U.S. Army Corps
of Engineers

Explore 1

The California Coastline
Oregon Border to Klamath River Mouth

The Year of the Coast

The beauty and physical diversity of California's coast is exceptional. Its scenery is uniquely spectacular, with mountains dropping steeply to rocky shores, wide sandy beaches, rolling hills and coastal bluffs, dune fields and fertile marshes extending 1,100 miles from Oregon to Mexico.

The sea is the coast's chief architect, and continual changes take place as waves, rains and winds reshape and realign its contours. Coastal areas are animated with life forms as diverse as their habitats. Here the mighty whale and the tiniest of organisms, fragile shore plants and the towering redwood all live together with man in an intricately balanced state of interdependence.

The coast means something different to each individual. Some cherish it for its fresh salt air and opportunities for contemplative solitude; others see it as a potential site for commercial and recreational development. Some enjoy the coast as a place to picnic and swim, to fish, sun or sail, while to many it means searching for driftwood and shells or studying the mysteries of rocky offshore pools. To the U.S. Army Corps of Engineers it means a continuing dedication to coastal management and preservation through effective coastal engineering, exercise of regulatory authorities, flood and water quality control, harbor development and protection, and fish and wildlife conservation.

To assist you in developing a greater knowledge and appreciation of California's coastline and its valued resources, the Corps of Engineers, San Francisco District, has prepared a series of brochures which highlight both natural and man-made features. The sites included were selected for their unique scenic attributes, historic and educational significance, recreational opportunities and accessibility. Related information has also been included on coastal processes, plants and animals.

Bring your camera and binoculars, your curiosity and a sense of adventure and join us in exploring this wondrous gift of nature.

Oregon Border to the Mouth of the Klamath River

The ruggedly beautiful and sparsely populated 43 mile stretch of coastline between the Oregon border and the mouth of the Klamath River is one of California's most scenic coastal areas. Its rocky headlands and coves, wave battered cliffs and driftwood covered beaches, its rivers, lakes and wetlands offer both splendid vistas and endless opportunities for exploration.

Wildlife is abundant here, with hundreds of species occupying undisturbed and fertile habitats. Birds such as the great blue heron and snowy egret can be seen feeding in backshore marshes. Flocks migrating along the Pacific Flyway often join resident shorebirds on local beaches and river mouth sand spits. Raccoon and deer, porcupine, rabbits and squirrels live in forested coastal hills. Both sandy shore and rocky tide pools teem with life, and vegetation is particularly bountiful because of high annual rainfall and persistent fog. The Sitka spruce is perhaps the most common of near coast trees because of its sturdy resistance to the ocean's sprays and winds. Douglas fir and alder are also prevalent along with an array of low-growing shrubs and nearshore succulents and grasses. And, over the entire area broods the spirit of the giant redwood trees, surely one of the world's greatest natural wonders and certainly one of the dominant influences on the region.

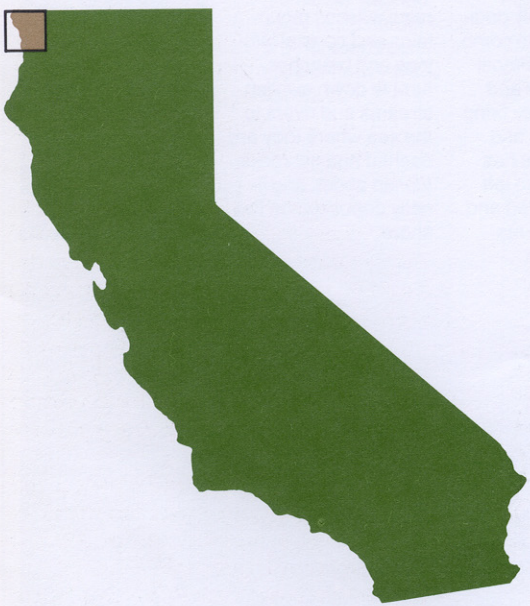
A large portion of the Del Norte County coastline remains in its natural physical state, experiencing only the on-going changes caused by erosion and accretion. The climate is moderate, although winter often brings violent storms and rainfall averaging 40 inches a year. Cool, foggy summers are common and fall days are often surprisingly warm and sunny.

