Welcome to the JASON XIV Student Atlas

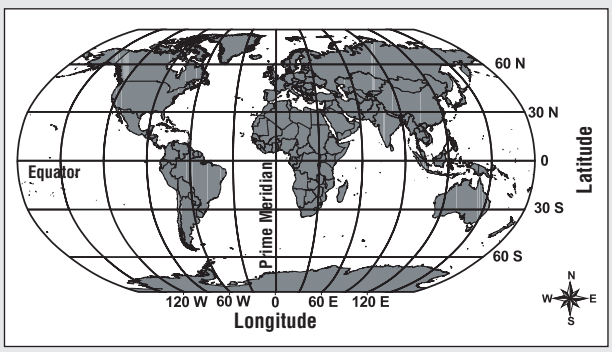
The JASON XIV *Atlas* contains the following maps to help you navigate from shore to sea:

- Map 1: Channel Islands Area Geography
- Map 2: Southern California Bight
- Map 3: Currents and Sea Surface Temperature
- Map 4: Chumash Villages of the Pre-mission Period
- Map 5: Channel Islands Land and Marine Management
- Map 6: Channel Islands Kelp Canopy

How Do You Use Latitude and Longitude?

Many maps are marked off in a pattern of intersecting horizontal and vertical lines called latitude and longitude. Lines of latitude show the distance north or south of the equator and are represented in degrees, with the equator being 0° latitude. Lines of longitude (also measured in degrees) show the distance east or west of a line, known as the Prime Meridian, that runs through Greenwich, England. Lines of latitude and longitude are used like a graph to plot locations anywhere on Earth.

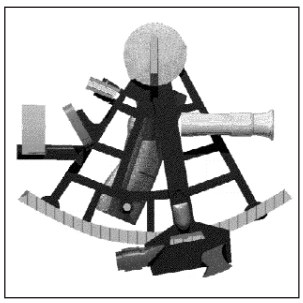
Can you find the latitude and longitude markers on Map 1? What are the boundaries of latitude and longitude for the Channel Islands region? Using this information, can you find approximately where the Channel Islands are located on this map of the world, or on a map in your classroom?



Navigation and mapping

For thousands of years, people living in the Channel Islands have depended on the ancient art of navigation—the ability to find their way from one place to another. Travelers used their knowledge of the sun and stars for direction, landmarks for position, and an understanding of waves and ocean currents to chart their speed.

Travelers today have the benefit of modern navigational tools, including maps, such as those in your JASON Atlas. In 150 A.D., Ptolemy devised a mapping system using a grid of lines called **latitude** and **longitude,** but his theories were not rediscovered until 12 centuries later. Then, in 1569, a **cartographer** named Gerardus Mercator published his own map with latitude and longitude lines that allowed mariners to navigate along a straight course.



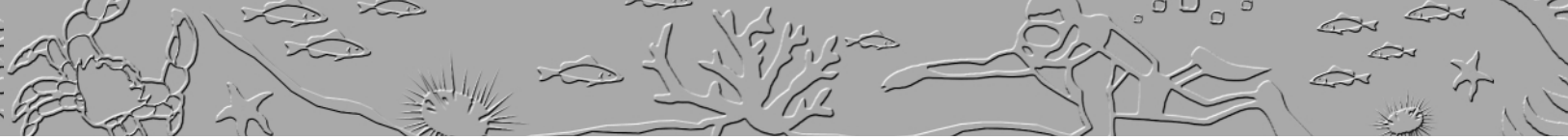
A sextant.

A number of other inventions have made navigating distant seas safer and surer. A **compass's** magnetized needle always points north, allowing navigators to determine direction. A **sextant** helps navigators find their latitude by measuring the angle between the sun or stars and the horizon. A **marine chronometer** is a timekeeping device that allows a navigator to work out a ship's longitude by comparing the ship's time to Greenwich Mean Time.

Today, one of the greatest navigational aids is the **Global Positioning System (GPS).** The GPS consists of 24 satellites, which continually transmit radio signals to all points on Earth. A device called a GPS receiver can calculate the latitude, longitude, and altitude of a given location by comparing the signals from at least four of these satellites at a time. GPS receivers have become important navigational tools on many types of vehicles.

