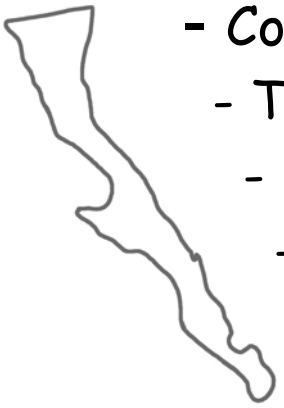
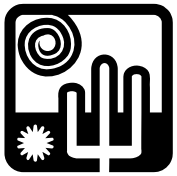
Environmental Education Series: Baja California



- Conserving the Peninsula
- The Sonoran Desert
- Sea Turtle Conservation
- Cave Paintings and Cowboys
- Friendly Whales



Debra Valov

www.LasEcomujeres.org

(Visit the ISSI pages for more about the series topics)

Conserving the Baja California Peninsula

By Debra Valov

The Baja California peninsula, 760 miles long and with an area of 89,100 sq. miles, is the world's second longest peninsula. It has almost two thousand miles of coastline, being bound on the west by the Pacific Ocean and on the east by the Gulf of California (or Sea of Cortéz), both of which are incredibly rich in marine life. Its geologic history has led to a uniquely varied environment with a wide range of habitats and a high level of biodiversity.

While over 60% of the peninsula's landmass falls within the Sonoran Desert, there can also be found mangrove and dry tropical forests in the south as well as snow-capped mountains with pine forests in the northeast. The Gulf is host to the northernmost coral reef in the America's, while three shallow Pacific Ocean lagoon systems form refuges and provide nurseries for California gray whales (*Eschrichtius robustus*) at the southern range of their annual migratory path.

A small population of berrendo, or Peninsular Pronghorn antelope, an endangered, endemic subspecies (*Antilocapra americana* ssp. *peninsularis)* roams the vast, mostly unpopulated plains of the Vizcaíno Desert Region. The vestiges of yet another protected species, the borrego cimarrón or Peninsular Bighorn Sheep (*Ovis canadensis* ssp. *nelsoni*) are now restricted to the steep slopes of the Sierra San Francisco and Las Tres Vírgenes volcano complex.

While only few remnant populations remain of the original native cultures (Kumiai, Paipai, Cocopa and Kiliwa in northern Baja California and the Cochimí, Guaycura and Pericu of the southern regions), what has survived of the peninsula's prehistoric inhabitants is still evident in the hundreds of rock art sites dispersed throughout the peninsula. Baja's rock art reached its apex in the central region, where cave paintings in the "Great Mural" style (el estilo Gran Mural), estimated at perhaps as old as 7,500 years, adorn isolated caverns and rock overhangs of the sierras.

For the most part, the peninsula is a rugged, uninhabited place, with little water and native species of flora and fauna that are well adapted to their present environment. It is the isolation and rugged wildness of Baja that has attracted so many visitors since the 1800's, many of whom were seeking monetary, scientific and spiritual riches. Others came looking for adventure or to settle Mexico's frontier. Ironically it is the peninsula's pristine nature and isolation that has both lured so many and simultaneously led to the growing exploitation of its resources and its environmental degradation.

Protected Areas & Species

The Baja Peninsula is host to a wide range of officially established protected natural areas, including four terrestrial and and two marine National Parks, four Protected Natural Areas, various Wildlife Sanctuaries, and five Biosphere Reserves, of which the Vizcaíno Biosphere Reserve is the largest protected area in Latin America. The Vizcaíno is also recognized by UNESCO as a World Heritage Site for it's cave paintings and whale and borrego sanctuaries.

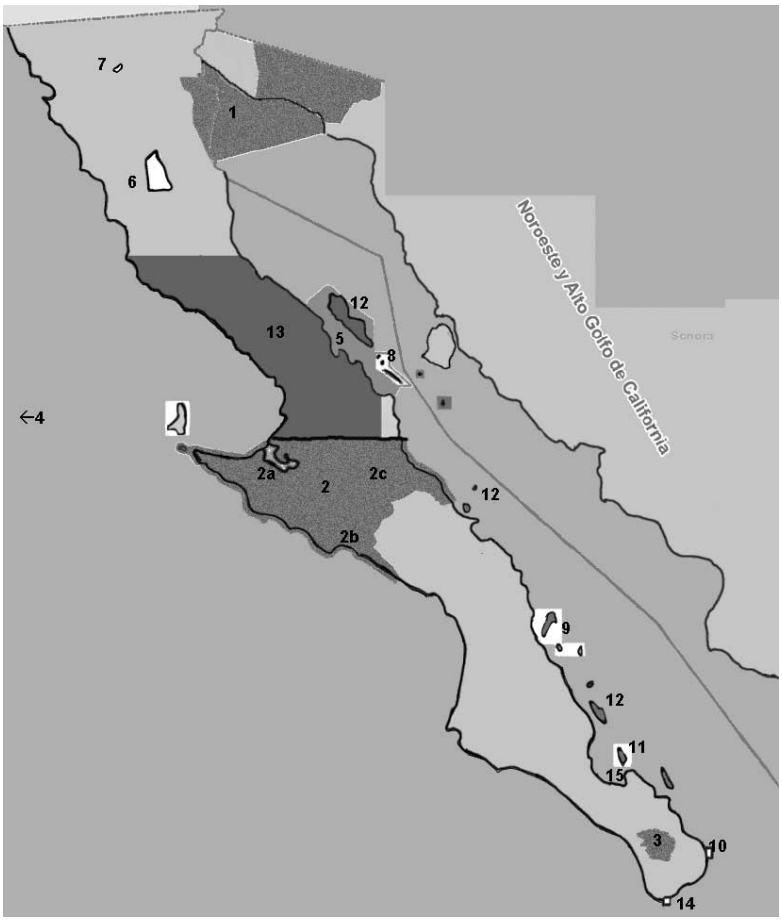
In addition to antelope, bighorn sheep, and gray whales, there are a number of other threatened species on the peninsula that are federally protected: five of the world's seven species of sea turtles either nest on peninsular beaches or feed in its waters; a number of other whale species (e.g., Blue, Humpback, Finn) call the region home. Plants species and their habitats are also protected: over 100 species of cacti, about 80% of them endemic and found nowhere else on earth are under federal protection as are mangrove forests and portions of the arid tropical forest of the Cape Region.

Environmental protection has a long history in Mexico and conservation on the peninsula was well underway by the 1970's with the establishment of the gray whale sanctuaries on the Pacific Coast. Mexico's environmental laws, and more specifically the *General Law of*

Ecological Balance and Environmental Protection first passed in 1988 (and with several subsequent, significant amendments), are among the world's strongest and most forward-looking. However, like all laws, their effectiveness depends on the government's willingness and ability to apply and enforce the statutes and the influence of the business sector and local governments in bypassing or thwarting them.

A wide range of local and international non-profits groups (NGO's) have formed to address conservation issues and they have continued to be instrumental in conserving the wild peninsula and its flora and fauna. At all levels (from school children to adults, and from small, informal, grassroots groups to service providers to well-funded binational environmental groups) their active participation has been vital in identifying problems and seeking solutions that benefit both the environment and the economic interests of the communities involved.

The intersection of governmental agencies with private sector businesses and local citizens groups has led to: a capture-captive breeding-release program aimed at increasing the number of berrendo; a stewardship-hunting program that maintains a healthy population of bighorn sheep; numerous hatcheries that annually release tens of thousands of baby sea turtles; the ongoing protection of the whale nurseries amidst pressures for industrialization of these areas; and a general overall increase in ecotourism. While problems do exist throughout the peninsula, such as a lack of sufficient governmental funding aimed at enforcement and some programs with questionable success, the overall trend is a positive one as all sectors come together to find creative solutions.



Biosphere Reserves

1. Alto Golfo de California y Delta del Río Colorado, Sonora/BC
2. Vizcaíno, BCS
   a. Ojo de Liebre Complex
   b. Laguna San Ignacio
   c. Sierra San Francisco
3. Sierra de la Laguna, BCS
4. Isla Guadalupe, BCN
5. Reserva de la Biósfera Bahía de los Ángeles, Canales de Ballenas y de Salsipuedes

National Parks

6. San Pedro Mártir, BC
7. Constitución de 1857, BC
8. Archipiélago de San Lorenzo, BC
9. Bahía de Loreto, BCS
10. Bahía de Cabo Pulmo, BCS
11. Archipiélago de Espíritu Santo

Protected Natural Areas (ANP)

12. Islas del Golfo de California, BC/BCS/Sonora
13. Valle de los Cirios
14. Las Cascadas de Arena & el Estero San José del Cabo
15. La Balandra

Vocabulario—Vocabulary

adapted; to adapt	adaptado *adj*; adaptar *v*
bighorn sheep	borrego cimarrón *m*
Biodiversity	biodiversidad *f*
Biosphere Reserve	Reserva de la Biósfera *f*
cactus, cacti	cacto, cactus *m*; cactos, cactus *mpl*
capture-captive breeding and release program	programa de captura, reproducción en cautiverio y liberación *m*
cave (rock) paintings, rock art	pinturas rupestres *f;* arte rupestre
citizens group or organization	grupo civil *m* o organización civil *f*
conservation; to conserve	conservación *f*; conservar *v*
coral reef	arrecife *m*
degradation; to degrade	degradación *f*; degradar *v*
dry (arid) tropical forest	bosque árido tropical
ecologist (a scientific profession)	ecólogo(a) *m,f*
ecotourism	ecoturismo *m*
endangered species	especie en peligro de extinción *f*
endemic (restricted to a particular range)	endémico(a)
environment	medioambiente *m,* medio ambiente *m*
environmental activist (not necessarily a scientist)	ecologista *mf*
exploit; exploitation	explotar; explotación *f*
fauna	fauna *f*
flora	flora *f*
grassroots; grassroots support	bases (de apoyo político) *fp*; apoyo popular *m*
gray whale	ballena gris *f*
habitat, habitats	hábitat *m,* hábitats *mp*
hatchery	vivero *m*
involve oneself	involucrarse
mangroves; mangrove forest	manglar *m*; bosque de mangles *m*
national park	parque nacional *m*
Non-governmental agency (NGO)	organización no gubernamental (ONG) *f*
peninsula *n*, peninsular *adj*	península *nf,* peninsular *adj*
pine forest	bosque de pinos *m*
pronghorn antelope	berrendo *m*
protect	proteger
protected natural area	área natural protegida (ANP) *f (el área, las áreas)*
refuge, santuary	refugio *m*
saltworks	salinera *f*
sanctuary, refuge	santuario *m*
sea (marine) turtle	tortuga marina *f*
service provider (e.g., tour company, guides)	prestador(a) de servicios *mf*
Sonoran Desert	desierto sonorense
threatened species	especie amenazada *f*
United Nations Educational, Scientific and Cultural Organization (UNESCO)	Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura *f*
volunteer	trabajar como voluntario(a)
(whale, bird, plant…) watching	avistamiento de (ballenas, aves, plantas…) *m*
World Heritage Site	sitio del patrimonio de la humanidad *m*