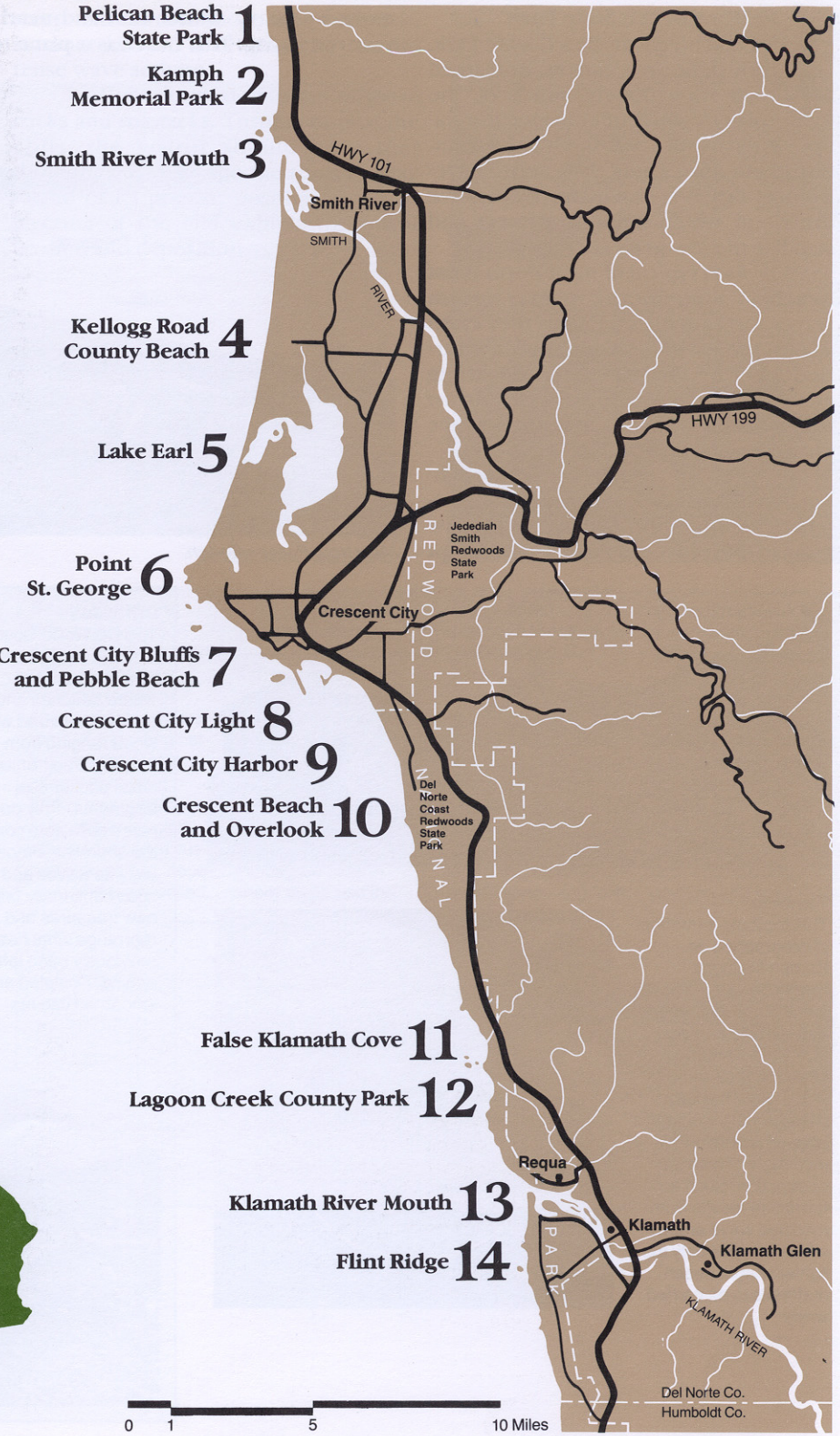
Much of the area between the mouth of the Klamath River and the Oregon border is protected and preserved within the boundaries of the 58,000 acre Redwood National Park. Lush Del Norte Coast Redwoods State Park, which lies within the larger park's perimeters, be-

gins just south of Crescent City and follows the coast south for many miles.

The area is rich in historical significance. It was first settled in the mid-1850's by gold-hungry prospectors who arrived to find the Yurok and Tolowa tribes peacefully inhabiting villages near the mouths of the Klamath and Smith Rivers. Gold prospectors were followed by farmers, lumbermen and fishermen, and today the local economy continues to be dependent primarily upon these industries. Swiftly flowing rivers and streams have a particular importance to the region's economic and physical well-being. Management decisions affecting the rivers' uses will have a significant impact on the industry, health and welfare of future generations.

As you enjoy this beautiful portion of the California Coast, the Corps of Engineers, San Francisco District hopes that you will gain a greater understanding and appreciation for its resources and an increased interest in its management and conservation.





