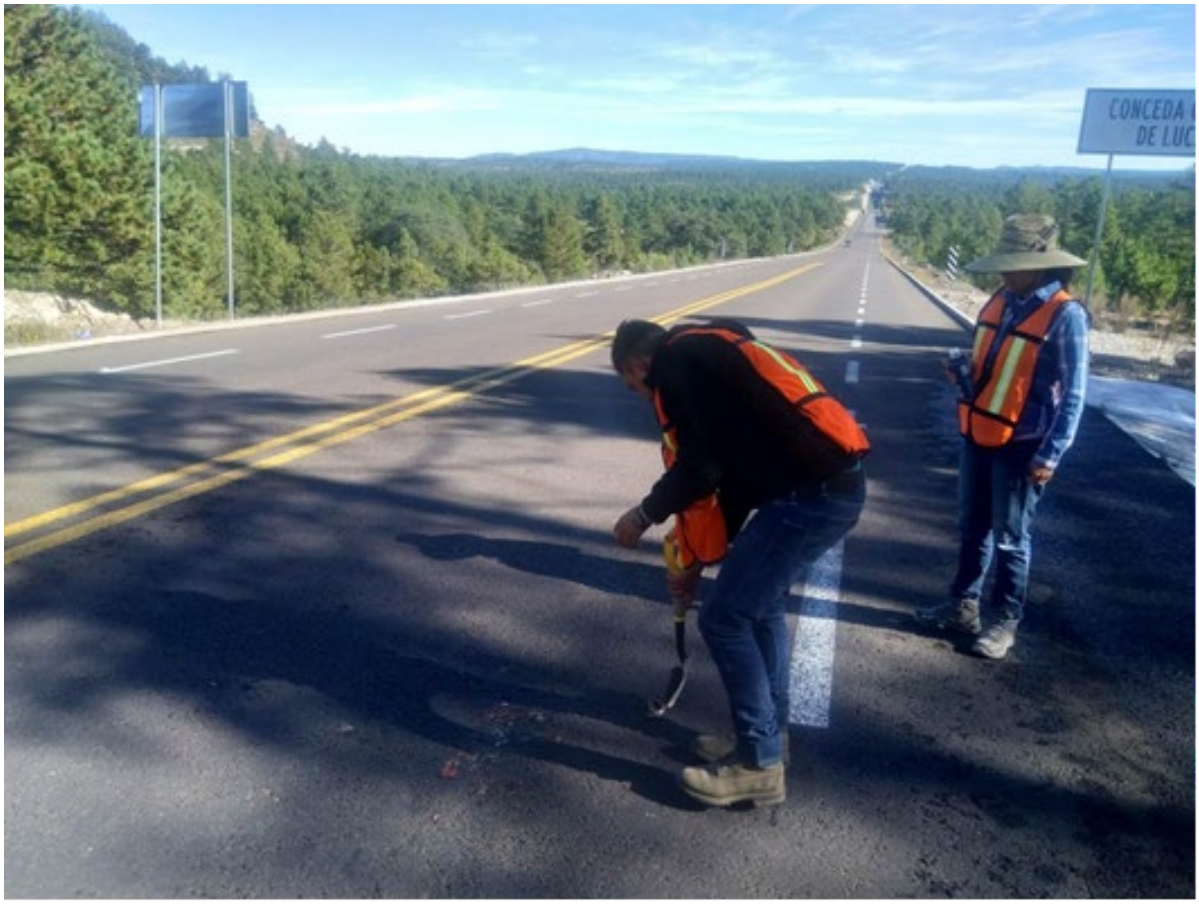
MCs. Rodolfo Cervantes-Huerta removing american owl (Bubo virginianus).



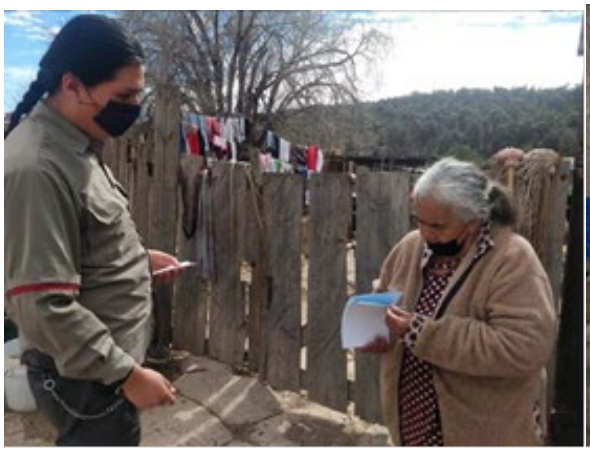
MCs. Jessica Duran-Antonio installing camera traps.