RESOURCES

Governmental Agencies/Entidades Gubernamentales

CONABIO Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (National Commission for the Knowledge and Use of Biodiversity)—responsible for managing protected areas hwww.biodiversidad.gob.mx (portal w/ lots eco resources)

CONANP Comisión Nacional de las Áreas Naturales Protegidas www.conanp.gob.mx (material didáctico en español https://www.gob.mx/conanp/es/articulos/ninas-y-ninos?idiom=es)

PROFEPA Procuraduría Federal de Protección al Ambiente (Federal Prosecutor for the Protection of the Environment)—Mexico's judicial branch of the environmental protection agency www.profepa.gob.mx

SEMARNAT Secretaría del Medio Ambiente y Recursos Naturales (Secretary of the Environment and Natural Resources—Mexico's legislative branch of the environmental protection agency. www.semarnat.gob.mx (digital library of resources—https://www.semarnat.gob.mx/gobmx/biblioteca/index.html

Environmental NGO's/ONG's Ecologistas (en defensa del medioambiente)

ASUPMATOMA https://www.asupmatoma.org ;

EcoAlianza de Loreto https://ecoalianzaloreto.org (science-based local NGO)

Grupo Tortuguero www.grupotortuguero.org *(network of turtle activists, NGO's, ecotourism)*

Proesteros http://proesteros.cicese.mx *(Wetland conservation in northern BC)*

Sociedad de Historia Natural Niparajá, A.C. http://www.niparaja.org *(NGO in La Paz, BCS)*

TerraPeninsular http://www.terrapeninsular.org *(land purchase/conservation in northern BC)*

Tortugueros las Playitas http://www.todostortugueros.org *(adopt a baby sea turtle, volunteer)*

WildCoast www.wildcoast.org *(peninsula-wide activities, media blitzes)*

Ecotourism Providers/Prestadores de Servicios Ecoturísticos

Baja Discovery www.bajadiscovery.com *(whale watching)*

Kuyima www.kuyima.com *(whales, birds, turtles, Vizcaíno, cave paintings, kayaking, camping)*

Mario's Tours https://www.bajagraywhales.com *(whale tours, RV/camping in Guerrero Negro)*

Pachico Ecotours http://www.pachicosecotours.com *(whale watching at San Ignacio Lagoon)*

Environmental Education/la Educación Medioambiental

Baja California Field Studies Program https://www.glendale.edu/academics/special-programs/baja-program (*Glendale Community College (short field courses at station at Bahía de los Ángeles*)

Ocean Oasis www.sdnhm.org/oceanoasis/toc.html (Baja natural history info, teacher's manual eng/esp, DVD)

Protected Areas/Las Áreas Protegidas

Cabo Pulmo Baja Coastal Institute www.bcibaja.org *(research, conservation)*
www.cabopulmoamigos.org *(local NGO, ecotourism)*

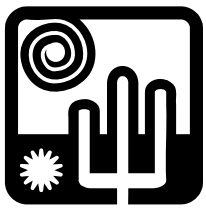
Parque Nacional Bahía de Loreto (Facebook group)
https://www.facebook.com/pages/Parque-Nacional-Bahía-De-Loreto/211312105554949?ref=br_rs

Sierra de la Laguna Reserve
https://www.unesco.org/en/mab/sierra-la-laguna

Vizcaíno Reserve https://simec.conanp.gob.mx/ficha.php?anp=116&reg=1
https://www.parkswatch.org/parkprofiles/pdf/vibr_eng.pdf *(description of park)*
http://www.parkswatch.org/parkprofiles/pdf/vibr_spa.pdf *(descripción del parque)*

Baja California's Sonoran Desert

By Debra Valov, www.LasEcomujeres.org



What is a Desert?

It would be difficult to find any one description that fits all of the twenty or so deserts found on our planet because each one is a unique landscape. While an expanse of scorching hot sand dunes with the occasional palm oasis is the image that often comes to mind for the word desert, in fact, only about 10% of the world's deserts are covered by sand dunes. The other 90% comprise a wide variety of landscapes, among these cactus covered plains, foggy coastal slopes, barren salt flats, and high-altitude, snow-covered plateaus. However, one characteristic that all deserts share is aridity—any place that receives less than 10 inches (25 centimeters) of rain per year is generally considered to be a desert and the world's driest deserts average less than 10 mm (3/8 in.) annually.

But why are deserts dry? There are a number of factors involved, including: low rainfall; high temperatures; clear skies; high rates of solar radiation and evaporation; and desiccating winds. Soils low in organic content and high in minerals also decrease moisture retention. Geography plays an important role as well. Many of the world's hot deserts are located around 30° north or south of the equator while other deserts, such as the Gobi in Mongolia, are formed as a result of being in the rain shadow of a significant mountain range. High temperatures are not requisite for desert formation and therefore not all deserts are hot—the Gobi, Argentina's Patagonian desert and the Taklamakan Desert of China are examples of cold deserts, where the only moisture falls in the form of winter snow. The polar icecaps, where all moisture is locked up in the form of ice and snow, are also considered deserts.

***Desert**: "A place where lack of water is severely limiting to living things most of the time". ASDM*

Baja California's Desert Regions

Over 60% of the Baja California peninsula falls within the boundaries of the hot, dry Sonoran Desert. In the summer, average temperatures can exceed 104° F with a humidity of <10% in some regions and around-the-clock temperatures of 90-100° F are not uncommon. Daily temperature fluctuations during other seasons of the year can exceed 50° F (e.g., ranging between 35° and 85° F). Rainfall is scarce and sporadic, with an annual average of 12-30 cm (4.7-12 inches). There are two rainy seasons, December-March and July-September, with the northern peninsula dominated by winter rains and the south by summer rains. Some areas experience both seasons, while in other areas, such as parts of the Gulf coast region, rain may fail for years on end.

Permanent above-ground water reserves are scarce throughout most of the peninsula but ephemeral, seasonal pools and rivers do appear after winter storms in the north or summer storms (hurricanes and thunderstorms—chubascos) in the south. There are also a number of permanent oases, most often formed where aquifers (subterranean water) rise to the surface. Pacific coastal regions along the entire peninsula enjoy the relatively cooling effects of fog throughout the year, generated as a result of the cool California Current; in some years, this may be the only source of moisture for wildlife.

Life in the Desert?

Plants and animals have developed many adaptations to deal with the desert's harsh environment. Organisms depend, above all, on water for survival and have developed a wide variety of characteristics and strategies for obtaining and retaining water. No sane, seasoned hiker would willingly face the challenge of the midday, desert sun in August, and if s/he had to, surely would not do so without first donning sturdy shoes, protective clothing, a wide-brimmed hat and sunscreen and carrying a water bottle. In the same manner, desert plants and animals have their own protective coverings and behaviors. Cacti, with their expandable ribs, as well as other succulent plants, are masters of water storage and retention. Dense hairs, spines, waxes and gummy exudates all protect plant foliage from damaging UV exposure, slow down water loss and help prevent overheating. Animals may sport large ears to help dissipate body heat or have the ability to recycle water from bodily wastes. Others will avoid the harsh environment

altogether, migrating, hibernating or living a nocturnal lifestyle in which they spend their daytime hours in the shade or in underground burrows. Some plants avoid energy expenditure on special adaptations by living only a brief lifecycle in which they sprout, flower and go to seed within a few short months or seasons, dying back before the harsh weather begins.

In more temperate regions of North America, where water is relatively abundant, plant and animal life appears to be lush in comparison to the desert regions. However, the Sonoran Desert is far from being a sterile, lifeless region. Relatively speaking, it is one of the wettest North American deserts where the dual rainy seasons, combined with the lack of hard freezes in winter, have led to an overall high diversity of plant and animal life—life that not only survives, but thrives in the desert.

Resources

Arizona Sonoran Desert Museum (ASDM): www.desertmuseum.org (info. in English and Spanish)
Flora of Baja California: http://bajaflora.org
San Diego Natural History Museum: www.sdnhm.org

Vocabulary

adapt; adaptation	adaptar; adaptación *f*
alluvial fan	bajada *f*
Annual	anual *adj*
Arid; aridity	árido *adj;* aridez *f*
Aquifer	Acuífero
Avoid	Evitar
basin (geology)	cuenca *f*
Bat	murciélago *m*
bighorn sheep	borrego cimarrón *m*
bobcat	gato montés *m*
burrow	madriguera *f*
cactus 1 Cardón, 2 Old Man, 3 Organpipe, 4 Pincushion	cacto o cactus *m* 1 cardón, 2 garambullo, 3 pitaya dulce, 4 viejita
caterpillar	oruga *f*
Cliff	acantilado *m*
coyote	coyote *m*
deciduous	caduco, caducifolio
desert *n;* desert *adj;*	desierto *m*; desértico *(adj.)*
diurnal	diurno *adj*
drought	sequía *f*
environment	medioambiente *m* (also: medio ambiente)
ephemeral	efímero *adj*
exudate	emanación *f*
flood	inundación *f*
foliage	follaje *m*
Fur	pelaje *m*
gland	glándula *f*
grade (up or downhill)	cuesta *f*
ground squirrel	juancito *m* (local Baja usage) ardilla *f*
gummy	pegajoso *adj*
habitat, habitats	hábitat *m*, los hábitats *m pl*
Hair; hairy	pelo *m*; peludo *adj*
Herb	hierba *f*
hibernate; hibernation	hibernar; hibernación *f*
Hill, peak	cerro *m*, pico *m*
horned lizard, horny toad	camaleón *m*

hummingbird	chuparosa *f*
hurricane	huracán *m*
jack rabbit	liebre *m*
kangaroo rat	rata canguro *f*
leaf	hoja *f*
life cycle	ciclo de vida *m*
lizard	largarto *m*, lagartija *f*
plateau	mesa *f*
moth	mariposa nocturna, polilla *f*
nature	naturaleza *f*
nocturnal	nocturno *adj*
oasis *n;* oases *npl*	oasis *m;* oases *mpl*
organism	organismo *m*
península	península *f*
perennial	perenne *adj*
plain	llano *m*
pronghorn antelope	berrendo *m*
rain/thunder storm	chubasco *m*
rainfall	precipitación (pluvial) *f*
rattlesnake	cascabel *f* serpiente de cascabel *f*
salt flat, drainage pan	playa *f*
sap, juice	savia *f*
slope, hillside	ladera *f*
snake	víbora, culebra, serpiente *f*
solar radiation	radiación solar *f*
sphinx (hawk) moth	mariposa esfinge *f*
spine	espina *f*
stem	tallo *m*
survive; survival	sobrevivir; sobrevivencia
tarantula	tarántula *f*
trees and shrubs mesquite tree Palo Blanco tree Elephant tree	árboles y arbustos *m pl* mezquite *m* palo blanco *m* torote *m*
wash, gully or stream	arroyo *m*
wasp (tarantula wasp)	avispa (de tarántula) *f*
wax; waxy	cera *f*; ceroso *adj*

Sea Turtle Conservation Issues: Grassroots Efforts in Mexico

Grupo Tortuguero and Baja California's Sea Turtles

Debra Valov
www.LasEcomujeres.org & Grupo Tortuguero

SEA TURTLE NATURAL HISTORY

Like all turtles, sea turtles are cold-blooded, egg-laying, air-breathing reptiles. All but one species has a hard shell composed of scales or *scutes*. They belong to the order Testudines and present day species are divided into two families, Cheloniidae (six species) and Dermochelyidae (one species). Of the seven extant species, five are almost cosmopolitan in their range while the Flatback (*Natator depressus*) is limited to northern coastal waters of Australia and the Kemp's Ridley (*Lepidochelys kempii*) is restricted to the Atlantic & Caribbean waters of the Americas.

