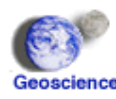
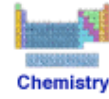
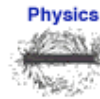




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Santa Monica Mountains - Field Trip

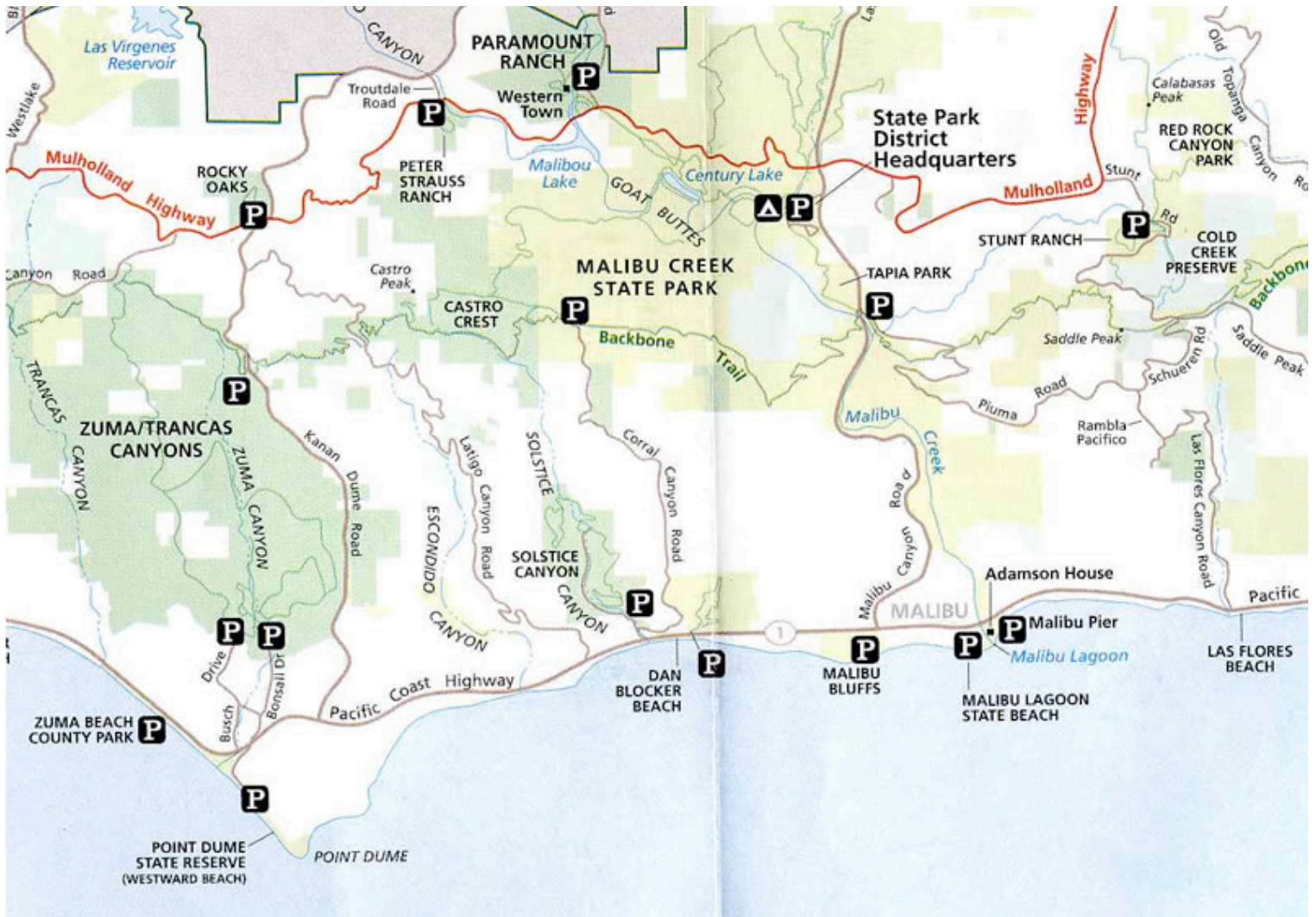
Field Sites

- Malibu Creek - [information](#) - [photographs](#)
- Point Dume - [information](#) - [photographs](#)
- Malibu Bluffs - [photographs](#)
- Malibu Lagoon - [information](#) - [photographs](#)
- Malibu Canyon - [photographs](#)



Other Information

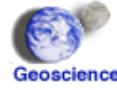
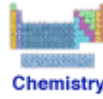
- [Climate and weather](#)
- [Geological Maps, aerial images](#)
- [Geology information about the Santa Monicas](#)
- [Plants](#)
- [Fire](#)
- [GPS Activity](#)
- [Tides](#)



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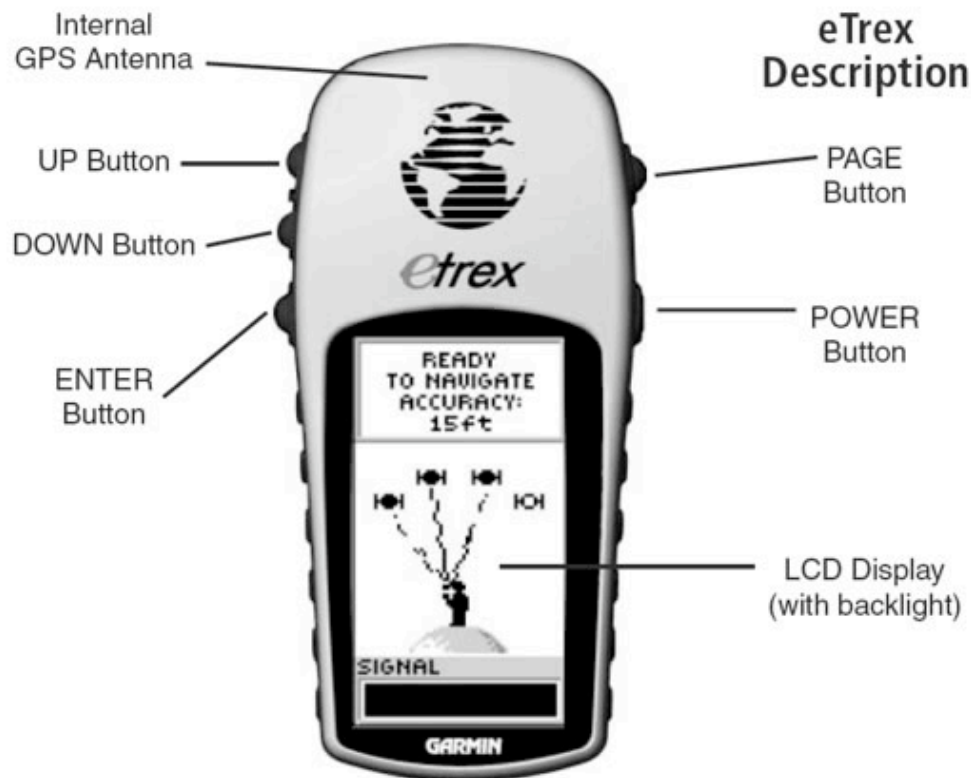


General Resources

Subject-Specific Resources

GPS - Global Positioning System

- [GPS Activity](#)
- [Topographic map of Malibu Lagoon](#)





The **UP/DOWN** Buttons:

- Select options on pages and menus
- Adjust display contrast on Satellite Page
- Zoom in and out on Map Page
- Cycle through trip data on NavigationPage

The **ENTER** Button:

- Confirms data entry or menu selections
- Displays options on main pages
- Pressing and holding the **ENTER** button activates the Mark Waypoint Page

GPS Data

Travel

origin			
destination			
distance (trip odometer)			
moving time			
moving average			
maximum speed			
overall average speed			
travel time			
route			

Destination 1

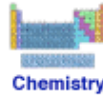
location			
elevation			
latitude			
longitude			
ecosystem			
aspect			
photograph			
yearly rainfall			

Destination 2

location			
elevation			
latitude			
longitude			
ecosystem			
aspect			
photograph			
yearly rainfall			

Destination 3

location			
elevation			
latitude			
longitude			
ecosystem			
aspect			
photograph			
yearly rainfall			