Reading maps

Maps are still among the simplest and most valuable aids to finding your way in unfamiliar territory. Some maps, such as **Map 1** showing southern California, have lines of latitude and longitude to help you orient yourself. But almost all maps provide some guidelines to help you understand the size of the area you are looking at, where in the world you are, and how to interpret specific labels or symbols.



On most maps, an arrow or **compass rose** indicates which way is north. (Usually it's the top of the map.) North is one of the four *cardinal directions* on the compass rose; the others are south, west, and east. (There are also *ordinal directions* in between—northwest, northeast, southwest, and southeast.) The size of the area shown in a map is indicated by a bar that relates distances in the area being mapped to distances on the map itself. This relationship is called **scale.** All of the maps in the JASON XIV Atlas have an arrow pointing north and a scale showing distance. Can you find them all?

As you can see, most distance scales for land areas in the Atlas are indicated in kilometers. The universal measurement used for distances at sea, however, is the **nautical mile.** The nautical mile differs from our familiar statute mile in that it is determined by the curvature of Earth. One nautical mile is the distance covered by one minute of latitude. (There are 60 minutes in 1 degree of latitude.) **Map 5** shows the boundaries of the Channel Islands National Park and Marine Sanctuary in kilometers and nautical miles.

Cartographers often use symbols to stand for various features on a map. Symbols and other information to help you interpret a map are contained in the map's **legend.** Look at the legend in **Map 1.** What information does it include? Some of the features marked by symbols in other legends include cities and villages in **Maps 2** and **4**, ocean temperatures in **Map 3**, and boundaries and monitoring sites in **Maps 5** and **6.**

Use the JASON XIV Atlas maps to find your way as you explore the shores and seas of the Channel Islands. Happy navigating!

Vocabulary

Atlas *n.* A collection of maps.

Cartographer *n.* A person who makes maps.

Compass *n.* An instrument having a magnetized needle to indicate magnetic north.

Compass rose *n.* The symbol used on a map to indicate directions, both cardinal and ordinal.

Global Positioning System (GPS) *n.* A system that uses a constellation of 24 satellites, their ground stations, and individual GPS receivers to accurately locate points on Earth.

Latitude *n.* Imaginary parallel circles running east–west around the globe. The equator is at 0° latitude, the North Pole is at 90° north latitude, and the South Pole is at 90° south latitude. The distance from one degree of latitude to the next is divided into 60 minutes, and the distance from one minute to the next is divided into 60 seconds. (People often use the ' symbol for minutes and the " symbol for seconds.)

Legend *n.* A guide to reading a map that typically contains distance scales, arrows indicating direction, and/or explanations of symbols used.

Longitude *n.* Circles drawn on a globe, or arcs on a map, running north–south. All lines of longitude run through the North and South Poles. The 0° longitude is the Prime Meridian; it runs through Greenwich, England. Longitude is also measured in degrees, minutes, and seconds.

Marine chronometer *n.* A portable time keeper with a mechanism for ensuring accuracy and adjusting itself, used for determining longitude at sea.

