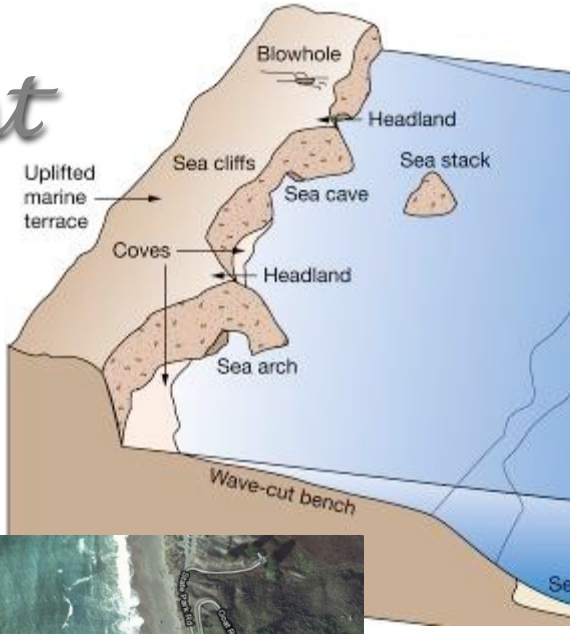
field trip 4 *Salt Point*

DIRECTIONS

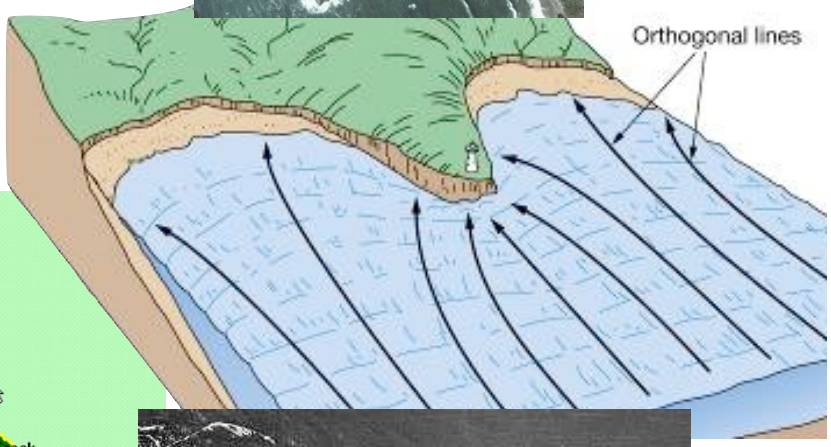
1. Hwy 101 North toward Santa Rosa (43 miles), past Novato and Rohnert Park
2. Take Exit 494 to **River Rd/Guerneville**.
3. Go west on River Road. This goes through Guerneville and the coast (about 30 miles), and becomes Hwy 116.
4. Just before Jenner, turn left on Hwy 1 South and go a short distance.
5. Turn right onto **Goat Rock Rd**.
6. Goat Rock Rd. ends at State Park Rd. Turn left and go to the parking lot near the big rock (not the parking lot near the beach).



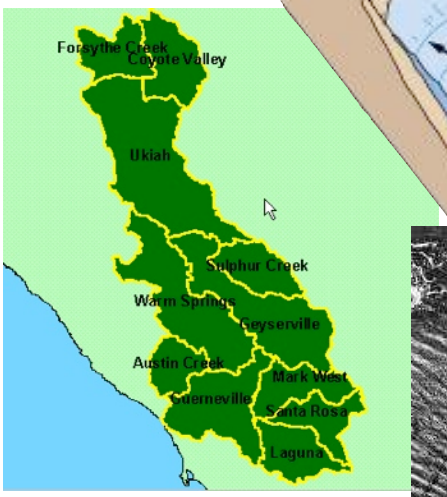
Watershed

Wave refraction

Tombolo



Headland
A portion of land jutting out from the coast.