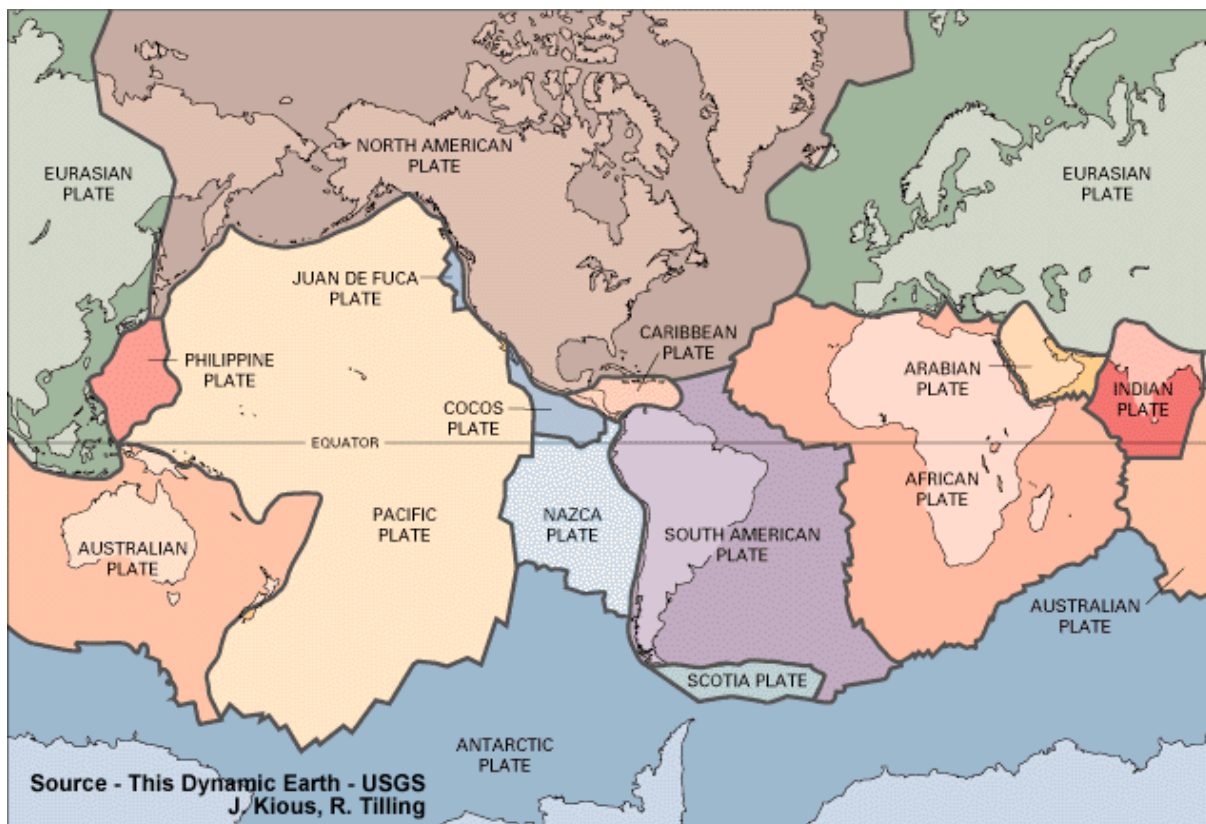


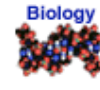
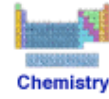
General Resources

Subject-Specific Resources

Geology of the Santa Monica Mountains

- The Santa Monica Mountains are a geological unit of the **Transverse** Mountain Ranges of Southern California.
- The Santa Monica Mountains are a part of the only **east-west** belt of mountains in California and one of only two in North America so oriented.
- The Santa Monica Range is a broad **anticline** that has been severely ruptured by faulting and intruded by **sills and dikes**.
- The Santa Monica range is **bisected** by the flow of water that flows through Malibu Canyon.
- Malibu Creek is thought to have flowed in its present course **before the mountains** existed.
- The main fault of the Santa Monica Mountains is the Malibu Coast Fault.
- The Santa Monica Mountain Range is a result of the **interactions** between the Pacific Plate and the North American Plate.
- The Pacific Plate's crust is oceanic and composed of **basalt**, which is denser than continental crust.
- The Pacific Plate **subducts** under the North American Plate.
- The Pacific Plate moves north, and the North American Plate moves south; a **strike slip plate boundary**.
- The area where the two plates slip past each other is called the **San Andreas Fault**.
- **Geologic maps** help us understand the geology of the mountains.
- **Geologic profiles** provide a view at what might be beneath the ground.
- Other **geology resources**.