Sea turtles have lived on Earth for at least 200 million years. The most intact fossilized remains of the world's largest sea turtle species, *Archelon ischyros* (pronounced Ar-key-lon is-key-ros), was found in South Dakota in the 1970's and was dated at 74 million years old. It measures 15 feet long from beak to tail, and 16.5 feet across from flipper to flipper. The live animal probably weighed about 4,500 pounds and the species may have lived to about one hundred years old. This, and other specimens discovered date from the Cretaceous Period (75-65 mya) when the Midwest region was covered by a shallow sea. The basic design of the smaller present day species has changed little from that of their ancient ancestors, though, like *Archelon*, they probably had a leathery carapace.

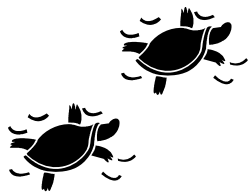
Sea turtles, once they hatch and make their way to the ocean, will never set flipper on land again, except in the case of mature females who will come ashore every two to four years to dig from 4 to 7 nests per season. The number of eggs laid (70-180) and the incubation period (52-65 days) depends on the species and nest temperature. Nest temperature also plays a role in the determination of sex, with temperatures above 30º C (86ºF) producing females, while those below 28º C (82º F) will produce males. Nests must also have ample moisture and air for proper egg development and hatchling survival.

Young turtles (hatchlings) spend many years in open ocean waters, floating within seaweed and debris rafts, evading predators while feeding and growing. Once they have reached an adequate size to be less of a tasty morsel for predators such as sea birds and larger fish, they will make their way towards the coast to feed, remaining either well offshore or venturing closer in to shallow waters. Most are opportunistic omnivores and will eat according to available food sources. Some species of sea turtles prefer crustaceans (crabs, shrimp), mollusks (snails, squid, octopus) or jelly fish. The Hawksbill finds sponges a delicacy while sea grass and algae is more to the Green's liking.

EASTERN PACIFIC SEA TURTLES

Five species of sea turtle occur in high concentrations off of the Baja California peninsula in either the Pacific Ocean or the Gulf of California (see chart below). This concentration constitutes a large portion of the respective species' regional population. This area is a major feeding ground for all five species as well as a minor nesting area for three (Green, Olive Ridley and Leatherback). Turtles feeding in the Baja California region will spend most of their lives there except for when they migrate elsewhere to breed. The principal nesting area for the Olive Ridley population is the west coast of mainland Mexico from the states of Sinaloa south to Costa Rica. When mature, they will migrate between June and November to the breeding grounds where they will mate and the females will go ashore to nest. Ridleys engage in mass nesting events called *arribadas* (the arrival).

Common Name (US)	Nombre Común (México)	Scientific Name
Green/Black	Tortuga prieta, Tortuga negra	*Chelonia mydas*
Hawksbill	Carey	*Eretmocheyls imbricata*
Leatherback	Tortuga laúd	*Dermocheyls coriacea*
Loggerhead	Tortuga amarilla, Tortuga cabezón	*Caretta caretta*
Olive Ridley	Tortuga golfita	*Lepidocheyls olivacea*



In the early 1990's, a connection between Loggerhead turtles off the Pacific coast of the peninsula and those in the waters of Japan and the South China Sea was scientifically established. After an ID tag from a dead Loggerhead that had been marked off Baja California was recovered by a fisherman in Japan, scientists set out to confirm a long-held theory of a connection. In 1996 Grupo Tortuguero researcher J. Nichols was the first to successfully track a mature female Loggerhead named *Adelita* by satellite as she traveled almost directly from Baja to Japan. Since then, several other mature female turtles have been tracked and this data, along with DNA evidence, has proved that Loggerheads born on the beaches of Japan (as well as other Asian countries) migrate about 5,600 miles across the Pacific to spend their adolescence along the Baja California peninsula and then as adults return to remain in their natal waters where they will mate and nest.

TURTLES AND HUMAN INTERACTION

Sea turtles have historically been an important source of protein in coastal populations world wide. Many indigenous cultures have revered sea turtles and include them in their religious ceremonies. Sea turtles continue to play a central role in the culture of the Comcaac Nation (the Seri) of Sonora, Mexico and the tribe has become an active participant in the sea turtle conservation movement. A traditional Turtle Island story of the Onondaga tribe (New York state) tells of the Earth being supported on Turtle's back (see: http://www.turtleisland.org/front/article3.htm). In Baja California, sea turtle images appear in 1000 to 1500 year old rock paintings found on cliffs and cave walls in remote canyons throughout the southern peninsula, indicating that these peoples were familiar with the animals and that turtles must have held some significance within their culture to have been depicted in their art. Mexicans have long believed that turtle meat and blood have medicinal properties and that the eggs have aphrodisiacal effects. These traditions and myths persist to this day in many areas and present a great obstacle to sea turtle conservation.

ENDANGERED SPECIES

Currently all seven species are recognized by the IUCN (International Union for Conservation of Nature and Natural Resources) as either data deficient (Flatback), vulnerable (Olive Ridley), endangered (Green), or critically endangered (Leatherback, Loggerhead & Kemp's Ridley). They are protected worldwide by the *Convention on the International Trade of Endangered Species of Wild Fauna and Flora* (CITES). All species were placed on the CITES endangered list between 1975 and 1977 except for the Flatback of Australia (1981). Mexico's sea turtles are specifically protected within Mexico by federal decree (*NOM-059-ECOL-2001*) and the *Carta Nacional Pesquera* of 2004, although enforcement continues to be problematic. In spite of all these protections, illegal, unsustainable consumption continues in Mexico as well as worldwide. In northwest Mexico and the southwest United States alone, at least 30,000 turtles are slaughtered and sold on the black market annually mostly during Easter, Christmas and other important religious holidays, where the eating of the meat is not considered to break the Lenten rules. National holidays as well as political and social events are also times of increased turtle consumption and even officials working on environmental issues have been known to procure a turtle meal for their honored guests.

Poaching for personal or commercial consumption is not the only factor contributing to the sea turtles' plight. Incidental by-catch is another major cause of turtle mortality, killing untold thousands yearly. They drown after they are scooped up in gill nets lacking turtle exclusion devices or snagged on long lines designed to catch large fish such as swordfish

or tuna. They are injured by boat propellers or drowned when they become entangled in old nets and fishing lines. Chemical contaminants (such as PCB's or the heavy metals cadmium and lead) weaken individuals and may affect long term fertility. They choke on plastic bags (commonly mistaken for jellyfish). Even the eggs are not safe once they are laid. Poachers can easily decimate a season's crop on an entire beach in some areas, as can wild and feral predators (coyotes, raccoons, wild pigs, feral dogs) that raid or otherwise disturb the carefully constructed nests.

Last but not least, the loss of pristine nesting habitat is reducing the rate of repopulation of the species as beaches are consumed for tourism or industrial projects. Coastal development brings with it invasive dune plant species that make nest digging difficult. Off-road vehicles run rampant, compacting the sand and suffocating eggs. Nocturnal lighting from hotels, homes and streets can confuse the hatchlings' ability to navigate safely and quickly toward the ocean. And it can be only assumed that global climate change will further contribute to this loss of habitat if, as projected, a substantial sea rise occurs.

Unchecked human exploitation of sea turtles, the continued systemic denial of the connection between human activity and environmental degradation, and our patent disregard for the health of the environment and all of its unique ecosystems have placed the sea turtle, among many other species, in a tightening, downward spiral. However, there are a growing number of individuals worldwide who have taken up the call to explore and address these issues as they pertain to sea turtles and in doing so, perhaps these efforts will have some rippling effect in the collective consciousness.

CONSERVATION PROJECTS—GRUPO TORTUGUERO DE LAS CALIFORNIAS (GTC)

In 1999, a small group of international scientists, community activists and local fishermen came together in Loreto, BCS for the first time to form Grupo Tortuguero. Their goal was to better understand and address the factors that were leading to the decline in the Eastern Pacific sea turtle populations. A drastic decline had been witnessed in nesting populations worldwide during the 1970's and 1980's. By the mid 1990's marine scientists and environmental groups were becoming ever more alarmed by the continued decline. On one beach alone in Michoacán, the number of nesting females coming ashore during a weekend-long *arribada* had declined from 25,000 in 1970 to less than 500 in 1999 (just 2% of the previous population).

The meeting launched Grupo Tortuguero's conservation work which was begun in a few fishing villages where there was a history of heavy poaching as well as an expressed interest in the project by local people. In the intervening years, the group has brought together fishermen, poachers (now ex-), government officials, scientists, school children, business people and environmental activists to work both within individual communities and on a regionally coordinated basis. The group uses a number of different approaches and works to promote behaviors and social norms that will help to preserve turtles and their environment.

Environmental Education. This is a key component of GTC's work, which uses the sea turtle as a *flagship species*, linking its success to the health of both marine and terrestrial environments as well as to the economic success of the region. Its national and international media campaigns have been innovative and many have addressed the myths surrounding turtles in Mexican society. Its workshops, scientific meetings and environmental festivals have helped to increase participant knowledge about the environment, current environmental challenges, and how individuals and communities can take proactive measures in its stewardship. Information gathered from outside activities will be taken back to a participant's community and may be incorporated there into further activities and workshops, assuring that information is cycled through the region. Many of these activities are geared toward children and youth, who are seen as future stewards of the area's resources. "*El futuro está en tus manos*" is the motto of EcoAmigos de Mulegé, a local non-profit youth group.

