Final Evaluation Report

Your Details	
Full Name	Luis Raúl Martínez García
Project Title	Scaling up to Conservation Guidelines: Lake Chapala Basin Wild Bee-Plant Interaction Network Conservation Project
Application ID	41869-2
Date of this Report	April 20, 2025

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
Establishment of the Restoration and Conservation Council for Biodiversity and Ecosystems				We establish the Council to assess its functionality. We have 20 members representing the human communities form each site.
Science dissemination through workshops on importance of plant-bee interactions in municipal agriculture-centers				We have presented preliminary results to the communities, including lists of bee species identified in each landscape (Figure 1). We also participated in community seed exchange gatherings to present the project. In total, at least 200 persons attended these presentations.
Generation of a wild-bee and plant catalogue				We began photographing some of the bee specimens from the collection at INECOL Pátzcuaro; however, we were unable to continue due to budget constraints. We believe this could be one of the deliverables for the next phase of the project.
Photography gallery				We presented two exhibitions: one at a popular cultural center in downtown Guadalajara, at the Galería Degollado (at least 50 persons at inaugural moment, and at least 200 in subsequent 15 days the gallery remained in this cultural center), and another at the Pedro Arrupe High School (at least 400 students and 30-40 teachers and employees of the High School were at inaugural moment, and many subsequent visits from the High School community in subsequent days) (Figure 2). Supporting documents are attached (Figure

				3).
Story contest in school				As part of the Science and Humanities Fair at Pedro Arrupe High School, we were invited to conduct a couple of classes focused on scientific storytelling and illustration (Figure 4). Supporting documents are attached (Figure 5).
Science-dissemination shorts: community-radio				We participated in a radio program on the Agronauta podcast. This resulted in several publications, as well as the release of the video and audio across all social media channels (Figure 6).
Development of a manual for good agricultural practices				We developed the Manual of Regenerative Practices in Productive Landscapes for the Conservation of Pollinators and Ecosystems in the Chapala Region, Jalisco. The document is currently in the final stage of editorial design. Although we do not yet have the funds for printing, we plan to apply for a grant from the Jalisco State Council of Science and Technology to print and distribute copies in the communities surrounding Lake Chapala (peasants, teenagers at High Schools and other population) (Figure 7). We need at least 1800-2500 GBP for printing this output of the project.
List of wild bees in conservation categories according to IUCN Red List protocol				We processed the taxonomic information we have determined so far, and by cross-referencing it with the species available in the IUCN Red List, we compiled a list of 591 specimens classified in some category. We have included this list in this report, and we are working on a publication for the journal Eco-Lógico,

				dissemination magazine by INECOL, Xalapa, Veracruz. Figure 8). We identified some rare specimens, such as *Ctenioschelus chalcodes*, that require further evaluation in the IUCN Red List, along with other species that have not yet undergone a comprehensive review (very valuable information).
Developing a protocol for the monitoring of plant-wild-bee interactions in agricultural landscapes in tropics				This deliverable was delayed due to challenges in meeting the timeline, but we have the data and some sections already written. We expect to complete it by the end of this year

2. Describe the three most important outcomes of your project.

a) We successfully carried out the first implementation of a Regional Council with representatives from each municipality and some ejidos. Although communication has been a challenge—as we mention below—we consider this a major achievement that should be kept alive throughout the project.

b) Once again, we have been featured in various media events, interviews, and podcast shows, and we've organized high-quality science communication events aimed at enriching human perception of nature, particularly in relation to wild bees and native pollinators conservation and education. We also have done the first "Manual of Regenerative Practices in Productive Landscapes For the Conservation of Pollinators and Ecosystems in the Chapala Region, Jalisco".

c) We classified most of the collected specimens according to the IUCN Red List. Although there is still much work to be done, we will continue to build on this effort soon. As a bonus —and despite these not being included in the deliverables for this phase of the project— we have drafted two scientific articles currently under review for publication in different journals, and we are planning at least three more: one exploring how "hidden landscape variables" (territorial and political management factors) shape wild bee ecological communities; another in the form of a commentary article on how "Small Grants, Big Science" is possible (a narrative account of our project funded by The Rufford Foundation); and finally, an analysis of national conservation schemes focusing on Protected Areas and the available information on native bees in Mexico.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

Shortly before going out to the field, we had to service the pickup truck due to an injector failure and a clutch valve issue that prevented us from shifting gears. This was an unforeseen expense, and we spent 22,800 Mexican pesos (currently around 865 GBP) from the budget. We also had higher fuel expenses than expected, as we continued field visits to conduct interviews even after specimen collection. We have included the travel expenses for the taxonomist's visit (1 flight and some bus tickets) and other visits made I made to the collection to Pátzcuaro (only bus tickets).

