

# **McKee Center for Environmental Conservation, Research, and Education**

A center for marine, coastal, and desert conservation, research, and education



**Fundación Hagamos Más por Santa Rosalía A. C.**

26 November 2024

# 1 Introduction

The Municipality of Mulegé, where the McKee Center is located, is the second largest municipality in Mexico. The municipality is in the center of the Baja California peninsula, surrounded by the Gulf of California to the east and the Pacific Ocean to the west. The Gulf of California is a marine ecosystem famous for its high productivity and biological diversity, which derives in part from its complex bathymetry and the constant exchange of its warm waters with cold waters of the Pacific Ocean. The McKee Center lies on the eastern seaboard of the municipality. The entire area is of great appeal to tourists of all nations.

The Santa Rosalía - Mulegé corridor (CSRM) is a coastal extension that stretches from Santa Rosalía in the north to Heroica Mulegé in the south in the municipality of Mulegé, between approximately 28°20' and 26°50' north latitude, and 112°55' and 111°50' west longitude. The towns of San Bruno, Ejido San Lucas, Mulegé, and the municipal seat, Santa Rosalía (CONANP, 2000; INEGI, 2010), are included in the corridor.

This corridor is considered mesotrophic according to the average distribution of chlorophyll in the marine ecosystem along which it lays. The coast consists mainly of sandy and rocky beaches. The continental shelf of this region is mostly rocky and narrow, with sudden changes in slope ranging from 80 to 100 meters deep, favoring the development of algae and reef zones (Santamaría-Del Ángel et al., 1995; Espinosa-Carreón & Valdéz-Holguín, 2007).

The CSRM is within the priority terrestrial region #5 El Vizcaíno-El Barril, the priority hydrological region #5 Mulegé-Santa Rosalía, and within the marine zone that is formed between the priority marine regions of the eastern coast of Vizcaíno (#12) and Bahía Concepción (#11). It also falls within the marine zone of influence of the islands of Tortuga, San Marcos (the only inhabited island in the region), Santa Inés, and San Ildefonso. These islands belong to the "Islands of the Gulf of California Flora and Fauna Protection Area". The main productive activities carried out in the region include mining (copper, cobalt, zinc, and gypsum), cattle raising, tourism, and coastal fishing. Our foundation, "Hagamos Mas Por Santa Rosalia" (FHMSR) was created to serve the needs of the communities of the municipality, but especially those found in the CSRM.

Thanks to several generous gifts and advantageous agreements, FHMSR has recently been able to begin development of a multifunctional space in the CSRM as an environmental educational center. The center will promote care of and respect for the environment, appreciation of the natural landscape, and the conservation of local marine, coastal, and desert ecosystems. The center will also serve as a base for research and is allied with the Mulegé Superior Technical Institute in Santa Rosalía. Education, particularly of school-aged children, will also be a primary focus of the center. The *McKee Center for Environmental Conservation, Research, and Education* is named to recognize Biologist Gwyn McKee, a key and inspiring person for the realization of this project.

This environmental education center will be designed with the appropriate infrastructure to offer a variety of educational and cultural activities to promote learning and appreciation of the environment and local culture through such activities as:

- Workshops and conferences related to the care and respect for the environment,
- Appreciation of the landscape and knowledge of the local flora and fauna,
- Promotion of art through photography, painting, and craft design,
- Interpretive trails and guided tours,

- A small regional museum where information on fauna and flora is provided in an interactive and didactic way,
- Art exhibitions and cultural events that promote the region's identity,
- Astronomical observations,
- Sustainable aquaculture practices such as aquaculture, and
- Training workshops for children and adults in home gardens.

To this end, it is proposed to create a spacious room built in a sustainable way and with low environmental impact using the largest amount of regional materials such as mesquite wood, palms, and others.

## 2 Access to Nature

### 2.1 Terrestrial

A network of interpretive trails will be created, identifying species of flora and fauna of the region or present in the area. These trails will allow visitors, especially children and families, to learn about the flora and fauna of the biomes of the region, as well as the importance and historical influence of these ecosystems in the culture of Baja California Sur.