Monitoring. Since 2001, GTC has managed a scientifically based monitoring project that brings much needed funding to local fisherman, and

involves them as active participants in the research and protection of their local resources. Teams conduct a monthly monitoring where, over a 24 hour period, they capture, weigh, photograph, tag and release turtles. They receive a monthly stipend that covers expenses as well as a small salary. A number of the sites included in this project are involved only with the protection of nesting beaches and egg relocation to nearby hatcheries that they maintain and guard. Team members from each community are expected to attend and present their data at the annual monitoring meeting which is held in a different community each August.

In January 2008, its annual meeting was held in Loreto, BCS concurrently with RETOMALA (a network of Latino turtle conservationists) and the 25th Annual Symposium of the International Sea Turtle Society with over 1200 tortugueros in attendance. At that meeting, a very positive action was discussed that marks the success of GTC's conservation program. As a result of his experience with GTC fishermen and scientists from Mexico, the US and Japan, the captain of a major Mexican fishing fleet working off the peninsula's Pacific coast made a landmark decision. He voluntarily retired the fleet's long lines, thereby making a commitment to the protection of at least 700 Loggerheads yearly that would have been killed by his fleet alone within a key turtle feeding hotspot. It is further hoped that local groups will be able to pressure the Mexican government to declare their area a national marine refuge, off limits to further large-scale commercial fishing harmful to turtles.

Grupo Tortuguero celebrated its 13th annual meeting in La Paz, BCS in January 2011. At this meeting, scientific papers and monitoring project results were presented. In Puerto López Mateos, for example, it was reported that there was a 60% decrease in the annual number of beached turtles that had been killed in nets. There had also been an increase in the degree of local involvement with nine fishing Co-Ops and a total of 15 organizations involved. Other projects, in Loreto Bay and Laguna San Ignacio, have studied the distribution of turtle populations in those places to determine patterns of use by both humans and turtles. The goal is decrease the impact and mortality of turtles in those areas and help determine if further delimitation of protected or closed areas is warranted. In another community, Punta Abreojos, researchers want to look at the effects of heavy metals on sea turtles, a possible explanation for the apparently stunted size of specimens captured there.

The 14th, and the 16th through 19th annual meetings were held in Mazatlán and hosted by the Acuario Mazatlán. Having gone through a few rough years financially and a reorganization, in January 2018 GTC hosted almost 200 attendees at their 20th anniversary meeting in Loreto, BCS. New acquaintances were made and old friendships rekindled. A variety of research reports were presented as were the yearly results from the monitoring and hatchery projects. In terms of the nesting beaches, there was an increase in the number of hatchlings released during the past season as compared to the previous year. There has been a stable yearly increase in the number of hatchlings released over GTC's 20 years of conservation and the number of nesting females s at Colula and two adjacent beaches in Michoacán had returned this year to pre-1975 numbers. Yearly meetings continue to be a focal point for sharing information and forming and/or strengthening inter-community and international alliances. From the original 45 people who formed GTC in 1999, the yearly meeting has grown. In 2020 attendance at the 20th Annual Meeting in Loreto topped 350. Today GTC is working with 59 communities across the two states of the Baja California peninsula and six other Mexican states as well as collaborating with groups in eight countries.

¡Viva la Tortuga! ¡Viva la Revolución Tortuguera!

!

RESOURCES/RECURSOS

www.grupotortuguero.org *(English and Spanish)* www.euroturtle.org
www.wildcoast.net www.todostortugueros.org
https://internationalseaturtlesociety.org *International Sea Turtle Society*
www.seaturtles.org *Sea Turtle Restoration Project*
http://www.widecast.org *Wider Caribbean Sea Turtle Conservation Network*

¿En las manos de quién? video— http://www.youtube.com/watch?v=W45Rmkw3tcg
Mi hombre no necesita huevos de tortuga video— http://www.youtube.com/watch?v=YnVN2VgLNZQ
Santo salva las tortugas video— http://www.youtube.com/watch?v=a0J4S6pZY8w
Santo vs. Chupacaguas video— http://www.youtube.com/watch?v=DGJROh2c6CE

Delgado, Stephen and Wallace J. Nichols. *Saving Sea Turtles from the Ground Up: Awakening Sea Turtle Conservation in Northwestern Mexico*. Mast 2005, 3(2) and 4(1): 89-104. available at: http://www.lasecomujeres.org/files/saving_turtles_nichols.pdf

VOCABULARY/VOCABULARIO

Adolescence	adolescencia *f*	investigate/the research	investigar; investigación *f*
ban/banned	veda *f* ; en veda	jellyfish	medusa/malagua *f*
Beach	playa *f*	lay eggs	desovar/poner huevos
black market	mercado negro *m*	male	macho *m*
blood simple	muestra de sangre *f*	maturity	madurez *f*
boat, a type of small	panga *f*	migrate	migrar
breed or mate	aparearse	monitoring	monitoreo *m*
by-catch	pesca incidental *f*	nest	nido *m*
Carapace	carapacho/caparazón *m*	nest/the nesting	anidar; anidación *f*
Capture	captura *f*	net	red *f*
Colesterol	colesterol *m*	non-governmental org	organización no gubernamental *f*
conservation program	programa de conservación *m*	non-profit organization	organización sin fines de lucro *f*
conserve/the conservation	conservar; conservación *f*	ocean	mar/océano *m*
Consumption	consumo *m*	patrol; to patrol	vigilancia *f* ; vigilar
Crab	cangrejo *m*	plastron (lower shell)	plastrón *m*
Crustacean	crustáceo *m*	poacher	cazador furtivo *m*
Decrease	disminución *f*	poaching	caza furtiva *f*
discharge (of waste)	descarga *f*	predator	depredador *m*
Dive	zambullirse	retractable	retráctil/replegable
education campaign	campaña educativa *f*	satellite transmitter	trasmisora satelital *f*
Egg	huevo *m*	scute (scales of shell)	escudo *m*
Endangered	en peligro de extinción	sea grass	los pastos marinos *mf*
erupt (nest), hatch	brotar	species	especie *f*
Environment	medioambiente *m*	tag/tagging	placa *f* , marcaje *m*
environmental contamination	contaminación ambiental *f*	TED (Turtle Excluder Device)	TED (Dispositivo Excluidor de Tortugas) *m*
feed/food	alimentar; alimentación *f*	the arrival = mass nesting	arribada *f*
Female	hembra *f*	threaten/the threat threatened	amenazar; amenaza *f* amenezado
fisher(man)	pescador *m*	tissue sample	muestra de tejido *f*
Flipper	aleta *f*	tourist guide	guía turística *m*
Fossil	fósil *m*	trade/the trade	comercializar; comercio *m*
garbage/waste	basura *f* ; desechos *mp*	turtle	tortuga, caguama *f*
gender (also genus)	género *m*	turtle activist	tortuguero *m*
heavy metals	metales pesados *mf*	turtle group	grupo tortuguero *m*
in decline	en declive	virus	virus *m*
internal parasites	parásitos internos *mp*	young turtle, hatchling	tortuguita/cría *f*

TURTLE FACTS

- **Worldwide species:** 7
- **Weight:** 80 – 880 lb (adult)
- **Size:** 2.5 ft – 9 ft long (adult)
- **Age:** 50 –100+ (?) years
- **Food:** crustaceans, jellyfish, sea grass, algae and sponges (species dependent)
- **Migration:** 5600 miles (Loggerhead)
- **Age of sexual maturity:** 15-30 years old

DATOS SOBRE LAS TORTUGAS MARINAS

- **Especies mundiales:** 7
- **Peso:** de 80 a 880 libras (adulto)
- **Longitud:** de 2.5 a 9 pies (adulto)
- **Edad:** de 50 a 100 (¿o más?) años
- **Alimentos:** los crustáceos, pastos marinos, medusas algas y esponjas (depende de la especie)
- **Migración:** 5600 millas (Tortuga amarilla)
- **Edad de maduración:** entre 15 y 30 años

DID YOU KNOW?

- It is estimated that only one in 1000 turtles survive to reach reproductive age.
- Black market trade results in the death of approximately 30,000 turtles each year in California, and northwest Mexico alone.
- Once they leave the nest and head to sea, male sea turtles will normally never come ashore again in their lifetime.
- Green sea turtles have been known to hold their breath for up to 5 hours.
- Sea turtles are extremely sensitive to the earth's magnetic field and use it to navigate.
- Leatherback turtles can dive up to 3200 ft.

¿SABÍAS QUÉ?

- Se calcula que solamente una entre cada mil tortugas alcanza la madurez.
- El comercio furtivo resulta en la muerte de aproximadamente 30 miles de tortugas cada año sólo en California y el noroeste de México.
- Al brotar del nido y entrar al mar, las tortugas machos generalmente nunca jamás caminarán en la tierra fuera del mar.
- Las tortugas prietas pueden contener su respiración hasta 5 horas.
- Las tortugas marinas son muy sensibles al campo magnético de la tierra y lo utilizan para navigar.
- La tortuga laúd puede zambullirse hasta 3,200 pies de profundidad.

Ick! I don't want to eat turtles or their eggs

- they are contaminated with heavy metals (cadmium, lead…)
- Green turtles have herpes and papillomatosis
- their flesh and eggs are very high in cholesterol
- they have cooties!! (internal parasites)

Me da asco. No quiero comer las tortugas o sus huevos

- son contaminadas por los metales pesados (el cadmio, el plomo…)
- Las tortugas prietas sufren de herpes y papillomatosis
- la carne y huevos contienen altos niveles de colesterol
- ¡Son infestadas por parásitos internos!

Cave Paintings and Cowboys of Baja California

By Debra Valov, www.LasEcomujeres.org

The cave art of the Baja California peninsula represents one of the most important collections of prehistoric art in the world and is considered to be on par with the neolithic art of Europe and Africa. Art styles range from petroglyphs engraved on basalt boulders with simple designs (geometric symbols) or complex images (animal or human figures) to gigantic painted murals tucked away in rocky overhangs and shallow caves and depicting hundreds of human and animal figures. Much of the art across the peninsula shares a common, underlying theme, though execution and style can vary regionally.

Until 2000, it was believed that the cave paintings, or *pinturas rupestres*, of Baja California were only about 1,900 years old. However, radiocarbon dating of the pigment binders were completed in 2002 and show that the paintings of San Borjitas cave, near Mulegé, may be about 7,500 years old (5400 A.C.), making them perhaps the oldest North American rock art known. However, there continues to be some dispute about the methodology involved in the study and its validity.

