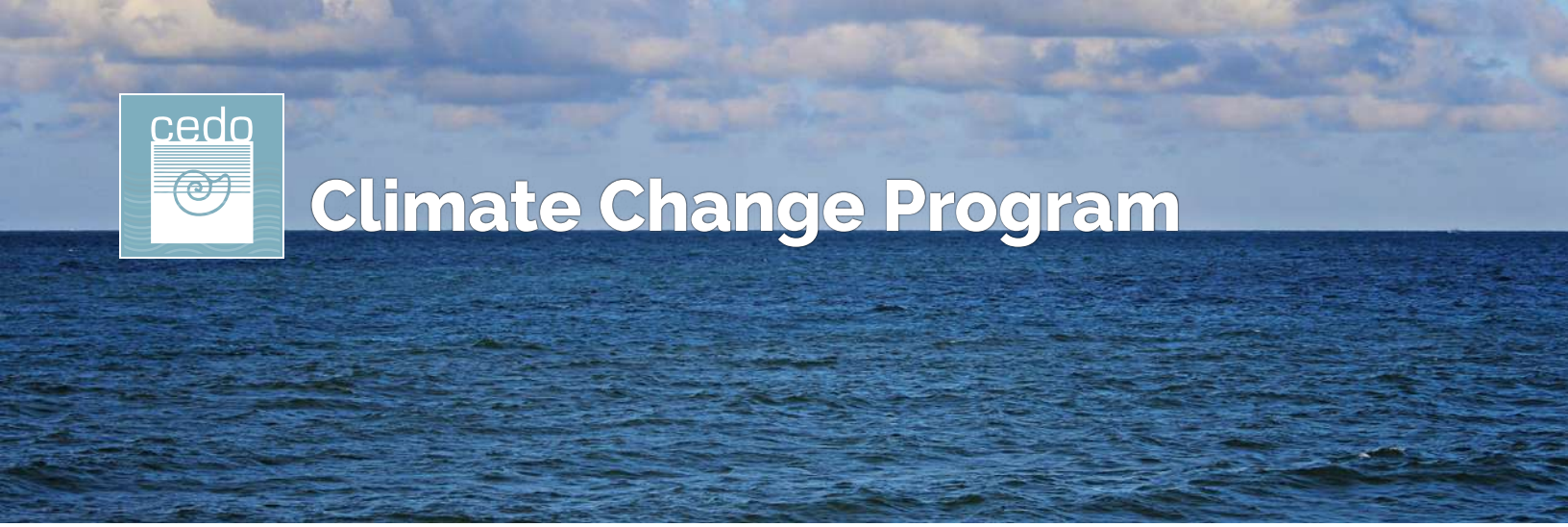
Climate Change Program



© Photo Socorro González.

The Climate Change Program's main objective is to carry out research actions to identify the effects of climate change, help understand which human populations, fisheries and aquaculture areas are the most vulnerable to this change and help improve the adaptive capacity of the fishing sector.

In Mexico, climate change is already impacting the life, habitats, and well-being of coastal communities, particularly in the northwestern region of Mexico where CEDO works. This is why, as researchers, we generate and disseminate information that will support our goal with a focus on the effects of climate change on fisheries, aquaculture and coastal communities.