1 Pelican Beach State Park

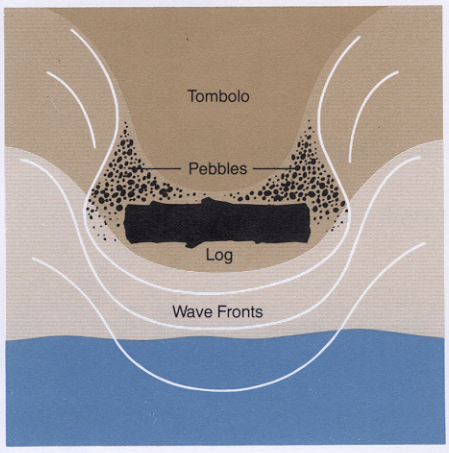
To reach Pelican Beach State Park, turn right on a narrow, unmarked road immediately south of the California-Oregon border inspection station. Wild, windblown and relatively undisturbed, this sandy five acre, wave-fronting beach is dominated by massive driftwood which helps to protect and stabilize the low grass covered dunes.

As is typical of most north coast beaches, high-energy winter storm waves sort beach materials as they crash against the shoreline. Finer sands are carried away by the backwash and strong currents. When summer swells return these sands, the beach's appearance changes once again.

Pelican Beach invites beachcombers, surf fishermen and agate hunters. The shoreline is backed by low coastal hills covered with timber kept moist by heavy winter rain and nearly year-round fog. This beach is a place to be alone with nature and enjoy the Pacific's thundering surf.

View from Pelican Beach.

Tombolo
This tombolo formation photographed on Kamph Memorial Beach developed as a result of the diffraction and refraction of erosive waves around a large piece of driftwood. Note the large pebbles lying in a fan-shaped formation immediately behind the obstruction. Such a formation results from modified wave energy which enables only the lighter weight beach materials to be carried away.



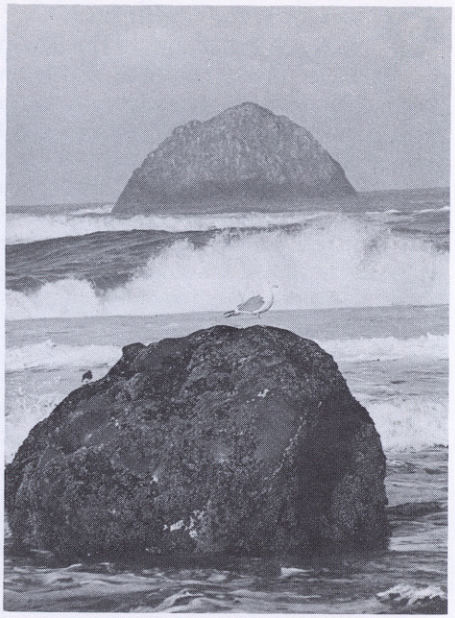
Driftwood
The Del Norte County Coast is a driftwood collector's dream where beaches and coves are littered with wood ranging from massive tree trunks to small pocket-size fragments. Truly dedicated collectors comb the shoreline almost daily as waves and tides continually bring new treasures and rearrange what has previously been left behind. Sculpted and smoothed into fascinating artistic shapes by the friction of sand and wave, a large portion of the driftwood found on the northern coast results from the areas' lumbering industry. As runoff from heavy winter rains washes mountains and coastal hills, logs and branches tumble down swollen streams and rivers to the sea where they are dashed against rocks, tossed about, and finally deposited on the shore.

2 Clifford Kamph County Memorial Park

Approximately 1.4 miles south of Pelican Beach, a sign identifies the location of Kamph Memorial Park. Its long sandy beach is similar in appearance to neighboring Pelican Beach; however, this county-maintained park is improved with picnic tables, public restrooms and fresh water facilities. Kamph County Park's shoreline is accessible by crossing a small foot bridge and following a path to steps leading to the beach. The sandy shore is backed by driftwood, grass-covered dunes and wave cut cliffs varying from 10 to 20 feet in height.

As is typical of wave-fronting beaches on the Northern California Coast, Kamph Beach experiences rather dramatic seasonal changes. Winter storm waves typically remove from 10 to 15 vertical feet of sand, leaving an often steep and narrow shore that widens in summer as sand is returned by less intense wave activity.

Cone Rock dominates offshore rocks and seastacks. Turning to face the cliffs, the visitor should note that thousands of years ago the shoreline lay inland of its present position. Exposed layering of the cliff exhibits historical erosion and deposition.