Much speculation exists about the people who created the cave art. Francisco Javier Clavigero was one of the first to describe the paintings in his book *A History of Baja California* published in 1789. He writes that when the Spanish Jesuit missionaries were establishing missions on the southern peninsula at San Ignacio and Santa Gertrudis in the early 18th Century, they heard stories from the native Cochimí about a race of giants from the north who had inhabited the land long before them and who had painted the gigantic murals. They claimed to be unrelated to this tribe and denied knowledge of their meaning.

Most likely, the artists were members of the now extinct Pericú (south), Guaycura (central) and Cochimí (central & north), indigenous nomadic hunter-gatherer tribes who exploited the region's resources, migrating seasonally between sea and mountains in search of food, water and shelter and leaving their mark on the cliff faces and rock shelters close to their seasonal campsites. Unfortunately, no other archeological finds exist that help to explain the true significance of the cave paintings.

Historical Research

The first scientific documentation of cave art on the peninsula was made in 1883 by Herman Ten Kate, a dutch anthropologist, and Lyman Belding, a north american naturalist. Leon Diguet, a french chemical engineer, first came to Baja California in 1889, having been contracted by the Boleo mining company in Santa Rosalía to survey for copper deposits. By the time he left Baja in 1892, he had written a number of scientific papers, including several on the subjects of local anthropology and archeology. He later returned to Baja California, this time as director of French expeditions in Mexico and led four expeditions beginning in 1894. In his published articles, he described in detail the art and artefacts of at least thirty different sites, and distinguished between two types of rock art present: petroglyphs and cave paintings.

After World War II, interest in the peninsula's prehistoric past began to increase. William C. Massey, an archeologist from the US, was one of several to explore the peninsula's archeological sites. In 1949, the first expedition to be backed and led by Mexican scientists was undertaken by Fernando Jordán, Barbro Dahlgren and Javier Romero. They traveled to San Borjitas, near Mulegé in the Sierra Guadalupe. Jordán extensively photographed the paintings, Dahlgren created careful drawings of the figures and Javier Romero excavated the surrounding area, where he discovered a number of stone artifacts (grinding stones). Their published work brought the cave paintings into the national spotlight.

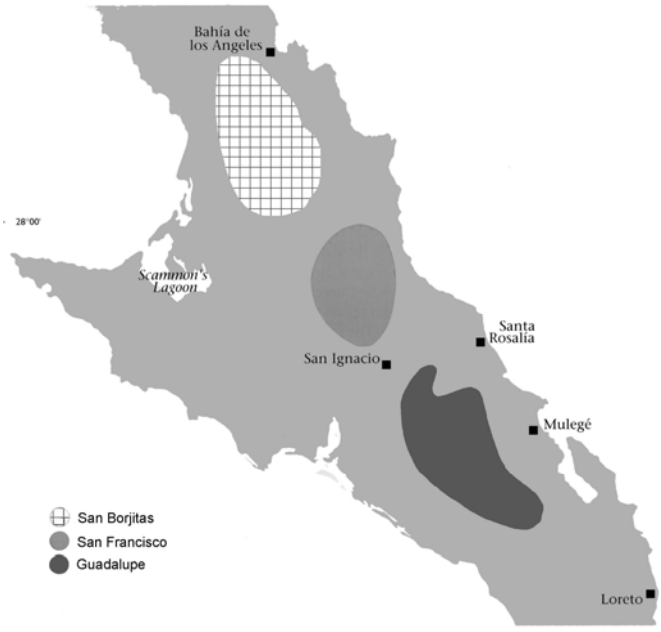
Erle Stanley Gardner, mystery writer and adventurer, began to explore the Baja Peninsula in 1961, taking with him on his various trips well-known scientists of the time. In 1965, he was accompanied by Dr Clement Meighan of UCLA. Meighan is credited with the first rigorous scientific study of the region's cave art and with

elevating the level of interest and discourse about the artwork and its significance.

In the 1970's and 1980's, photographers Harry Crosby from San Diego and Enrique Hambleton from La Paz, together traveled about 600 miles on mule and horseback, exploring an area of more than 7,450 sq. miles of rugged country where they photographed, documented and lent interpretation to more than 200 rock art sites, many of them never seen before by outsiders. Their subsequent work, *The Cave Paintings of Baja California: Discovering the Great Murals of an Unknown People*, first published in 1975 and later updated in 1997, continues to be the definitive work in English on the subject and made accessible to a greater public the beauty and mystery of this art form.

The Art

While there are a number of styles of rock art throughout the peninsula, perhaps the best known and most studied is that known as The Great Mural. Over 1200 known sites with paintings of this style occur in the central region of the peninsula, including the Sierra San Borja, Sierra San Francisco, and Sierra Guadalupe (see map). The art has been carried out on a monumental scale. Some sites have hundreds of figures, many of them overlapping and that can reach high up on the cave walls or on rock overhangs. Figures are executed with a high level of skill as compared to art of other areas of the peninsula. While there are five recognized sub-styles of the Great Mural art demonstrating distinct differences in how figures are depicted—realistic versus abstract images; images filled with one or more colors versus unfilled images; anthropomorphic figures with disproportionate body sizes and square heads for example—the subject matter is fairly homogenous across its range. Depictions of wildlife are the most common, representing bighorn sheep, rabbits, jackrabbits (hares), mountain lions, deer and turkey vultures. Terrestrial animals often were shown with arrows piercing or lying across their bodies. Marine animals such as manta rays, fish, and turtles can also be found. Ranging anywhere from a few inches to more than ten feet, human figures, referred to as 'monos'—men, women and what have been interpreted as shamans (human figures wearing odd head dresses) are also represented. Little is actually known about the nature of the symbolism of the figures or the use of colors, where ochre, black and red predominate and only a small amount of both white and yellow is used.



Source: adapted from Crosby (1997) & Gutiérrez Martínez (2003)

More is understood about the process by which the art was made. Pigments were created from ground minerals from local rocks, bound together with water and cactus juice. It has been proposed that the paintings of the Great Mural style were created using scaffolds constructed from palm trunks that were tied together with ropes and cords made from plant fibers such as palm fronds or agave. Brushes were most likely fabricated from the fibers of the Maguey plant (Agave species) common to the area. Much of the work is superimposed over previous layers indicating that the paintings were likely laid down over several hundred to thousands of years and therefore across many generations. This means that the Painters would have repeatedly returned to the same remote areas to engage in the act of painting—why, we will never really know. The paintings of the Great Mural style do show clear evidence of being repainted and retouched, especially on some of the human figures. It is thought that this may have been done because these images were particularly venerated, representing either mythic figures or their own ancestors. Earlier attempts at carbon dating of

the images were skewed, giving an age of less than two thousand years, because while it was correctly surmised that the underlying images would be the first and therefore oldest, it was not initially known that many of these had been retouched hundreds or even thousands of years later.

Other styles of rock art are found in the northern peninsula. One well known example that is open to the public is El Vallecito, located about 42 miles east of Mexicali. It is considered to be the most representative of the region and six of the 18 sites at this location can be visited. Images include geometric and anthropomorphic figures, a shark's head, butterfly and a man apparently rooted in the ground (*el hombre enraizado*).

Conservation

Baja's cave paintings are impermanent although they have so far persisted for hundreds or thousands of years. The paintings are exposed to the elements—rain, hurricanes, extreme heat and cold, and will eventually erode. Additionally, salts dissolved in the water undermine the underlying rock and painted layers, gradually loosening the pigments and layers of rock from the cave's surface. They have managed to escape significant vandalism in recent times primarily because they are located in such remote areas that are not easily accessible.

Visitors to all cave painting sites are required to purchase permits from the local INAH office and contract registered guides in order to make trips to the individual sites. Throughout the peninsula, local people, such as ranchers, on whose land the paintings are to be found, are now charged with protecting these world treasures. Access to the sites is controlled locally and most guides are usually from the area of the site, although outside groups registered with the government office can also lead trips in conjunction with local custodians. This locally based stewardship program has improved the economic condition of surrounding communities and provides revenue for the ongoing protection of the artwork.

In 1993, the Sierra San Francisco, and the rest of the surrounding Vizcaíno Biosphere Reserve, was declared a World Heritage Site by UNESCO. This area contains a large number of significant sites of the Great Mural style, and at least 350 registered sites. A management plan has been in place in the Sierra San Franciso since 1998, in which is laid out methods to help decrease the impact of public visits. Currently, many of the most heavily visited sites have handrails, walkways, paths, or protective fences and access is strictly controlled and monitored.

Visiting the Cave Paintings

To truly enjoy the beauty of both the cave art and the surrounding desert areas, visitors should take the time to go on a mule trip adventure. Multiple-day trips down into the canyons of the Sierra San Francisco allow the visitor to visit numerous sites, such as the spectacular Cueva Pintada and Cueva de las Flechas in Santa Teresa Canyon. Santa Martha, between Mulegé and San Ignacio also offers the chance of multi-day trips or a day-trip on foot or mule. For the traveler with limited time or some physical limitations, there are a number of sites that can be visited on a day hike or after a 1-2 hour car trip and a short (15 minutes) to medium (1-2 hour) walk. La Trinidad and Cueva San Borjitas outside of Mulegé are good examples, as is Cueva del Ratón in the Sierra San Francisco. Cave painting trips are also a great opportunity to get to experience a slice of ranchero life. Some families date back to the first Californios, settlers who arrived with the missionaries in the 18th Century but who stayed on after their departure and moved into the mountains to start isolated ranches. Traditional crafts such as leather working, embroidery, cheese making and animal husbandry are still actively pursued.