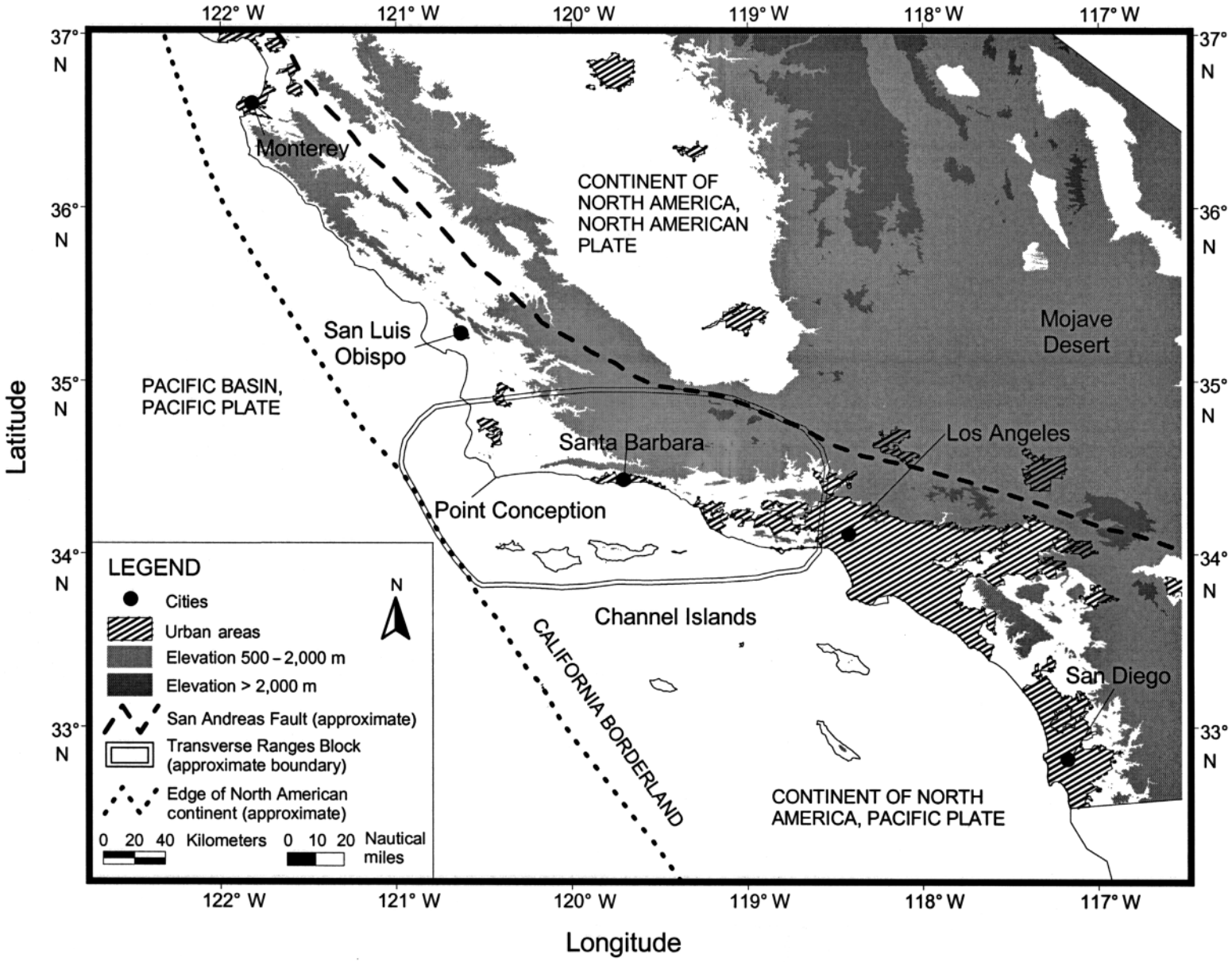
Nautical mile *n.* A unit of length used in sea navigation based on the length of 1 minute of arc on a great circle—on Earth, 1 minute of latitude. A nautical mile is equal to 1,852 meters (6,076 feet), or approximately 1.15 statute miles.

Scale *n.* The relationship between distances in the area being mapped and distances in the map itself.

Sextant *n.* An astronomical instrument for measuring angles, primarily altitude of celestial bodies to determine latitude.