Cone Rock is mirrored by a smaller rock nearer shore.

Wave Cut Cliffs

The degree to which shoreline cliffs are affected by wave erosion depends primarily on their physical composition. Those consisting of less consolidated materials such as sand, clay and gravel erode more quickly and continually move inland.

The rugged, irregular coastline which characterizes Northern California results from the interaction between intense wave energy and the coast's varying land composition. Softer materials are slowly washed away while harder rock promontories persist in spite of heavy wave action.

Wave cut cliff.

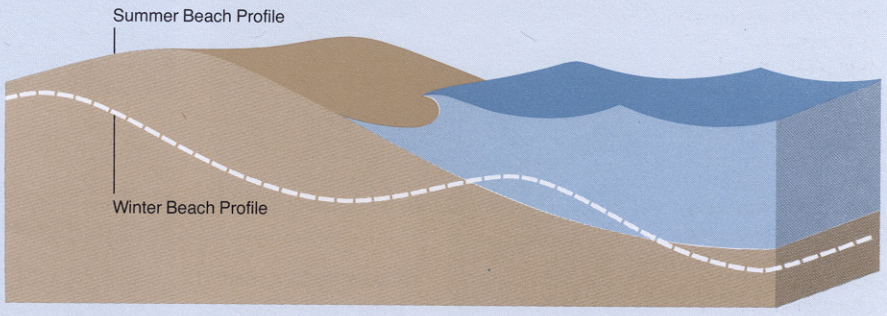
Beach Variations

Beach composition and formation depend primarily upon the dynamic forces of winds, waves and currents. Sands, originating from the eroding effects of natural forces and supplied by area streams and rivers, are placed in suspension, sorted, deposited and redeposited.

Longshore currents transport sand particles along the shore, with movement dependent upon wave and current direction and magnitude.

Beaches are classified not only according to average sand grain size but according to the degree of foreshore slope and the size of onshore berms. Steeper beaches are generally distinguished by large grained sands while shores of a more gentle slope exhibit finer sand composition. Winds also have a substantial effect on beach characteristics. Large, high-energy storm waves remove beach sands and form offshore bars which, during calmer periods, are slowly eroded away as sand is returned to shore and wider summer-type beaches are produced.

As you explore the Northern California coast, observe differences in its beaches both in terms of composition and form.



3 Mouth of the Smith River

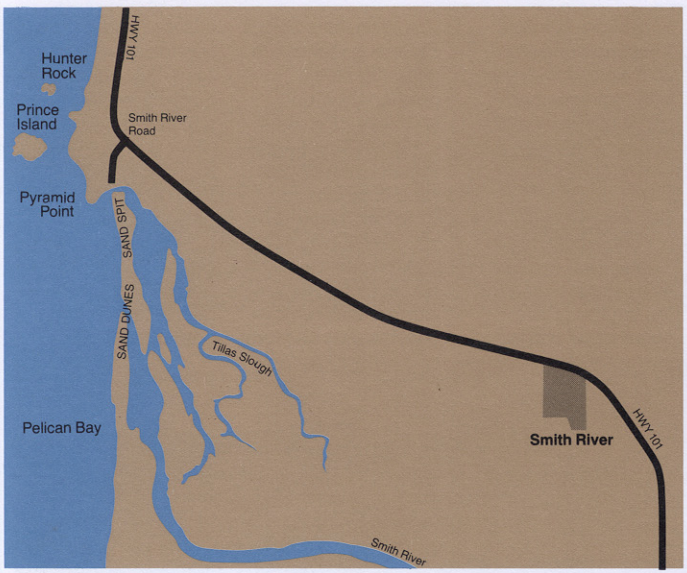
To reach the mouth of the famed Smith River, continue south on Highway 101, turn right on Smith River Road approximately a mile south of Kamph Memorial Park and follow the road to its end. A short walk leads to a pebbled beach which provides an excellent vantage point for observing the Smith meet the sea. Directly across the river's channel, which widens and narrows seasonally as flow increases and decreases, is the tip of a long dune-covered sand spit which lies perpendicular to the dominant wave approach. The spit is a popular resting place for local and migrating shorebirds.

A short walk to the right across a heavily cobbled beach leads to the top of Pyramid Point, a rugged and rocky promontory which marks the northern end of Pelican Bay and fixes the northerly progress of the river's mouth. Looking upcoast, observe magnificent Prince Island and Hunter Rock.