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Resources

- **Ecoturismo Kuyimá**—www.kuyima.com – rock art tours and whale watching based in San Ignacio
- **El Vallecito**—history, description and location of this site
  http://www.gobiernodigital.inah.gob.mx/ZonasArqueologicas/todas/htme/za00101a.html
- **Ignacio Springs B&B** (yurts)—http://www.ignaciosprings.com
- **Instituto Nacional de Antropología e Historia** (INAH in San Ignacio, BCS)
  From US dial 011 52 615 154-0222 to arrange visit to Sierra SF and Santa Martha sites.
  Daily Rates 2008-09 (in pesos): Guide $60 to $200; pack animal $150; INAH permit $35, camera $35
- **Mulegé Tours**—La Trinidad & San Patricio sites—mulegetours@hotmail.com
- **Baja Insider**—**Baja Peninsula Travel and Living online magazine**: http://www.bajainsider.com
- **Saddling South**—Mule trips to cave sites and ranches. 011 52 (613) 100-8438 or 011 52 (615) 104-7967 (outside Mexico) or Trudi Angell – tourloreto@aol.com – ask for DIY info or private tour dates. For rock art tours and cultural tours see Saddling South pages: https://www.saddlingsouth.com/index.php

Vocabulary: The Cave Paintings – El Vocabulario: Las Pinturas Rupestres

ancestor	antepasado *m*
anthropology; anthropologic; anthropologist	antropología *f;* antropológico *adj;* antropólogo(a) *m, f*
anthropomorphic	antropomorfo *adj*
archeology; archeological; archeologist	arqueología *f;* arqueológico *adj;* arqueólogo(a) *m, f*
arrow	flecha *f*
artifact	artefacto *m*
by carbon dating method	por el método de radiocarbono
cactus juice (sap)	savia de un cacto *f*
canyon	cañon *m*
cliff	cantil *m*
cord	cordel *m*
date	fechar
dating analysis	análisis de fechamiento *m*
deer	venado(a)
discover	hallar
engraved	grabado *adj*
Great Mural Style (*paintings that reach more than 32 ft)*	estilo Gran Mural *m (pinturas que llegan alcanzar hasta más de 10 metros de altura*)
grindstone	metate *m*
ground; to grind	molido *adj;* moler *v*
guide (person), lead rope *m*; guide (book) *f*	guía *m;* guía *f*
handrail	barandal *m*
human figures in the paintings—*literally*: doll	mono *m*
hunter-gatherer	cazador-recolector *m*
Iron oxide, manganese oxide	óxido de hierro, de manganeso *m*
jackrabbit	liebre *m*
jesuit missionary	misionero jesuita *m*
migrate	migrar
migration	migración *f*
mineral (noun & adj)	mineral *m & adj*
monumental scale	escala monumental *f*
mythic figure	figura mítica *f*
native, indigenous (noun or adj.)	indígena *mf o adj*—el pueblo indígena, los indígenas
naturalist	naturalista *m,f*
permit	permiso *m*
petroglyph	petroglifo *m*
pictorial style	estilo pictórico *m*
pigment binder	aglutinante de los pigmentos *m*
pigment, paint	colorante, pigmento *m*
plaster, gypsum	yeso *m*
produce, make,	elaborar
protective fencing	cerco de protección *m*
record (an event, object)	registrarse
retouch, repaint	repintar/retocar
rock, cave	rupestre *adj.*
rocky shelter	resguardo rocoso *m*
rocky shelter or overhang	abrigo rocoso *m*
Rope (common *Mex.*)	mecate *m*
scaffold(ing)	andamio *m*
scientific study	investigación científica *f*
seasonal camp	campamento estacional *m*

shaman	chamán *m*
sheep	borrego *m*
superimposed	sobrepuesto *adj*
trip	recorrido *m*
turkey vulture	zopilote *m*, aura *f*
United Nations Educational, Scientific and Cultural Organization	Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO)
walkway	andador *m*
world heritage	patrimonio mundial *m*
worn	desgastado

Vocabulary: Cowboys – El Vocabulario: Los Vaqueros

bit (or bridle)	freno *m*
campfire	fogata *f*
Camping place	campamento *m*
Corrals	corrales *mpl*
Cowboy	vaquero *m,*
dammed-up section of arroyo or clay soil depression	represo *m*
desert or countryside	monte *m*
dismount (to get down)	bajarse
Donkey	burro *m*, burra *f*
female mule & male mule	mula *f,* & macho *m*
firewood	leña *f*
flat mountain top	mesa *f*
Goat	chivo(a) *mf*
headstall	cabezada *f f*
herder, wrangler	arriero
livestock	ganado *m*
mountainside, or a level bench or ridge in a canyon	ancón o faldeo *m*
natural "holding tank" in an arroyo	tinaja *f*
natural spring, or upwelling in a riverbed	ojo de agua *m*
old style leather pack "frame"	aparejo *m*
orchard, or vegetable garden	huerta *f*
Pack animal	animal de carga *m*
Pack box	java *f*
Pack frame	burriquete *m*
Peak	picacho *m*
Place to contain animals (box canyon or mesa)	potrero *m*
Plain	llano *m*
pool of water *(fem)*; well *(masc.)*	poza *f;* pozo *m*
Ranch or a small community of ranch families)	rancho *m*
Reins	rienda *f*
ride on (horse, mule, donkey)	montar a (caballo, mula, burro)
saddle	montura *f*
smooth rock banks usually in riverbed (slickrock)	tepetates *mpl*
Steep	empinada *f*
Steep downhill descent; also an alluvial fan	bajada *f*
Steep trail or road up or downhill, a grade	cuesta *f*
stirrup	estribo *m*
Stone or cement holding tank for irrigation	pila *f*
top of a ridge or a "saddle"	cumbre *f*
trail (road too)	camino de herradura *m*, camino *m*
volcano	volcán *m*
watercourse with or without water	arroyo *m*

Los Ranchos Remotos de Baja California

Por Trudi Angell (traducción a español Olivia Angell)

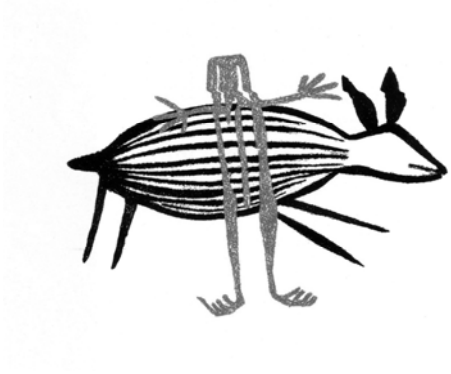
Imagínate que subes a tu litera por la noche debajo de un techo de palma a una cama de tejido de cuero que clavaste en un marco de madera de palma. Las estrellas alumbran el claro de tierra que te separa de los corrales. No hay paredes. Quieres que la brisa pase para refrescarte en la noche. Estás en el nivel más alto para que las criaturas de la noche no te molesten, y en un colchón debajo de ti, también separado del suelo, está tu perro. Si un puma llega a matar tus chivos, el perro saltará al suelo, despertarás, palparás el rifle que está a tu lado, escucharás atentamente los ruidos de la noche y podrás sentir si los chivos se encuentran incómodos. Los chivos son tu vida y cada uno que se lleva el puma representa una semana de comida que acabas de perder. Sustento, y el pueblo, están a cinco horas caminando por viejas veredas misioneras de hace 300 años, a través de un desierto sin árboles a un pequeño pueblo en un oasis, con una sola tienda. Vas ahí cada cuantas semanas solo para que tu lengua no se te pegue al paladar. Nunca has escuchado hablar de Rube Goldberg pero has diseñado el sistema de alarma perfecto; causa y efecto. Y aunque tu perro no platica mucho, es tu mejor compa.

En Baja California hay pequeños ranchos solitarios tan cercanos, pero con todo un mundo de diferencia entre sus vidas y las nuestras. Cincuenta-y-tanto Salvador Meza vive solo, con su perro, en la Sierra de la Giganta a dos horas en carro, y cuatro horas en mula, del vivo pueblo turístico de Loreto. Prefiere caminar a montar, un caso extraño entre los rancheros, y el pueblo de Comondú es su principal destino cuando necesita ir de mandado. Sus hermanas viven ahí también, entonces cuando necesita un poco de conversación se acomoda su bolsa de cuero en el hombro y sale.

Hace solo cuarenta años si manejaras unos cuantos días al sur de Ensenada, al tiempo que la carretera se convertía en terracería cruzando cerros de cactus, notarías que ranchos lejanos, esparcidos por el desierto, tenían su propio camino principal. Accedías a ellos por caminos de herradura y era común ver a los rancheros dirigidos al pueblo en mula con una fila de burros de carga enfrente del arriero. Los coches y las camionetas eran escasos en esa época.

En el siglo XXI todavía existen pequeñas rancherías sin camino, o a veces un paraje, pero son pocos y muy separados. En el norte de Baja California Sur, en la Sierra de San Francisco, se encuentran más de una docena de ranchos escondidos en cañones inaccesibles o situados en lo alto de cerros volcánicos. Unos cuantos están separados por la longitud de la Sierra de Guadalupe y al sur hacia La Purísima. En la Sierra de la Giganta entre Comondú y La Paz el remoto rancho de Salvador Meza es uno de los diez, más o menos, en una sierra que ha sido grabada y cortada por caminos de terracería que hacen la vida más fácil para los rancheros que necesitan transportar su ganado al pueblo.

Muchos ranchos son citados en detallados mapas topográficos que ocasionalmente son actualizados. Pero antes de pavimento y caminos, esos ranchos eran trabajados y formaban una red de conectividad entre familias, rutas de fayuca y ojos de agua. Hoy por la carretera de Baja California raramente se ven esos burros de orejas largas, trotando enfrente de un vaquero que necesita ir por el mandado.



Remote Ranches of Baja California

By Trudi Angell

Imagine climbing up into your bunk for the night under a thatched roof on a bed of woven strands of leather you strung across a palm-wood frame. The stars light the dirt clearing between you and the corrals. There are no walls. You want the breeze to pass through to cool you at night. You're up on the higher level so that animals of the night don't disturb you, and on a sleeping pad below, also raised off the ground, is your dog. If a puma comes into your yard to kill the goats, the dog will jump down, you'll wake up, touch the rifle at your side, listen closely to the night sounds and try to sense if the goats are disturbed. The goats are your livelihood and each one the puma takes is a weeks worth of food lost to you. Food, and town, is a five-hour hike on old missionary trails from 300 years ago, cross-country through a treeless desert to a tiny oasis village, with one store. You go there every couple of weeks just so your tongue doesn't get stuck to the roof of your mouth. You've never heard of Rube Goldberg but you've designed the perfect alarm system; cause and effect. And though your dog doesn't talk much, he's your best pal.

In Baja there are small isolated ranches, so close, and yet a world away from our everyday lives. Fifty-something Salvadór Meza lives alone, with his dog, in the Sierra de la Giganta two hours by car and four hours by mule from the bustling tourist town of Loreto. He prefers to hike rather than ride, a rare thing for a rancher here, and the village of Comondú is his main shopping destination. His sisters live there too, so when he wants some conversation he slings a leather bag over his shoulder and heads out.

Just 40 years ago if you drove a few days south of Ensenada, as the highway turned to tracks through the cactus slopes, you'd see that remote ranches sprinkled sparingly through the desert had their own main roads. They were accessed by *caminos de herradura* (horseshoe trails) and it was a common sight to see ranchers riding into town on mules with a pack string of burros being herded ahead of the *arriero* (herder/wrangler). Cars and trucks were scarce back then.