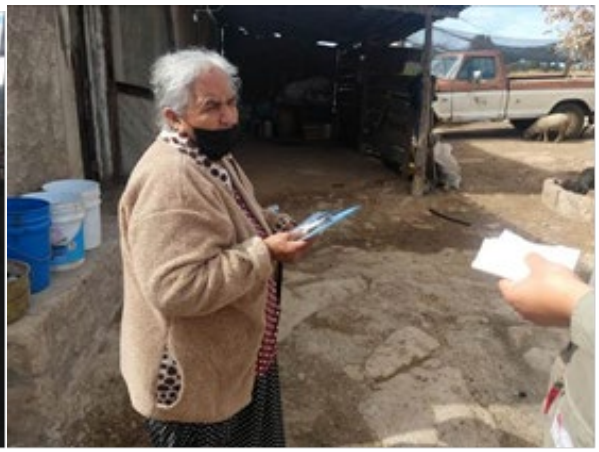


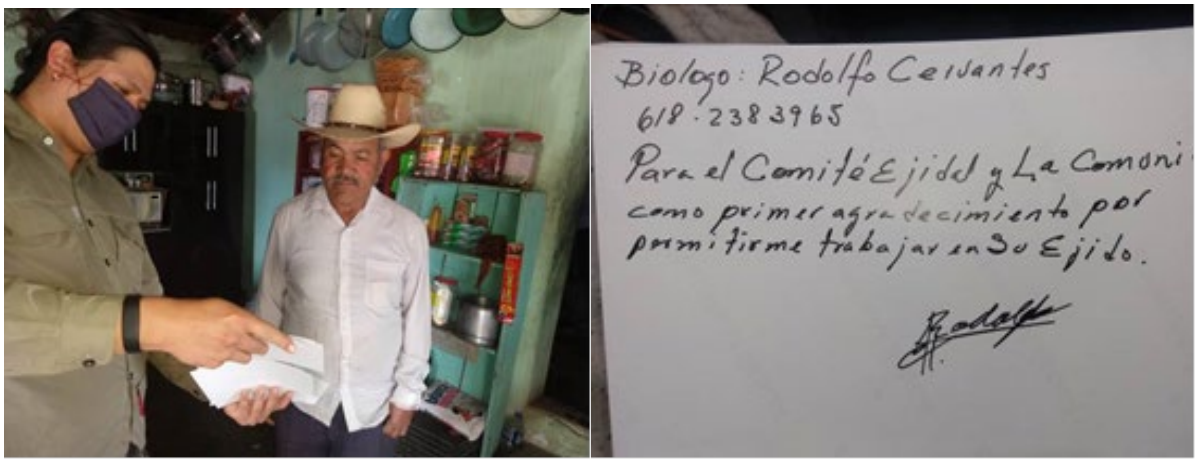
MSc. Jessica Duran-Antonio assisting the undergraduate student in the placement of camera traps.



