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Coastal Solutions Project in Bahía de Todos Santos

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Mediterranews

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Editorial

Welcome to a new issue! Summer is coming to an end and with it, our routine activities begin to settle down, but cheer up! I invite you to relax and choose your favorite place to sit comfortably and enjoy the last days of summer reading this new issue of Mediterranews that that we prepared for you.

At Terra Peninsular we love to share the natural beauty of our Baja California and therefore, we welcome all who visit us to carry out research projects or simply to know another state. In this issue, researchers from Brigham Young University, Chicago Field Museum and UNAM share an article about the different lichen communities in the Punta Mazo Nature Reserve. In addition, I invite you to discover the experience that students from the University of the Americas of Puebla had during their visit to Baja California through an article written by Daniela, one of the students.

We are also excited to share that the campaign ***La Playa es de Todos*** (The beach belongs to everyone in English), which began in the summer of 2018, continues this year thanks to the Coastal Solutions Fellow Program of the Cornell Lab of Ornithology and the California Department of Fish and Wildlife. This project joins the efforts of civil society organizations, local authorities and private initiative to protect a beach that we all can enjoy: migratory species that nest there in summer, and people who love to have a good time there.

Similarly, at Terra Peninsular we promote respect for wildlife and the sustainable and responsible use of natural resources. We know that we are part of the ecosystem, it is in our hands to preserve its integrity to ensure the perpetuity of the habitat and species with whom we share these areas, the economic base of many communities depend on this. I invite you to read about management units and biological corridors, written by good friends of Terra Peninsular together with staff members.

I would like to thank all the authors who, with their contributions and vision, enriched this issue of Mediterranews, and also thanks to all our friends and donors for making the projects we discussed here possible. Finally, of course we could not miss the opportunity to invite you to the 5th. San Quintín Bay Bird Festival. See you on November 8 and 9!

Enjoy your reading!

César Guerrero
Executive Director of Terra Peninsular

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Contents

15 Creative Focus

27 Diversity

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Continue reading on page 21...

Photo: *Bárbara Ramírez*

Terra Peninsular

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ON THE COVER
Snowy plovers in the Bahía de Todos Santos Shorebird Reserve, in Ensenada. Photo: Jonathan Vargas.

Coastal Solutions Project *in Bahía de Todos Santos*

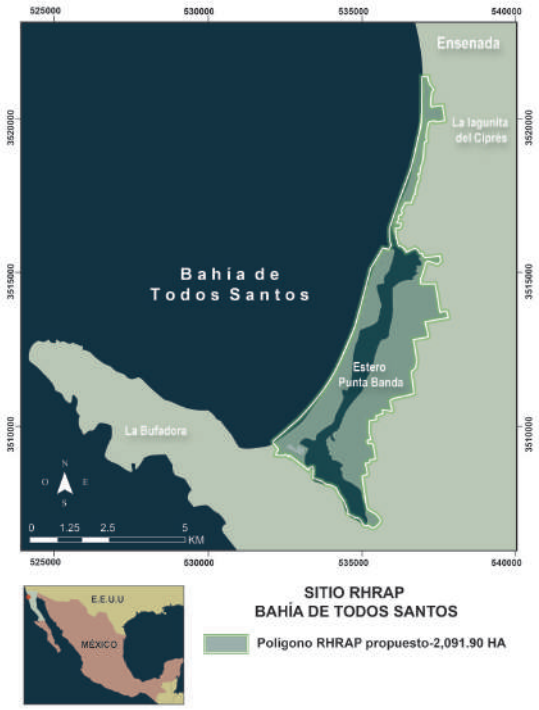
Text by Jonathan Vargas
Photos by Bryan Gerardo y Jonathan Vargas
Translated by Óscar Gómez and Antonieta Valenzuela

Bahía de Todos Santos Shorebird Reserve

Bahía de Todos Santos, located in Ensenada, Baja California, is a site of ecological importance on which thousands of migratory shorebirds depend throughout the year, including species of worldwide conservation interest, such as the red knot (*Calidris canutus roselaari*).

During spring and summer, the sandy beaches are used as refuge and breeding areas by the **snowy plover** (*Charadrius nivosus*) and the **least tern** (*Sternula antillarum*), both considered threatened species and under special protection by the Mexican Official Norm 059 (SEMARNAT, 2010).

▼ A family of snowy plovers in Ensenada. Photo: Jonathan Vargas.



Map of the Bahía de Todos Santos Shorebird Reserve.

Thanks to its importance for migratory shorebirds, in 2017 Bahía de Todos Santos was declared a **Site of Regional Importance of the Western Hemisphere Shorebird Reserve Network (WHSRN)**, and thus becoming the 99th shorebird reserve in the American continent for hosting 20,000 shorebirds throughout the year and the 4% of the Pacific populations of the snowy plover. This was achieved thanks to the collaboration between Terra Peninsular and the Commission for Environmental Cooperation (CEC), Dr. Eduardo Palacios (CICESE), and the participation of authorities and organizations.

The site is also considered an Important Bird Conservation Area (AICA for its acronym in Spanish), and it is also included in the List of Wetlands of International Importance by the Ramsar Convention. In addition, it is considered as a Priority Site of The Pacific Americas Flyway due to its importance to shorebirds (Senner et al., 2017).

Female snowy plover (*Charadrius nivosus*) named Marina. Photo: Jonathan Vargas.

Vehicles on Ensenada beaches. Photo: Jonathan Vargas.

Shorebirds Are in Danger!

Shorebirds frequently compete with humans for coastal habitats, including beaches, marshes, saltpeter beds, mangroves, lagoons, and wetlands. Urban development, especially in Latin America, leads to habitat destruction and degradation, increased disturbance and degradation of shorebird feeding, resting and breeding sites (Senner et al. 2017). These are some problems that have caused the decreasing of 30% of shorebird population in North America or under some conservation program.

The sandy beaches of Ensenada have been absorbed and fragmented by urban development, the growth of the agricultural zone around Punta Banda Estuary, and the several households.