In the 21st century, there are still pockets of isolated roadless *rancherías* (small enclaves of a few families) or sometimes a *paraje* (single camp that offers seasonal grazing), but they are few and far between. In the upper reaches of Baja California Sur, in the Sierra San Francisco, more than a dozen are tucked into inaccessible canyons or perched high on volcanic ridges. A few are spread out over the hundred mile length of the Guadalupe Mountains southward to La Purísima. And in the Sierra Giganta, between Comondú and La Paz, Salvador Meza's remote ranch is one of only ten or so in a mountain range that has been scribed and carved with dirt roads to make it easier for the locals to get their livestock to town.

Many abandoned ranches are noted on detailed topographic maps that the statistic department updates on occasion. But prior to pavement and roads, those were working ranches and they formed a web of connectedness between families, trade routes and waterholes. Today along the Baja highways you rarely see those long-eared burros in a pack train, trotting ahead of a cowboy who needs to make a shopping trip!

Trudi Angell was born in Alta California and migrated to Baja California Sur in the mid 70s. First attracted to the peninsula as a sea kayaker, she spent a number of seasons exploring the coast of the Gulf of California between Mulegé and La Paz. Subsequently she began the first adventure tour company in Loreto, and over the years has logged more than 3000 sea miles by paddle and sail. In1986 she visited the mural rock art sites by mule with local cowboys of the region, went home to Loreto, bought a horse, and began to explore the canyons and ridges of the major sierras of the peninsula. Now with 3000 miles of trail riding under her sombrero as well, she is recognized as an authority on ranch culture of Baja. Two highlights for Trudi have been: a 41-day mule pack trip with her 9 year old daughter in 1999 from central Baja to the Sierra San Pedro Mártir following sections of the historic El Camino Real; and co-producing the film Corazón Vaquero in 2006, a documentary on ranch life of the peninsula.

MEXICO'S FRIENDLY WHALES

Their natural history and conservation status

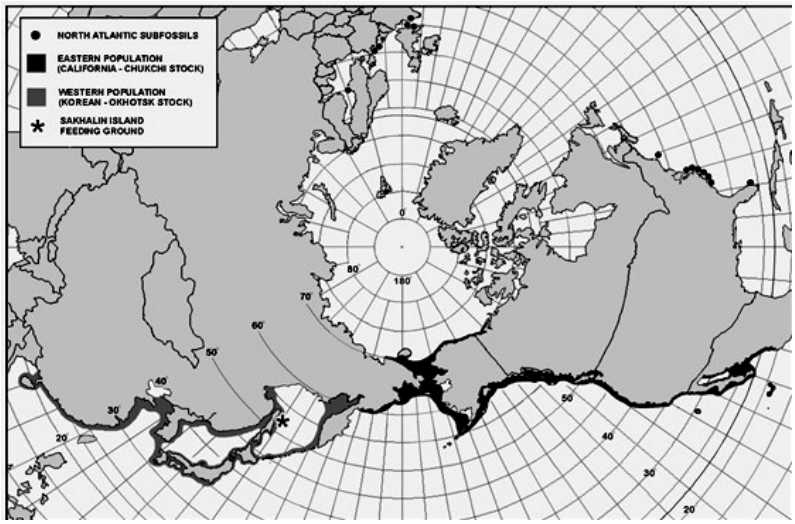
Debra Valov, www.LasEcomujeres.org

GRAY WHALE NATURAL HISTORY

The pacific gray whale (*Eschrichtius robustus*) is a mammal in the Order Cetacea. Whales are relatives of dolphins and porpoises. Like all members of this order, grays use echolocation to communicate and navigate. As an adult, the gray usually reaches a length of about 45 feet and can weigh 30-40 tons. The gray whale belongs to the group known as *baleen* whales which also includes the Blue Whale, Humpback Whale, and Right Whale. They use specialized comb-like structures made of keratin that are attached to their jaws to filter small marine organisms such as crustaceans and tube worms that they scoop up in large mouthfuls from the ocean bottom. Pleats in their sides allow the mouth to swell as they fill their mouths with water and then strong muscles squeeze the water out through the baleen, trapping food particles inside the mouth.

Life Cycle. Gray whales spend their summers (July to Sept.) feeding in the cold, nutrient rich waters of the Arctic's Bering and Chukchi seas. As winter approaches, they begin a journey that is the longest known migration of a mammal. They complete the 5000 to 7000 mile journey in just under two months, swimming non-stop down the pacific coast of North America to the shallow coastal lagoons of the Baja California peninsula. Once they arrive at the lagoons in December, courtship and mating ensues while, females who mated in the lagoons the year before, will give birth to their calves. Newborn calves are about 16 feet long and may weigh up to 1500 pounds. Calves may gain 60-70 pounds a day on the fat rich milk (53% fat) their mothers provide. The whales feed very little while migrating or in the lagoons and must live off of the thick layer of blubber deposited in the summer.

There are a number of reasons that the lagoons are ideal whale nurseries. They are surrounded by hot desert terrain and the sun and dry air quickly evaporates water from the lagoon's surface, thereby increasing the lagoon's salinity, and the water's buoyancy. The added buoyancy assists newborn whale calves while they learn to swim. The shallow lagoons also offer protection from killer whales, their principle predators. Finally, the lagoons continue to be relatively free of high-volume human activity and the shores for the most part remain undeveloped.



In February or March, the male grays head north at a more leisurely pace, while the females and calves remain until April, when they too head back to their Arctic feeding grounds. Mothers and there calves will travel in pods with other related females and for protection from killer whales. By they time the calves begin their first migration, they may have reached a length of 19 feet.

CONSERVATION STATUS

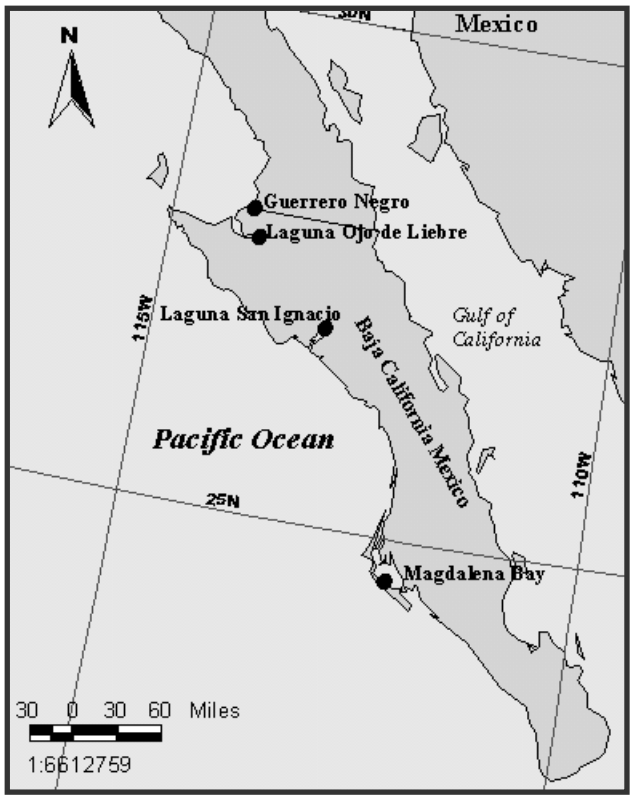
There are two distinct populations of gray whale in the Pacific Ocean. The Western North Pacific population is critically endangered, with perhaps 100 individuals remaining. Their range is from the Arctic in summer to the South China Sea in winter. Their breeding grounds are still unknown. The Eastern North Pacific grays are our California gray whales. Gray whales were hunted to near extinction in the 19th century for their meat and for their blubber, which was mainly used as a source of fuel. In 1857, the whaler Charles Scammon discovered the northernmost Baja lagoon (it was later named after him). The wholesale slaughter of whales that ensued over the next twelve years decimated the population (from an estimated 30,000 to just 2,000), causing whalers to eventually give up on the lagoons. Gray whales were called *devilfish*, because of their tendency to fight back and sink whaling boats when they were cornered or when their young were attacked in the shallow lagoons. In 1947 the International Whaling Commission (IWC) granted full protection to the gray whale through a whaling moratorium. Since that time the California gray has made a remarkable recovery. They number between 19,000 and 23,000 individuals and some scientists believe that this is a healthy herd, with numbers close to their original population size. However, in more recent years there may be signs that all might not be completely well within the herd, with intermittent reports of malnutrition among individuals arriving at the lagoons and increased mortality noted along the migration route.

FRIENDLY WHALES

José Francisco Mayoral, a fisherman from San Ignacio was the first person known to have experienced a close encounter with a friendly gray whale back in 1972. In the mid 1970's a number of visitors to the lagoon also had encounters with grays who wanted to rub against their boats or play with their dinghies. Once word spread about the whales' behavior, scientists began to flock to the lagoon by 1980. Those whales that approached the boats, showing an apparent desire for human contact soon became known as "friendlies." Today, it is not unusual for a mother whale to physically nudge her calf towards a boatload of squealing humans who are eager to pet or even kiss the baby whale. The whales do seem quite curious and the calves will commonly spend a short time scoping out the situation, giving the boat a once or twice over with its huge eye and then swimming up from underneath it to poke its head out from the water like a giant jack in the box. Whales have been known to spend hours in the company of humans and most encounters in the lagoons are incredible displays of gentleness and control on the part of the whales. That can't be always said of the humans, who in their eager rush to pet the whale simultaneously run the risk of falling out of the boat!

THE WHALE NURSERIES

In 1972, the Mexican government declared Laguna Ojo de Liebre (Scammon's Lagoon), Laguna Guerrero Negro and Laguna San Ignacio to be whale sanctuaries. In 1988, the Vizcaíno Biosphere Reserve, the largest protected area in Latin America was created and included these three lagoon systems. Finally, in 1993 the lagoons along with the cave paintings of the nearby Sierra San Francisco were named a UNESCO World Heritage Site under *the Man and the Biosphere Program* (MAB-UNESCO).



Another large lagoon system and nursery is found farther south in Bahía Magdalena, which includes the communities of Puerto A. López Mateos and Puerto San Carlos.

The lagoons offer more than just a gray whale nursery. Most have dense mangrove stands along the shorelines and estuaries which host sea turtles and a large variety of migratory water and shore birds. To some degree, the Mexican government has tried to ensure that the whales are protected as it is obligated to work within the guidelines of the Biosphere Reserve and World Heritage Site. However, commercial fishing and some illegal development has been allowed to occur along some parts of the lagoons. Enforcement of regulations is especially difficult due to the inadequate resources allocated to the immense reserve.

The Mexican government issues concessions (permits) to ecotourism businesses offering whale watching tours during the winter months. In order to protect the whales and decrease human interference when the whales first arrive, access to the lagoons is not granted until January 1 each year. This gives the whales time to mate and give birth, while preventing potential human-whale accidents during the whale's very active mating season and while the newborn calves are most vulnerable. The number of *pangas* and other tour boats are limited in both the total boats per company on the water at any given time as well as by the total number of boats on the water each day. Rules delimit the viewing areas and boat operator behavior is regulated (for instance, chasing whales or purposefully trying to get between the mother and calf is not permitted).