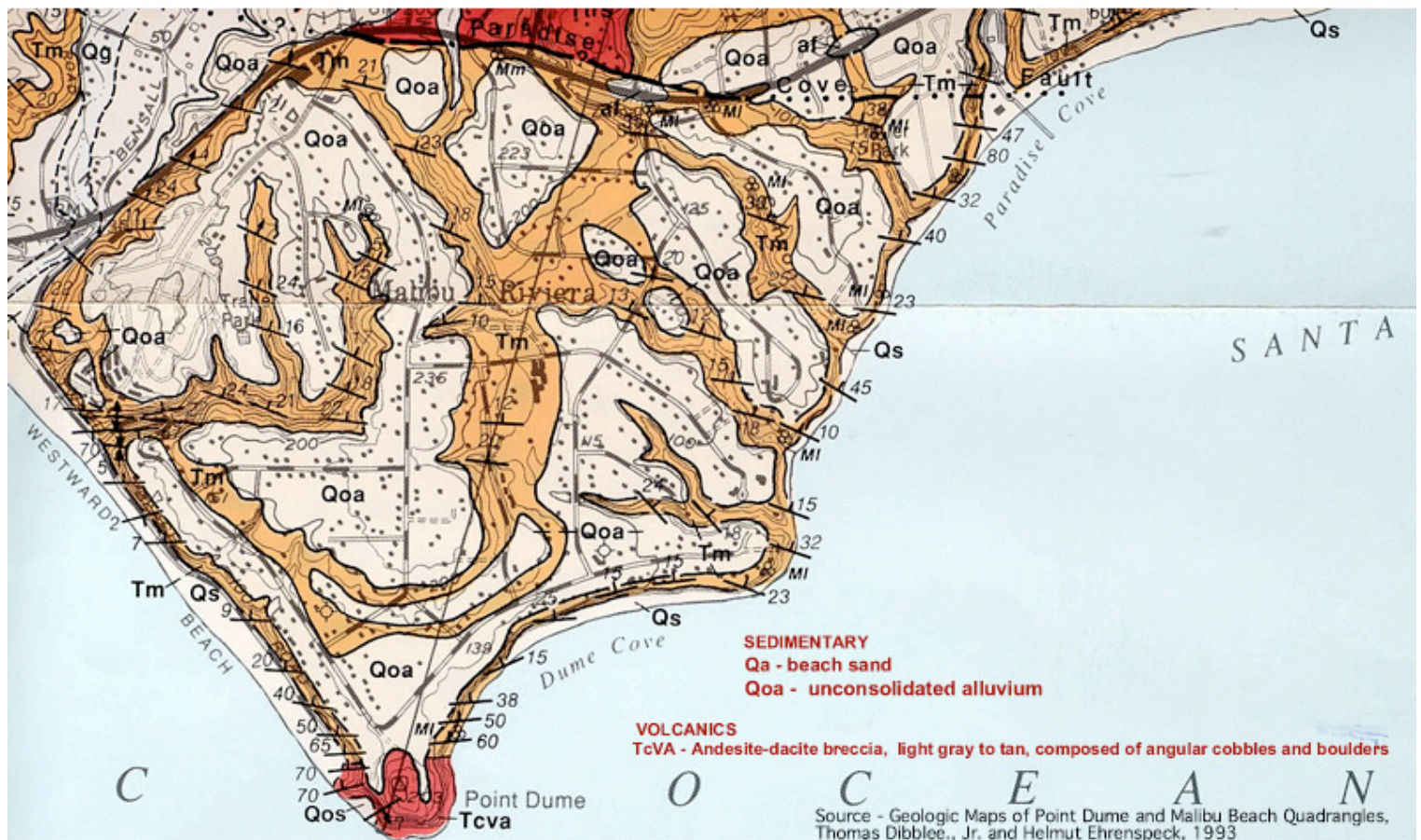




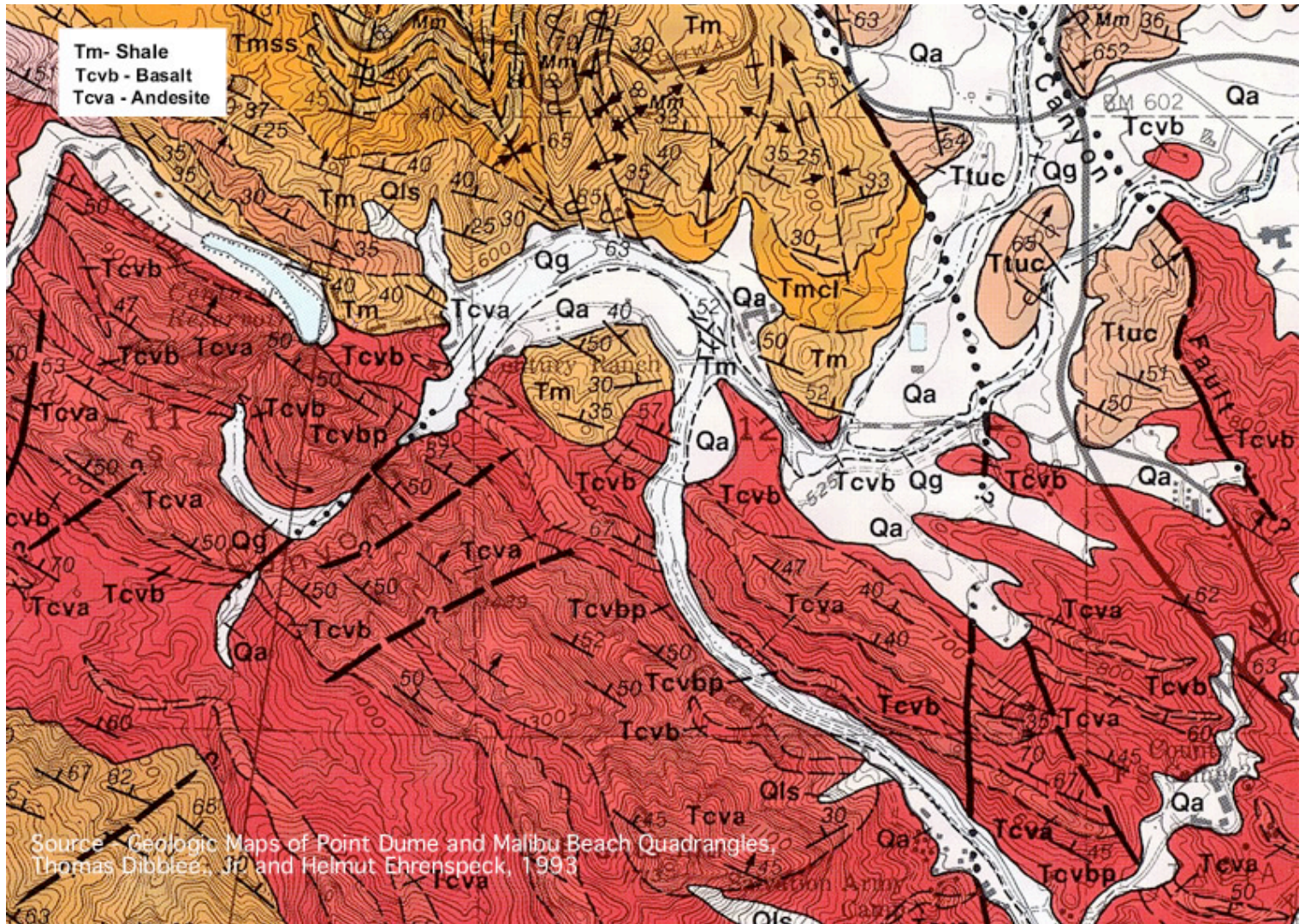
Geologic Maps

Source - Geologic Maps of Point Dume and Malibu Beach Quadrangles,
Thomas Dibblee., Jr. and Helmut Ehrenspeck, 1993

See [profiles](#).



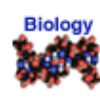
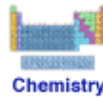
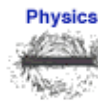
Point Dume - [see enlarged view](#)



Malibu Creek- The rock pool is near the Century Ranch. - [see enlarged view](#)



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Malibu Canyon



Pepperdine University



chaparral - Malibu Canyon



chaparral and riparian communities



Malibu Canyon

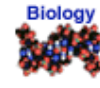
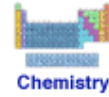
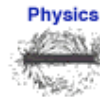


willow resprouting -

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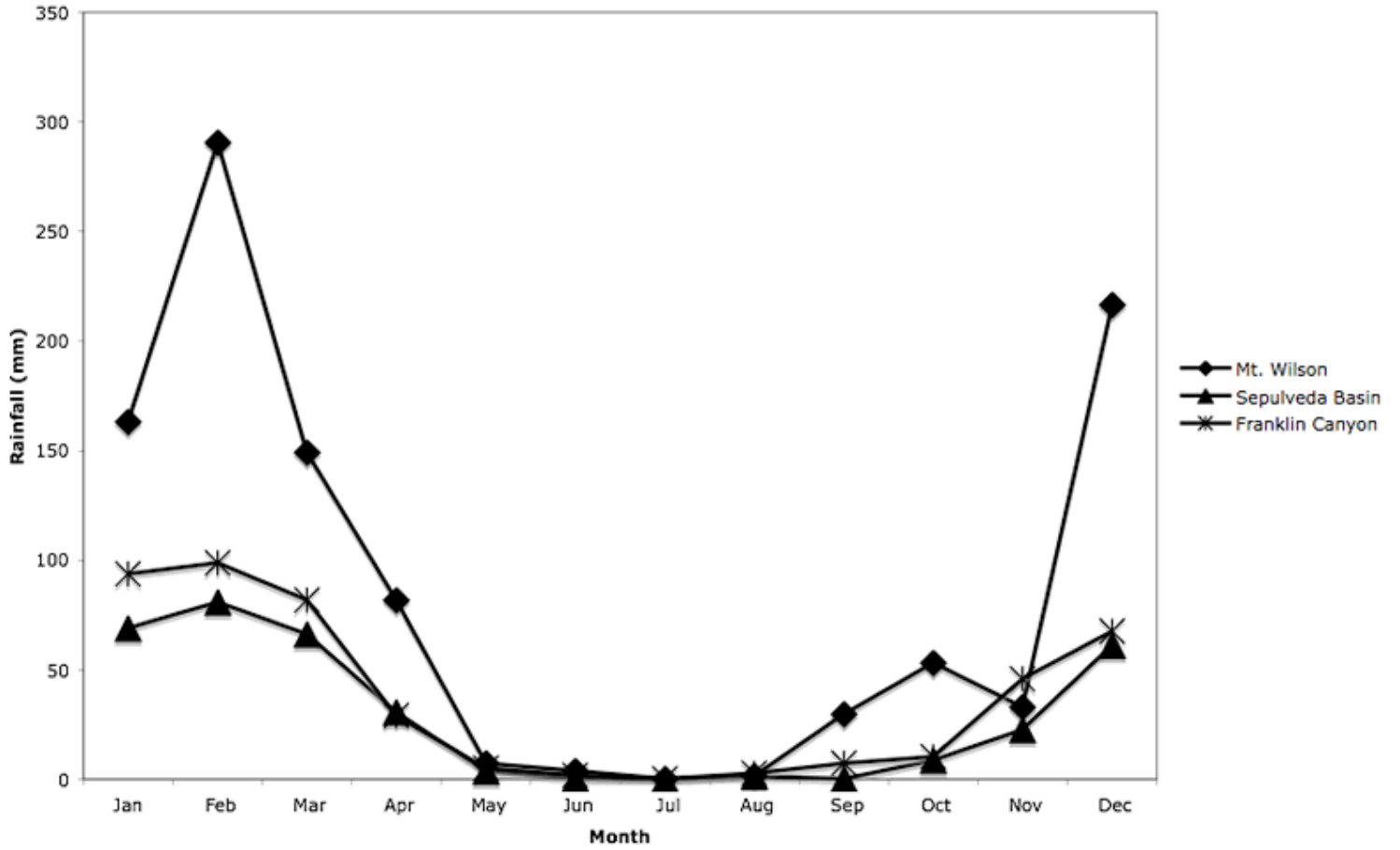