Presence of off-leash dogs. Photo: Jonathan Vargas.

Press conference to launch "Share the Beach" campaign in 2018. From left to right: Jonathan Vargas (Coastal Solutions-Terra Peninsular), Fernanda Escobosa (Pacifica at Ensenada Bay), Claudia Guzmán (Terra Peninsular), Keila Pino (Ellos Son La Razón) and Marco Antonio Martínez (Contacto Salvaje). Photo: Antonieta Valenzuela.

This means the place is now used as a recreational area without control. One of the biggest problems is the excessive use of off-road vehicles, putting not only shorebirds, but also, individuals and their families at risk.

Another issue that shorebirds face is the continuous presence of off-leash dogs that disturb and in some cases affect them. In addition, there is a major problem of predation due to the presence of packs of feral stray cats and dogs.

Conservation Actions: #ShareTheBeach

Between June and August of 2018, Terra Peninsular in cooperation with Pacífica at Ensenada Bay, Contacto Salvaje, Ellos Son la Razón, and the support of the Directorate of the Federal Terrestrial Maritime Zone of Ensenada, launched the campaign **"La Playa es de Todos" ("Share The Beach, in English)**, with the aim of protecting breeding shorebirds through four main activities:

- Installation of a temporary fence to protect nests and breeding pairs.
- Rescue and rehabilitation of stray dogs.
- Environmental education activities.
- Prevent the usage of motorized vehicles on nesting sites.

Nowadays, **thanks to the Coastal Solutions Fellows Program of the Cornell Lab of Ornithology and the California Department of Fish and Wildlife**, the conservation actions of shorebirds such as the snowy plover have been intensified with this project. A nesting site monitoring and management program has been implemented to reduce disturbance and to increase the reproductive success of this endangered species.

For the next decade, the Coastal Solutions Fellows Program will support young planners, developers, and scientists in Latin America to implement new solutions for the current challenges that coastal ecosystems and their communities faces.

▲ Snowy plover chick. Photo: Jonathan Vargas.

The program will support six young professionals per year to implement a project at a priority site on the Pacific Flyway in Latin America. I had the honor of being selected for the 2019-2020 class.

All fellows will receive two years of funding, mentoring, and professional development opportunities, including annual retreats that combine peer learning and strategic trainings.

About the Project

To protect shorebirds, the Coastal Solutions project in Bahía de Todos Santos aims to solve the problem caused by vehicle traffic on Ensenada's beaches, through active collaboration with various government agencies, private initiative, and civil society organizations, which allows us to find strategies and alternatives to promote the regulation of the sustainable use of beaches and natural resources of Bahía de Todos Santos.

To achieve our goal, we will promote appropriate regulations for the use of beaches and shorebirds critical habitat in Bahía de Todos Santos. We established a program to monitor bird populations and its disturbance during 2019 to 2020, through the application of citizen science, research, and habitat management projects.

A publicity and environmental awareness campaign will be created to promote the importance of shorebirds, as well as an architectural landscape proposal focused on highlighting the ecotourism potential of the bay that benefits the conservation of shorebirds habitats, and that can be included in municipal development plans. In addition, a program to control populations of feral and stray dogs and cats has been created, this program will help to reduce the predation pressure during the snowy plover breeding season.

▼ Cerco de protección temporal. Foto: Bryan Gerardo.

▼ Snowy plover nest protected against predators. Photo: Jonathan Vargas.

The installation of the protection fence was possible thanks to the help of volunteers. Photo: Bryan Gerardo.

First generation of fellows and mentors at the Cornell Lab of Ornithology in New York, March 2019. Photo: courtesy.

Jonathan Vargas is part of the class 2019-2020 of the Coastal Solutions Fellows Program.

Special Thanks

This project was possible thanks to the support of some associates with whom we are deeply grateful: Dr. Eduardo Palacios (CICESE), Pacífica at Ensenada Bay, ZOFEMAT, Contacto Salvaje, Ensenada's Ecology Department, Secretariat on Environment Protection of Baja California, California Department of Fish and Wildlife, CICESE, UABC, Pro Esteros, Los Correcaminos Club, El Ciprés military zone, Municipal Police, Ellos Son La Razón, Ensenada's Canine and Feline Center, Ensenada's Urban Birds Program (PAU Ensenada), INPACVI, Bahía de Todos Santos Surf's Reserve, San Diego Zoo, Snowy Plover Mexican Monitoring Network (CHORLNEV), Luke Eberhart Phillips and Dr. Daniel Galindo (UABCS), among many others.

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San José de la Zorra. Photo: Ricardo Eaton.

Management Units for Wildlife Conservation

Text by Ricardo Eaton and Jorge Andrade
Photos by Ricardo Eaton and Aurora Torres
Translated by Antonieta Valenzuela

Use and conservation are two concepts that always create controversy in the field of nature, biodiversity and management of natural resources. It is often conceived that the appropriation of a natural resource is opposed to its conservation, however, this is not necessarily true.

The traditional approach to conservation has been based on prohibitionist and restrictive ideas regarding the use and exploitation of natural resources. Policies derived from traditional conservation have been frequently classified as naturalists and anti-humanists (Guha, 2003). The Natural Protected Areas (ANP for its acronym in Spanish), listed as the maximum exponents of traditional conservation, are perceived as areas of opportunity for local-rural development, or as regions that limit the population to access better conditions of well-being by restricting the use of natural resources in order to protect them (Riemann, *et al.*, 2011).

Of course, these traditional concepts have been challenged over time. The theoretical discussion around these issues began with the Brundtland report (Brundtland *et al.*, 1987), the means of modern production were questioned and the concepts and paradigms of management, conservation and sustainability emerged, which propose three dimensions in its conception and execution:

economic, social and environmental. From that moment, appropriation and conservation of natural resources began to change, as did the policies related to the management, conservation and exploitation of wildlife in Mexico.