This time, we had no issues with fieldwork. However, taxonomy work has been delayed because Philippe Sagot, our lead taxonomist, retired last year. Although Jorge Mérida has been helping us, the pace of work has slowed down.

We also faced some financial limitations that prevented us from making the necessary trips to transport specimens from Pátzcuaro, Michoacán, to San Cristóbal de las Casas, Chiapas. Additionally, we were unable to cover travel expenses and wages for the person who was supposed to continue photographing specimens for the wild bee catalog of the Chapala Region. This is certainly a task we want to continue. At the moment, there is a GBIF call that could support the digitization of specimens from the two entomological collections (CECOM and ECOAB). However, we would need to dedicate a work phase to mobilize the required personnel.

We have also encountered some difficulties in mobilizing members of the Regional Council, as most of them live in remote areas. Facilitating communication for the Council to function remains a challenge. One option we are considering is to organize a series of meetings to foster a sense of familiarity and camaraderie within the group. These gatherings would also serve as an opportunity to filter for those most interested in being part of the Council, and to attract new members.

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

Now people know us. The community has been involved in the project mainly by providing support such as lodging, occasional meals, safety warnings, and other gestures. As I mentioned earlier, the Regional Council has been formed, but participation is still developing—mainly due to the geographic and spatial barriers involved in moving from one municipality to another, as travel distances are quite long.

The communities have a positive view of the project and believe that our connection has been beneficial for carrying out this work. Some agricultural practices have been questioned during our dialogues, and it has been challenging to reach a consensus on how certain practices pose risks to both ecosystem and human health. There is still a need for deeper environmental education, but we believe we are on the right track. Other working groups we have connected with have been active for many years, and we have invited three individuals from those groups to join the Regional Council.

We received two applicants to master's degree for this project, but unfortunately, they could not pass the necessary academic filters to get the position at INECOL.

5. Are there any plans to continue this work?

We believe we are currently in a phase of wrapping up several deliverables—scientific articles, editorial design tasks for the Manual of Regenerative Practices, and other pending items that have emerged during this stage of the project. I plan to focus on completing my PhD between August and October of this year, 2025, and then return to move forward with the next phase of the project.

I've started teaching a course on "Nature-Based Solutions" at ITESO (Jesuit University of Guadalajara), and I'm also participating in a group of academics at Tecnológico de Monterrey, which focuses on environmental education, biodesign for multispecies coexistence, and other related topics that align with my work. So now I have a student platform (24 at ITESO, 40 at Tec de Monterrey), as well as support from fellow colleagues, which will allow me to develop the next phase of the project with stronger backing—not only from my colleagues at INECOL, Pátzcuaro, and Freiburg University, but now also involving members from other universities to mobilize more grants and collaborative projects as part of a shared effort, positioning this initiative as part of something bigger.

In summary, yes—I fully intend to continue this wonderful project, which is increasingly being recognized as a flagship experience in the Chapala Region, thanks to the generous support of The Rufford Foundation.

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

As I've mentioned before, we've done educational work in schools and at events organized by NGOs with similar missions in the region, as well as participating in radio shows, podcasts, setting up scientific photography galleries, and many other efforts to share the project within rural communities. We are now finishing the editing of scientific articles, which serve as another way to share our findings with the scientific and academic community, along with the development of a few outreach articles and one in the form of a "commentary" scientific paper in an indexed journal.

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

I believe that, for now, the most important task is to continue engaging the members of the Council until we can secure funding for the next phase. This phase will need to include community dialogues, follow-up visits, and the ongoing co-design of materials for education, outreach, and scientific knowledge focused on the conservation of native pollinators.

Another key component will be the digitization of some specimens from the collection to provide access to valuable information that has already been gathered. We also aim to support the training of master's and undergraduate students to make use of the pollen samples we were able to recover from the bees' legs, as well as the floral structures collected—data that were not included in our current analyses but could serve as a perfect complement to this project.

And of course, I believe it will be essential to continue expanding our communication network with other countries (USA, Canada, Germany, and others) to increase scientific reach and make the most of all the information generated through this project. There's still a lot to be done.