The Smith River, named after explorer Jedediah Smith who first visited the area in 1828, is internationally recognized as a prime fishing center where steelhead trout, salmon, flounder, smelt and ling cod enter the river's tidewaters. The Smith meanders across a flat flood plain extending approximately eight miles inland and 25 miles downcoast to Point St. George which, along with Pyramid Point, helps to stabilize the orientation of long, wave-fronting Pelican Bay Beach to the south.

The Smith River delta, identified as one of seven stabilized delta areas on the California Coast, exhibits some seasonal change, particularly when winter floods bring large sediment loads downriver. Typically, however, varying currents, wave direction and intensity cause only minimal changes in the river mouth area.

In July, visitors can enjoy the beauty of blooming fields of Easter lilies which dub the Smith River area the Easter Lily Capital of the World. Giant redwoods are prevalent in area coastal hills. The Smith has been designated a component of the California Wild and Scenic Rivers System because of its largely primitive shoreline, extensive watershed and outstanding scenic qualities.



Smith River Area.

The vast flood plain of the Smith River extends eastward toward coastal hills.

Pyramid Point, at the mouth of the Smith River.

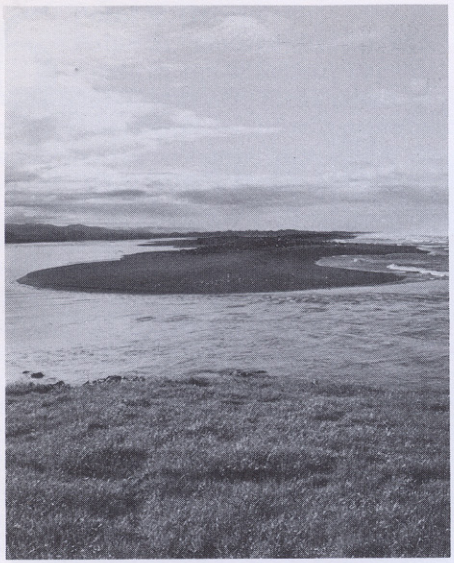
Lines on coastal rock show high and low tide variation.

Hunter Rock.

Sand Spits

Sand spits can be most simply described as elongated barriers connected to shore at one end. The spit formation is produced by the prevailing local water circulation pattern resulting from nearshore and current interaction. Where wave-induced currents are weakest, a greater quantity of beach materials is deposited. Coastal spits are often formed in conjunction with coastal lagoons and river mouths.

The precise location of a spit's opening to the sea is a function of the balancing of natural forces present during any particular period. Typically, the location of an opening, or mouth, tends to migrate toward the north during the winter storm season, only to migrate to the south or even close during periods of low stream flow and quieter summer conditiions.



Mouth of Smith River from end of Smith River Road.

4 Kellogg Road County Beach

Visitors can reach beautiful Kellogg Road County Beach by turning right on Lake Earl Drive about 100 feet past the Smith River Bridge. Continue to Fort Dick, turn right on Morehead Road, right on Lower Lake Road and left on Kellogg to a paved parking area. Along the way, observe extensive areas of mature dune fields covered with grasses and trees interspersed with wetland areas and ponded marshes.

Kellogg Beach, located approximately in the middle of Pelican Bay, conveys a somewhat different feeling than beaches visited to the north. Straight and long, open and expansive, it is backed by dune fields and backshore marshes filled with the brackish waters typical of many low-lying coastal areas. The beach along Pelican Bay is aligned parallel to predominant wave crests and is fed by sediments brought downriver by the Smith. On a clear day look for the St. George Light several miles offshore.

Looking north along Pelican Bay from Kellogg Road County Beach.

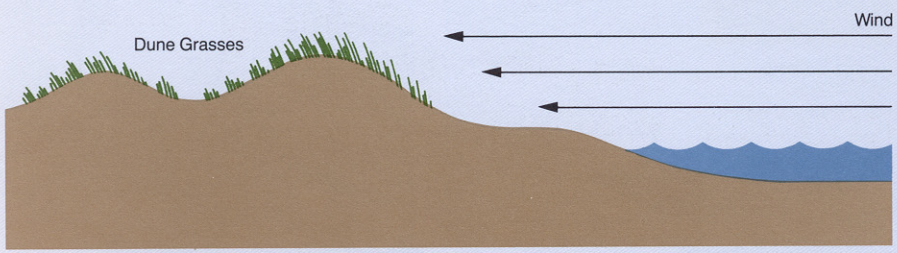
Sand Dunes

Sand dunes develop when loose dry sand is blown inland by onshore winds and later stabilized by vegetation. Hardy dune grasses, credited with being the true dune builders, grow quickly once roots take hold. As more complex root webs are established, increasingly large amounts of sand are trapped to form hillocks or sand masses. Barrier dunes provide valuable protection for low-lying backshore areas by sacrificially resisting even the powerful eroding action of storm waves and tides. These stockpiles of sand, which eventually form continuous ridges oriented to the prevailing winds, provide valuable habitats for a variety of small animals and other lifeforms. Paths made by vehicles, animals or man can, however, destroy dune stability and sands accumulated over many years can quickly be eroded away by the winds.