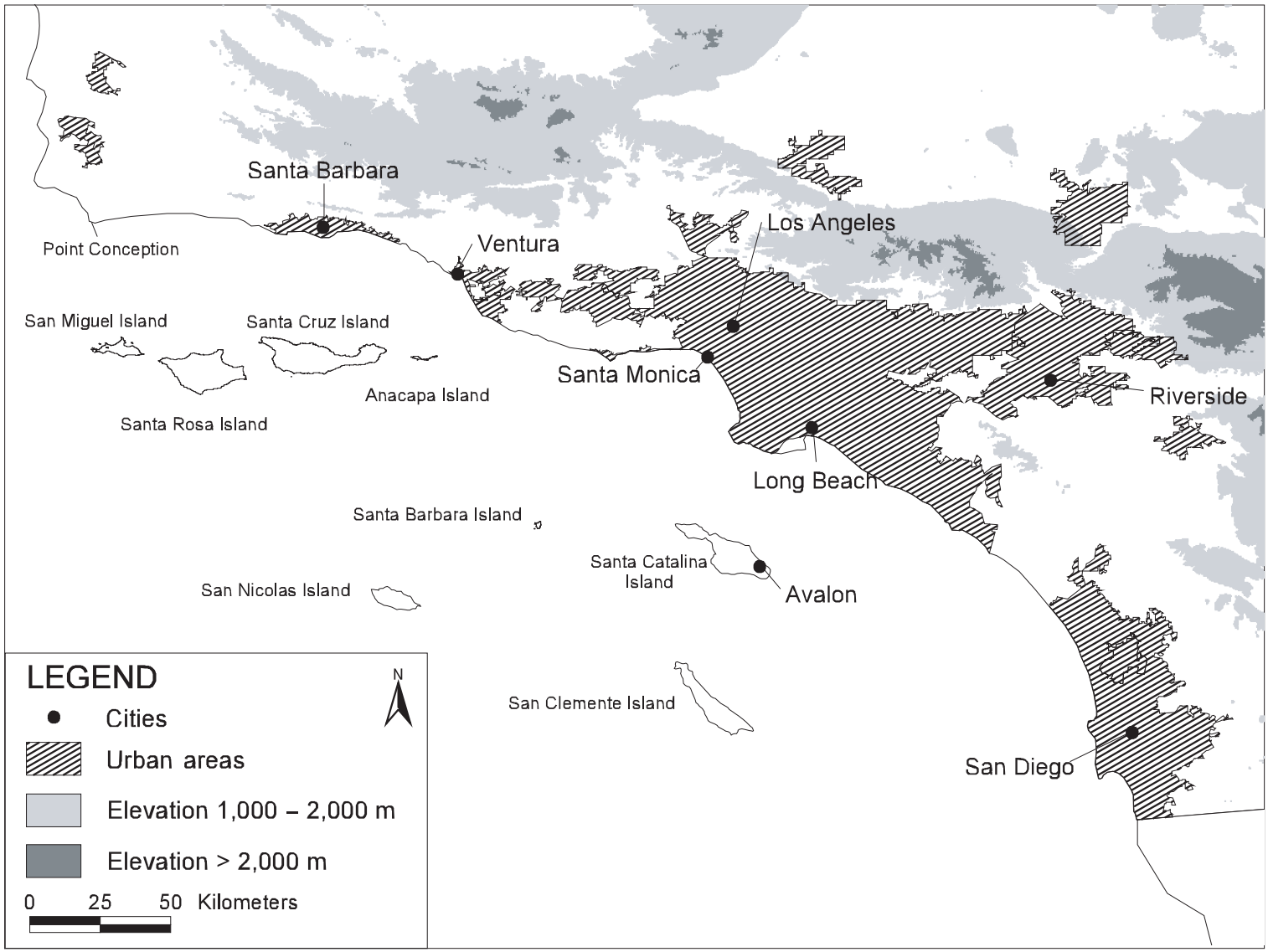
Map 1

Channel Islands Area Geography



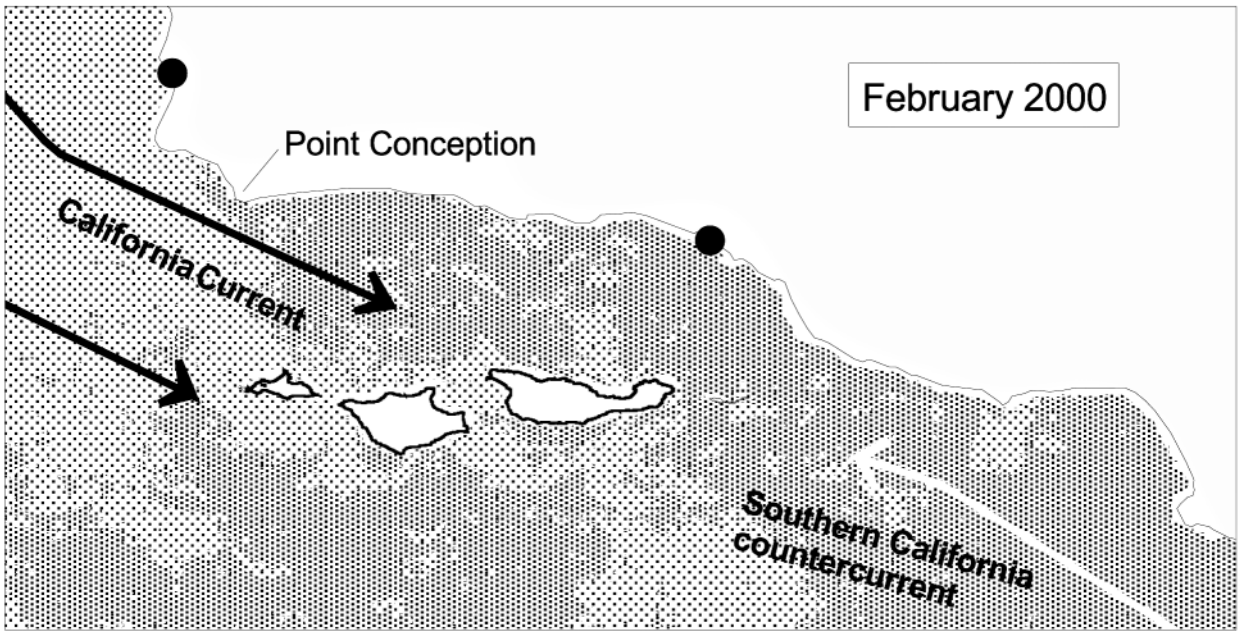
Map 2

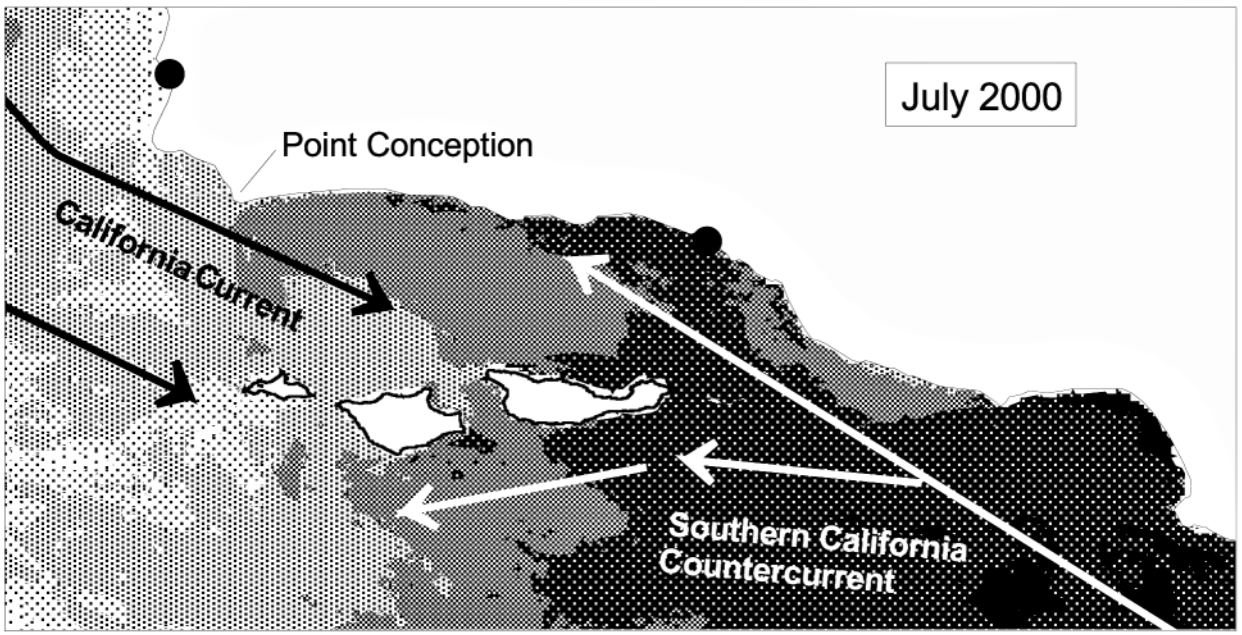