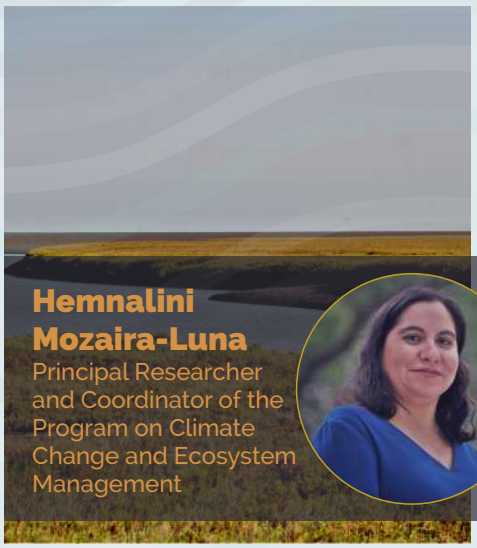
ACHIEVEMENTS 2021

- Collaboration in a research consortium focused on the effects of climate change on fisheries and aquaculture in Mexico, combining CEDO's experience and resources to answer more complex and broader questions.
- Participation in the recently published report "Study of Climate Change in Mexico". The document presents a detailed analysis of the fishing and aquaculture situation in Mexico in face of the perspectives and challenges that climate change presents, and analyzes the vulnerability of the country's coastal communities facing this pressure, their location, and what are the most and least favorable scenarios for climate change in two-time horizons, the years 2050 and 2100. The analysis showed that currently, the northwestern states of Mexico, Sonora, Sinaloa and Baja California, specifically, have the largest number of vulnerable communities.
- Participation in three popular science publications focused on ecosystem management, fisheries and climate change, an achievement that allows us to foster collaboration with other scientists and institutions and spread the knowledge we generate.

© Photos by Abelardo Castillo and CEDO Archive.







Hemnalini Mozaira-Luna
Principal Researcher and Coordinator of the Program on Climate Change and Ecosystem Management



Conservation, Biodiversity and Citizen Science Program

© Photo Alejandro Castillo. CEDO Archive.

The main objective of the Conservation, Biodiversity and Citizen Science Program is to consolidate voluntary citizen networks, trained and certified to monitor biodiversity in the Northern and Upper Gulf of California and collaborate efficiently to restore landscapes and protect priority species.

The Northern Gulf of California and the Sonoran Desert are recognized for their great biodiversity and the cultural legacy of the Tohono O'odham, Cucapá, and Comcac Nations. Three protected natural areas converge in it: the Alto Golfo y Delta del Río Colorado Biosphere Reserve, the El Pinacate y Gran Desierto del Altar Biosphere Reserve, and the Protected Area for Flora and Fauna of the Gulf of California Islands.

ACHIEVEMENTS 2021

- We obtained the 1st Place of the "Tierra de Mujeres" Award from the Yves Rocher Foundation, as recognition for more than 15 years of work on research, conservation and protection issues in the Morúa Estuary and for promoting the work of women from the "Cooperativa Única de Mujeres" and " Cooperativa Punta Roja" in oyster farming.
- We continued to monitor Gulf of California sea lions (Zalophus californianus) and least terns (Sternula antillarum) as indicators of the health of our ecosystems. Using a citizen science strategy, fishermen, women and youth from fishing communities integrate local knowledge and science.
- We participated as full members of the region's three NPAs Advisory Councils, the El Pinacate y Gran Desierto de Altar Biosphere Reserve, the Upper Gulf of California and Colorado River Delta Biosphere Reserve, and the Protected Area for Flora and Fauna of the Gulf of California Islands, aimed at incorporating the various sectors involved in managing the areas.
- We obtained certification as a Management Unit for Wildlife Conservation (UMA) in intensive management modality. The objective of the UMA is to conserve, manage, reproduce, and rescue desert pupfish (Cyprodon eremus) and longfin dace (Agosia chrysogaster) and provide opportunities for recreation, environmental education and research, featuring exhibits and CEDO's botanical garden.