Stack
A headland completely eroded so that it is now an island

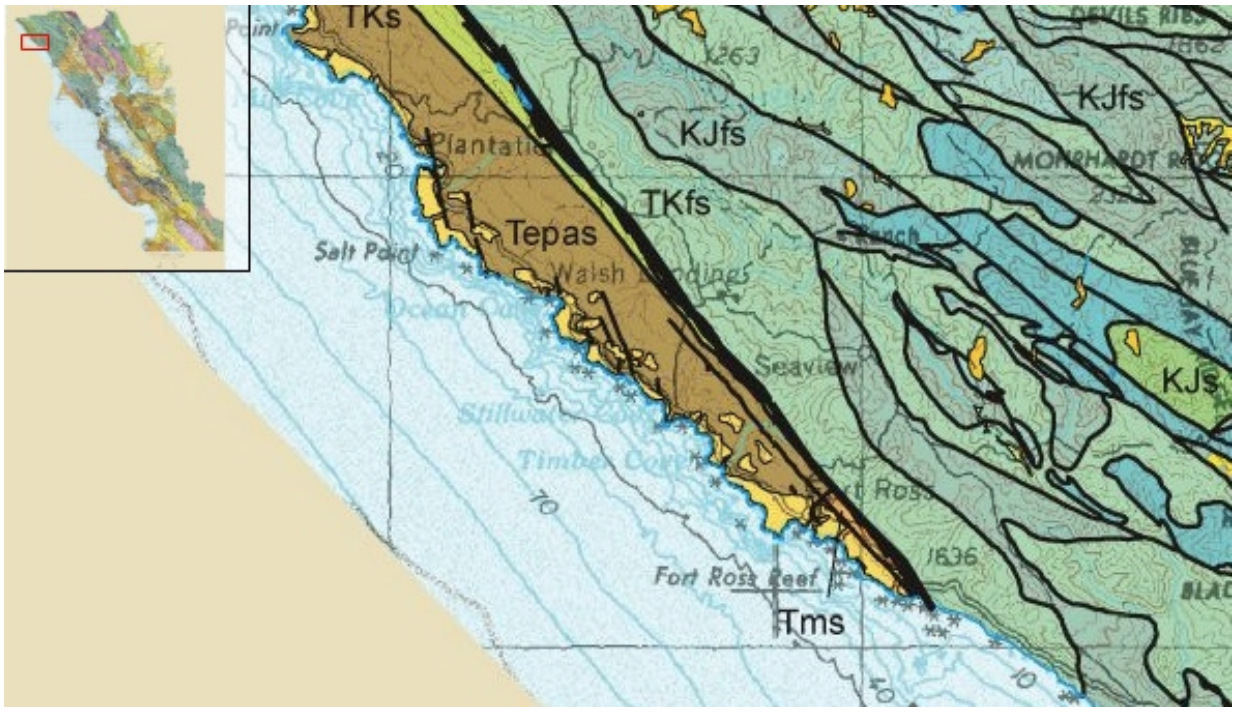
Arch
A headland that has not yet completely separated from land to form a stack

DIRECTIONS TO SALT POINT STATE PARK

1. Backtrack to Hwy 1, turn left and go through Jenner.
2. Follow past Fort Ross.
3. Turn left into Salt Pt. State Park. The left turn is not well marked. There is just a small knee-level brown sign that says “Gerstle Cove Campground.” It looks like this:

4. If you find yourself at Stump Beach or Kruse Ranch Rd., you’ve gone too far. If you get lost, you can try calling me at (510) 219 2103 (but cell reception is spotty).
5. Pay $8 day use fee per car.
6. Park at end of road near bathrooms.