Trails will be designed in a way that respects the environment, taking advantage of the flora and fauna of the area, and minimizing the impact on the land. Along the trails will be signage and information on the species present, their ecological, economic, and social importance, as well as relevant ways to promote and encourage their conservation.

### 2.2 Night Sky

*McKee* is an ideal area for astronomical observation (Bortle 2 scale) due to the absence of nighttime light pollution found in large cities. Thus, the center will have a primitive, walk-in camping area that will allow visitors to spend the night safely and enjoy the night sky. The location allows us to offer activities such as the observation of stars, planets, and astronomical phenomena with the support of telescopes and specialized guides.

### 2.3 Intertidal

The *McKee* Center shoreline is rocky, with several points extending into the sea, which itself has a relatively sandy bottom. The adjacent intertidal zone is especially rich and supports abundant invertebrate populations. Initial inspection indicates the area is worthy of detailed investigation. A further description of the intertidal zone is provided in the description of habitats below.

### 2.4 Estuarine

In the area selected for the implementation of this environmental center, a natural estuary fed by a small spring of fresh water at the mouth of a large arroyo, along with the coastal shoreline, offers an environment conducive to observation of unusual ecosystems in the region. It also offers scope for testing sustainable activities such as aquaculture. Not only do these activities represent an opportunity to learn new techniques and generate economic benefits that contribute to the self-sufficiency of the center and local communities, they also have the potential to enrich the visitors' experience on a social and educational level.

Aquaculture in this context not only promotes food production in a sustainable way, but also serves as a valuable educational tool by allowing visitors to learn about the importance of aquatic resource

conservation, biodiversity, and human-environment interaction. In addition, by integrating responsible aquaculture practices, the McKee Center can become an example of good environmental practices and raise awareness of the importance of sustainability in the management of natural resources.

## 2.5 Future

As the center grows and develops, new infrastructure will be incorporated to harness solar energy, allow for rainwater harvesting, and utilize other natural resources in the area, allowing McKee to establish itself as a model environmental education center for sustainable development and conservation of local ecosystems. We also hope to add more land in and around the center McKee to ensure the continuation and continuity of the center in the long term.

# 3 Mission and Vision

## 3.1 Mission

1. Educate and raise awareness in the general community about the importance of the conservation of marine, desert, and coastal ecosystems.
2. Promote sustainable and environmentally friendly learning and activities through interactive educational programs, sustainable productive activities, and experiences in nature, fostering connection to and respect for the regional environment.

## 3.2 Vision

1. To be a benchmark in environmental education focused on the conservation of peninsular ecosystems: marine, desert, and coastal, where children and families can learn, enjoy, and engage by knowing and identifying the cohesion between the natural and cultural environment of the region.
2. To contribute substantively to the preservation of biodiversity and the development of a society that is more aware of and committed to caring for the planet.

# 4 McKee Center Development Process

Development of the McKee Center is proposed by establishing manageable phases for the promotion of education, conservation, and local development, while at the same time minimizing negative impacts on the natural and cultural environment. The phases are outlined below.

## 4.1 Phase 1 Planning and design

- Design a logo that identifies and reflects the center's objectives.
- Establish contact with local, state, and national agencies, including academic institutions and environmental organizations interested in participating in activities focused on the center.
- Prepare and establish fundraising proposals and programs for organizations, institutions, and companies interested in sponsoring the development of the environmental center as part of their community social responsibility.
- In agreement with academic institutions, carry out studies to evaluate the fragility of the ecosystem and minimize negative impacts.
- Design infrastructure using local and low-impact materials, such as regional timber, to harmonize with the environment.
- Plan the location of trails, campsites, and aquaculture areas without affecting vegetation and sensitive habitats.

- Incorporate sustainability criteria into the design, such as rainwater harvesting systems, wastewater treatment, and solid waste management.
- Design educational programs suitable for all ages to be developed within the center.
- Design and construct didactic material for environmental education appropriate to the local environment and needs.
- Generate training proposals for people of all ages to promote conservation activities to be performed throughout the region.