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

We used The Rufford Foundation's logo in various presentations and outreach materials, including talks at universities (ITESO, Tec de Monterrey), at Pedro Arrupe High School, in the progress mini-documentary (video of work progress), in the Agronauta podcast, and in posters displayed in rural communities to showcase preliminary results. The logo was also featured during the inauguration of the entomological collection (CECOM) at INECOL's Regional Center in El Bajío; at an event aimed at "re-educating Jalisco's agro-food giant," organized by the Colectivo Ecologista de Jalisco within the framework of Green Action Week; also at the event titled "Jalisco's Bees: Black, Blue, and All Colors", by the Colectivo Ecologista de Jalisco; and during the "Academic Day: Lake Chapala and the Water Crisis – Perspectives within the Framework of World Wetlands Month-Chapala", organized by the NGO Instituto Corazón de la Tierra and held at CETAC, Jocotepec (supporting document attached, Figure 10).

Video:
https://www.youtube.com/watch?v=BHbeavIIEDI

Interview:
https://youtu.be/iCK1D7o8rbc?si=KirO9OX0PuWKd3jl&t=425

https://open.spotify.com/episode/0UJNQO5ITzUUrVXZlbNsGv?si=8_jgRiUlRsOe-d8YAWMy-Q

It would be an honour if The Rufford Foundation post the summary videos (phase 1 and 2) in their social networks.

I stated in the interview that this kind of landscape-scale work with bees in intensive agricultural landscapes are still rare, and in Mexico only exists other 2, but they are not in landscape-scale for some academic issues regarding the treatment of spatial data (for instance, these did not consider replication or other scientific points). In this way, the nature of this project supported by The Rufford Foundation is reference for our study Region, and possibly for Mexico.

9. Provide a full list of all the members of your team and their role in the project.

MSc. Luis Raúl Martínez García, project leader
(https://www.linkedin.com/in/luisrmtzg/)

Dr. Carlos Andrés Cultid Medina – advisor. Statistician, data science specialist, ecological analysis and modeling expert.
Creator of scientific content on the radio program "The Pollinators on FM".

https://www.inecol.mx/personal/index.php/diversidad-biologica-del-occidente-mexicano/205-carlos-andres-cultid-medina
https://scholar.google.es/citations?user=w6CRgSQAAAAJ&hl=es

Dr. Rémy Benoit Marie Vandame – advisor. Native bee specialist, collection curation, science, agroecology, and agricultural toxicity.
https://www.ecosur.mx/academico/rvandame

Dr. Tlacaelel Aarón Rivera Núñez - internal advisor on public policy, qualitative research, and sociocultural issues
http://inecol.edu.mx/personal/index.php/redes-academicas/ambiente-y-sustentabilidad/246-tlacaelel-aaron-rivera-nunez
https://scholar.google.es/citations?user=O8uWZWMAAAAJ&hl=es

Dr. Alexandra Maria Klein – external advisor. Ecologist, specialist in ecosystem functioning, multi-trophic interactions with a strong background in pollination ecology, conservation, environment and sustainability.
https://www.nature.uni-freiburg.de/team-en/klein.en
https://scholar.google.com/citations?user=8o_zQvQAAAAJ&hl=de

Philippe Sagot – wild-bee taxonomist expert at Ecosur, San Cristobal de Las Casas, Chiapas
https://www.researchgate.net/profile/Philippe-Sagot

Juan Marti – audiovisual and post-production director
https://vimeo.com/migrantefilms

Marcelo Salazar (@marcelosalazare) – Voice-over artist/narrator, male voice
www.centraldevoces.com

Ing. Pamela Fabiola Gallardo González – second field work team leader
Ing. Aranza Lizeth Ilescas García – field worker
Biol. Fátima Sarahí González Lara – field worker, student
Ing. Angélica María Hernández Mendoza – field worker, student
Biol. Evelyn Jacqueline Andrade Balsamo – field worker, student
Biol. Isreal Pantoja Ocegueda – technical trainer and field worker
Biol. Oscar Daniel Hernández López – field worker, student
Biol. Omar Rentería Martín – insect taxonomist and field worker, student
Biol. Ricardo Lara García – field worker, student
Biol. Alberto Picasso Contreras – field worker and illustrator, student
Biol. Alan González Ramírez – field worker, student
Biol. Marisol Rodríguez – field worker, student

