

## General Description of Bahía de Los Angeles

### History

- In 1533 Fortún Jiménez (a pilot working for Hernando Cortés) sailed into Bahía La Paz (he thought this land was an island).
- The Spanish explorer Francisco de Ulloa (during his 1539-40 expedition; also sailing for Cortés) appears to be the first to have discovered that California is a peninsula.
- It is not known who was the first explorer to use the name California.
- Most authors agree that the name California originates from a Spanish novel published in the 1500s called "Las Sergas de Esplandián" (The adventures of Esplandián). This novel describes an island inhabited by women (The Amazons) with a queen named Calafia (G. *cal* "beautiful" and *orni* "a bird" after the griffins used during battle by these women warriors).
- Another hypothesis claims that the name California comes from the Latin *Calida Fornax* or Hot Furnace.
- Politically, the peninsula encompasses two states separated by the 28<sup>th</sup> parallel: Baja California (or Baja California Norte) and Baja California Sur.

### The Baja California Peninsula and the Gulf

- The Baja California Peninsula is 1,300 km long (806 miles; fourth longest peninsula in the planet) and ranges between 45 to 230 km (28 to 143 miles) in width with a total area of about 144,600 km<sup>2</sup> (55,584 miles<sup>2</sup>).
- The islands and islets add an extra 2,460 km<sup>2</sup> (950 miles<sup>2</sup>) of area.
- The Gulf of California (also called the Sea of Cortés after the Spanish conquistador) has an average width of about 150 km (93 miles) and encompasses a total of about 4,800 km (2,976 miles) of coastline.
- The climate of the Gulf Coast is very dry with maximum temperatures above 40°C (104°F; July to August) and minimum temperatures of less than 10°C (50°F; December to January). Temperatures as high as 43-49°C (110-120°F) have been recorded in the Gulf Coast.
- The region receives most of its rain during the winter months. The annual average for the Gulf Coast tends to be less than 76.2 mm (3 inches).
- The annual average surface water temperatures in the Gulf are about 24°C (75°F) and they vary not only seasonally, but also with oceanographic phenomena (e.g., El Niño) and latitude. These temperatures range from 12°C (54°F) during winter to 32°C (90°F) in the summer.
- The Gulf can be divided into three regions according to some basic oceanographic parameters that affect the distribution of species (biodiversity increases as you move south):
  - ☞ Southern Gulf (Cabo San Lucas to La Paz). This region is characterized by deep canyons and trenches of more than 3,000 m (12,000 feet) in depth. This area is greatly influenced by tropical species assemblages and encompasses the farthest north "true" coral reef in the eastern Pacific (Cabo Pulmo).
  - ☞ Central Gulf (including the Midriff Islands). Deep waters and very little silting characterize this region. In this region tropical and temperate species overlap in

- their territory. The Midriff Islands area is characterized by strong upwelling and high primary productivity.
- ☞ Northern Gulf (Midriff Islands to Colorado Delta). This region tends to be very shallow as a result of silting from the Colorado River. High evaporation and salinity, and large tidal ranges characterize it. This region is dominated by a more temperate assemblage of species.

### **Formation of the Peninsula and Gulf:**

- 150Ma (Jurassic)
  - ☞ Subduction of the Farallon oceanic plate under the North American continental plate.
  - ☞ A deep trench forms on the boundary of the plate.
  - ☞ Chain of Volcanic islands (Arc) extends from Sierra Nevada to Puerto Vallarta (E of the trench).
- 110-80 Ma (Cretaceous)
  - ☞ Subduction continues.
  - ☞ Accretion of sediments and volcanic rocks results in the formation of a mountain range.
  - ☞ As time passes, the mountain range becomes eroded.
- 65-45 Ma (Paleocene)
  - ☞ Tropical rains cause extensive erosion exposing granite cores, with rivers emptying sediments towards the Pacific.
  - ☞ Formation of broad coastal plains on the Pacific coast.
- 30-20 Ma (Oligocene)
  - ☞ East Pacific Rise (zone of divergence between the Farallon and Pacific plates) approaches the North American plate.
  - ☞ Pacific plate with Alta California begins sliding in a NW direction relative to the North American plate at about 2.5-3.5 cm/yr (0.98-1.39 inches/yr).
- 15-5 Ma (Miocene)
  - ☞ Opening of the Gulf.
  - ☞ Subduction stops and a rift valley forms between the coastline and what will become mainland Mexico
  - ☞ Peninsula does not move uniformly. The southern portion has a more divergent type of movement.
  - ☞ Rift valley sinks below sea level and a Proto-Gulf forms.
  - ☞ Seawater enters and recedes from this Proto-Gulf at least a couple of times (evaporation leaves large salt deposits behind).
- 5-2 Ma (Pliocene)
  - ☞ East Pacific Rise extends into Gulf.
  - ☞ Colorado River shifts course and begins sedimentation of northern Gulf.
- 2-0 Ma (Pleistocene to present)
  - ☞ Uplifting in Southern California and Baja creates high mountain ranges.
  - ☞ Ice Ages: glaciations lead to lowering sea levels and cooler wetter climates; end of glaciations leads to rise in sea levels and desertification.