## 4.2 Phase 2 Construction and Adaptation

- Drinking water intake installation available for basic needs (sink, bathrooms, and shower).
- Build a classroom-type room for workshops at the same time that it is adapted as a regional museum, following sustainability guidelines.
- Build a basic toilet with a septic tank for sewage.
- Build a small basic watering location for visitors.
- Install a sink, with a gray water reuse system.
- Delimit a dining area using materials from the region, such as wood, rocks, etc..
- Prepare the interpretive trails with signage.
- Delimit birdwatching and other strategic areas to appreciate the landscape.
- Place signs of areas with conservation messages.
- Design signs or plaques for groups that wish to leave some identification of their work.
- Establish the camping area with rustic floors and solar lighting.
- Implement aquaculture facilities, such as ponds and recirculating water systems.
- Build a small jetty or floating pier for small boats, which can be removed in case of natural phenomena such as hurricanes, which are the most common in the region.

## 4.3 Phase 3 Operation and Environmental Education

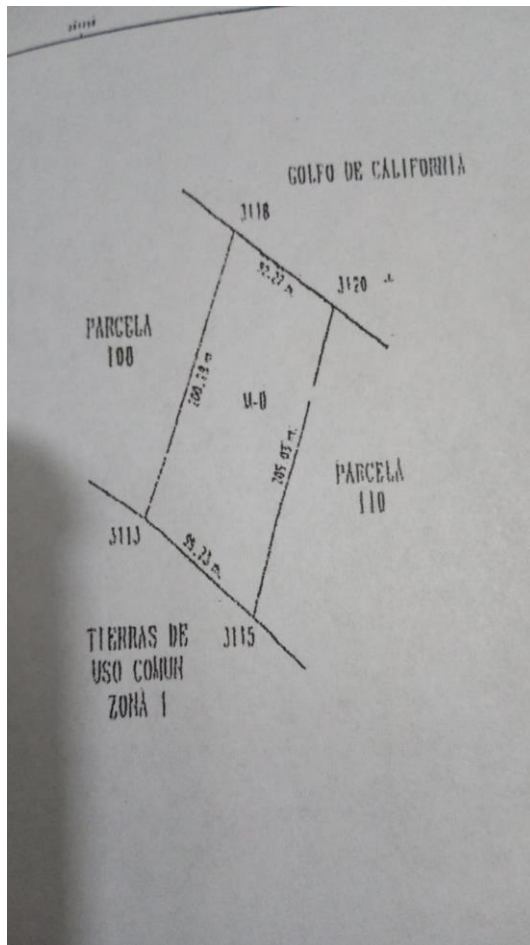
- Offer educational and cultural activities at the center, such as workshops, guided tours, and exhibits about the local environment and culture.
- Promote appreciation of the natural landscape through activities such as photography and painting.
- Develop environmental education programs for visitors and local communities on topics such as care for the environment, flora, fauna, and culture.
- Implement good management practices in aquaculture activities to minimize impacts.

## 4.4 Phase 4 Monitoring and Continuous Improvement

- Carry out constant monitoring of the environmental and social impacts of the center.
- Implement mitigation and compensation measures to reverse any damage generated.
- Seek certification as an ecotourism entity that meets sustainability standards.
- Seek certification as an organization focused on environmental conservation, complying with national and international sustainability standards.
- Involve the local community in the development and operation of the center to generate long-term support and socioeconomic benefits.

# 5 Description of the Center

**WORKING AREA:** 18,744 Square Meters



1.1- Nombre y apellidos del causante: **C. ADRIAN BELTRAN ROMERO,**

1.2- Apoderado del causante:

1.3- Domicilio oficial para ote notificaciones:

2.0- DESCRIPCIÓN DEL PREDIO:

2.1- Ubicación: **FRACCION DE LA PARCELA NO.109 210 P1/1, EN LA POBLACION DE SAN LUCAS**

2.2- Servicios urbanos con que se cuenta:  
 Agua **NO** Luz **NO** Drenaje **NO** Alumbr **NO** Esfuerzo: **NO** Bana. **NO** Telefono **NO**

2.3- Destino: **HABITACIONAL**

2.4- Clase: **TERRENO PLANO DE FORMA REGULAR**  
 (plano, inclinado, de forma regular o irregular, arcosos, etc.)

