



Maritime on the Move: Carpinteria

Station 1

[Carpinteria Salt Marsh \(CSM\) Nature Park](#)

[Carpinteria Salt Marsh Reserve \(CSMR\)](#)

The Carpinteria Salt Marsh, also known as El Estuario, is one of the most important wetlands in Southern California. This beautiful, relatively unspoiled estuary is home to rare and endangered plants and birds. It is a haven for migrating birds, the foundation for much of the local food chain, as well as a nursery for marine fish.

Along Ash Avenue you will find nature paths and platforms for safely viewing the estuary. The estuary totals 230 acres, 120 of which is owned by USCB as the Salt Marsh Reserve. The remainder is the Salt Marsh Nature Park, which is owned and operated by the [City of Carpinteria](#).

The Carpinteria Salt Marsh Reserve contains a critically important [Southern California estuary](#), which supports many sensitive plant and animal species. The site includes extensive wetland, sub-tidal channel and emergent upland habitats. The Reserve is adjacent to a sandy beach, subtidal rocky reef, and kelp beds.

The reserve provides habitat for migratory waterfowl along with several species of plants and animals listed as endangered, threatened or of special concern, such as the salt marsh bird's-beak, light-footed clapper rail, and Belding's savannah sparrow. It also is an important regional nursery for California halibut and other species of marine and estuarine fish.

Themes to focus on as you explore the marsh

- Important habitat between mountains and sea
- Role it plays during floods-
- Unique adaptation for animals/plants who live here
- Stop over for migrating birds- part of the [Pacific Flyway](#)
- Restoration- Channel Islands Restoration and ice plant removal
- Research- Part of the UC Reserve system

Questions to Ponder

Ask students *Where we are? What is this place? What are the sources of water coming into the marsh? Rain? Tide?*

Point out Franklin and Santa Monica Creeks. With these creeks come freshwater. Introduce the concept of watersheds, water that drains into these creeks (and everything that comes with that water-pollution) makes up the watershed of the CSMR.

Ask students if they can think of anything else that might come into the marsh with the creek water. Trash. Have students guess the top three types of trash that come into the marsh. Styrofoam cups, plastic grocery bags, and plastic soda bottles (items that float).

Point to the large, bright green patch on the surface in the middle of the marsh. Ask students if they can think of what this might be. It is a patch of algae that thrives on the fertilizer runoff from the greenhouses (point to these on the map). Is this good or bad for the marsh? It could be bad. Algae does photosynthesis during the day and flourishes with the nutrients from the greenhouse fertilizers, but at night all this extra algae does respiration and can consume a lot of oxygen from the water, creating hypoxic conditions in the water. How might this affects organisms in the water, it could also affect animals in the marsh that are further up in the food chain, like the species of special concern that live in the marsh.

Bird count- this is an important location for the annual [Christmas Bird Count](#), organized by [Audubon Society](#).

Natural History Facts

- Wetlands ([Southern CA Wetlands Recovery Project](#)) perform vital ecosystem services that support an array of life, including us
- Franklin and Santa Monica Creeks and other smaller channels drain through the wetland to the mouth of the inlet
- CSMR is one of few estuaries that remain in Southern California
- The landscape associated with CSMR encompasses a wide range of habitats from marine to freshwater; these include: coastal salt marsh, tidal channels, tidal mudflats, sand bars and salt flats.
- As in many estuaries, the biological productivity is affected by its tidal flow.
- 225 different species of vascular plants (45% native)
- 16 different species of [molluscs](#)
- At least 16 different species of fish, over 125 bird species, 15 mammals
- CSMR is home to at least 23 rare plants and animals, some of which are endangered including:
 - **Light-footed clapper rail**- last seen in 1988 and is one of the most endangered birds in CA.
 - **The Belding's savannah sparrow**- year-round resident, this species breeds in estuaries of S. CA and northern Baja.
 - **Salt marsh goldfields**- rare spring wildflower, this plant is found along the edges of the salt marsh
 - **Salt marsh bird's beak**-endangered summer-flowering