**Bahía de Los Angeles:**

- Located on the eastern coast of the Baja California Peninsula.
- The Bay is in the region known as the Midriff Islands located between Latitudes 28° 53' N to 29° 07' N and Longitudes 113° 25' W to 113° 34' W.
- The Bay is about 6.4 km (4.0 miles) in width by 16 km (10 miles) in length and has a maximum depth of about 50 m (164 feet).
- There are a total of 17 islands, which vary in area from more than 8 km<sup>2</sup> (3.1 miles<sup>2</sup>; Isla Coronado) to less than 0.03 km<sup>2</sup> (0.01 miles<sup>2</sup>; Isla Calavera).
- The tallest island is the volcano at Coronado Island (473 m; 1,551 feet).
- None of these islands has a superficial source of water.
- The islands were formed as peaks of mountains became isolated by rising sea levels beginning about 10 Ma.
- The modern look of the Bay dates back to 10,000 to 15,000 ya.
- Below is a list of the islands:
  - ☞ Coronado [=Smith]
  - ☞ Coronadito
  - ☞ Isla and Islote Mitlán
  - ☞ Jorobado (Hunchback) [= Borrego (Lamb)]
  - ☞ Calavera (Skull)
  - ☞ San Aremar [= Rasito]
  - ☞ Pata (Leg, Foot)
  - ☞ Bota (Boot)
  - ☞ Flecha (Arrow)
  - ☞ Llave (Key)
  - ☞ Cerrojo (Bolt, Latch)
  - ☞ Ventana (Window)
  - ☞ Piojo (Louse)
  - ☞ Cabeza de Caballo (Horse Head)
  - ☞ Islas Los Gemelitos (The Twins)
- The Bay is connected to the Canal de Ballenas (west of Isla Angel de La Guarda by four main channels which are (from NW to SE):
  - ☞ Isla Coronado-La Gringa
  - ☞ Isla La Ventana-Isla Cabeza de Caballo
  - ☞ Isla Cabeza de Caballo-Islas Los Gemelos
  - ☞ Islas Los Gemelos-Punta Roja
- Canal de Ballenas is a deep underwater canyon (more than 1 km in depth; 3,280 feet) that creates upwelling by the influence of strong tidal currents moving through.
- Tides are intensified in the Northern Gulf, which follows a mixed semidiurnal schedule. Ranges can be quite extensive, example: low of -93 cm (-3.05 feet in January 9, 2001), high of 285 cm (9.34 feet in August 18, 2001). Try to identify the dates and heights for the lowest and highest tides during our stay in Bahía by looking at a schedule of tides in the station.
- Currents within the Bay are dependent on wind patterns.
  - ☞ When the winds blow from the E and SE (mostly during summer) currents follow a SE to NW pattern entering the Bay mainly between the Isla Cabeza de Caballo-

Islas Los Gemelos or Islas Los Gemelos-Punta Roja channels and exit mainly through the Isla Coronado-La Gringa channel. The pattern reverses itself in the winter and appears to be more variable during spring and fall.

- Formation of rocky or sandy points such as Punta La Gringa and Punta Arena may be attributed to temporal clockwise gyres of water that appear to occur in these areas primarily during the spring and fall months.