Climate data for Southern California

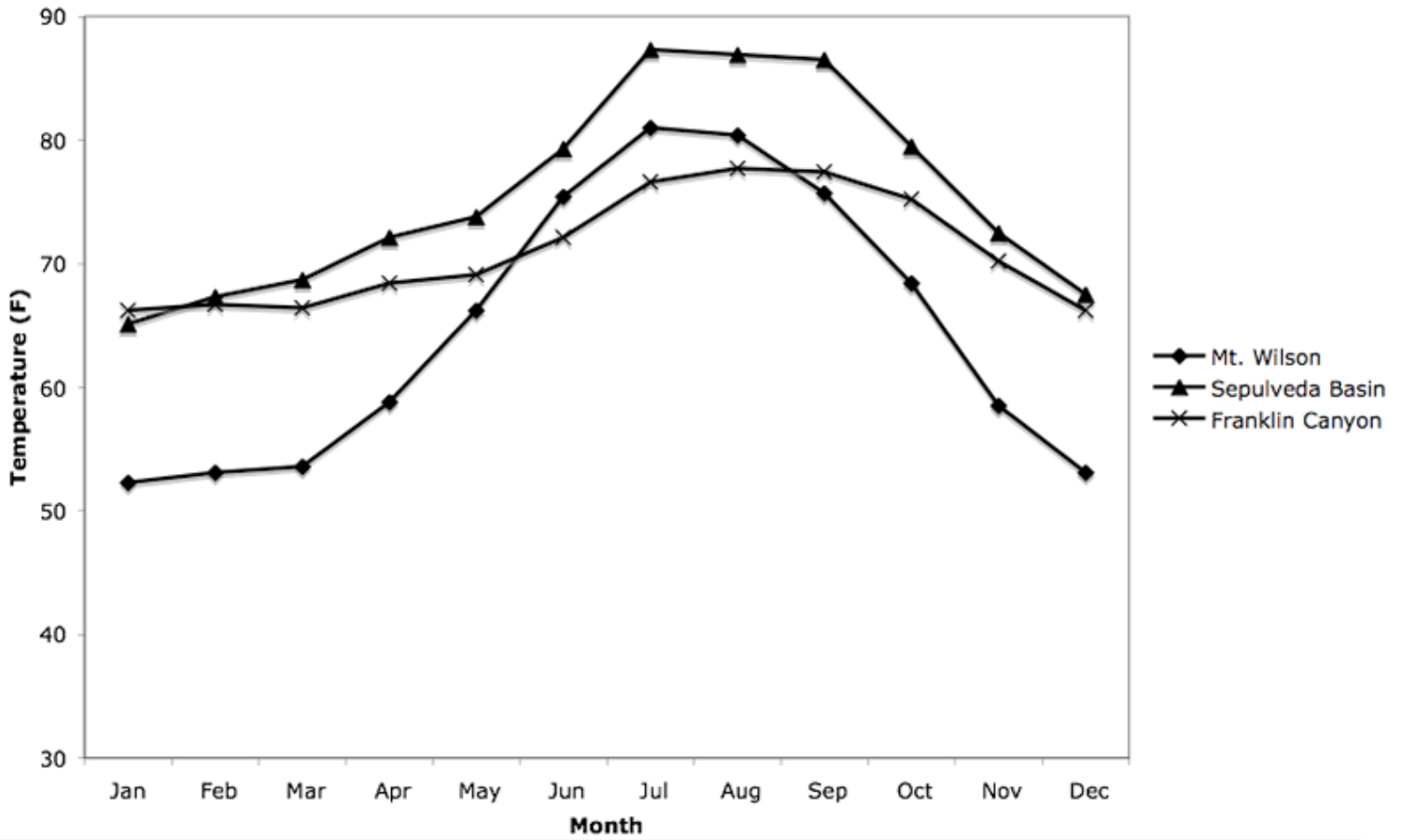
[more climate data](#)

Mount Wilson													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
rainfall-mm	163.1	290.6	149.2	81.9	7.3	3.8	0.2	1.5	29.8	53.1	32.9	216.5	1030.9
rainfall- in	6.4	11.4	5.9	3.2	0.3	0.1	0	0.1	1.2	2.1	1.3	8.5	40.6
Ave. Max °F	52.3	53.1	53.6	58.8	66.2	75.4	81	80.4	75.7	68.4	58.5	53.1	64.8
Ave. Min °F	36.5	36.9	36.3	39.7	46.9	55.9	62.6	61.5	56.8	50.5	41.9	37	46.9
Sepulveda Basin													
rainfall-mm	69	80.9	66.3	30.8	3.7	0.3	0	1.3	0.3	8.6	22.7	61.1	345.7
rainfall- in	2.7	3.2	2.6	1.2	0.1	0	0	0.1	0	0.3	0.9	2.4	13.6
Ave. Max °F	65.1	67.3	68.7	72.1	73.8	79.3	87.3	86.9	86.5	79.5	72.5	67.5	75.4
Ave. Min °F	41.4	43.3	45.7	50	53.1	56.8	60.8	61.2	59.2	53.6	47.1	43.2	51.3
Franklin Canyon													
rainfall-mm	93.8	98.7	81.8	29.2	5	1.8	0.2	2.7	7.3	10.2	45.9	67.6	445.1
rainfall- in	3.7	3.9	3.2	1.1	0.2	0.1	0	0.1	0.3	0.4	1.8	2.7	17.5
Ave. Max °F	66.2	66.7	66.4	68.4	69.1	72.1	76.6	77.7	77.4	75.2	70.2	66.2	71.1
Ave. Min °F	50.4	50.7	50.5	52.3	54.9	57.9	61	62.2	61.7	59	54.5	50.7	55.6

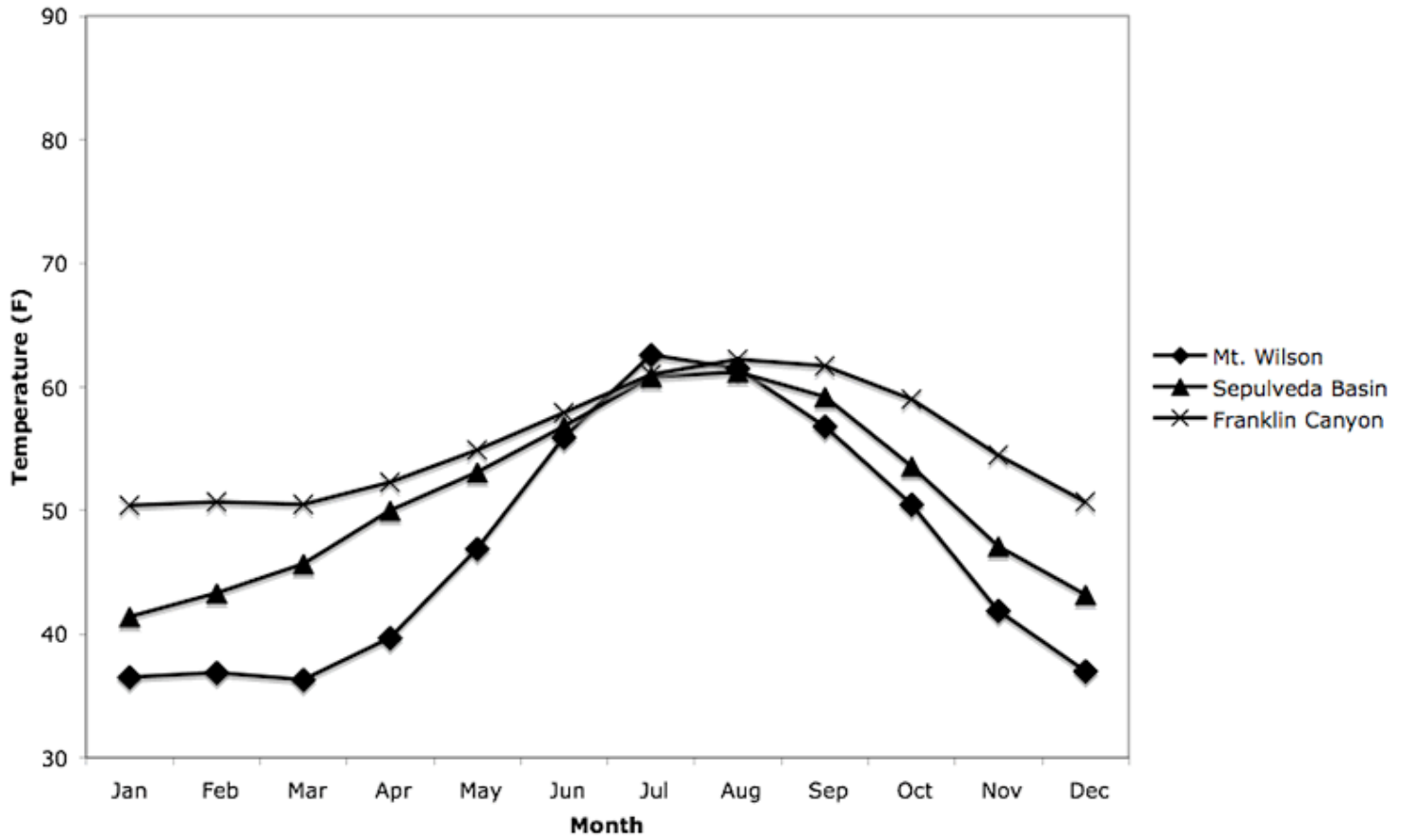
Rainfall Averages (mm)



Average Maximum Temperatures



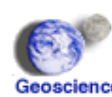
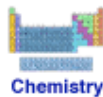
Average Minimum Temperatures (F)



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General Resources Subject-Specific Resources