2.5 Sup. total del terreno: **18,744.27 M<sup>2</sup>** **CONST.** M<sup>2</sup>

2.6- MEDIDAS Y COLINDANCIAS:

CUADRO DE CONSTRUCCION			
LADOS	RUMBOS	DIST	COLINDANCIAS
1-2	NORTE	92.27	GOLFO DE CALIFORNIA
2-3	SUR	99.73	TIERRAS DE USO COMUN ZONA UNO
3-4	ESTE	205.03	PARCELA NO.110
4-1	OESTE	200.29	PARCELA NO.108

2.7- Valor del terreno : \$ **234,303.38** VALOR CONSTRUCCION

2.8- Valor total del inmueble: \$ **234,303.38**

2.9- Ingreso por renta mensual:

2.10- Fecha en que fue ocupado el inmueble:

3.0- ORIGEN DE LA PROPIEDAD Y TITULOS:

3.1- Naturaleza de la adquisición del Predio: **COMPRA VENTA**  
 (Compraventa, donación, prescripción, etc.)

Título de propiedad:  
 Fecha

3.2- Escritura No. **20,907** **21/02/2014** NOTARIO: **UC TERRIBO ABULCAN ROMERO**

3.3- Propietario anterior: **SEÑES FRANCISCO JAVIER, JESUS, MARIA DE LOS ANGELES Y ALMA DELIA RAMIREZ NAVARRO,**

3.4- Inscripción en el Registro Público de la Propiedad:

Título de propiedad:  
 Volumen Seccic Fecha

COMUNIQUESE A LA DIRECCION DE CATASTRO LOS CAMBIOS DE DOMICILIO  
 LA PRESENTE MANIFESTACION NO ACREDITA LA LEGALIDAD DE LA PROPIEDAD.

Recibida para su trámite el \$ **6** de **MARZO** de **2015**

**U. CASTRO**

**DIRECTOR DE CATASTRO DEL  
 H. XIV AYUNTAMIENTO DE MULEGE  
 ING. RICARDO CASTRO JUAREZ**

Figure 1 Property Description

## 5.1 Aerial Views

This report features aerial views of the McKee Center for Environmental Conservation, Research, and Education, highlighting its location within a desert and coastal ecosystem. The landscape is characterized by its proximity to the Gulf of California and desert vegetation, such as cacti and mesquites, that are representative of the Baja California Peninsula. Large arroyos subject to intense flooding surround the center. These streams, which are usually dry, play a critical role during the rainy season by replenishing local flora and providing essential nutrients to the surrounding ecosystem.



*Figure 2 Aerial view 1 by drone (Julio Parra) – note the small brackish estuary*