Migrating dunes are those which, unencumbered by the clutches of vegetation, continually move inland, shifting and changing with varying wind velocity and direction.

Stabilized grass covered dunes.

A "blowout," as shown here, occurs when a dune's protective plant cover is broken and exposed sands are blown landward to form a depressed passage.



5 Lake Earl

Lake Earl is a 2,000-acre fresh water lagoon running parallel to Pelican Bay behind a sandy barrier beach. To reach this popular spot, return to Lower Lake Road and continue south through the flat farming area which forms the southern portion of the Smith River flood plain. Turn right on Lake Earl Drive, right on Lakeview Drive, and continue directly to the lake. Surrounding wetlands serve as a principal Del Norte County habitat for shorebirds and waterfowl. Runoff from Lake Earl, which is surrounded by large bullrushes, fills smaller Lake Talawa. In winter, Talawa exchanges water with the Pacific during high tides. The area is a haven for fishermen, duck hunters and birdwatchers.

After visiting Lake Earl, continue south on Lake Earl Drive and turn right on Washington Boulevard which runs across Point St. George and leads to the next featured coastal site.

Bullrushes at Lake Earl.

Wetlands

The extensive wetland areas of California's sparsely populated northern coast serve a number of important functions. In addition to providing prime nesting, spawning and resting habitats for a variety of plant and animal species, wetlands act as storage areas for storm and flood waters and as natural ground water recharge and water purification sites. In addition, wetlands shield other areas from wave action, erosion and storm damage, and serve as important settings for the study of aquatic environments.

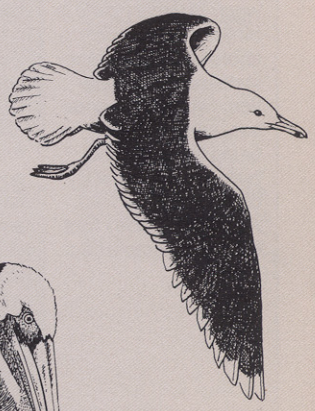
The U.S. Army Corps of Engineers Regulatory Program, in accordance with the Clean Water Act of 1977, identifies wetlands as productive and valuable public resources and states that any unnecessary alteration or disturbance is contrary to the public interest.

Even the most casual exploration of marshy bogs and waterways of northern coast wetland areas will help to develop a deep appreciation for one of nature's most productive ecological systems.

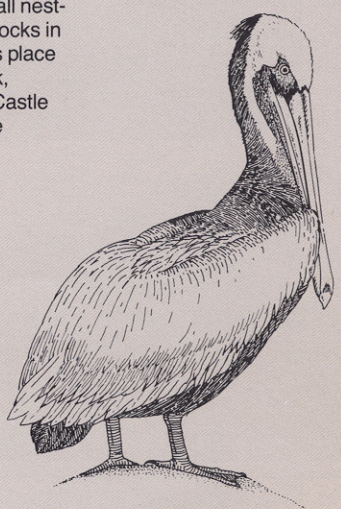
Shorebirds

A fascinating variety of shorebirds enjoy undisturbed habitats along California's northern coast. They are most commonly seen on sandy spits or beaches and in nearshore marshes where outgoing tides continually provide abundant supplies of insects, worms and small organisms. Because many shorebirds are similar in appearance, use of a birdwatcher's guide to aid in identification of various species can add an enchanting aspect to coastal explorations.

Offshore rocks in Del Norte County serve as key rookeries, or nesting and breeding centers, for numerous local and migrating sea birds. Approximately 46% of all nesting on coastal rocks in California takes place on Hunter Rock, Prince Island, Castle Rock and False Klamath Rock.