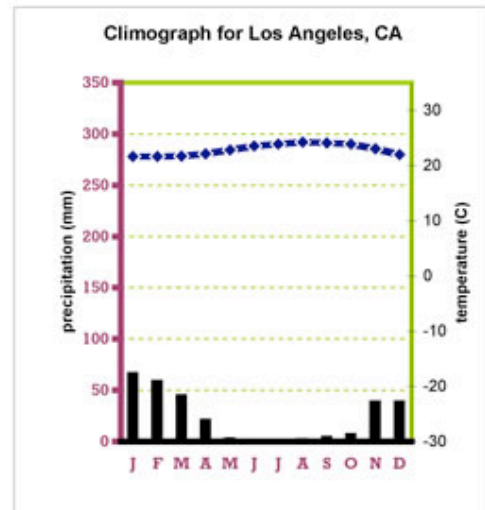
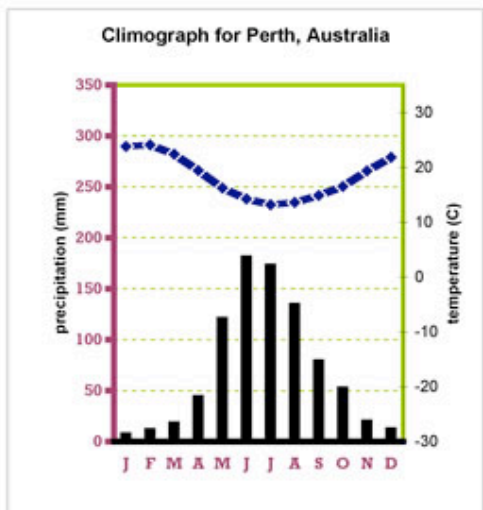
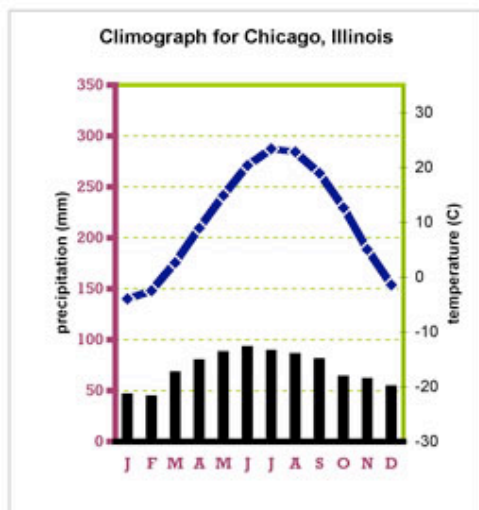
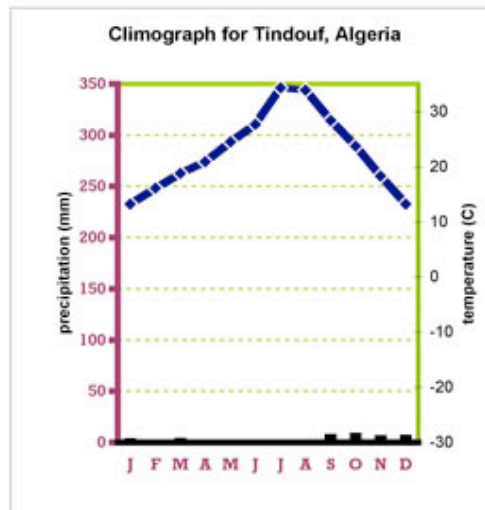
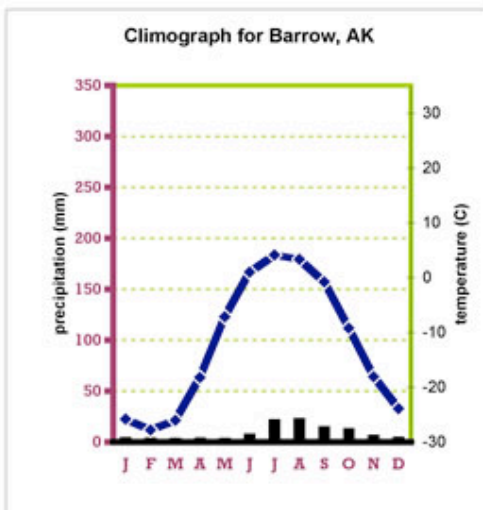
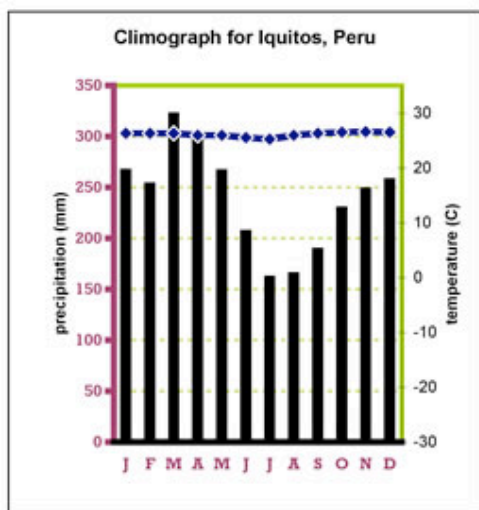
Climate

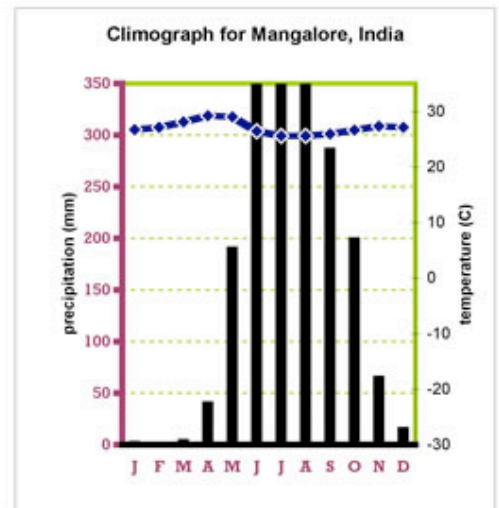
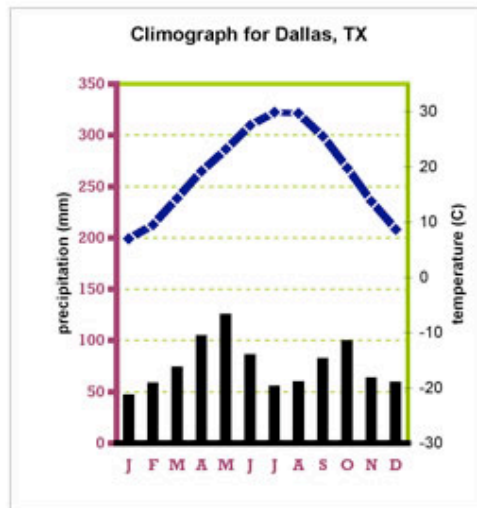
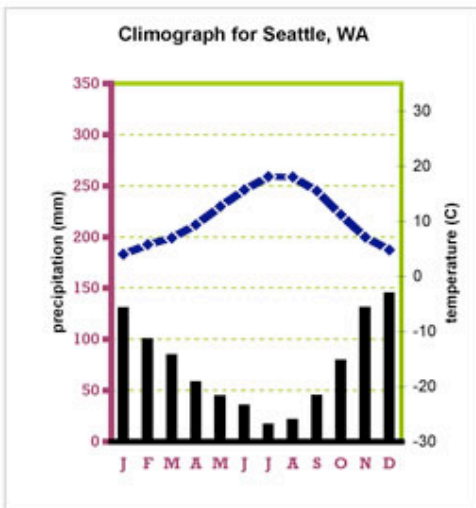
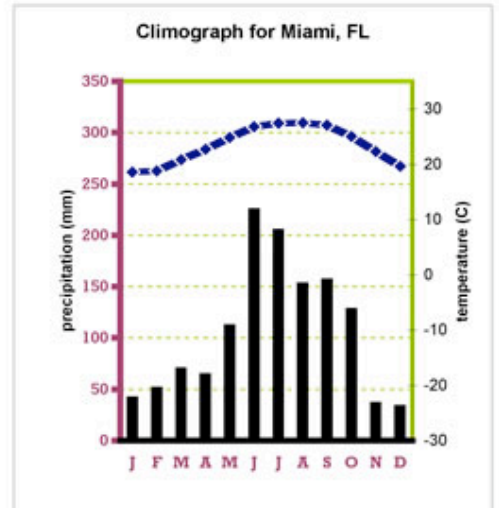
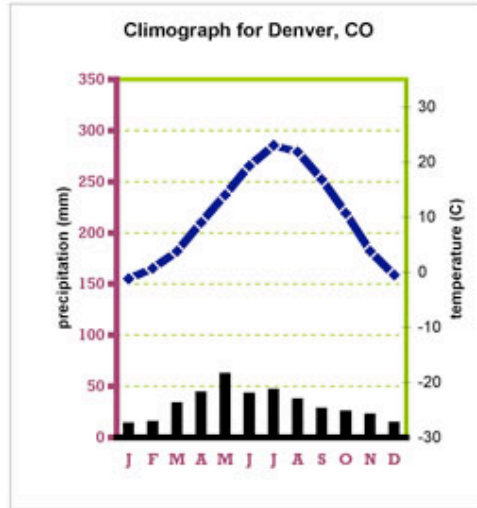
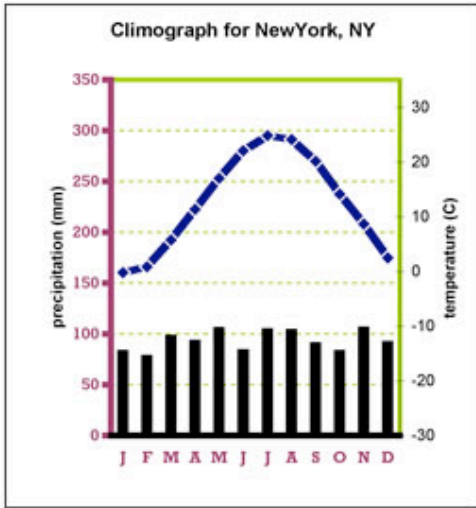
Weather and climate data

- [Weather resources](#)

Climographs

- A climograph summarizes the climate of a region by plotting average monthly temperatures and precipitation. These climographs were made from this [spreadsheet](#).
- [Climographs for Southern California](#).