*Figure 3 Aerial view by drone (Julio Parra)*



*Figure 4 Aerial view by drone (Julio Parra) note Peninsular Highway 1*

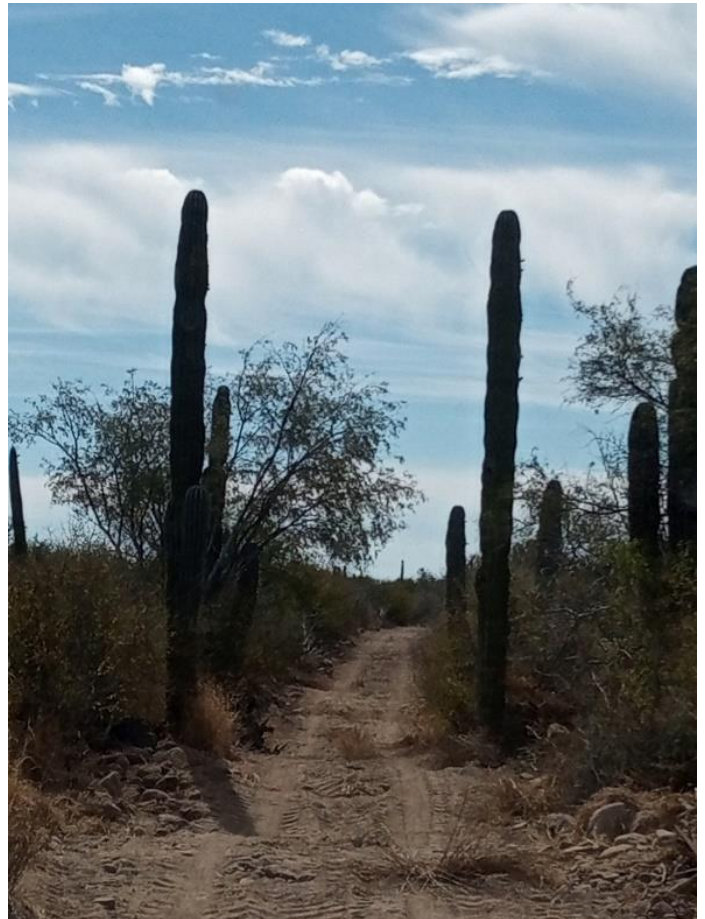
## 6 Progress to Date

### 6.1 Opening of the Access Road

A thorough assessment was carried out to determine the most appropriate access route, prioritizing minimal impact on local flora. The opening of the access road began using heavy machinery, constructing an access road of approximately 1,000 meters to allow the transit of vehicles to the entrance of the center.



*Figure 5 Machinery improving access*



*Figure 6 Improved Path*



*Figure 7 Entrance to the center*



*Figure 8 View of the McKee Center showing the seashore*

## 7 Initial State of the Environmental Center

The photographs below show the environmental center before the cleanup began. These images show a significant accumulation of plant leaves and other organic debris. In response to this situation, the decision was made to start cleaning and improving the space. This was made possible by the generous donation of Gwyn McKee.



*Figure 9 Initial state of the palm grove*



*Figure 10 Ground completely suffocated by palm debris*



*Figure 11 Machinery starting cleaning*



*Figure 11.42 Partially cleaned place*

## 7.1 Use of Heavy Machinery and Las Palmas Assessment

Heavy machinery was used to facilitate access to the area and remove the large amount of accumulated vegetative debris from the local palms. After a detailed evaluation, it was determined that some of the palms were in poor condition and represented an imminent risk of falling, so it was necessary to proceed with their demolition.



Figure ~~12-43~~ Use of cleaning machines



Figure [1344](#) Palmar after the removal of the plant remains

## 7.2 Vegetation Clearing and Waste Management

The clearing of vegetation in the area began, ensuring the protection of the mangrove species that were in the environment. This process required a total of 900 hours of backhoe work, which included opening roads, clearing vegetation, and loading waste onto trucks.

As a result of these efforts, 41 trips were made to transport waste materials, which were deposited in the community landfill located 10 kilometers from the site.