ENDANGERED LAGOONS?

Current Development. ESSA (Exportadora de Sal, S.A. de C.V.) is one of the world's largest solar evaporation salt works and is located on the shores of Laguna Ojo de Liebre near Guerrero Negro, BCS. The company's principal shareholder is the Mexican government (51%) with the other shares being held by Mitsubishi Corp.. Salt is created through a year long process in which huge diesel pumps suck up to 35,000 gallons per minute from the nearby lagoon and deposit it into a series of evaporation ponds where it is left to evaporate under the desert sun and wind. As the brine becomes more concentrated, it is successively pumped from one evaporation pond to the next and then finally into crystallization ponds once it has reached a certain level of purity. As the brine continues to concentrate, crystals of almost pure sodium chloride will form and fall to the bottom of the pond. These are later scraped up by gigantic bulldozers, loaded onto massive transport vehicles, unloaded and washed, then loaded first onto a barge and then to ships at Isla Cedros for transport overseas for industrial use. [More on salt production (Spanish only) can be found at: *http://www.essa.com.mx/proceso_produccion.aspx*. The salt works has been in operation since 1957 and in recent years, has become more diligent in protecting the wildlife in the nearby lagoons. Access to the lagoon is actually obtained by driving through locked gates onto the salt works property and past the many ponds to the whale watching launch sites.

In 1994, ESSA proposed a new salt works to be built on the shore of Laguna San Ignacio (LSI) to the south. The project was to have been even larger than the project in Guerrero Negro, with 16 diesel pumps removing water from the lagoon, a mile long pier jutting out into the Pacific for loading the salt directly onto the transport ships and miles and miles of dykes and pipelines crossing through isolated desert and the Biosphere Reserve. The communities that would be most affected by the project rejected it, stating that the presence of the pumps and machinery close to the whale nursery would have a detrimental effect on the whales (as well as on other wild life that traverse the pristine, undisturbed area) and would thus jeopardize their livelihood. Additionally, the proposed pier would have been placed right on top of the lobster, scallop and abalone beds that the 80 families in the cooperative had maintained sustainably for 45 years.

A six year battle ensued, mainly aimed at Mitsubishi. The locals' petitions to the government fell on deaf ears so they enlisted the help of a number of Mexican and international environmental groups, most notably Grupo Cien and NRDC (Natural Resources Defense Council).

The environmentalists launched an international campaign that included letter-writing, a boycott of Mitsubishi products and a "Save the Whales" media campaign with international celebrities descending on the lagoon to schmooze with the whales. They also examined the meager economic benefits promised by ESSA (electricity, jobs, etc.) and strategized with the local cooperatives and *ejidos* on a development plan that would be sustainable, eco-friendly and use alternative energy sources to help modernize the isolated communities, all the while maintaining the already relatively high standard of living that most of the fishermen and ecotourism businesses were enjoying.

In 2000, at the height of the conflict, President Ernesto Zedillo traveled to the lagoon with his family to check out what all the uproar was about and to see the friendly whales. Within minutes of arriving in the viewing area, a calf approached their boat. Bending over the side of the *panga*, Zedillo's wife planted a kiss on the calf's nose then immediately burst into tears. At that moment, Zedillo, who had been unresponsive to the community's appeals, must have felt like a cornered man. Just five days later upon his return to the capitol, he announced in a national press conference that the salt works project was dead and that as a national treasure, the lagoon should be off limits to development such as that proposed by ESSA. The decision offered Zedillo a way to save face; no doubt his marriage as well. It was a big win for the lagoon and it validated what the activists had been asserting all along—that the Mexican government could not ignore the designation of the area as a Biosphere Reserve and World heritage Site along with all of the regulations and restrictions on development that these designations demanded. Nor could it do anything to endanger a national treasure, one that was after all, "100% Mexican by birth."

Salt Works Chapter 2. Local, sustainable eco-projects at LSI went forward with NGO assistance after the 2000 decision and the salt works project was deemed to be dead. So it was with surprise that word came of ESSA's plan to revive the project in 2005 under a new more pro-development Federal government. Activists changed their strategy this time, choosing one that had recently gained popularity and proved effective in the US, that of the conservation easement.

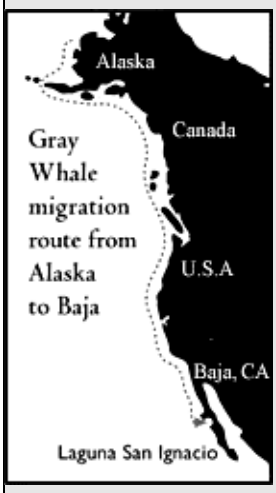
A conservation easement (CE) places a piece of property under protection in perpetuity from particular types of development (designated within each contract) while still granting the landowner use of the land as well as a yearly or lump sum payment for honoring the contract. In 2005, five NGOs formed the LSI Conservation Alliance. With donations, the Alliance was able to negotiate with Ejido Luís Echeverría Álvarez for a CE on over 140,000 acres of its land along the southern shore of the lagoon. In 2006, the Mexican government approved the protection of 65,500 acres of federal land along the western shoreline. Currently the Alliance is trying to raise funds for a CE to protect an additional 174,000 acres belonging to Ejido Emiliano Zapata on the lagoon's north shore. The ultimate goal is to protect all one million acres of the lagoons shoreline in perpetuity for future generations of Mexicans, thus prohibiting urban and industrial development while still allowing for sustainable, low-impact, eco-friendly projects.

MEXICO'S FRIENDLY WHALES

Debra Valov, www.LasEcomujeres.org

GET TO KNOW YOUR FRIENDLY GRAY WHALE

- A man can stand up inside a whale's mouth, but could hardly insert his fist into the animal's throat.
- Its tongue can weigh a ton!
- Friendly gray whales have big hearts—over 4 cubic meters in size!



Gray whales migrate 12 to 14 thousand miles yearly between the Arctic and Baja California (the longest migration by a mammal).

Gray whales are really **black**—patches of ectoparasites like barnacles and lice give them a grayish appearance.

Each whale can be identified by its unique blotches and the shape of the fluke (tail).

- Whale's milk is 53% fat compared to human milk which is only 2% fat.
- Gray whales usually live about 40-50 years but some may reach 70.
- They sexually mature at about 8 years old.
- Feeding dives range from 3 to 15 minutes long.
- Think you have a big appetite? One adult gray whale eats around 2,600 pounds (1.3 tons) per day and can eat about 396,000 pounds (198 tons) of amphipod crustaceans in approximately 5 months in the Arctic.

CONOCE A TU BALLENA AMISTOSA

- Un hombre podría estar de pie dentro de la boca de una ballena gris, pero no podría meter la mano dentro de la garganta.
- ¡La lengua pesa hasta una tonelada!
- ¡Las ballenas amistosas tienen corazones grandes-más de 4 metros en total!

Las ballenas grises migran entre 12 y 14 mil millas anualmente entre el ártico y Baja California (es la migración más larga de cualquier mamífero).

Las ballenas grises de verdad son **negras**-los ecto-parásitos como los balanos y piojos forman machas grises.

- Se puede identificar cualquier ballena por las manchas únicas y la forma de la cola.

- La leche maternal contiene 53% de grasa mientras la de los seres humanos es solamente de 2 por ciento.
- Las ballenas grises viven por entre 40 y 50 años aunque algunas alcanzan los 70 años.
- Se maduren más o menos a la edad de 8 años.
- Los zambullos de alimentación varían, durando entre 3 y 15 minutos.
- ¿Crees que tienes un apetito enorme? Una ballena gris adulta consume casi 2,600 libras (1.3 toneladas) diario y puede comer alrededor de 396,000 libras (198 toneladas) de crustáceos anfípodos en aproximadamente 5 meses en al ártico.

VOCABULARY / EL VOCABULARIO

arctic	ártico *m*	International Whaling Commission (IWC)	Comisión Ballenera Internacional *f*
baleen	las barbas/placas *fm*	lagoon	laguna *f*
baleen whale	ballena con barbas *f*	length	longitud *f*
barge	barcaza *f*	male	macho *m*
barnacle	balano *m*	mangroves	mangles *mp*
blow hole	espiráculos *mp*	mate	aparearse
blubber	grasa *f*	mating	apareamiento *m*
boat for whale trip	panga *f*	members of co-op	ejidatarios *m*
brine	salmuera *f*	migrate	migrar
calf	ballenato *m*	migration	migración *f*
concession	concesión *f*	migratory birds	aves migratorias *fp*
conservation easement	servidumbre ecológica *f*	NGO non-governmental organization	ONG organización no gubernamental *f*
cooperative org.	ejido *m*	nursery area	área/ zona de crianza *f*
crustacean	crustáceo *m*	pectoral fin	aleta pectoral *f*
crystallization pond	vaso de cristalización *m*	pier	muelle *m*
Devil fish	pez diablo *m*	pleats	pliegues *mp*
dolphin	delfín *m*	protected area	el área protegida *f*
ecotourism	ecoturismo *m*	pump/to pump	bomba *f* /bombear
ectoparasite (external)	ectoparásito *m*	salt flat	salitral *m*
environment	medioambiente *m*	salt works	salinera *f*
species	especie *f*	sanctuary	santuario *m*
estuary	estero *m*	shallow	poco profundo
evaporation pond	vaso evaporativo *m*	throat	garganta *f*
exporter	exportadora *f*	ton	tonelada *f*
female	hembra *f*	tour guide	guía turístico *m*
filter	colar	wetlands	los humedales *mp*
fluke (tail)	aleta de la cola *f*	whale watching	avistamiento *m*
friendly	amistoso	whale	ballena *f*

RESOURCES / LOS RECURSOS

Whale FAQ's:

* *American Cetacean Society Factsheet*— https://www.acsonline.org/gray-whale?
* https://oceanconservancy.org/blog/2022/12/01/everything-you-need-to-know-about-gray-whales/

Ecotourism and Conservation

* www.kuyima.com (*Ecotourism Business in San Ignacio, BCS*)
* www.wildcoast.org (*Conservation Group working with whale lagoons, coastal issues)*
* www.nrdc.org (*National Resources Defense Council*)
* Serge Dedina (2000). *Saving the Gray Whale: People, Politics, and Conservation in Baja California*.
* *Baja's Friendly Whales*: https://www.oceanicsociety.org/travel-ideas/whale-watching-baja-california-encounter-the-ocean-giants/

Visit www.lasecomujeres.org for many more resource links