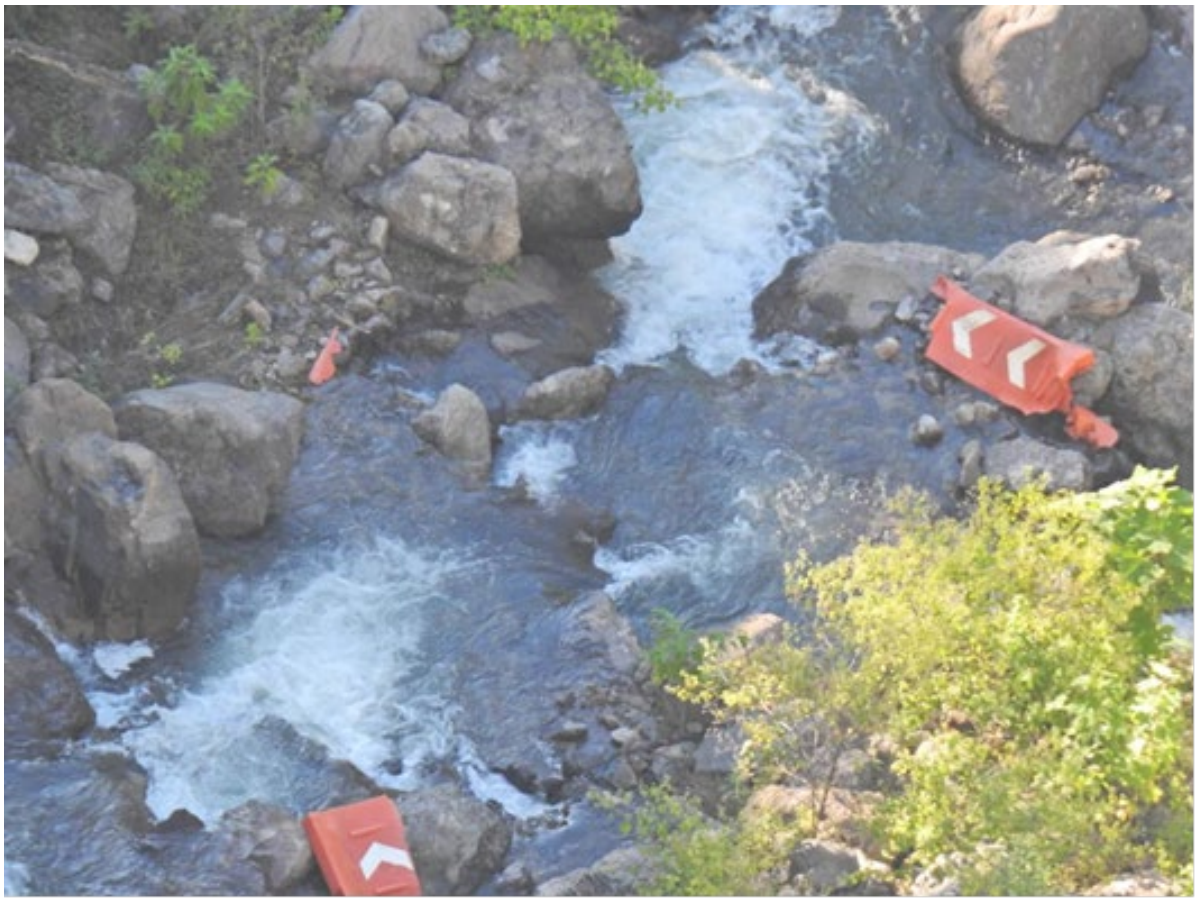
MSc. Jessica Duran-Antonio assisting the undergraduate student in the removal of roadkill remnants on asphalt.