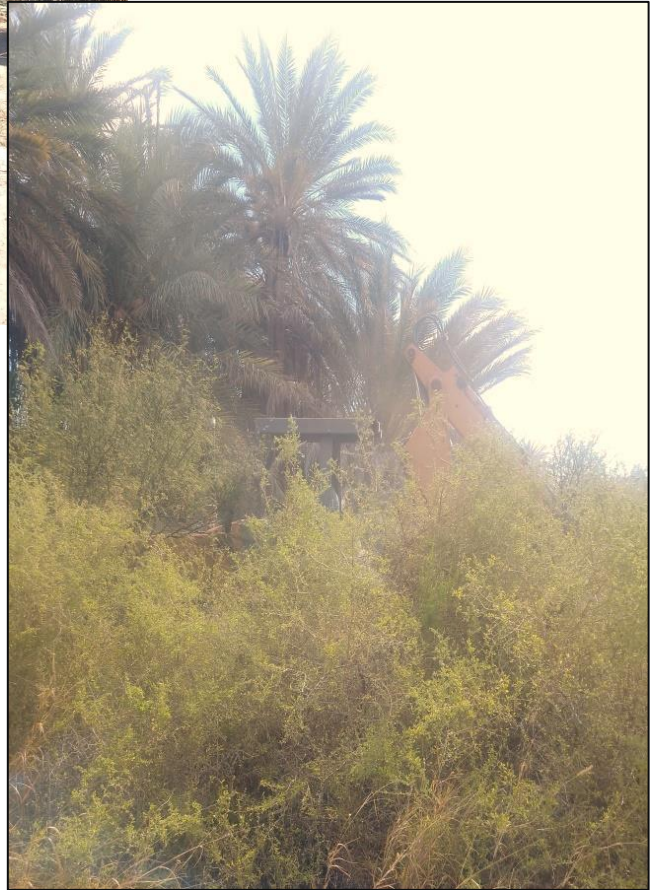


Figure 1445 Mature palms in good condition



Figure [1546](#) Several species of palms in the center

### 7.3 Hiring Local Labor for Las Palmas Cleaning

Local personnel were hired to clean 40 palms at the site, with the aim of preventing the generation of more waste in the area. This team was equitably paid for their work, and the skill with which they did the work was greatly appreciated, as it is a skill that is currently rare in the region.



Figure [1647](#) Highly skilled local workforce



Figur

e 1748 Beautiful workmanship results



Figure 1849 Our clean and beautiful center location

## 8 Septic Tank Excavation

The presence of the machinery was used to carry out an excavation that, in the future, will be converted into a septic tank exclusively for the management of wastewater. This advance planning will contribute to the proper management of non-hazardous liquid waste at the environmental center.



Figure 1920 Septic tank

## 9 Habitats of the McKee Center

The center hosts several habitats relatively uncommon in the area, including the palm oasis itself, an especially rich intertidal zone, and two adjacent small estuaries. While the entire area is in need of debris removal, the habitats are essentially unaltered from their original conditions.

### 9.1 Intertidal Zone

The McKee Center is bound on the Gulf of California by nearly 100 meters of intertidal zone (Figure 4). The beach is composed of sand covered by rock cobbles varying in size from a few centimeters to tens of centimeters (Figure 21). The adjacent seafloor is largely sand, but small points of larger rocks extend from the beach offshore at intervals of about 50 meters, and these areas support considerable algal growth on the underwater rocks.

Examination of the site at low tide on June 24, 2024, revealed an abundance of invertebrates under and around rocks, especially echinoderms (Figure 22); many sea cucumbers, large brittle stars, *Heliaster* sunstars, and urchins, and molluscs (many chitons, large and small snails). Colonies of coral (*Porites*), zoanthid anemones (Figure 23; *Zoanthus danae*), and large feather duster worms (*Spriobranchus giganteus*) were also abundant. Sandy areas between rocks featured burrowing anemones, as well as large crabs and pistol shrimp in burrows.



Figure 21 Rocky beach with 3 small points



Figure 22 Numerous echinoderms under a rock

Despite the relatively small size of these points, algal and invertebrate diversity is quite high. These features, and the relative ease with which the intertidal zone can be explored, make this site an attractive location for education and research efforts focused on rocky intertidal communities.

Although the three points of the Center's intertidal area are very close together, it appears that the communities of organisms at each point are somewhat different. For example, numerous colonies of zoanthid anemones and sponges were found at Point 2, but not elsewhere.



Figure 23 Zoanthid anemones and sponges

Point 1 is at the opening of the small east-most estero, and tidal exchange appears to have deposited more sediment there than at the other points. Biological and physical differences between the three points could thus provide the basis for educational field and monitoring programs that compare community composition with physical features such as rock size, sedimentation, and freshwater influence.

This area will be surveyed more comprehensively in May 2025 by students from ITESME and Stanford University (USA) in a collaborative effort.

## 9.2 Small Estuary

As mentioned previously, the small estuaries present in the area have the potential to be used as demonstration areas for aquaculture. In the estuary shown below (Figure 24), fish and small shrimp can be observed, as well as various species of birds which contribute to the biodiversity of the environment.