Local collaborators:
Alicia Ceja Acuña (Licho) – Farmar, municipality of Tuxcueca
Espiridión Fuentes (Paye) – Farmer, municipality of Ixtlahuacán de los Membrillos
Ricardo Reyes – ejido commissioner, municipailty of Tizapán el Alto
Alfredo Cárdenas – Farmer, El Refugio, municipality of Tizapán el Alto
Sacarías Cárdenas – Cowherd, Potrero La Pila del Guayabo, municipality of Tuxcueca
Serapio Ruiz – Farmer, municipality of San Luis Soyotlán

Ing. Francisco Salazar – ejido commissioner, municipailty of Jocotepec
Rosendo Lamas, Comisario – ejido commissioner Huejotitán, municipality of Jocotepec
Roberto Martínez, Comisario – ejido commissioner Callejón de la Calera, municipality of Cojumatlán de Régules, Michoacán de Ocampo state.
César Covarrubias Andrade – ejido commissioner, Cumuatillo, municipality of Venustiano Carranza, Michoacan
Natividad Godinez – ejido commissioner, municipality of Jamay
Ramón Vergara Chavez – Farmer, Huejotitan, municipality of Jocotepec
Salvador Estrada – rancher, San Luis del Agua Caliente, municipality of Poncitlán.
Saúl Jiménez – ejido member, municipality Jamay
Carlos Maldonado – entrepeneur, municipality Poncitlán
Armando Muñoz – ejido member, municipality Poncitlán
Jorge Antonio Rodriguez – ejido commissioner, San Luis, Poncitlán
Arturo Sioridia – municipal delegate, San Juan Tecomatlán, municipality Chapala
Marcelo Raygoza – municipal delegate, Santa Cruz de la Soledad, municipality Chapala
Ramón Vázquez – Farmer, La Cañada, municipality Ixtlahuacán de los Membrillos
Delegado José Rodríguez – municipal delegate, Ejido Modelo, Villa Emiliano Zapata, municipality Tizapán El Alto.

10. Any other comments?

We extend our heartfelt thanks to The Rufford Foundation for their generous support and trust in our work. Their commitment to biodiversity conservation has been a key pillar in the progress we've made throughout this project. This journey has allowed us to deepen our understanding of native wild-bees and the ecosystems they depend on, while fostering tangible actions for their protection. The Foundation's encouragement has empowered us to turn ideas into impactful outcomes, and to build stronger bridges between science, communities, and nature. As we reflect on what we have accomplished, we are motivated to continue this path with even greater determination. We are truly grateful to count on The Rufford Foundation as an essential ally in this shared mission to protect pollinators and promote ecological resilience in rural and urban areas, universities and other young populations.

Figure 1. Presenting preliminary progress at a local socio-academic event in Jocotepec.

Figure 2. Setting up a scientific exhibition at Pedro Arrupe High School, with support from Oscar Hernández and Pamela Gallardo.


BACHILLERATO
PEDRO ARRUPE SJ
LLAMADOS PARA TRANSFORMAR EL MUNDO

OTORGA EL PRESENTE

RECONOCIMIENTO

A

Luis Raúl Martínez García

Por su aportación al cuidado de la biodiversidad y conciencia ecológica con la galería científica titulada "NUESTRAS OTRAS ABEJAS" dentro del marco celebrativo de la Feria de Ciencias y Humanidades 2023-2024

"Cambio climático ¿aún hay tiempo?"

22 y 23 de febrero del 2024, Guadalajara, Jalisco

Cecilia Sahagún Calderón
Dirección de Bachillerato

Arely Rocha Viramontes
Coordinación Académica

Figure 3. Supporting document: "Nuestras Otras Abejas", a scientific photography exhibition for conservation. Held at Pedro Arrupe High School.