In 1995, the National Wildlife Strategy was published, which was based on the National Environment Program 1995-2000; based on the foregoing, in 1996 the General Directorate of Wildlife (DGVS) was created within the then Secretariat of Environment, Natural Resources and Fisheries (now SEMARNAT), having as one of its three main purposes productive diversification through conservation.

One of the flagship programs was the National Program for Wildlife Conservation and Productive Diversification in the Rural Sector 1997-2000 (PDP for its acronym in Spanish), which sought to integrate environmental, economic, social and legal strategies focused on production and diversification of the rural sector, based on the use, exploitation and conservation of wildlife (Gallina-Tessaro *et al*., 2009; López, 2009).

This program had two main objectives: the recovery of priority species and the establishment and operation of the Units for Conservation, Management and Sustainable Use of Wildlife (UMA for its acronym in Spanish) (De Benito, 2009; Hernández, 2008).

The UMAs were born as a modern scheme for management and conservation of natural resources, and also as a complementary strategy to the establishment of the Natural Protected Areas in Mexico (Lopez, 2016). The UMAs are intended to reconcile the actions and needs of conservation of wildlife with the production and economic development of the rural sector, and therefore they represent and opportunity to integrate the aforementioned dimensions of sustainability.

Rancho Guacatay, in Rosarito, Baja California. Photo: Aurora Torres.

Sierra de San Pedro Martir. Photo: Ricardo Eaton.

White deer, Sierra de San Pedro Mártir. Photo: Ricardo Eaton.

According to the article 39 of the General Law of Wildlife published in 2000, the general objectives of the UMAs is to conserve natural habitats, populations and specimens of wild species; in addition to specific objectives of restoration, protection, maintenance, recovery, reproduction, restocking, reintroduction, research, rescue, shelter, rehabilitation, exhibition, recreation, environmental education and sustainable use.

Likewise, it is defined in a general way that UMAs can be of intensive or extensive type, and within these areas you can perform consumptive and non-consumptive activities.

Within **intensive UMA**s, breeding, propagation or production activities of native or exotic species are carried out, for example in Baja California there are two notable examples, the UMA of the Guacatay Ranch in Rosarito that since 1994 carries out the breeding of red deer and the intensive UMA for totoaba breeding, which is operated by the University of Baja California (UABC).

And within **extensive UMAs,** management and conservation of native species is carried out, this type is also called free life, since the species develop in natural conditions without restriction in their movements by applying techniques of conservation and habitat management and population monitoring. At the same time, those species that are not subject to management are conserved, and to the communities and ecosystems to which they are associated, which implies a greater challenge, but this is a subject for another article.

In Baja California, at least for the 2009-2010 hunting season, the operation of 69 extensive UMAs was reported, where 171 304 wildlife specimens were used and covered 7.3% of the state area (SPA, 2011). These extensive or free-living UMAs are the most numerous in the country and is the only way by which hunting activities can be carried out. From another perspective and according to the PDP, they allow the transfer of economic resources from urban areas to the rural sector (Hernández, 2008).

In this way, the **UMAs are defined as: lands and facilities registered by the owners (in any of its forms) that operate autonomously and in accordance with an approved management plan that permanently tracks the habitat status and populations or individuals found there** (Schroeder *et al*., 2009). As a consequence, UMAs are so complex in its conception, establishment and operation, that they represent a real challenge for management, conservation, and for the practical reconciliation between the three dimensions of sustainability.

Although the UMAs have proved to be an interesting conservation scheme (De Benito, 2009) and have proven to be a good local development scheme for ranches and communities through hunting and species reproduction activities (López *et al*., 2010), they are also conceived as the "new tragedy of the commons", considering that they have had a negative impact on wildlife conservation and rural development, mainly in communities of high marginalization in the southern part of the country (Weber *et al.,* 2006).

Since this is a natural resources management model that has been active for more than 20 years in our country, it is therefore necessary to reconsider some priority issues that were the basis to create the UMAs: the certification and improvement of technical capacities of the staff responsible for operating and authorizing the UMAs; the transparency in the operation of the UMAs; improve the monitoring mechanisms of the authorities and communities; the effective orientation and strengthen of the economic, conservation and social objectives related to the UMAs; the development of programs to promote environmental education activities, use of resources and economic activities in the rural sector (Contreras *et al.,,* 2010; Gallina-Tessaro *et al.,* 2009 y Contreras, 2008).

In addition, we must add to the analysis complex issues such as climate change, the lack of detailed information on the current state of the population size at the regional and national level of the species with the highest hunting demand, as well as the change in environmental policies and laws.

We must also consider that UMAs are an alternative for the establishment and operation of Areas Voluntarily Destined for Conservation (ADVC for its acronym in Spanish). For all the above, it is necessary to analyze and rethink its establishment and operation so that they are an effective reconciliation tool between the conservation and development dilemma•

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El Arrastradero, Sierra Juárez. Photo: Ricardo Eaton.

Glances.

First Exhibition of the Huellas Volcanicas *Photography Club*

El Arco wetland.

Text by Claudia Guzmán and Mirna Borrego
Curatorship by Alejandro Espinosa
Translated by Antonieta Valenzuela

The Huellas Volcanicas Photography Club was invited to participate in the collective exposition "Rise", this event was an initiative of the Climate Science Alliance and it was inaugurated on August 13, 2019 at the Idyllwild Arts Academy in California, USA.

For the first time, the club presented a selection of 15 photos that show the landscapes and natural richness of San Quintín, a bay that is surrounded by volcanoes and wetlands that provide refuge and food to thousands of migratory birds.

This club was established in 2018 with the aim of creating a group of young people aware of the importance of the place they live in, it is currently composed of 4 young students aged between 12 and 16, this group is led by their professor Lamberto.

The young photographers have received training and have learned to use photography as a tool to promote, raise awareness and value the natural and cultural heritage of San Quintín Bay.

It is worth mentioning that the activities of the club have been financed by the Cornell Lab of Ornithology and the Copper River International Migratory Birds Initiative (CRIMBI).