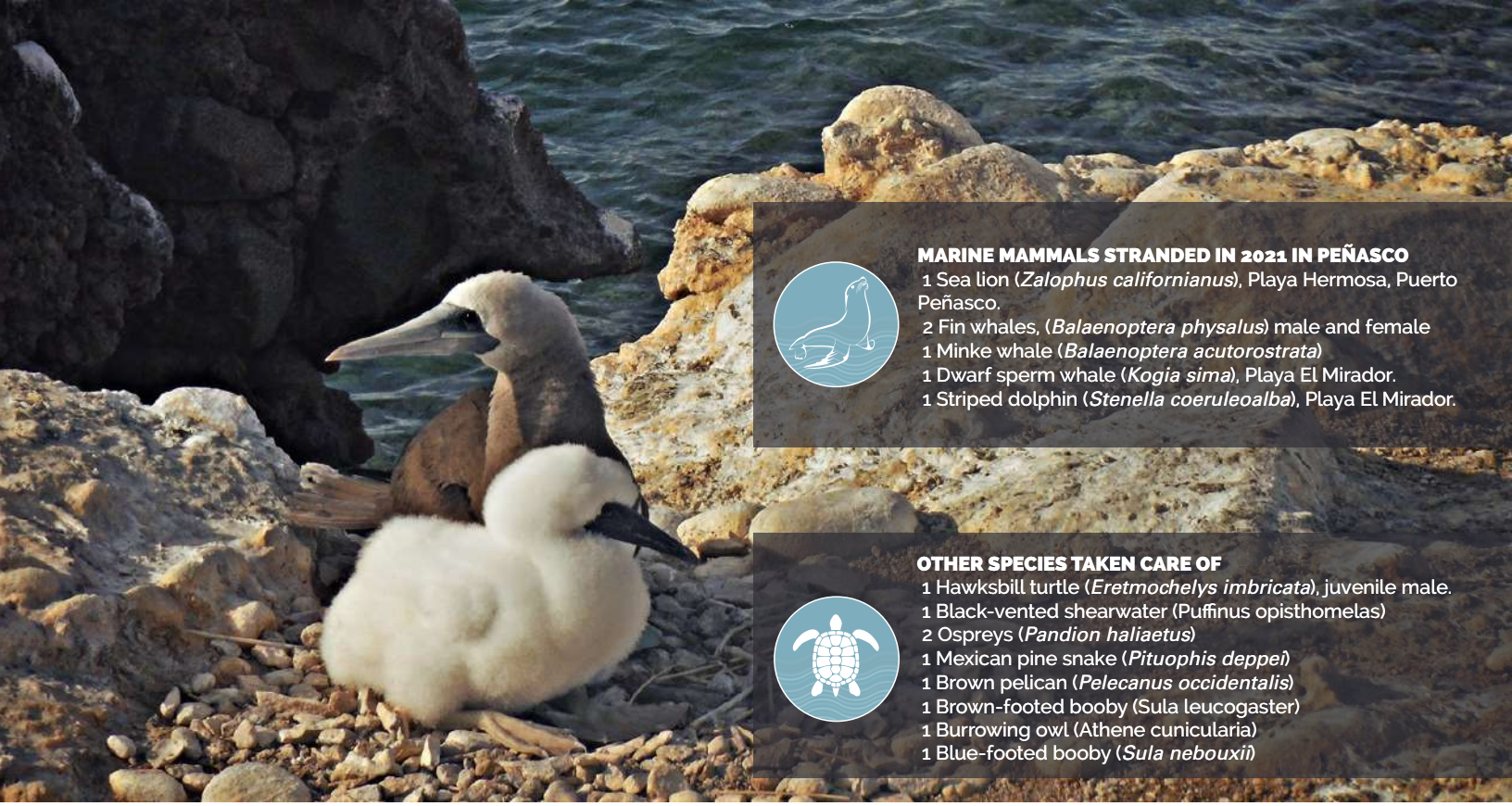
© Photos by
Grupo Lobos, Alejandro Castillo and Abelardo Castillo.
CEDO Archives.











MARINE MAMMALS STRANDED IN 2021 IN PEÑASCO

1 Sea lion (*Zalophus californianus*), Playa Hermosa, Puerto Peñasco.
2 Fin whales, (*Balaenoptera physalus*) male and female
1 Minke whale (*Balaenoptera acutorostrata*)
1 Dwarf sperm whale (*Kogia sima*), Playa El Mirador.
1 Striped dolphin (*Stenella coeruleoalba*), Playa El Mirador.

OTHER SPECIES TAKEN CARE OF

1 Hawksbill turtle (*Eretmochelys imbricata*), juvenile male.
1 Black-vented shearwater (Puffinus opisthomelas)
2 Ospreys (*Pandion haliaetus*)
1 Mexican pine snake (*Pituophis deppei*)
1 Brown pelican (*Pelecanus occidentalis*)
1 Brown-footed booby (Sula leucogaster)
1 Burrowing owl (Athene cunicularia)
1 Blue-footed booby (*Sula nebouxii*)