Western Gull



Brown Pelican

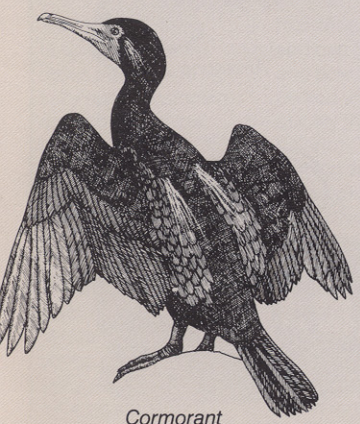
Sanderling

6 Point St. George

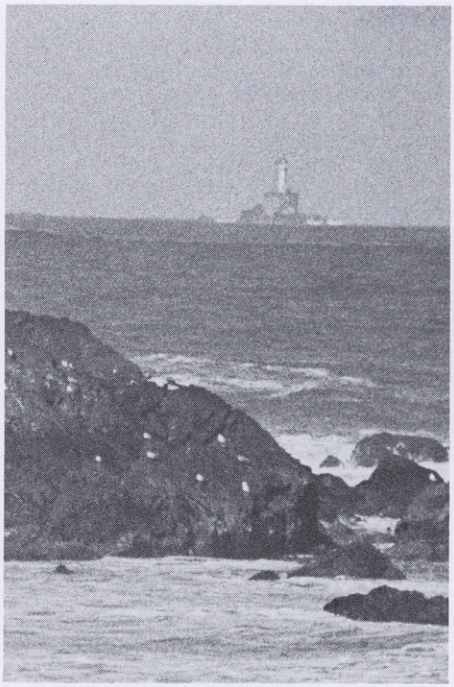
Point St. George lies at the southern tip of Pelican Bay approximately 16 miles south of the Oregon border. A virtually treeless and windblown coastal bluff, Point St. George is composed of slowly eroding rock covered by a layer of top soil. A downhill path located off the parking area at the end of Washington Road leads to an excellent point from which to view infamous St. George Reef, an often fog-covered, partially submerged chain of rocks extending seaward from the Point. Shoreline waters are filled with seastacks that have been detached by erosion from the shore's rocky cliffs. Seastacks and offshore rocks here and throughout surrounding areas are believed to be composed of Franciscan Rock from the Jurassic-Cretaceous era.

St. George Light, a 146 foot grey tower, sits at the outer edge of the reef. The lighthouse was built following an 1865 tragedy when the steamer Brother Jonathan struck what is now called Jonathan Rock approximately three miles downcoast. The disaster caused the death of all but 19 of the 232 passengers. Many of the victims are buried in the Crescent City Cemetery, now designated as a California Historical Site.

Pelican Bay as viewed from Point St. George.



Cormorant



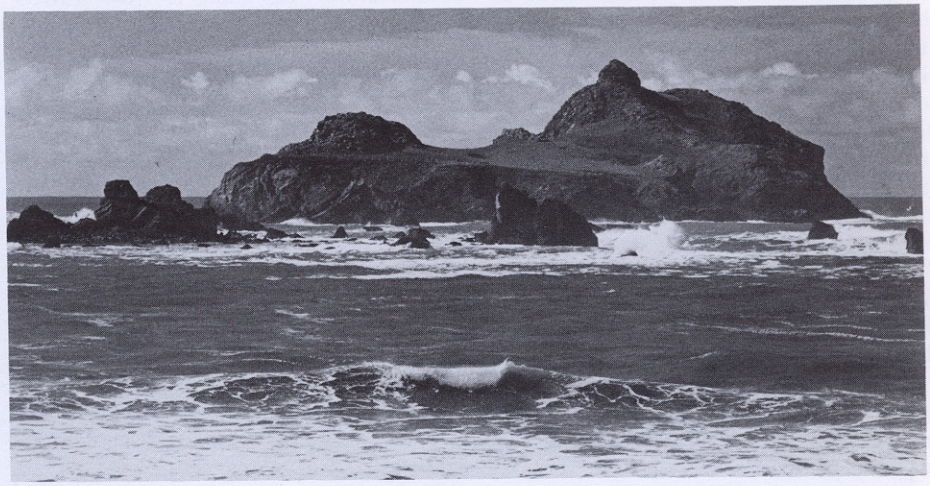
Hazardous St. George Reef consists of a series of submerged and partially-submerged rocks and covered ledges. It extends 6.5 miles directly offshore from Point St. George. The reef is composed of nine visible rocks including the outermost Little Black Rock and Star Rock to the far southeast. The St. George Light, built on Northwest Seal Rock following the wreck of the coastal steamer Brother Jonathan in 1865, appears in the distance.

Pocket beach off Point St. George.