Southern California Bight



Currents and Sea Surface Temperature

Map 3





LEGEND

Sea surface temperature, in degrees Celsius

8 – 9
10 – 11
12 – 13
14 – 15
16 – 17
18 – 19
20 – 21

PISCO sampling station

N

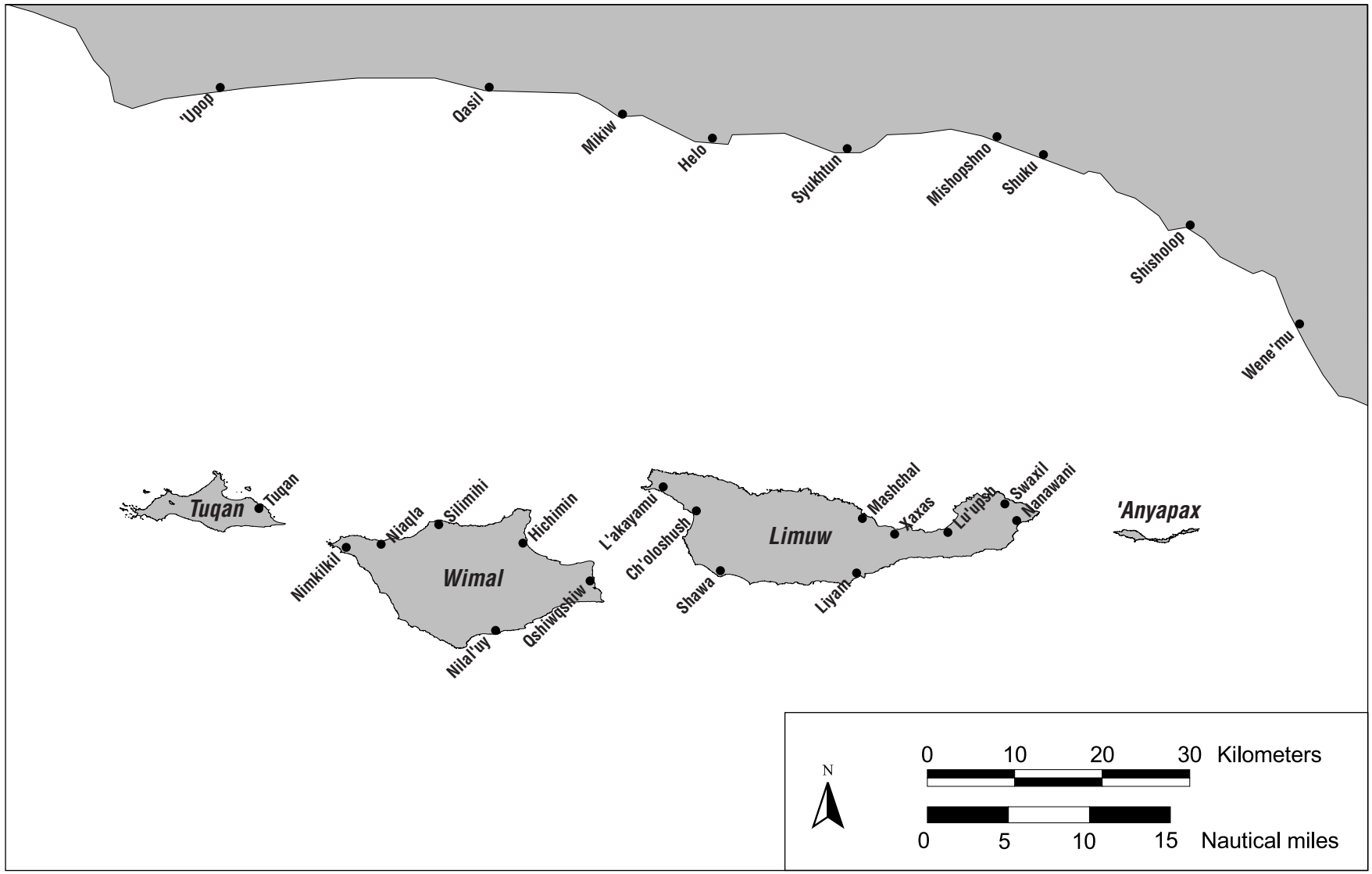
0 20 40 Kilometers

0 5 10 15 20 Nautical miles

Note: The Southern California countercurrent is weaker in winter than in summer.