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Details that matter, textures and shapes.

Natural habitat.

Super bloom.

Bright colors.

The vision of everything.

At the top of the Sudoeste volcano

A place to rise.

The community of volcanoes.

The strength of a volcano.

Exploring life.

Hope.

The wonder of migration.

Ecosystem Services Provided by Bats

Text by Jorge Andrade **Infographic by** Laura Tamayo
Translated by Oscar Gómez and Antonieta Valenzuela

Chiropters, commonly known as bats, are an order of mammals with the fascinating ability to fly.

Bats are the only mammals able to fly!

Bats are quite a wide and numerous order, with approximately 1411 species (Burgin *et al.*, 2018) and the second largest order of mammals.

From an ecological point of view, bats are of the utmost importance as they occupy a wide variety of ecological niches. There are some bats that are pollinators, seed dispersers, and predators of terrestrial arthropods and small vertebrates.

The intrinsic value of bats and their roles in the environment make this order of mammals immensely important, not only in the ecological context, but also, in the economic and social context. Economy? Society? Yes, beyond the importance of the bat per se, bats have a positive impact on economic activities and human well-being.

But, how does this happen? Bats provide a variety of ecosystem services, which are defined as all the benefits that human societies derive from ecosystems (MEA, 2003). These include natural resources, ecosystem processes that regulate the conditions in where humans live, ecosystem contributions that benefit societies, and basic ecosystem services that allow that all of the above can be executed (MEA, 2003).

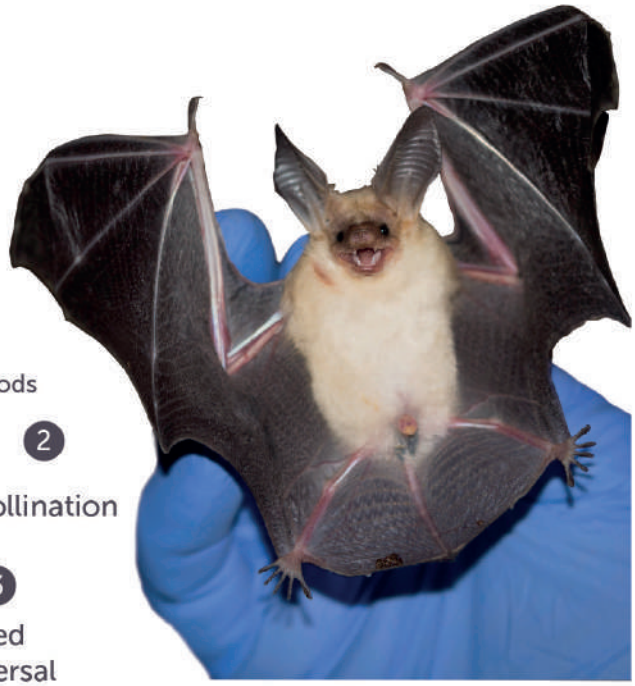

PHOTO: ALAN HARPER

▲ THE ECOSYSTEM SERVICES PROVIDED BY BATS (KUNZ ET AL., 2011)

1 million individuals — **8.4 tons of insects**

How does this benefit us?

There are many more examples of the importance of bats to humans from the point of view of ecosystem services.

Such as the Brazilian free-tailed bat *(Tadarida brasiliensis),* which is a well distributed insectivorous bat in the American continent. Its diet is based on hemipterans (for example, cicadas), homopterans (for example, woodlice), neuropterans (for example, green lacewings), coleopterans (for example, beetles), nocturnal lepidopterans (for example, butterflies) and hymenopterans (for example, bees).

It has been described that a maternity colony of *T. brasiliensis* with an average of 1 million individuals consumes 8.4 tons of insects in one night, many of them are important pests for agriculture (Kunz *et al.*, 2011). For example, in cotton and corn fields in the US, its service as a natural predator of moths has been valued in at least $3.7 billion dollars per year (Boyles *et al.*, 2011; Fenton & Simmons 2014).

> **"No bats, no tequila"**

Many of us have heard this warning from Dr. Rodrigo Medellín. As ridiculous as it may sound, it is a real and well founded warning. The tequila zone in Mexico is located on the migratory route of the greater long-nosed bat (*Leptonycteris nivalis*) and the lesser long-nosed bat (*Leptonycteris yerbabuenae*). These bats are pollinators of the agave and other species. The genetic diversity of agaves and their long-term conservation depends on bats.

Can you imagine Mexico without tequila and mezcal?

We could lose both if we lose bats!

Bats are also relevant in the worldview of different cultures. For example, in the Mayan civilization bats were associated with the night, darkness, death, sacrifices by beheading, and extraction of the heart, as well as sexuality and fertility (UNAM, 2019).

We owe lots to bats and its conservation involves the conservation of various ecosystem goods and services which we take advantage of.