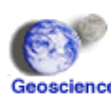
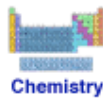
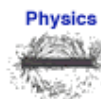




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General Resources

Subject-Specific Resources

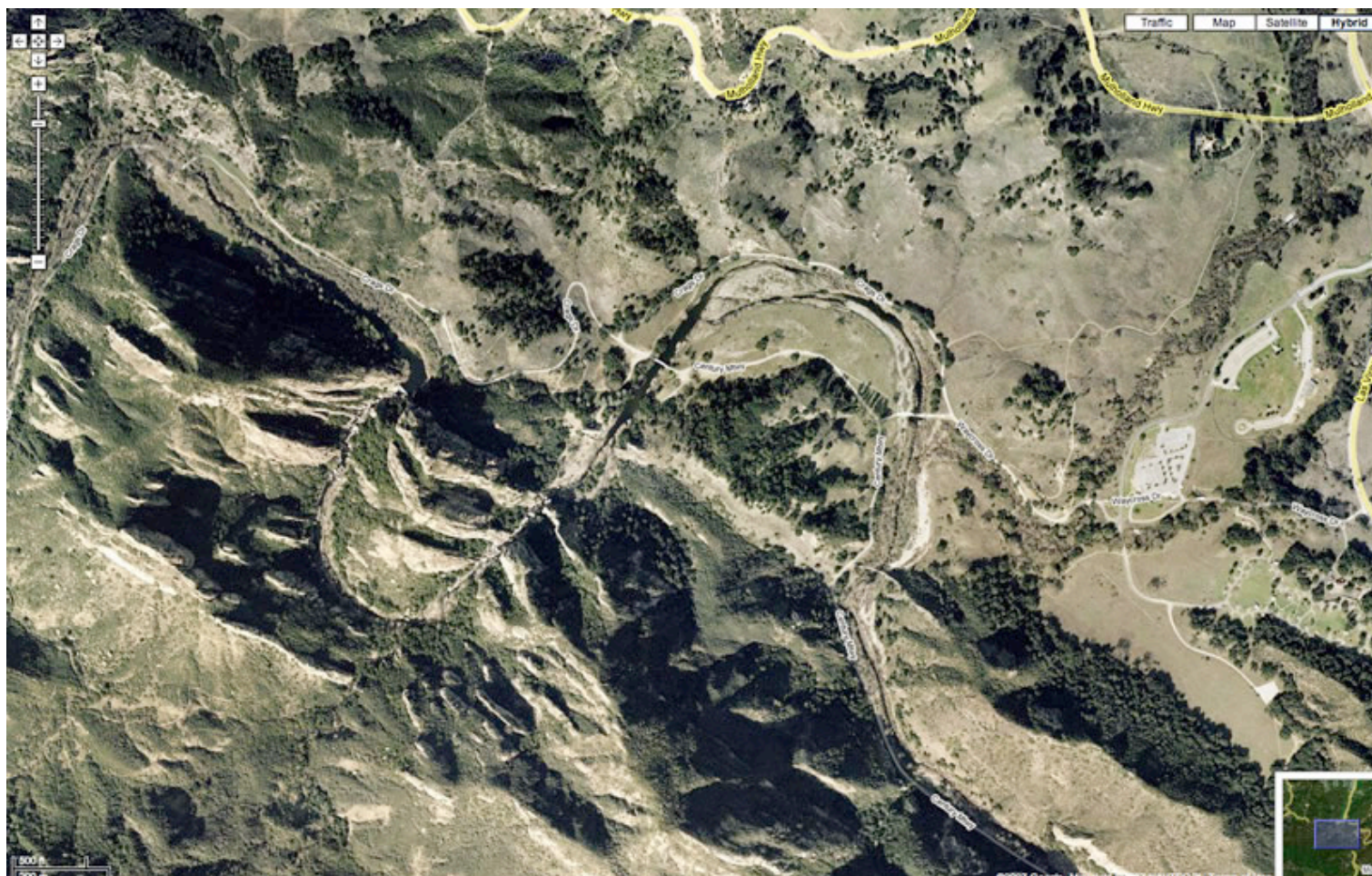
Malibu Creek State Park

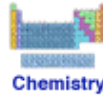
Resources

- [Malibu Creek State Park](#)
- [Aerial photograph and map](#)
- [Photographs](#)

Activities

- Activity - Identify 10 or more different evidences of human activity
- Plot on the aerial map the [plant communities](#) you see





General Resources

Subject-Specific Resources

Malibu Creek State Park



Meadow of mustard



Oak woodland



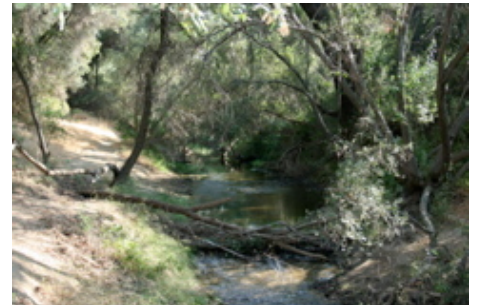
grassland



poison oak in Fall



poison oak in summer



riparian habitat



Malibu Creek State Park



Malibu Creek State Park



sycamore tree



cat tails



riparian ecosystem



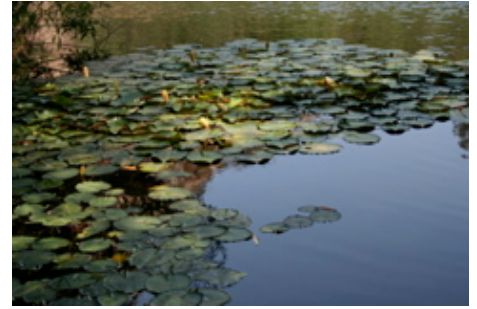
Rock Pool on Malibu Creek



Century Lake



Upper Malibu Canyon



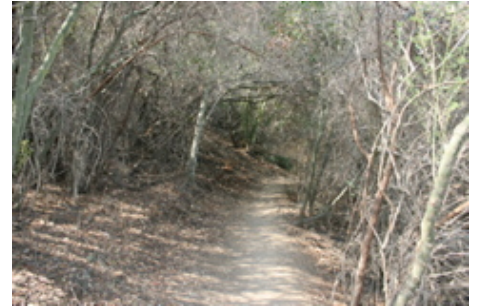
pond lillies at Century Lake



pond ecosystem



chaparral on hill



chaparral



milkweed



milkweed seeds



algae on bay tree



lichen on andesite



sedimentary rock



canyon oak and valley oak



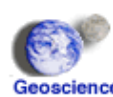
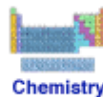
valley oak



eucalyptus with oak reforestation



valley oak saplings



Plant Species in the Santa Monica Mountains

The Mediterranean biome in the Santa Monica Mountains includes:

- Chaparral
- Oak savannah
- Grasslands
- Riparian
- Coastal sage
- Intertidal

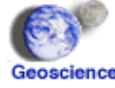
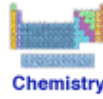
Over 1,000 plant species provide habitat for approximately 500 mammal, bird, reptile, and amphibian species. The Santa Monica Mountains have been heavily affected by grazing, logging, dams and water diversions, and intensive agriculture and urbanization, as well as competition by numerous introduced or exotic plant and animal species.

- Mediterranean-type [climate](#) occurs roughly between 30° and 40°
- Occurs on the west coasts, where there are cold ocean currents.
- It is characterized by wet winters, and long, dry summers.
- Total annual precipitation ranges between 15 and 40 inches per year.
- Temperatures are moderated by maritime influence and fogs.
- It has a very limited growing season.
- The Mediterranean biome is characterized by shrubs.
- These shrubs are evergreen and have small, leathery leaves.
- Sometimes the leaves are so reduced as to appear needle-like.

Tree species are in bold. Read about each plant at the [USDA Plant Database](#).