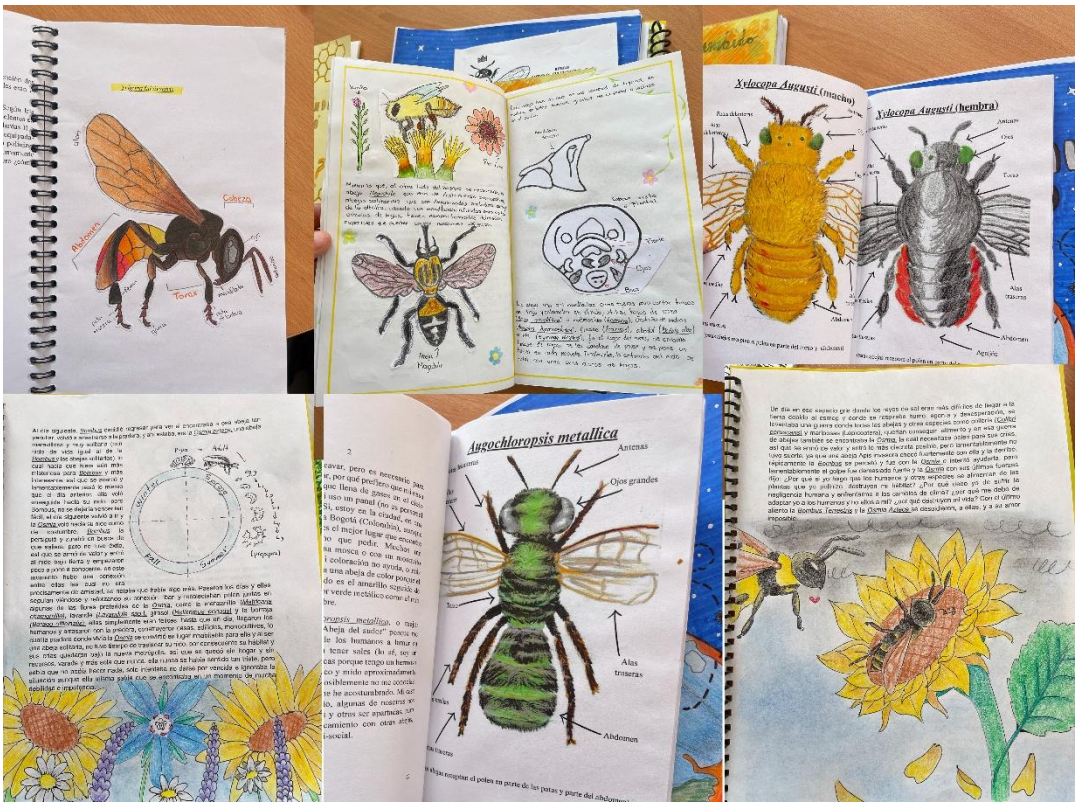

Figure 4. Products created by bachelor students during the short course on scientific storytelling and illustration. Pedro Arrupe High School.


BACHILLERATO
PEDRO ARRUPE SJ
LLAMADOS PARA TRANSFORMAR EL MUNDO

OTORGA EL PRESENTE

RECONOCIMIENTO

A

Luis Raúl Martínez García

Por su valiosa como ponente de la charla
"La biodiversidad, las Abejas nativas, y el cambio climático" y el curso "dibujo y narración científica"
en el marco de la Feria de Ciencias y Humanidades 2023-2024.
22 y 23 de febrero del 2024, Guadalajara, Jalisco

Cecilia Sahagún Calderón
Dirección de Bachillerato

Arely Rocha Viramontes
Coordinación Académica

Figure 5. Supporting document: "La biodiversidad, las Abejas nativas, y el cambio climático", Certificate for the short course on scientific storytelling and illustration. Held at Pedro Arrupe High School.

Figure 6. Participation in the agricultural-themed podcast *Agronauta*, with distribution across all social media platforms and national reach

Figure 7. One of our deliverables from the project: “Manual of Regenerative Practices in Productive Landscapes for the Conservation of Pollinators and Ecosystems in the Chapala Region, Jalisco”.