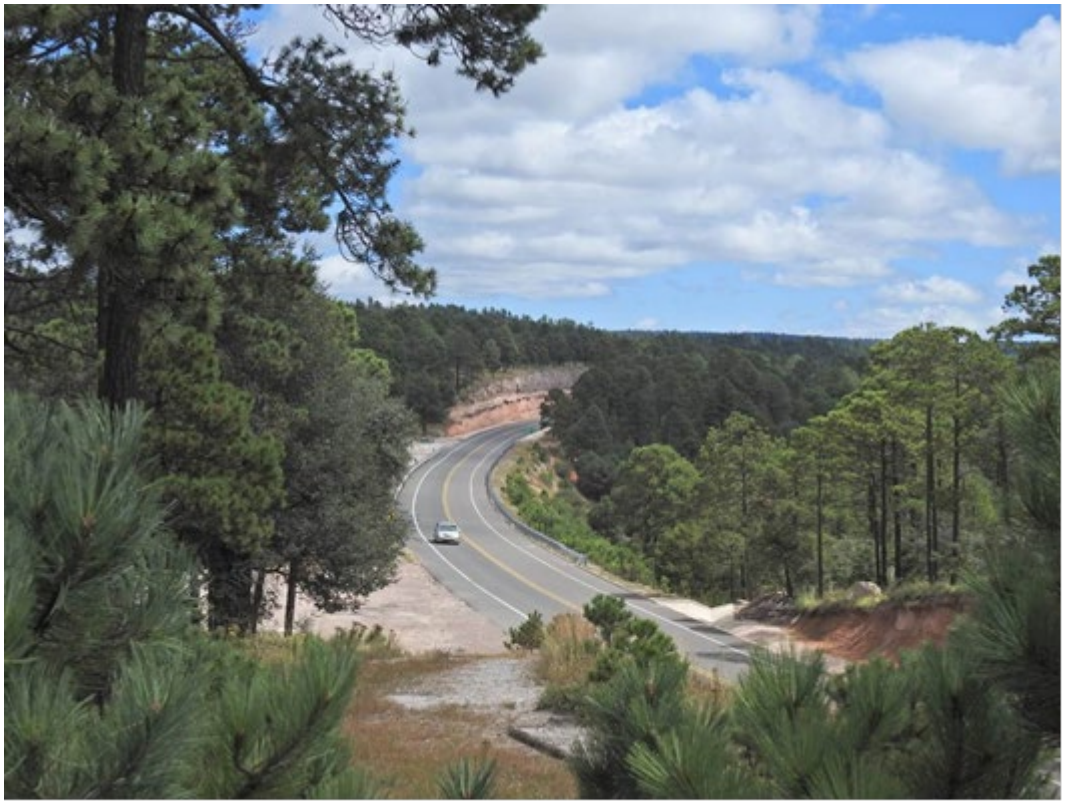






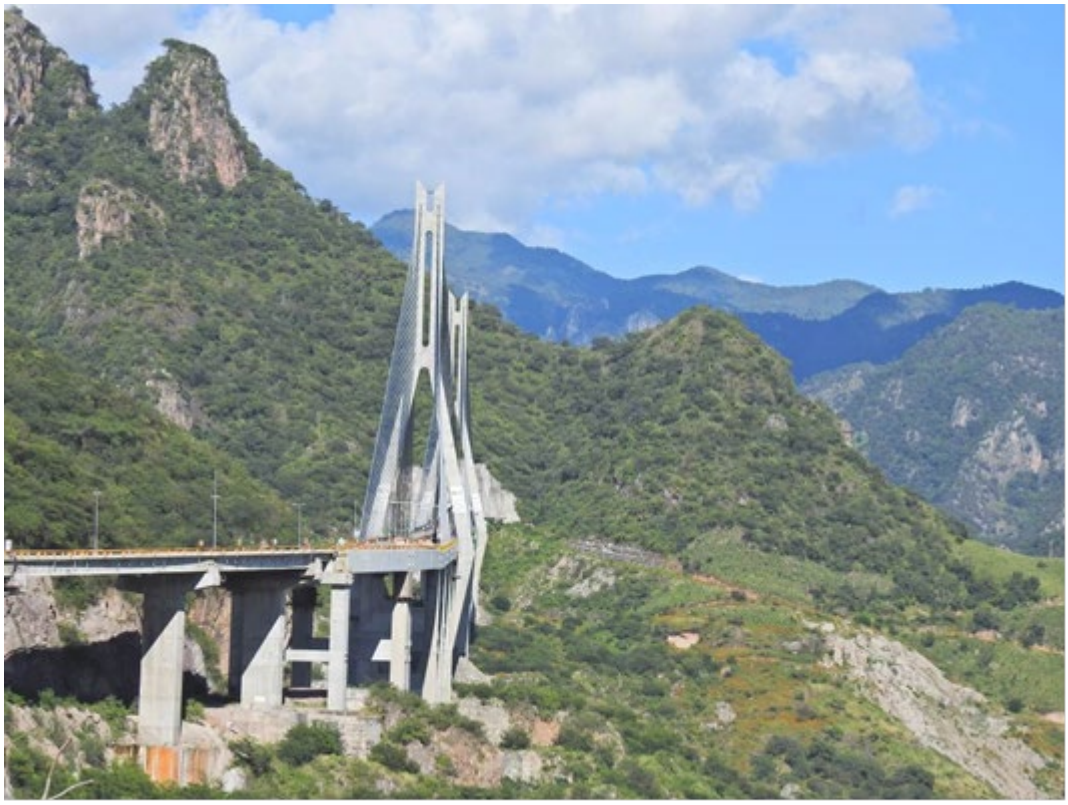
Delivery of photographs to ejido authorities.


Signage debris in the vicinity of the road.



Our study area. The highway completely immersed in the temperate forest.

Our study area. The highway completely immersed in the temperate forest. With large infrastructure that not only reduces vehicle transportation time, but also serves as a safe passage for wildlife.



Our study area. The highway completely immersed in the temperate forest. With large infrastructure that not only reduces vehicle transportation time, but also serves as a safe passage for wildlife.