<i>Latin name</i>	Common name	Checklist
<i>Fraxinus velutina</i>	Arizona ash	
<i>Salix lasiolepis</i>	arroyo willow	
<i>Arctostaphylos glauca</i>	big berry manzanita	
<i>Acer macrophyllum</i>	big leaf maple	
<i>Ceanothus megacarpus</i>	big pod ceanothus	
<i>Convolvulus arvensis</i>	bindweed	
<i>Brassica nigra</i>	black mustard	
<i>Juglans californica</i>	black walnut	
<i>Rubus ursinus</i>	blackberry	
<i>Pteridium aquilinum</i>	bracken fern	
<i>Umbellularia californica</i>	California bay	
<i>Scirpus californicus</i>	California bulrush	
<i>Eschscholzia californica</i>	California poppy	
<i>Artemisia californica</i>	California sagebrush	

<i>Eriogonum fasciculatum</i>	California wild buckwheat	
<i>Ricinus communis</i>	castor bean	
<i>Typha latifolia</i>	cat tail	
<i>Adenostoma fasciculatum</i>	chamise	
<i>Yucca whipplei</i>	chaparral yucca	
<i>Quercus agrifolia</i>	Coast live oak	
<i>Rhamnus californica</i>	coffee berry	
<i>Cuscuta sp.</i>	dodder	
<i>Sambucus mexicana</i>	elderberry	
<i>Penstemon heterophyllus</i>	foothill penstemon	
<i>Vulpia myuros var. hirsute</i>	foxtail fescue	
<i>Populus fremontii</i>	Freemont cottonwood	
<i>Ribes californicum</i>	hillside gooseberry	
<i>Prunus ilicifoli</i>	holly leaf cherry	
<i>Marrubium vulgare</i>	horhound	
<i>Castilleja sp.</i>	Indian paintbrush	
<i>Malosma laurina</i>	laurel sumac	
<i>Lupinus sp.</i>	lupine	
<i>Cercocarpus betuloides</i>	mountain mahogany	
<i>Toxicodendron diversilobum</i>	poison oak	
<i>Opuntia littoralis</i>	prickly pear cactus	
<i>Solanum xanti</i>	purple nightshade	
<i>Quercus dumosa</i>	scrub oak	
<i>Foeniculum vulgare</i>	sweet fennel	
<i>Platanus racemosa</i>	sycamore	
<i>Heteromeles arbutifolia</i>	toyon	
<i>Nicotiana glauca</i>	tree tobacco	
<i>Quercus lobata</i>	valley oak	
<i>Salvia apiana</i>	white sage	
<i>Marah macrocarpus</i>	wild cucumber	
<i>Avena fatua</i>	wild oats	
<i>Rosa californica</i>	wild rose	
<i>Mimulus brevipes</i>	yellow monkeyflower	



General Resources

Subject-Specific Resources

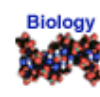
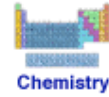
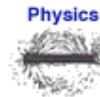
Fire in the Mediterranean Biome

- Many species are aromatic and contain flammable oils.
- A twenty-year cycle of fire maintains a subclimax of chamise
- Ceonothus, sumac, toyon, and manzanita dominate w/o fires
- Dwarfed oaks and closed-cone pines may also occur w/o fire
- The flammable oils of chamise and other shrub species promote fire;
- Chamise sprouts from the roots after a burn
- The resin coating the cones of closed-cone pines melts in a hot fire
- Perennial forbs survive fires as underground bulbs
- The rosette shape of yuccas protects the inner growth bud
- An "elfin forest" of live oaks may develop in absence of fire.
- [Photographs following Malibu Bluffs fire](#)





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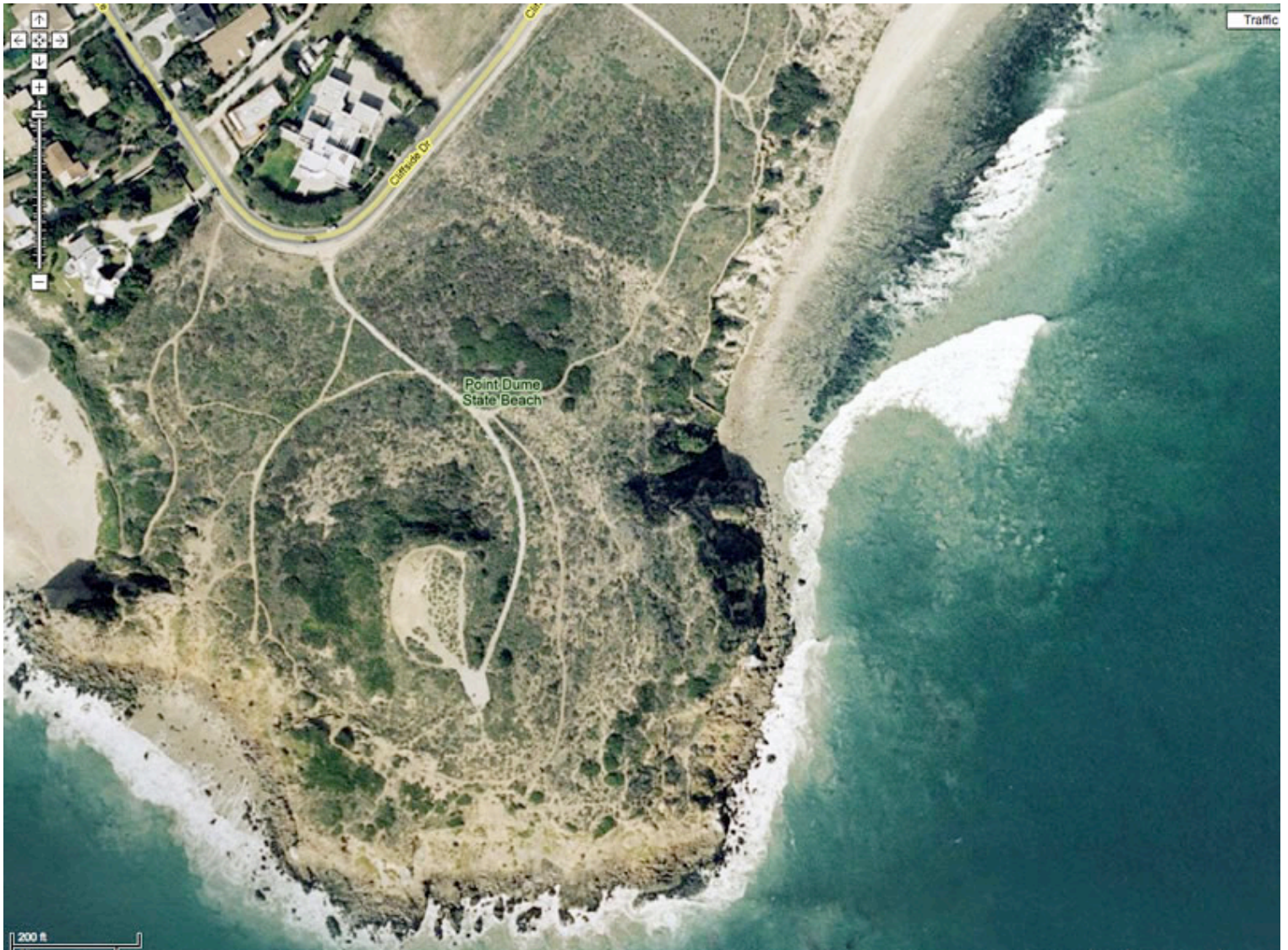
Point Dume

Resources

- [Photographs](#)
- [Geologic map](#)
- [Aerial map of Point Dume](#)
- [Brochure](#)
- [Tides](#)

Activities -

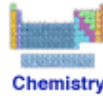
- Identify or describe and photograph 10 life forms in the intertidal zone.
- Identify and photograph volcanic and sedimentary rocks.
- Locate on the [geologic map](#) and the aerial photograph where the rocks may have come from.



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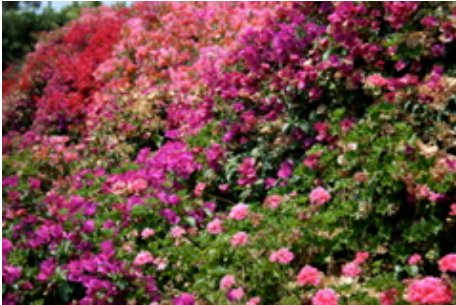




General Resources

Subject-Specific Resources

Point Dume



bouganvillea - introduced species



Point Dume



Point Dume



Intertidal zone



Limpits



volcanic and sedimentary rocks



sedimentary rocks



sedimentary rocks



rocks at Point Dume



coastal sage ecosystem



costal sage ecosystem



flowers in costal sage



California Poppies



California Poppy



Dodder, parasitic plant

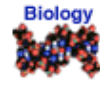
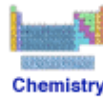
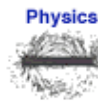


buckwheat, coastal sage

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General Resources

Subject-Specific Resources

Malibu Bluffs



Malibu Bluffs - coastal sage ecosystem



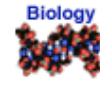
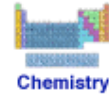
laurel sumac resprouting