© Photo Grupo Lobos

COURSES AND TRAININGS

- Bird monitoring at El Pinacate: objectives and methods, facilitated by Aaron D. Flesch and Miguel Grageda, School of Natural Resources and the Environment, University of Arizona.
- Virtual Workshop to Exchange Experiences, part of the Natural Protected Areas Learning Community (CAAP) 2020 project supported by the Mexican Fund for the Conservation of Nature (FMCN), September 2 and 3, 2021.
- Introduction to Marine Mammalogy with emphasis on the study and care of strandings, virtual modality, facilitated by the Asociación de Megafauna Marina, Atención, Rescate y Ecología y Sociedad (MMARES, A.C.), November 13 and 14, 2021.
- Insular Biosafety Workshop, Islands of the Gulf of California, facilitated by the Grupo de Ecología y Conservación de Islas, A. C. Training the Regional Sub-Council Islands of the Gulf of California in insular biosafety.
- Basic Concepts to Understand the Environmental Impact Assessment Procedure (PEIA), facilitated by Centro Mexicano de Derecho Ambiental, A.C., la Sociedad de Historia Natural Niparajá, A.C. and Centro Mexicano para la Defensa del Medio Ambiente A. C. September 30, 2021.
- Training course for members of the Natural Protected Areas Advisory Councils: "Importance of Women's Participation in Advisory Councils".
- Transfer of knowledge and skills to operate to CONOCER service providers: Skills Certificate EC0578.
- Master's Degree in Arid Zones Ecosystem Management (MEZA) from UABC.

MONITORING

- 10 desert birds monitoring events in the Pinacate y Gran Desierto de Altar Biosphere Reserve for the Binational Avian Monitoring, Research, and Capacity Building Project at the El Pinacate and Organ Pipe Cactus National Monument Biosphere Reserves.
- 1 exchange of experiences- CONANP groups.
- 1 theoretical-practical course on Meeting with Groups and personnel of the CONANP-Gulf of California and with a specialist in priority species from the central offices.
- 3rd. sea lion disentangling campaign on San Jorge Island.
- 6 California sea lion (Zalophus californianus) monitoring events on San Jorge Island.
- 4 human uses monitoring event in San Jorge Island.
- 2 land sanitations on San Jorge Island.
- 5 least tern (Sternula antillarum) monitoring events in Barra San Jorge.
- 2 brown-footed booby (Sula leucogaster) monitoring events in San Jorge Island.
- 2 desert pupfish (Cyprodon eremus) and longfin dace (Agosia chrysogaster) monitoring events in March and October.

EVENTS

- Updating the management program of the APFF-islands of the Gulf of California.
- APFF- islands of the Gulf of California National Network for Attention to Entangled Pinnipeds.
- Third Sea lion (Zalophus californianus) disentangling campaign in the Gulf of California from November 23 to 28, 2021.

PERMITS

- 1 no-vehicle tourism for the El Pinacate y Gran Desierto de Altar Biosphere Reserve (Natural Protected Area).
- 1 permit to exhibit CEDO's scientific collections.
- 1 permit for the Desert Fish Management Unit (UMA) and the botanical garden.
- 1 permit for the 2022 whale watching season.

AGREEMENTS

- 1 agreement between the Autonomous University of Baja California Sur (UABCS) and the Marine Mammal Research Program (PRIMMA) for projects carried out on marine mammals in the Puerto Peñasco-Lobos, Sonora Biological-Fishing Corridor.

Angeles Yazmín Sánchez Cruz
Manager in Conservation, Biodiversity and Citizen Science



Sustainable Fisheries and Aquaculture Program



© Photo Abelardo Castillo.

The Fisheries and Sustainable Aquaculture Program main objective is to promote and advise the regional and national fishing sector so that one third of the annual regional productions of commercial fisheries are produced and marketed with social responsibility and fair-trade models developed by fishing improvement and certification projects.

77% of the fishing production in Mexico is obtained from the Pacific Ocean and of this percentage, 80% comes from the Gulf of California through 17 main fisheries and 131 species, including crab, clam, and shrimp.

Fishing is the main economic activity in the Northern and Upper Gulf of California, where 78 thousand people live and around 760 boats are used (PROFEPA. 2021). We work to consolidate sustainable fishing for commercially important species, while conserving and protecting their habitats for long-term sustainable use.

Sustainable fishing involves any product that comes from fisheries or legal aquaculture companies working with a rational use of species and natural resources that allow for conservation and sustained performance over time, and whose activities have a triple impact—environmental, social and economic—in the fisheries themselves and in the working fishing communities.