PHOTO: ALAN HARPER

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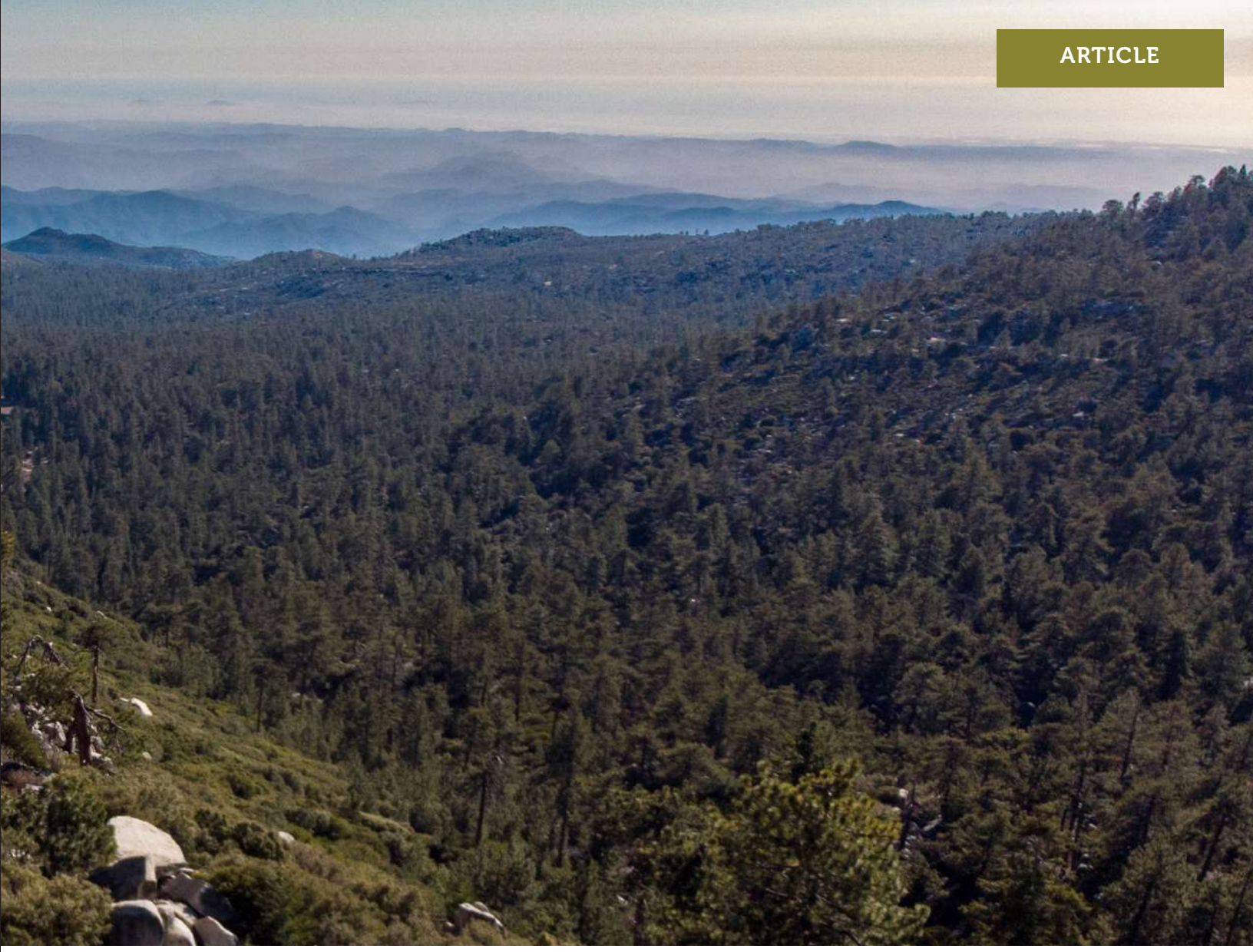
Learn more about bats of Baja California in the issue no. 7 of Mediterranews (page 15)
http://terrapeninsular.org/en/mediterranews-june-2017-issue/

Sierra de San Pedro Mártir National Park. Photo: Alejandro Arias.

Towards the Creation of a **Biological Corridor** *in Baja California*

Text by Gustavo P. Lorenzana and Verónica Meza
Photos by Alejandro Arias, Bárbara Ramírez, Laura Tamayo, and Antonieta Valenzuela
Translated by Óscar Gómez and Antonieta Valenzuela



When driving on the highway, we have the possibility to appreciate rural landscapes that liberate us from the monotony of our urban environment dominated by concrete. Depending on the region, we will find exuberant jungles, peaceful forests or wild bushes. Our journey will be faster on the highways or it will be slower if we pass by picturesque villages.

Plants and animals, in their own way, also need to travel to develop their daily activities. However, wildlife generally does not benefit from road and urban infrastructure. On the contrary, it causes serious problems, such as isolation of populations caused by fragmentation and habitat loss, as well as mortality from collisions and illegal hunting due to the increase of vehicles and people [1].

Each species has its own ecological requirements that allow them to adapt accurately to its environment. Despite vegetation seems to be static, it is spread by pollen grains and seeds that are carried by wind, rain, or some animals such as bees and bats. On the other hand, animals search for food, water or a breeding pair, colonize new territories or migrate to avoid environmental scarcity or stressful conditions.

This requires productive and healthy ecosystems, with a series of functional attributes (including what experts call landscape connectivity) that depend on the territorial configuration and extension of habitats in a certain region, as well as the movement capability of the different species.

Punta Mazo Nature Reserve in San Quintín. Photo: Alejandro Arias.

For example, thanks to the ability to fly, birds can travel long distances, meaning they are potentially able to maintain a high connectivity, even in degraded areas. On the other hand, large predators, such as pumas, are highly sensitive to disturbance and tend to move away from human-dominated areas, resulting in a drastic reduction in the connectivity of their populations.

Nowadays, the aggravating effects of climate change means that many species are likely to be forced to modify their range, moving to a changing landscape to track the appropriate conditions for their existence, or disappearing in the attempt. This is a huge challenge we must face responsibly for the future of our biological diversity.

Fortunately, our country has some legal instruments that seek the protection and sustainable use of natural resources, as well as the mitigation of climate change effects. The main instrument is Natural Protected Areas, managed by the federal government through the National Commission of Natural Protected Areas (CONANP for its acronym in Spanish). Therefore, important areas throughout the country have been declared Biosphere Reserves or National Parks, among other categories [2].

However, it is not viable to preserve the entire national territory under this scheme, so, it is necessary to apply complementary strategies. Thus, specialists have proposed the concept of biological corridors, which are defined as "geographically defined areas that provide connectivity between habitats, landscapes and ecosystems, allowing the maintenance of biodiversity and its ecological and evolutionary processes" [3].

There are several of them in Mexico, such as the Mesoamerican Biological Corridor, which connects the Mesoamerican rainforests, from Yucatan Peninsula to Panama, and the Chichinautzin Biological Corridor, a great ecological relevance area near to the capital.