Waves, Wetlands and Watersheds: CA Coastal Commission Science Activity Guide

<https://healthebay.org/sites/default/files/WavesWetlandsWatersheds.pdf>

Wetlands Live: A Distance Learning Adventure

https://wetlandlive.pwnet.org/resource/wetland_ecology.php

CARPINTERIA SALT MARSH RESERVE DID YOU KNOW



CSMR is one of the few estuaries that remain in Southern California and is home to rare plants and animals some of which are endangered



Salt Marsh Goldfields



Salt Marsh Bird's Beak



CSMR Flora and Fauna



Belding's Savannah Sparrow

A year round resident, this species breeds in local estuaries



Light-footed Clapper Rail

Last seen in 1988 and is one of the most endangered birds in California



Pacific Flyway

The birds of the Pacific Flyway
www.audubon.org/pacific-flyway



Maritiem on the Move: Carpinteria

Station 2

[Carpinteria State Beach](#)

Beach area at the end of Linden Ave

Twelve miles south of Santa Barbara, Carpinteria State Beach offers a mile of beach for swimming, surf fishing, tidepool exploring and camping. The Spanish named the area Carpinteria because the [Chumash tribe](#), which lived in the area, had a large seagoing [tomol](#) (plank canoe) building enterprise, or "carpentry shop" here. This was because of naturally-occurring surface tar, which was used to waterproof the canoes.

Seals and sea lions can be seen in the area December through May, as well as an occasional gray whale. Tidepools contain starfish, sea anemones, crabs, snails, octopi and sea urchins.

Themes to focus on as you explore the beach

- Sandy beaches are [dynamic habitats](#), ever changing depending on the tides.
- Beaches serve as buffer zones or shock absorbers that protect the coastline, sea cliffs or dunes from direct wave attack
- [Sandy beach animals](#) have to deal with constantly shifting sand, crashing waves, tides coming in and out, a beach that changes seasonally, and marine and terrestrial predators
- The animals that live in this environment are almost always buried in the sand and have many adaptations to help them survive
- Here in Carpinteria, the city puts up a [berm](#) every year. Why? What is predicted to happen to the beach with sea level raise and climate change?

Questions to Ponder

- How do our local beaches change throughout the year?
- Look for some of the animals who depend on sandy beaches?
- What are some settle signs of strong currents: rip tides, long shore currents?
- How do humans use and abuse such places as beaches?

Activities

- [Digging for sand crabs](#)- important indicator species
 - Students will survey the distribution and abundance of the [Pacific mole \(sand\) crab](#). These crabs are among the most important herbivores on our local beaches and they are an important link in the sandy beach food web. By monitoring, [citizen scientists](#) can track changes in abundance over time. Sand crabs are an indicator species, meaning that their presence or absence

indicates the health of ocean. If you have lots of sand crabs than the ocean is probably healthy.

- **Look for [boring clams](#)** in rocks-very dynamic habitat- talk about adaptations.
 - Boring clams, found in the rocky intertidal zone on the beach, are the demolition crews of the beach, and they have their own special way to protect themselves. No, they don't wear hard hats, but they have developed the ability to bore into solid rock. The rock is even greater protection than a shell. We learned that they use the shell to rub away some of the rock. In addition, their foot can secrete chemicals that erode rocks, allowing the clam to create a clam-made shelter. And when the clam grows bigger, it will just bore some more into the rock until its shelter fits just right. And by having clams bore holes into rocks, rocks break down more easily creating more sand, which replenishes beaches that lose sand to erosion. A clam's life is anything but boring!
- **Look for washed up kelp-** talk about [kelp forest](#) ecosystem.
 - We use kelp for over 80 of our common products- how is it harvested in a sustainable way. When [kelp holdfasts](#) break loose and kelp fronds wash up on shore, the kelp is no longer a food source and shelter for 800+ plants/animals but now becomes a yummy meal and home for amphipods and other animals on the beach. Amphipods or beach hoppers are great recyclers for the beach – having more than 8000 species around the world they help beaches around the world stay clean.
- **Making the connection-** [Marine debris](#) one of the biggest environmental threats facing our oceans but yet the easiest so solve.