ACHIEVEMENTS 2021

- We are currently in the third consecutive year of the Crab FIP implementation, working with the Cooperativa Ejidal Bahía San Jorge that brings together 56 members of the Rodolfo Campodónico community from Caborca, Sonora.
- We generated information to update the status of population stocks and any incidental catch.
- We carried out selectivity experiments involving various traps and baits to promote the greatest efficiency, and cleaning sessions and use of degradable staples to avoid ghost fishing.
- We carried out a management and reuse plan for fishing waste.
- We implemented four volunteer fisheries refuges.
- To implement the white clam FIP we worked with two cooperatives and seven permit holders from Puerto Peñasco. During the first year of FIP implementation we managed to install the Consultative Subcommittee to regulate and manage resources and we generated inputs for its management plan, the National Fisheries Charter, and the annual quota.
- We collaborated to certify water bodies and products, and we helped producers access a sustainable market for Smart Fish Mexico.
- We facilitated capacity building for fisherwomen, fishermen, and other members of the fisheries value chain by certifying labor competencies and offering other specialized courses.
- Through fisheries ordering we promoted the implementation of management tools generated in consensus with the communities by working with community groups, fisheries authorities and academics focused on implementing management zones and regulating traditional fishermen activities.

FISHERIES & AQUA CULTURE









- We promoted productive diversification by fostering development and implementation of mariculture projects for priority species, as well as aquaculture to repopulate species that have declined.
- We promoted alternative businesses to commercial fishing and the use of the value rescue model, application of traceability systems in priority fisheries, and improved infrastructure for projects, mainly to open new markets for local fisheries.
- We worked hand in hand with Fish Choice, Smart Fish, Pronatura Noroeste and eight coastal communities: Puerto Peñasco, Golfo de Santa Clara, the Ejidos Rodolfo Campodónico, 15 de Septiembre, Álvaro Obregón, Desemboque de Caborca and Puerto Lobos in Sonora, and in San Felipe in Baja California.

RENÉ LOAIZA VILLANUEVA
Manager of Sustainable Fisheries and Aquaculture



© Photos by Abelardo Castillo and CEDO Archive.



Community Well-being Program



© Photo Abelardo Castillo.

The main objective of the Community Well-being Program is to strengthen the communities of the Northern Gulf of California with tools and practices that allow them to identify their problems and self-manage nature-based solutions to improve well-being. We focus mainly on women and youth for more resilient communities.

Our work revolves around the governance of the region's fishing communities and management with municipal, state and federal governments and other actors to consolidate partnerships and design collaboration models that allow us to get involved and support implementing solutions that build more sustainable and resilient communities. To achieve this, we work the following strategic lines: Strengthening Community Resilience, Promoting Governance, Strengthening Capacities and Empowering Women, Youth, and Older Adults.





© Photos Abelardo Castillo, Nélida Barajas. CEDO Archives.

ACHIEVEMENTS 2021

STRENGTHENING COMMUNITY RESILIENCE

- We refurbished and reactivated the San Jorge Bay Community Center and School of Sea (CCEM-BSJ) as a space for capacity building and community decision-making, equipping it with computer equipment, internet service, television, and a solar cooker.
- We offered training at the CCEM-BSJ facilities on access to social services, professionalization of skills, and wildlife and environmental care. The center was also was also used as a vaccination and medical support center during the pandemic.
- We provided personal safety equipment to prevent COVID infections to fishermen, women and youth and emphasized the importance of use during training. We delivered maritime safety equipment to crab fishermen.
- We designed a diagnosis of the Social Impact of COVID, carrying out community workshops where we consulted with women and fishermen about the level of impact on the fisheries' work environments to build a "Community Protocol for work environments free of Covid- 19 in the Artisanal Fishing sector".
- We built "Community Agendas" with fishermen and fisherwomen from San Felipe and Golfo de Santa Clara and prioritized common issues to rebuild the social fabric, support in facing the impacts of COVID and mitigate issues in the Upper Gulf including the embargo and the ban on nets / gillnets, among others.
- We implemented social programs such as "Youth Building the Future" and helped four Upper Gulf fishing communities to access voluntary affiliation to the IMSS.



© Photo Angeles Sánchez.