German Rancho Formation, formed 40-60 Ma



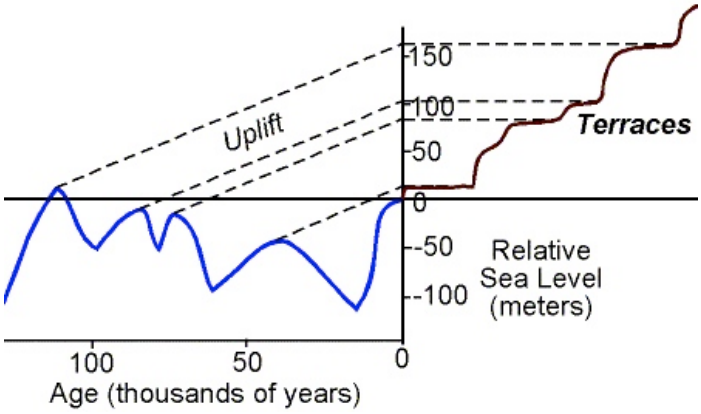
Tafoni--Don

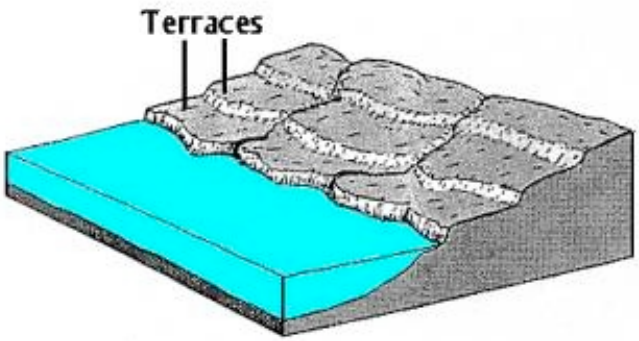
Differential Erosion

Marine terrace

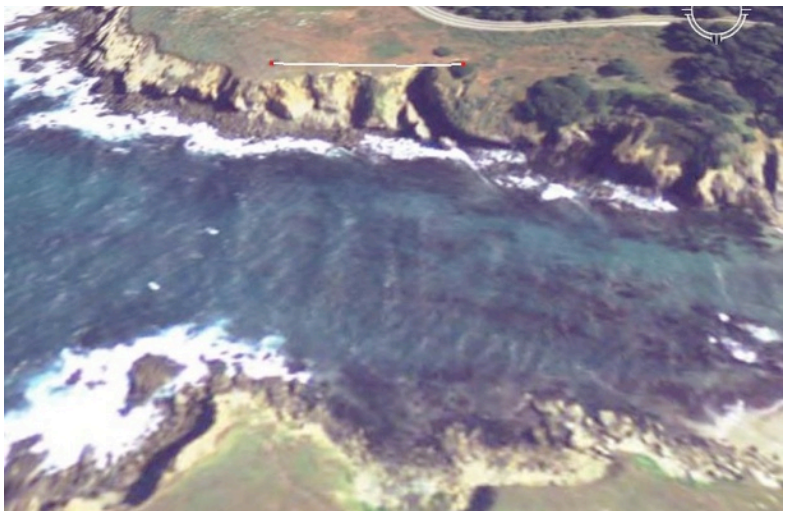
Wave-cut platform

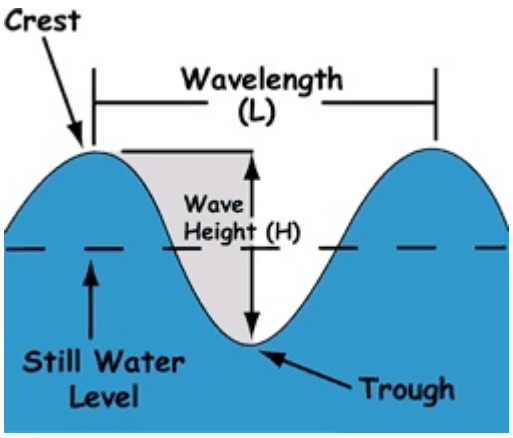
Turbidites





Block diagram illustrating characteristics of recently emergent coasts. Previous wave-cut platforms are elevated above sea level and form terraces





STUMP BEACH

This is our view of the Stump Beach area. As you look across to the other side, you can see two trees connected by this line I've projected using Google Earth. This line is exactly 100 m.

The wavelength of a wave is the distance between two crests.

1. First, find our position on this Google Earth image on the following page.

2. Using the two trees on the shore for a reference of how far 100 m is, what is your estimation of the wavelength of these waves? _____m

3. Another way to estimate wavelength is the fact that waves break when the height/ wavelength ratio is 1/7. Therefore, if a breaking wave is one 1 meter high when it breaks, its wavelength is 7 meters.