Web Resources

- Long-term Monitoring Program and Experiential Training for Students:
<https://limpets.org/what-is-limpets/>
- YouTube on the Piddock clam/boring clam:
<https://www.youtube.com/watch?v=NISWyKwU7BQ>
- Finding the Hole Truth about Piddock Clams:
<https://www.shapeoflife.org/blog/finding-hole-truth-about-piddock-clams-monterey-bay>
- Kelp Forests-Channel Islands National Park:
<https://www.nps.gov/chis/learn/nature/kelp-forests.htm>
- Marine Debris- National Geographic- education
<https://www.nationalgeographic.org/encyclopedia/marine-debris/>
- Cover story-National Geographic:
<https://www.nationalgeographic.com/environment/oceans/critical-issues-marine-pollution/>

Name:

Date

School:

Grade:

Crafty Crabs!

Use addition and color by number!

| COLUMN 1 | COLUMN 2 |
|--|--|
|  $1+12$    | $17+2$     |
|    $14+3$  |   $20+3$   |
| $13+6$     |  $12+5$    |
|   $21+2$   |    $9+4$  |

These 8 crabs need to get paired off by color, but they won't show their shells until you solve the math problems!

COLOR KEY:

- **RED** = 13
- **GREEN** = 17
- **Yellow** = 19
- **Blue** = 23

Once you've solved the equation and colored the crabs, draw a line to match the crab pairs.

Name:

Date:

School:

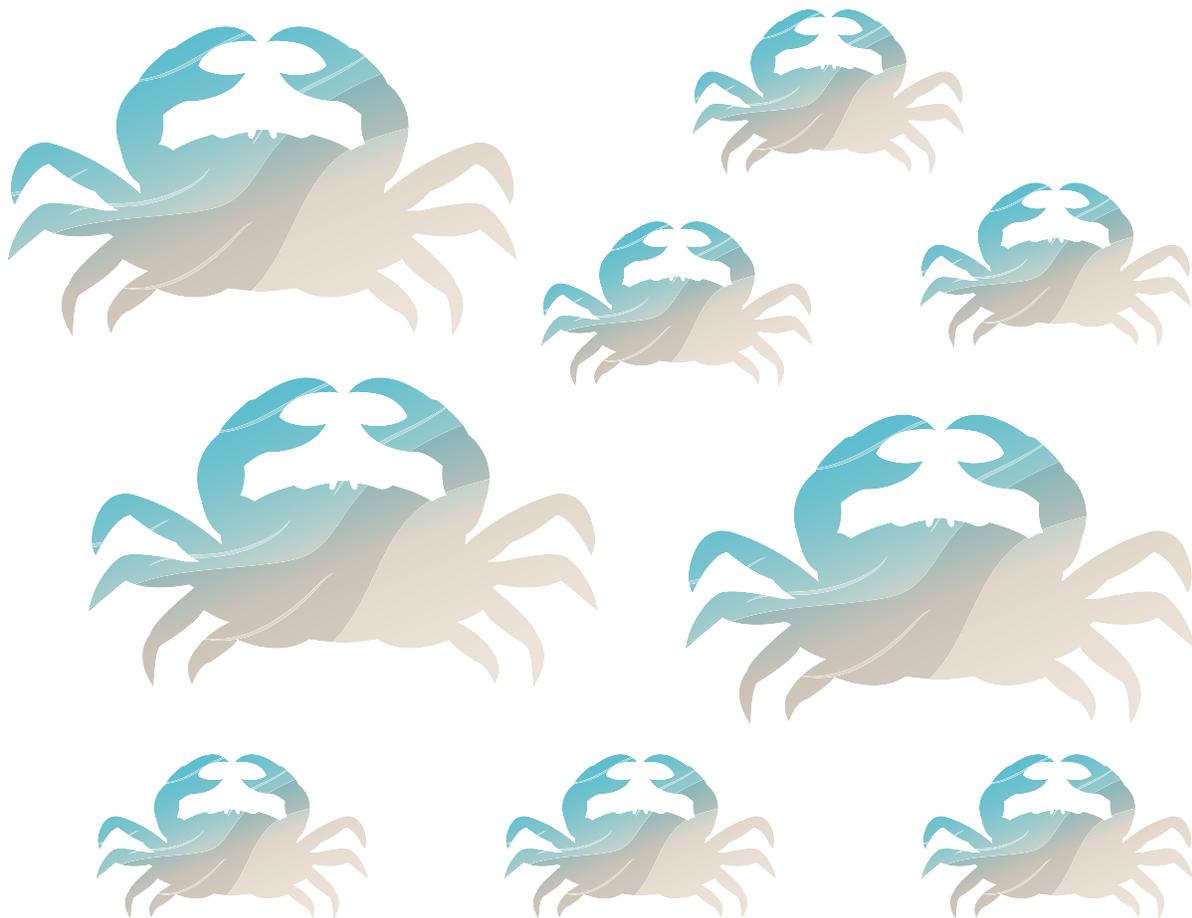
Grade:



SMALL CRAB, BIG CRAB

A quick game with big and small crab!

There are so many crab in this ocean! Are there more big crab or more small crabs? Start counting the big crab and small crab to find out!



Big Crab:

Small Crab:

SAND DWELLERS

Sand Dwellers move all over the beach.

If you dig in the wet sand and find sand crabs, don't expect to find them in the same place later.

As in all intertidal zones, any given spot in the zone change from submerged, at high tide, to exposed, dry conditions during low tide – a radical change in habitat over a short period of time.



ARTHROPODS

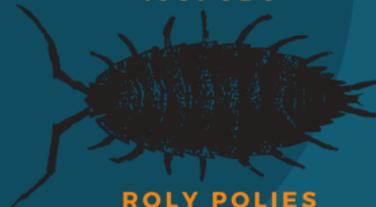
SAND CRAB

AMPHIPODS



BEACH HOPPERS

ISOPODS



ROLY POLIES

T I D E

low vs high

MANY OF THE ANIMALS THAT LIVE AT THE BEACH MOVE CONSTANTLY TO FOLLOW THE TIDE AS IT RISES AND FALLS:

- SAND CRABS (ARTHROPODS)
- ROLY POLIES (ISOPODS)
- BEACH HOPPERS (AMPHIPODS)

THEY MOVE UP AND DOWN THE BEACH ACCORDING TO THE WATER LEVEL. THIS ON-THE-GO LIFESTYLE MAKES MANAGEMENT OF THIS ECOSYSTEM A UNIQUE CHALLENGE.



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Station 4

Seal Rookery

Carpinteria Bluffs Nature Preserve

The Carpinteria Seal Sanctuary is an easy hike or bike ride from town by way of the Coastal Vista Trail. The trail runs for miles along the bluffs offering great views overlooking the ocean. The Carpinteria Harbor Seal Preserve is home to almost 100 adult seals who give birth to their cubs on the Carpinteria shoreline; one of the four harbor seal rookeries remaining along the southern California coast. Stop on the bluffs above the seal preserve, to quietly watch the seals playing in the water and sunbathing on the shoreline. The best spot for viewing is well marked with a sign, and has a bench for resting. The sanctuary is a protected birthing habitat for harbor seals from December 1 through May 31st.

Tip: Bring binoculars for the best view, please be respectful and do not attempt to approach the seals from the beach.

Themes to focus on as you explore the seal rookery

- Marine mammals of the S. CA and Channel Islands
- Sharks
- Channel Islands National Marine Sanctuary and National Park
- Importance of isolated islands for rookeries of marine mammals and sea birds
- Why islands are fragile ecosystems
- Importance of wilderness areas- biodiversity =stability

Questions to Ponder

- Why do the harbor seals like to haul out here?
- Why do these marine mammals come ashore?
- Who are their natural predators?
- What are some other marine mammals in our area and SB Channel
- Who are the Carpinteria Seal Watch Volunteers?