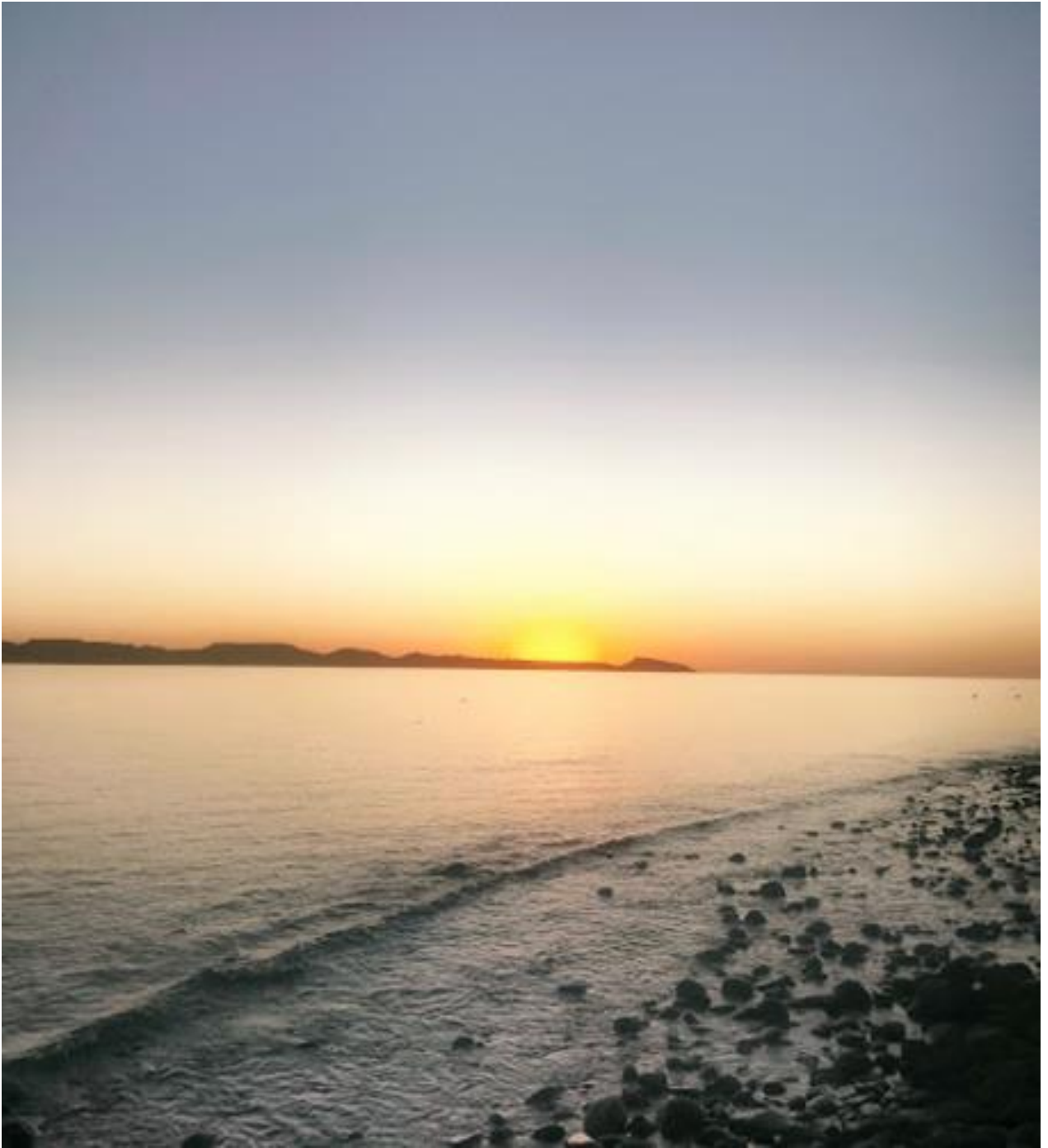
*Figure 24 Spring-fed estuary at the Center*

## 10 Sunrise Experience at the McKee Center for Environmental Conservation, Research, and Education.

The observation of a sunrise from the environmental center is, without a doubt, an enriching and unique experience, which is expected to become an additional attraction at our center (Figures 25, 26).



*Figure 25 Sunrise from our center*



*Figure 26 The sunrise seen from McKee Center*