PROMOTING GOVERNANCE

- We installed the "Consultative Subcommittee for the ordering and management of the white clam resource in Sonora", headed by CONAPESCA, as a mechanism for social participation and decision-making for the clam fishery, supporting the FIP group of fishermen and fisherwomen in managing white clam.
- We represented NGOs in the Advisory Council of the Upper Gulf of California and Colorado River Delta Biosphere Reserve, and advised representatives of the fishing sector.
- We signed the collaboration agreement with CONAPESCA to promote fisheries management to regulate the activity of traditional fishermen in the region and implement a network of 26 fisheries refuges in the Puerto Peñasco - Puerto Lobos Corridor, these actions will improve the local economy, community resilience to climate change, and food security.
- We installed the "Well-being Committee for Citizen Participation" in collaboration with the municipal authorities of the Caborca City Council in Ejido Rodolfo Campodónico and in the town 15 de Septiembre.
- We collaborated with SAGARPHA, the Undersecretary of Fisheries of the State of Sonora and the Institute of Aquaculture of the State of Sonora to promote ordering in the State and fisheries management committees and support fisherwomen and rural women.
- We collaborated with the organization Impacto Colectivo por la Pesca en México to transcend and impact national goals and public policy with an emphasis on the social impact of fishing.

STRENGTHENING CAPACITIES

- We certified competencies in "Good Fishing Practices" and in "Fishing Monitoring" for fishermen, women, and CEDO personnel.
- We offered training in information technologies to youth from the Rodolfo Campodónico community.

EMPOWERING WOMEN, YOUTH, AND OLDER ADULTS

- We integrated women during training sessions on "Good Fishing Practices" and "Fishing Monitoring".
- We supported the Federation of Women Fishermen of Desemboque in managing a workshop for more than 200 fishermen on how to process their sea permit, a requirement to participate in the Bienpesca program.
- We promoted and disseminated the work in fisheries and aquaculture of the women of the Única de Mujeres Cooperative in Estero Morúa, oyster farmers, fishery monitors in the Gulf of Santa Clara and San Felipe corvina monitors, women who dive in Puerto Lobos and those involved in every step of the fishing process in various communities in the region.
- We provided visibility to the work of women in fishing to the authorities of the three levels of government who have joined to support implementation of specific solutions for women.

TRAINING

- "Working with purpose: Proactivity, Dynamism, Resilience and Concreteness".

CERTIFICATIONS

- EC0578 Good fishing practices on board small vessels.
- EC0820 Monitoring of coastal fishing activity.

Elia Inés Polanco Mízquez
Community Well-being Manager





Education, Outreach and Communication Program

© Photo Abelardo Castillo.

The main goal of the Education, Outreach and Communication Program is to promote and implement updated environmental education and Escuela del Mar curricula, specialized and professional courses, and labor competencies certifications for children, youth, producers, local professionals and tourists and to share lessons learned to scale the impact.

At CEDO we are committed to education as a fundamental tool to transform progress in people and societies. Through our awesome School of the Sea project, we train fishermen and women to acquire the knowledge and skills to fish responsibly and sustainably in the region to minimize impacts to the environment and increase benefits for their communities.







© Photos by Abelardo Castillo, Paloma Valdivia. CEDO Archives.



Paloma A. Valdivia Jiménez
Education and Outreach Manager

ACHIEVEMENTS 2021

- We promoted and obtained the Accreditation of CEDO's School of the Sea as a Competences Certification and Evaluation Entity (ECE) before the National Council for Standardization and Certification of Labor Competencies (CONOCER). This allows us to ensure excellence in the operations and services offered by our community partners and back their experience and knowledge with official certificates from the Ministry of Public Education.
- We offered fishers interesting courses on entrepreneurship to promote self-employment and mechanisms to access social services systems, and training to certify two competency standards.
- We implemented the project "Characterization of waste at Morúa Estuary" with the group of volunteers "Girls for the Change" and other volunteers including scouts, users of the natural resources of the estuary such as oyster farmers and local authorities, to promote best practices for solid waste disposal and management, contribute to conservation strategies in wetlands, one of the most important ecosystems in the area. Solid waste disposal helps mitigate one of the biggest threats to ecosystems and the region's beaches.
- We organized the 2021 International Coastal Cleanup in collaboration with the Puerto Peñasco City Council, the Clean Beaches Committee, and other local collaborators. 618 Puerto Peñasco volunteers collected approximately 3 tons of waste on 17 kilometers of beach and contributed the information on the waste collected to the international database promoted by The Ocean Conservancy.
- We also contributed to maintaining the Clean Beach Certification of the only three certified beaches in Sonora by creating and monitoring a Biodiversity Conservation Action Plan.
- We reactivated our academic services as a field station to transmit the biocultural knowledge of the region to the students and researchers who visit us.
- We also reactivated our eco-tours in the main ecosystems of the region through our NaturArte program, where visitors learn a little more about the flora, fauna and natural history of this region.