baccharis resprouting



Malibu bluffs fire, January 2007



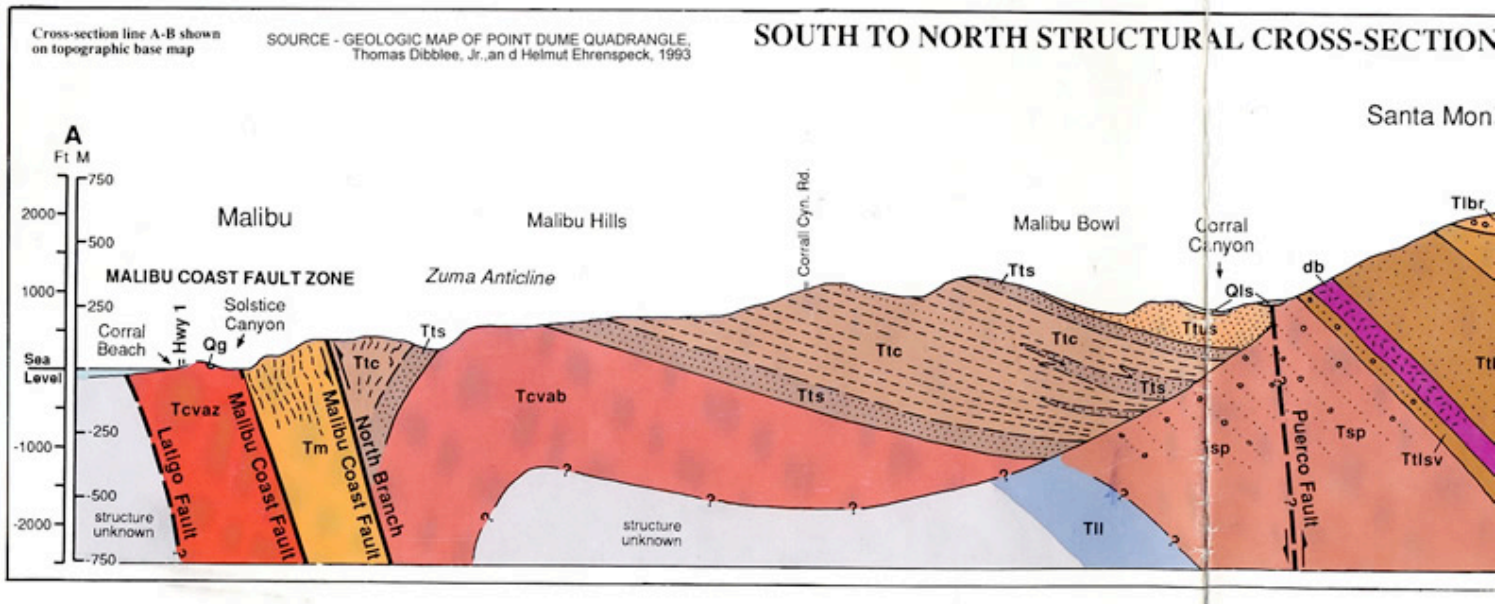
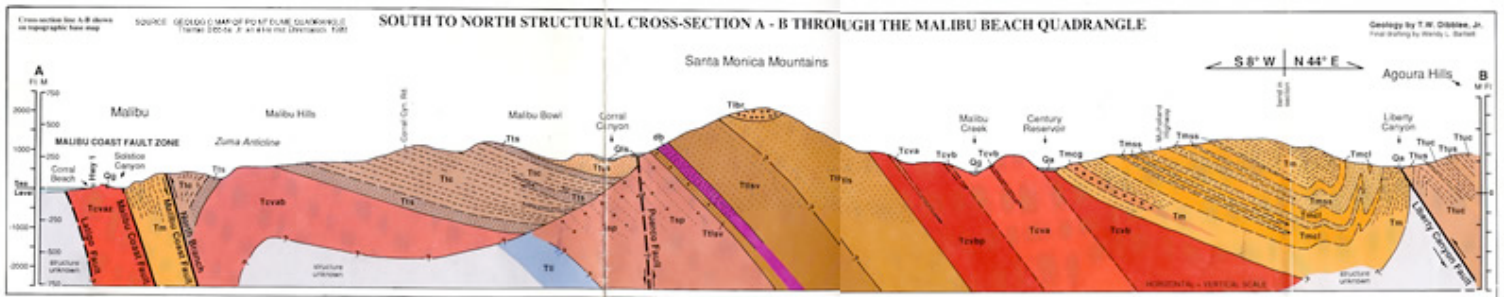
General Resources

Subject-Specific Resources

Geological Profiles

Source - Geologic Maps of Point Dume and Malibu Beach Quadrangles,
Thomas Dibblee., Jr. and Helmut Ehrenspeck, 1993

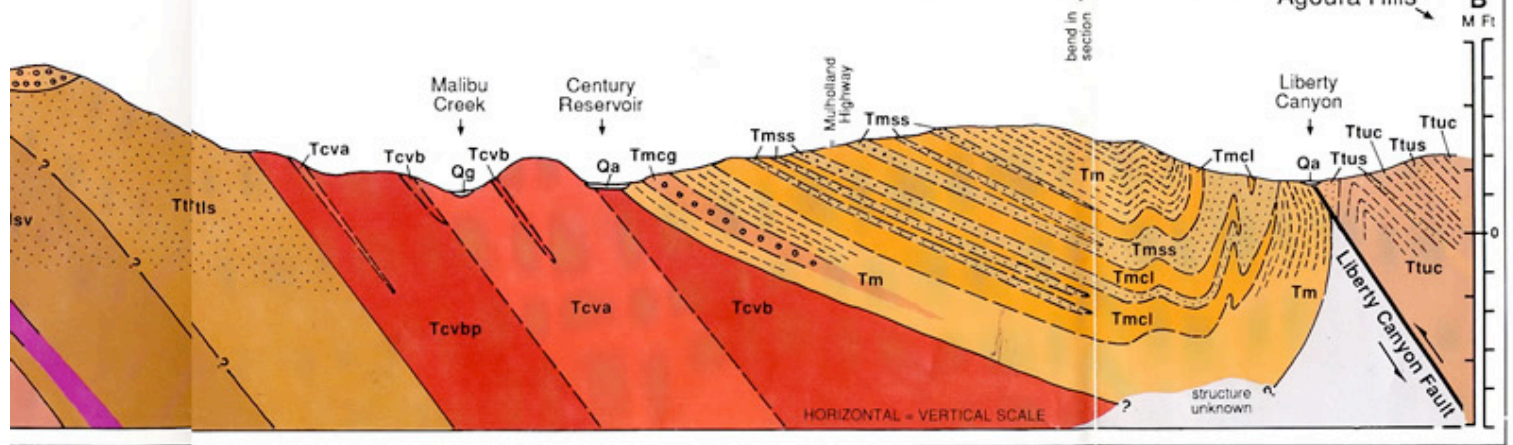
[See full profile](#) | [See maps](#)



A - B THROUGH THE MALIBU BEACH QUADRANGLE

Geology by T.W. Dibblee, Jr.
Final drafting by Wendy L. Bartlett

ica Mountains



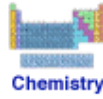
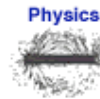
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General Resources

Subject-Specific Resources

Malibu Lagoon

Resources

- [Photographs](#)
- [Website](#)
- [Tides](#)

Activities

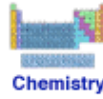
- Identify and photograph 5 birds in the lagoon.
- Describe 4 or more ways that trash can harm animal life.
- Why do estuaries have such a rich variety of life?



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General Resources Subject-Specific Resources

Malibu Lagoon



Malibu Lagoon



sea gulls



estuary



estuary



kelp and other algae



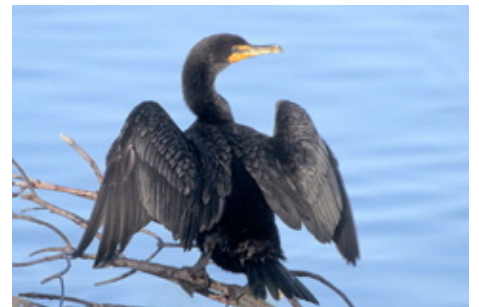
rushes in estuary



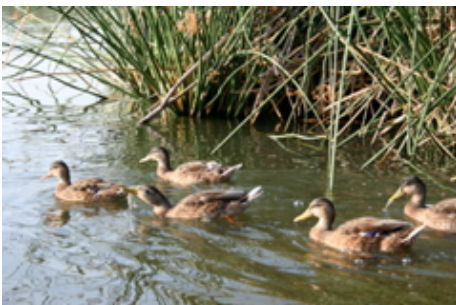
pelican



snowy egret



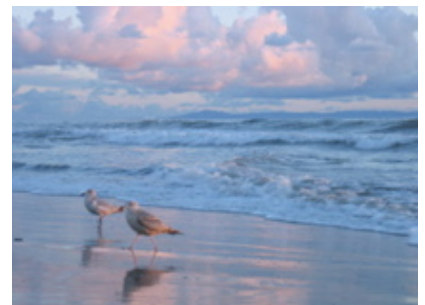
Double-crested Cormorant



ducks



waterfowl, estuary



plovers



sandpiper



cormorants

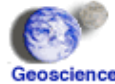
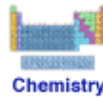
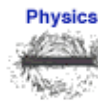
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General Resources

Subject-Specific Resources

Malibu Canyon



Pepperdine University



chaparral - Malibu Canyon



chaparral and riparian communities



Malibu Canyon



willow resprouting -

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