Corridors are also essential for wildlife movements on continental scale, such as the majestic annual bird migrations between North and South America, or the epic migration of the monarch butterfly from the Canadian plains to the coniferous forests of central Mexico. While human activities continue and natural habitats are reduced and fragmented, the importance of biological corridors will continue to grow, and their protection will be vital to avoid the isolation of wildlife populations. The identification and preservation of corridors is a complex task and its implementation requires political will and a broad academic and social involvement.

Fortunately, Baja California has the proper conditions to implement effective actions. If we look at the two national parks of the entity, San Pedro Mártir and Constitution of 1857 National Parks, it is feasible to think about the implementation of a network of corridors along the peninsula, from the snowy peaks of mountains to the coastal scrubs in San Quintín-El Rosario area.

This work can be highly benefited by an interesting legal protection mechanism promoted by the CONANP: the Areas Voluntarily Destined for Conservation (ADVC, for its acronym in Spanish) [4]. This is a tool that Terra Peninsular actively promotes among the rural populations and that can have a synergistic effect on the conservation of pines and eagles, lynxes and cacti, Anthony's liveforever and deer, among many other species that are part of our biodiversity.

Terra Peninsular has facilitated the incorporation of seven ADVCs into the state, so far, around 25,698 acres, with great potential to grow in the number of properties adhered to the program and, if so, to become a successful conservation example worth to be replicated in other areas of the country. Next time you drive on the Transpeninsular Highway, slow down and appreciate the landscape and try to identify a biological corridor around you.

Deer on Sierra de San Pedro Mártir National Park. Photo: Bárbara Ramírez.

Anthony's liveforever in San Quintín. Photo: Bárbara Ramírez.

Valle Tranquilo Nature Reserve in El Rosario. Photo: Antonieta Valenzuela.

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This image of a puma was taken using a camera trap in Valle Tranquilo Nature Reserve.

Photo: Alejandro Arias.

How to Make Compost Step by Step

With information from the "Manual of Waste Management Practices" by Adriana Puma, Carolina Armijo, Mark Lupio and Jorge Andrade

Illustrations by Patricia Viramontes

Translated by Antonieta Valenzuela

What is a compost?

It is the product resulting from a process of biological decomposition of organic waste. It is produced ecologically and can be used in urban agriculture, as it provides the necessary nutrients to the soil, improving the soil for plant production. This technique is based on accelerating the process that nature follows to make the earth fertile by creating humus. There are several types of compost, some of them are: hot compost, Bokashi compost and vermicompost.

Hot compost

The hot compost takes 4 weeks to be completed, it is the simplest and easiest to care for, its procedure is described below.

Materials

- Plastic bin or box that allows drainage and ventilation.
- Soil and water.
- Garden waste (grass clippings, fallen leaves, etc.).
- Gloves.
- Garden watering can.
- Garden spade
- Cover with mosquito net or mesh.
- Organic waste (see chart).

Waste

Greens / Kitchen

- Green Leaves
- Tea bags
- Fruits and vegetables remains
- Used napkins

Browns / Garden

- Sawdust
- Straw
- Dried leaves
- Grass clippings or pruning trees

Waste to avoid

- Excrements of carnivorous animals, such as dogs and cats
- Diseased plants
- Oils, fats and dairy products
- Meat, bones or fish remains

Preparation

First layer

1 **Deposit a layer of soil and brown organic waste in the bottom of 10 to 15 centimeters.**

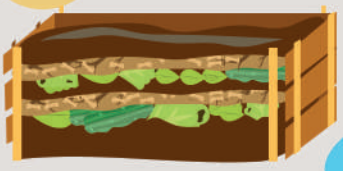
Second layer

2 **Place the organic waste in layers, start with the green waste, forming a layer of 3 to 5 inches.**

Third layer

3 **Continue with the next layer of sawdust or dried leaves (brown residues) of 3 to 5 inches.**

4 **Repeat until the bin is filles**



Repeat the process as you generate waste until the bin is filled and add water to keep it moist (avoid waterlogging). Repeat until the container is filled.

5 **Mix the layers constantly**

Mix the layers constantly to circulate the air and help decomposition. Mix the layers constantly.

6 **Cover the compost with a mesh**

Always cover the last layer with soil or brown residues and cover the container with a mesh to avoid unwanted animals.

Compost use

The compost is ready when it smells and looks like soil, and is at room temperature. It can be used directly on plants.

Maintenance

- Maintenance is necessary every week, do not let the compost dry.
- Compost soil should always be moist but not wet or soaked.
- Remove the soil constantly to circulate air..

Download the "Manual of Waste Management Practices" (available only in Spanish):
http://terrapeninsular.org/wp-content/uploads/2019/05/Manual-de-practicas-de-manejo-de-residuos.pdf

Fog Lichens of the Punta Mazo Nature Reserve

A First Look into the Diverse Lichen Communities

Text and photos by Steven D. Leavitt, Felix Grewe and María de los Ángeles Herrera Campos

Fog zones in coastal deserts create unique habitats supporting incredible biological communities. These coastal fog deserts make up only a small portion of the total amount of earth's landmass worldwide but harbor a disproportionately high amount of diversity.

In Baja California fog desert communities (Fig. 1) face unprecedented threats from urban and agricultural development, recreational off-roading, and changing climate. In some cases, the biological value of coastal fog deserts has been recognized and protected. Protected areas, including the Punta Mazo Nature Reserve, located near San Quintín Bay, play crucial roles not only in conservation but also in facilitating research to better understand fundamental biological questions in these regions.

Biodiversity inventories play important roles across a wide range of biological subdisciplines, including conservation, ecology, and evolution. Recently, we carried out a crucial assessment of lichen communities in the Punta Mazo Nature Reserve, focusing on 'fog lichens', a diverse group comprising two closely related genera of lichen-forming fungi – *Niebla* and *Vermilacinia* (Ramalinaceae).