Nombre de abeja	DD (data deficient)	EN (endangered)	LC (least concern)	NT (near threatened)	Total general
Andrena (Callandrena) bilimeki LaBerge, 1967	0	0	2	0	2
Andrena (Callandrena) levigata LaBerge, 1967	0	0	1	0	1
Anthidiellum (Loyolanthidium) toltecum (Cresson, 1878)	0	0	7	0	7
Anthidium (Anthidium) parkeri Gonzalez & Griswold, 2013	0	0	1	0	1
Anthidium (Anthidium) rodriguezi Cockerell, 1912	0	0	2	0	2
Anthophora (Micranthophora) squammulosa Dours, 1869	0	0	5	0	5
Augochlora (Augochlora) quiriguensis Cockerell, 1913	0	0	2	0	2
Augochlora (Augochlora) smaragdina Friese, 1917	0	0	4	0	4
Aztecanthidium xochipillium Michener & Ordway, 1964	0	0	0	2	2
Caenaugochlora (Caenaugochlora) inermis (Vachal, 1904)	0	0	28	0	28
Calliopsis (Calliopsis) hondurasica Cockerell, 1949	0	0	1	0	1
Centris (Centris) eisenii Fox, 1899	0	0	7	0	7
Centris (Heterocentris) transversa Pérez, 1905	0	0	72	0	72
Centris (Paracentris) albiceps Friese, 1899	0	0	1	0	1
Ceratina (Zadontomerus) ignara Cresson, 1878	5	0	0	0	5
Ceratina (Zadontomerus) nautlana Cockerell, 1897	0	0	3	0	3
Coelioxoides punctipennis Cresson, 1878	1	0	0	0	1
Epicharis (Epicharana) elegans Smith, 1861	0	0	44	0	44
Epicharis (Hoplepicharis) lunulata Mocsáry, 1898	0	0	1	0	1
Eufriesea pallida (Kimsey, 1977)	1	0	0	0	1
Euglossa (Euglossa) viridissima Firese, 1899	0	0	3	0	3
Exaerete azteca Moure, 1964	1	0	0	0	1
Exomalopsis (Stilbomalopsis) byersi Timberlake, 1980	0	0	16	0	16
Lasioglossum (Lasioglossum) circinatum (Vachal, 1904)	0	0	1	0	1
Megachile (Argyropile) flavihirsuta Mitchell, 1930	0	0	33	0	33
Megachile (Chelostomoides) quadridentata Mitchell, 1930	0	0	10	0	10
Megachile (Chelostomoides) reflexa (Snelling, 1990)	0	0	33	0	33
Osmia (Diceratosmia) aliciae Ayala & Griswold, 2005	0	0	56	0	56
Osmia (Diceratosmia) azteca Cresson, 1878	0	0	4	0	4
Paragapostemon coelestinus (Westwood, 1875)	0	0	1	0	1
Peponapis azteca Hurd & Linsley, 1966	0	0	1	0	1
Peponapis smithi Hurd & Linsley, 1966	0	0	2	0	2
Plebeia (Plebeia) manantlensis Ayala, 1999	0	4	0	0	4
Syntrichalonia fuliginea LaBerge, 1994	0	0	40	0	40
Tetraloniella (Pectinapis) labergei (Dorchin, 2018)	0	0	54	0	54
Tetraloniella (Pectinapis) salviae (LaBerge, 1989)	0	0	7	0	7
Tetraloniella (Tetraloniella) ayala LaBerge, 2001	8	0	0	0	8
Tetraloniella (Tetraloniella) donata (Cresson, 1878)	0	0	6	0	6
Tetraloniella (Tetraloniella) jaliscoensis LaBerge, 2001	3	0	0	0	3
Trachusa (Heteranthidium) pectinata Brooks & Griswold, 1988	0	0	30	0	30
Trachusa (Ulanthidium) mitchelli (Michener, 1948)	0	0	47	0	47
Xenoglossa fulva Smith, 1854	0	0	2	0	2
Xylocopa (Notoxylocopa) guatemalensis Cockerell, 1912	0	0	39	0	39
Total general	**19**	**4**	**566**	**2**	**591**

Figure 8. List of 591 wild bees classified in the **IUCN Red List**, derived from the cross-referencing of the collected specimens in this project.

Figure 9. Pickup truck maintenance prior to fieldwork.

CORAZÓN DE LA TIERRA
INSTITUTO AMBIENTAL

EL INSTITUTO CORAZÓN DE LA TIERRA

OTORGA LA PRESENTE **CARTA DE PARTICIPACIÓN** AL: M.C. LUIS RAÚL MARTÍNEZ GARCÍA del Instituto de Ecología, A.C-Centro Regional del Bajío y Ecosur, San Cristóbal de Las Casas, Chis, por haber asistido a la **Jornada Académica: El Lago Chapala y la Crisis del Agua. Perspectivas en el marco del Mes Mundial de los Humedales-Chapala**, realizado el **15 de febrero del 2024**, con sede en el CETAC, Jocotepec, Jalisco.

Agradeciendo además su participación como expositor de un Cartel con el tema: PAISAJES HUMANOS, PAISAJES PARA POLINIZADORES: RELATORÍA DE PROYECTO DE CONSERVACIÓN DE REDES DE INTERACCIÓN PLANTA-ABEJA SILVESTRE ALREDEDOR DEL LAGO DE CHAPALA.

Guadalajara, Jal. a 20 de febrero del 2024

Cordialmente

Lic. Nelida Orozco Santiago
Presidenta

Figure 10. Supporting document for the participation in the event "Academic Day: Lake Chapala and the Water Crisis. Perspectives within the Framework of World Wetlands Month–Chapala".

ANNEX – Financial Report

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