Map 4

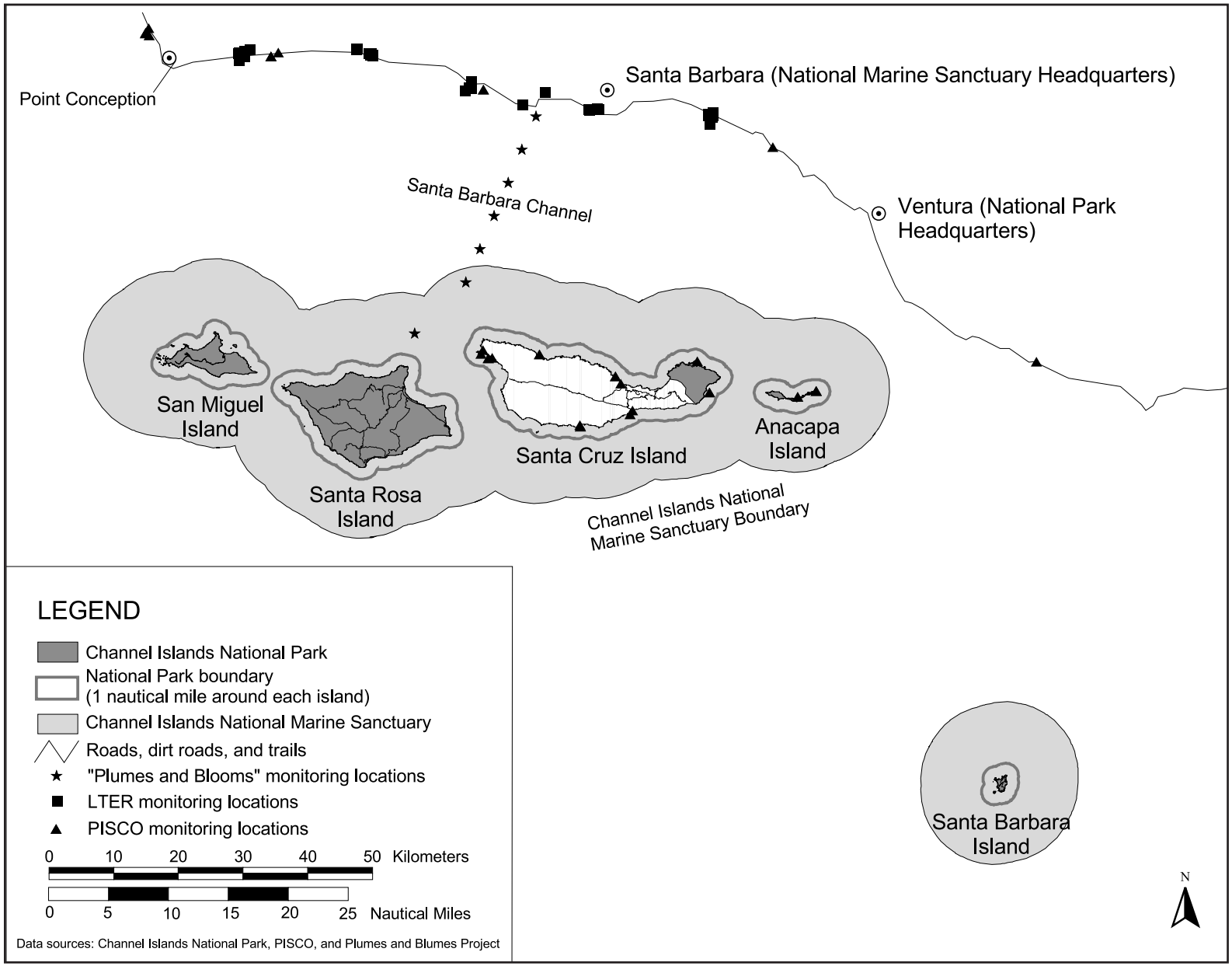
Chumash Villages of the Pre-mission Period



Adapted with permission from (1) *California's Chumash Indians: A Project of the Santa Barbara Museum of Natural History Education Center,* published by the Santa Barbara Museum of Natural History (to order, call 805 682-4711, ext. 310). (2) *The Origins of a Pacific Coast Chiefdom,* published by University of Utah Press.

Map 5

Channel Islands Land and Marine Management



Map 6

Channel Islands Kelp Canopy