In the Punta Mazo Nature Reserve, a total of 19 *Niebla* species and 8 *Vermilacinia* species were found distributed across three sampled sites (Figs. 2, 3 & 4), which represent nearly half of the known species in these two endemic coastal fog desert lichens. These fog lichens are only known to occur in Baja California and in other coastal fog deserts in South America.

Responses of different lichens and lichen communities provide a mechanism for quantitatively assessing ecosystem health, and

Figure 1. A typical coastal fog desert lichen community in Baja California Norte. - alkali hills southeast of Puerto Catarina.

Figure 2. Fog lichens (*Niebla* and *Vermilacinia*) on slopes of Volcán Sudoeste, Punta Mazo Nature Reserve.

Figure 3. Fog lichens (*Niebla* and *Vermilacinia*) on boulders near the shoreline on the east side of Bahía Falsa. ▲

Figure 4. Lichen community on the west-facing slope of the Monte Ceniza Nature Reserve. ▼

the inventory of 'fog lichens' in Punta Mazo Nature Reserve provides a valuable baseline for future comparisons. Therefore, **future work developing a comprehensive lichen inventory at the Punta Mazo Nature Reserve will be important in environmental conservation efforts in Baja California.**

In spite of the biological and ecological roles of lichens in coastal fog deserts and the documented importance of these fog lichens in Baja California, these communities remain vulnerable. Other areas in Baja California also support incredibly diverse fog desert lichen communities, including a number of rare endemic species, but have no protection status. Currently, very little is known about the factors driving diversification and the timing of evolutionary events in these deserts.

We are presently using genomic data to understand questions related to how diversity evolved in these unique coastal fog desert lichen communities along the Pacific Coast. By analyzing these data, we hope to develop a sound framework for studying diversity and evolution in coastal fog desert lichen communities. Our initial inventory will be published in Evansia, a journal published for the American Bryological and Lichenological Society.

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♦ **DR. GREWE** is the Genome Analyst at the Field Museum in Chicago. His responsibilities at the museum include comparative genomic work across all museum specimen.

♦ **DRA. MARÍA DE LOS ÁNGELES HERRERA CAMPOS** is curator of the Lichen Collection at the National Herbarium of the Biology Institute at the Universidad Nacional Autónoma de México (UNAM). ●

Punta Mazo Nature Reserve in San Quintín. Photo: Alejandro Arias.

A JOURNEY WORTH TAKING: **BAJA CALIFORNIA**

Text by Daniela Gómez de la Maza
Photos by Alejandro Arias, César Medina and Francisco Perera

Being a conservationist is not the typical life story. Most of the parents urge their children to pursue more traditional careers. Nevertheless, a unified sense of pride takes over everyone, regardless of their job, when a success story hits the headlines of how scientists saved ecosystems or a species from extinction. However, encouraging people to study life sciences is not very usual – on a personal note, I can say that I was lucky when my parents supported my decision to study Biology, although with some reluctance.

Sometimes people are quick to judge complex situations they do not fully understand, and remain oblivious to the huge amount of work that must take place in order to achieve a milestone in conservation.

This article tells the story of a conservation student on a journey through one of the most untouched habitats in Mexico. The state of Baja California is known for its cities that share the border with the USA, its vast deserts, and breathtaking seaside cities. A one-week field trip to Baja California ended up teaching us, a group of Biology students, what really goes on when you become a conservationist.

We arrived in Tijuana where ground transport was waiting for us to take us to Ensenada. Once there, we met the incredible people that work at Terra Peninsular, an organization that focuses on conservation programs around Baja California. Last summer they registered the reappearance of the San Quintín kangaroo rat which was thought to be extinct for over 30 years. They also monitor natural protected areas, and organize events for public awareness to explain the importance of protecting these habitats and the role they play in key ecological processes.

Then we made our way to the Sierra San Pedro Mártir National Park. This unique place was home to the

Valle Tranquilo Nature Reserve. Photo: Francisco Perera.

Biology students from the University of the Americas Puebla (UDLAP). Photo: Alejandro Arias.

California condor *(Gymnogyps californianus)* many years ago, but it almost went extinct in the wild. To combat this, the government of Mexico and the US made an agreement to create a binational program that would reintroduce the species into its original distribution area.

The condor is the biggest bird in North America, and it is a strict scavenger. This species was in danger because of lead poisoning, eating pieces of micro-trash and flying into power cables, so the program started by placing the remaining 17 individuals in captivity for reproductive management. Soon after, the population grew, and they were able to periodically reintroduce individuals into de wild (De la Cruz-Robles & Peters, 2007).

Mohammed Saad, one of the lead conservationists of the reintroduction project gave us a briefing of how the program started and the amazing job they have accomplished so far. They have reintroduced over 36 condors since the 1990s in Baja California, and they have registered 11 births of this species in national territory. This project caught

Gray whale (*Eschrichtius robustus*). Photo: César Medina.

View of the Punta Mazo Nature Reserve from the Sudoeste volcano. Photo: César Medina.

my eye because I never considered the huge amount of time and work required to implement a conservation plan. It is truly admirable.

Our trip continued down towards the Pacific, and a change in the atmosphere was tangible. The ecosystem changed from a pine tree forest to shrubbery and arid meadows. Finally, we arrived at the San Quintín Bay where **we witnessed a rare event called super bloom.** This event had not been registered since 6 years

ago, but the unusual abundance of rains in the region allowed the desert plants to flower, painting the hills with beautiful vivid colors.

The protected areas in San Quintín are essential to maintain the wetlands where locals operate oyster farms. These wetlands are separated from the ocean by sand dunes, that are protected from erosion by stones washed ashore. However, these stones are considered valuable in the US as garden decor, leading to uncontrolled exploitation of the resource and depletion of rocks on the beach. This has caused dunes erosion and the endangerment of the wetlands. Also, this could affect some activities such as aquaculture, and seagrass population would decline and affect bird species such as the black brant, a migratory goose that feeds on seagrass.