Activities

- Do an animal count- what is the tide? Why does that determine number of animals.
- Interview the seal watch volunteer- how many pups were born in the past week? How many have been born so far in this season? Any unusual activities?
- Use a long rope to measure and show the length of whales and other marine mammals: bottlenose dolphin, common dolphin, harbor seal, sea lion and elephant seal, we have here along our coast and in the SB Channel. Add sharks too- if you have time.



Maritime on the Move: Carpinteria

Station 3

[Tar Pits Park](#)

[Asphalt Lake](#)

The Tar Pit Park is one of only five locations on the planet to see a natural tar seep. This strange “asphalt lake” was formed by oil seeping up to the surface along a geologic fault. The gooey substance eventually turned to asphalt as it cooled and mingled with the air and ocean water.

The intriguing phenomenon has been happening for millions of years, as evidenced by the animals from the [Pleistocene epoch](#) that have been found preserved in the tar. In the early 1900s, miners extracted the asphalt to help build California’s coastal highway. The tar pits then became part of a state beach, which opened to the public in 1941.

Themes to focus on as you explore the tar pits

- [History of Carpinteria](#)- starting with [Chumash](#)- the builders/carpenters
- What is tar- why the SB Channel is so rich in petroleum and natural gas
- History of oil industry- past, present and future- mini debate about what to do with the oil platforms once they are decommissioned.
- History of [Venoco in Carp](#)
- Future with [renewable energy](#)

Questions to Ponder

- Why was this area popular for the first native Americans?
- How do these tar pits give us a window in to the past?
- How is oil formed? Is there is an endless amount of fossil fuels?
- What are some of the risks of tapping into the oil reserves along the coast and in the SB Channel?

Web Resources

Carpinteria Tar Pits: https://en.wikipedia.org/wiki/Carpinteria_Tar_Pits

“Goodbye oil processing: Carpinteria oil plant to be decommissioned”: news article from Nov 17’: http://www.coastalview.com/news/goodbye-oil-processing-carpinteria-oil-plant-to-be-decommissioned/article_b8432fe8-ceed-11e7-b070-23c9cd7603f5.html

Natural History Facts

- This rookery (haul out) is home to over 100 adults who haul out to rest, breed and nurture their pups
- This beach is closed from Dec 1st through May 31st so the harbor seals have a peaceful place
- This rookery is one of four remaining along the coast of S. CA
- Harbor seals are a true seal, lacking external ears like a CA sea lion.
- Harbor seals can dive to depths of over 1000 feet and stay submerged for up to 40 minutes
- They feed on a variety of fish, cephalopods (squid & octopus) and other invertebrates
- They are most vulnerable out of the water and will quickly retreat the water when they feel a threat.
- Each year about 60 pups are born here in the winter and spring months.
- Pup mortality is high-50%
- There are over 20,000 harbor seals in CA and 5,000 in S. CA; mostly around the Channel Islands.
- 27 different species of cetaceans: whales, dolphins and porpoise have been sighted in the SB Channel. 1/3 of all cetacean species in the world.
- At least 12 different species of sharks in our waters too! We need these top predators keeping everything in check and balance. But some species are lower on the food chain and are bottom dwellers: angle sharks, swell sharks and horn sharks. Show eggs of swell and horn sharks. Talk about biology/reproduction.

Web Resources

- Carpinteria Coast: http://www.carpinteriacoast.com/seal_rookery.html
- Carpinteria Seal Watch: <https://carpinteriasealwatch.org/>
- Channel Islands National Park: <https://www.nps.gov/chis/index.htm>
- Channel Islands National Marine Sanctuary: <https://channelislands.noaa.gov/>
- Ocean Futures Society's video: difference between seals and sea lions: <http://www.oceanfutures.org/learning/kids-cove/creature-feature/sea-lions-and-seals>
- Sharks of the SB Channel: <http://www.fearbeneath.com/sharks/sharks-of-the-santa-barbara-channel/>