   Look to where the waves are cresting. Your rough estimate of the height of the wave face: _____ m

   If this height is 1/7th of the total wavelength, then what is the wavelength? _____ m

   How well does this match with your estimation in Step 2?

4. In open ocean, wave height is small, but as they come ashore the energy starts to "bounce" off of the bottom and waves rise up. In fact, waves begin to noticeably rise when the reach a depth of ½ of the wavelength.

   Look to where the wave bumps first start to seem to "rise up." This is the point at which the water depth is ½ of the wavelength. Using one of your previous calculations of wavelength, estimate the depth here.

   The depth of the water where the waves are breaking: _____ m

5. The period of a wave is the amount of time, in seconds, required for two crests to pass a stationary object, such as a rock.

   Fix your eye on a stationary spot on the opposing shore—a rock or a tree. Now use your watch to count, in seconds, the period.

   The period of these waves is : _____ sec

6. If your wave period is correct, how many waves do we expect per minute?_____

   Now use your watch and count the number of waves over the span of 1 minute: ____

7. We can calculate the speed of the waves by the formula

   wave speed = wavelength/ period

   For example, if the period is 8 seconds, and the wavelength is 100 m, then the speed would be 12.5 m/s

   Wavelength: _____ m

   Period: _____ s

   Approx. Speed: _____ m/s

GERSTLE COVE
depending on time and tide, we may be able to see some critters in this cove.

Gerstle Cove was the source of much of the sandstone imported into San Francisco after 1854. A good place to see these transported rocks today is the shoreline near the Marina Green in SF. Ships used to anchor in the cove and receive hunks of sandstone quarried from this area. We can still see numerous drill/dynamite holes from this time.

Gerstle Cove is a marine sanctuary. Please do not take or hurt anything here. Make sketches of what you see.

As a result of its sanctuary status, some now consider this cove to have among the highest diversity of marine life on the West Coast.

Phylum Echinodermata
5-fold symmetry, spiky skin, predators, scavengers, herbivore

Sea star (starfish)
(*Pisaster giganteus*)

Sea urchin
(*Strongylocentrotus purpuratus*)
In life, it has numerous spines, which contain adhesive tube feet. It looses them in death. We may only see these at a very low tide

Sand dollar (*Astrodapsis*)

Phylum Mollusca
Mollusks encase their bodies in a hard outer shell. Sessile (immobile) mollusks fix themselves to a rock and filter-feed. Mobile mollusks cling to rocks by a large "foot" and graze on plant/kelp material.

Mussel (*Mytilus californianus*)

Limpet (*Macclintockia scabra*)

Abalone (*Haliotis rufescens*)
Basically a big, flat snail. The "mother-of-pearl" luster on the inside of the shell is referred to by the adjective "nacreous."

Periwinkle (*Littorina*) A common snail

Phylum Cnidaria ("nigh-dare-ee-ah")
predators and filter-feeders who employ nematocysts ("stinging cells") to capture prey

Anemone (*Anthroleura*)
Fixed to rock. Uses stinging tentacles to paralyze prey. Colonies are clones of each other, and sometimes attack neighboring colonies in complex warfare.

Velella (jellyfish). Sometimes blue. Has a distinct "sail." Often wash ashore in the thousands.

Phylum Arthropoda
Jointed, segmented exoskeleton. Scavengers, filter-feeders.

Barnacle (*Balanus*)

Decorator crab (*Loxorhynchus crispatus*)
Purple shore crab (*Hemigrapsus nudus*)
Hermit crab (*Pagurus samuelis*)

Phylum Chromista
Not true plants. They photosynthesize, but with different types of chlorophyll—hence the range of colors from yellow to brown to green.. Lack vascular system.

Kelp
Sea palm (*Posteisia*)
Sea lettuce (*Ulva*)

Phylum Plantae
Surf grass (*Phyllospadix scouleri*)

Writeup:

as always, give me a brief write-up of what we saw at each major stop and email it to me (geology.prof@yahoo.com) before next Sunday.

References & Resources:

- http://eqdoc.home.netcom.com/salt2.html
____Sue Hirschfeld's excellent summary of Salt Pt. Geology

- http://www.californiacoastline.org/
an excellent source for free, highly-detailed coastline pictures