Another research focus of Terra Peninsular in the area is the intertidal region of the bay, which holds key endemic species of San Quintín. A desalination plant is planned to be installed and it can irreversibly damage this habitat. This critical situation motivates the organization to continue their research in hope that they can optimize the release of the desalination plant to safeguard the bay's species.

After our stay in the research facility of Terra Peninsular at the Punta Mazo Nature Reserve, we went to the Valle Tranquilo Nature Reserve. This valley is a complete desert that holds an enormous amount of cacti and wildlife.

We continued our journey downstate and finally arrived in Guerrero Negro, where one of the most memorable experiences awaited us. A whale sightseeing tour picked us up early in the morning to take us to the breeding grounds of the **gray whale *(Eschrichtius robustus)*.**

This whale migrates to Mexican waters to breed before returning to the cold north. So, we set sail and arrived at the point where most viewings tend to happen. Little did we know that although the reproductive season was coming to an end, we would be able to see more than ten whales, including a full grown adult and a mother with its offspring.

The whales were hesitant to come near the boats at first, but quickly they became more curious and started playing in touching distance. When one of the whales popped its head out, our eyes locked and something inside me made sense. **I am not studying Biology because of financial ambition, but because of a far greater type of ambition: I want to fight for those who do not share our language, yet have outlived us in the history of this planet.** I want a planet where everyone is proud to call home. I want everyone to work together to achieve something that seems impossible: the conservation of our habitat.

This trip was not only educational but eye-opening for my future endeavours. I know that I want to become a conservationist. Nevertheless, caring and acting to take care of our planet is not exclusive to life-science careers. Small actions can create big change, and right now humankind is at a turning point. The protection of natural areas is crucial to overturn the critical condition our planet is living, but first we must take full responsibility. It is important that people realize the human ecological footprint we are leaving behind and use this awareness as motivation to change our lifestyles into more sustainable ones.

We can still turn things around. Some may say we are shooting for the stars, but if we were ambitious enough to get to where we are, we can be conscious enough to reverse the situation. **I believe we can still do it, and I invite you to believe it too.** Let us fight for something bigger than all of us, something invaluable: humanity's survival.

The gray whale migrates to Mexican waters to breed before returning to the cold north. Photo: Alejandro Arias.

At the top of the Sudoeste volcano in San Quintín Bay. Photo: Francisco Perera.

We witnessed a rare event called super bloom. Photo: Francisco Perera.

♦ **DANIELA GÓMEZ DE LA MAZA** is a Biology student at Universidad de las Américas Puebla (UDLAP) daniela.gomezda@udlap.mx •

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THIS TRIP WAS POSSIBLE THANKS TO THE SUPPORT OF JIJI FOUNDATION.

CALENDAR

ENVIRONMENTAL DATES

SEPTEMBER

4
In 2013, Rancho La Concepción Nature Reserve was certified by the Mexican government.

5
In 2017, Bahía de Todos Santos in Ensenada was designated as a Shorebird Reserve.

11
In 2008, San Quintín Bay was designated as a Shorebird Reserve.

14
Oyster Fest at the Monte Ceniza Nature Reserve

16
International Day for the Preservation of the Ozone Layer

18
World Beaches Day

22
World Car Free Day

24
International Coastal Cleanup

27
Environmental Awareness Day

29
World Maritime Day


Photo: *Mark Lee.*

EVENT

5th. San Quintín Bay Bird Festival . November 8 and 9, 2019 La Chorera, Baja California


Photo: *Michael Ready*

OCTOBER

3
World Habitat Day

4
World Animal Day

18
World Day for Wildlife Protection

NOVEMBER

1
World Day of Ecology

15
World Clean Air Day

22
Issue no .17 of the Mediterranews magazine

27
International Conservation Day

See the full calendar of events here: http://terrapeninsular.org/proximos-eventos/

GLOSSARY

Áreas Destinadas Voluntariamente a la Conservación (ADVC) (page 14 and 24)
It is a conservation tool within the category of Natural Protected Area of federal jurisdiction. This certification is obtained through the Mexican Secretariat of Environment and Natural Resources (Semarnat in Spanish), through the National Commission of Natural Protected Areas (Conanp in Spanish), and consists of voluntarily allocating land for conservation actions.

Arthropods (page 19)
The arthropods are invertebrate animals. *Types of arthropods* include insects, arachnids, crustaceans and myriapods.

NOM-059-SEMARNAT-2010 (page 5)
Refers to the Mexican official norm that identifies flora and fauna species and populations at risk. Through an evaluation to assess the risk of extinction, the species are classified by different categories and integrated into a list.

Western Hemisphere Shorebird Reserve Network (WHSRN) (page 7)
The Western Hemisphere Shorebird Reserve Network is a conservation strategy to protect shorebirds and their habitats in the American continent.

NEW IMAGE

SERVICIOS TURÍSTICOS
UMA PPF
BAHÍA SAN QUINTÍN
LOS VOLCANES

At the 5th San Quintín Bay Bird Festival we will offer birdwatching boat tours around the bay and we will participate at the Oceanfront party in La Chorera on an exhibition stand.

SERVICES WE OFFER IN SAN QUINTÍN BAY AND ISLA SAN MARTÍN

- Marine flakes manufacturers
- Sport fishing
- Hunting activities
- Photographic safaris

By René Duarte

WHO ARE WE?

We carry out activities since 1960 and we established our company in 1992. Currently, some of the staff members belong to the third generation and our staff is composed of local people.

OUR VALUES

We are a company committed to the sustainable exploitation of natural resources. We carry out conservation activities and management of hunted species.

CONSERVATION ALLY

We are part of a program to strengthen ecotouristic companies in San Quintín, this is carry out together with the organization RED de Turismo Sustentable.

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New website coming soon!

Terra Peninsular

*THE NICE THING ABOUT **TEAMWORK** IS THAT YOU ALWAYS HAVE OTHERS ON YOUR SIDE*

MARGARET CARTY