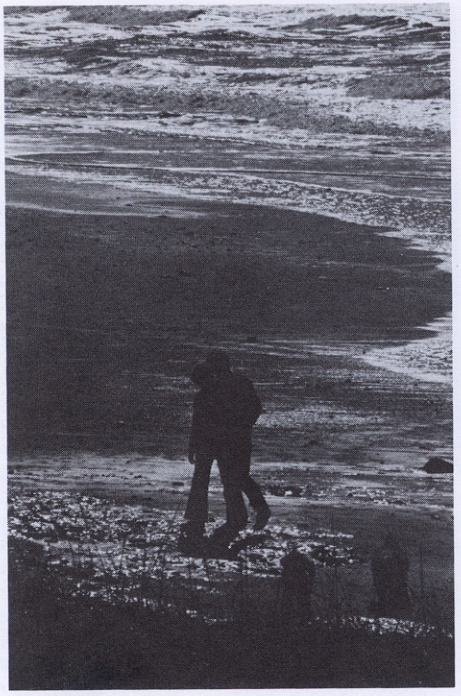
7 The Crescent City Bluffs and Pebble Beach

Returning from Point St. George on Washington Road, continue south by turning right on Pebble Beach Drive. Proceed along the top of Crescent City's scenic bluffs. Several lookout areas offer splendid vistas of spectacular Castle Rock, dozens of offshore seastacks and the energetically breaking waves so typical of California's rugged northern coast. Watch for sea lions resting on Castle Rock and note the historical marker identifying nearby sites of former Tolowa Indian villages.

Occasional steps lead down to Pebble Beach, a narrow sand and cobble strip running from Point St. George to the Crescent City Harbor. Small pocket beaches are prevalent here due to the interaction of waves with offshore rocks and the bluff's variable erodability. Pebble Beach is especially popular with driftwood collectors, surf fishermen, and rockhounds.



Castle Rock.

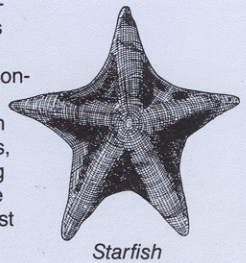


Pebble Beach is popular with rock collectors and surf fishermen.

Tide Pools

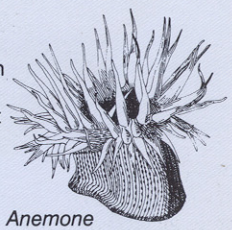
Tide pools offer fine opportunities for observing one of nature's most mysterious and fascinating ecological systems in a single small place. These cool, well-aerated aquariums support a fragile and delicately balanced environment where each creature has its own special niche. Tide pool life revolves around the simple instincts of finding food, escaping enemies and reproduction.

Inhabitants are stratified according to the varying degrees of exposure that take place during tidal changes; that is, according to low tide, middle tide, high tide and splash zone classifications. The splash zone, for example, supports the barnacle and periwinkle snail who need only periodic moisture, while the high tide zone is home to creatures such as limpets and shore crabs. Starfish and clam worms inhabit the middle zone, and urchins and sea hares flourish in lower tide areas. Because of continual exposure to periodic evaporation and battering waves, creatures occupying the middle tide zone are perhaps the most hardy and adaptive.

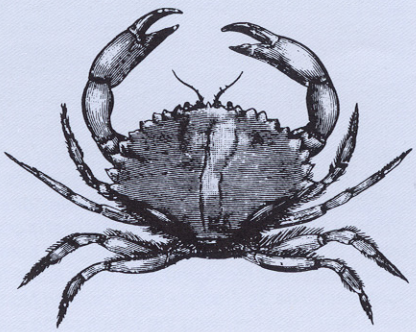


Starfish

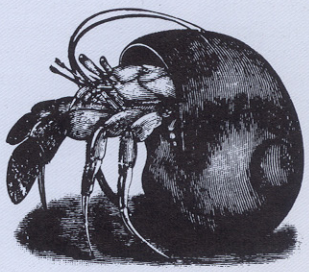
As you quietly explore this complex wilderness, we ask that you help in its preservation by not disturbing the creatures who make it their home.



Anemone



Rock Crab



Hermit Crab

8 Crescent City Lighthouse

A visit to the historic Crescent City Lighthouse off Battery Point is a must if time and tides permit. Located on a small island near the foot of A Street, the lighthouse was built in 1856. Although no longer used as an aid to navigation, the lighthouse today houses a fine collection of maritime relics and local historical materials, including Indian artifacts. The museum, open only during summer months, can be reached at low tide by walking across a short stretch of intertidal beach during the period from two hours before to one hour after low tide.

The Crescent City Light off Battery Point is accessible only during low tide.

Warnings

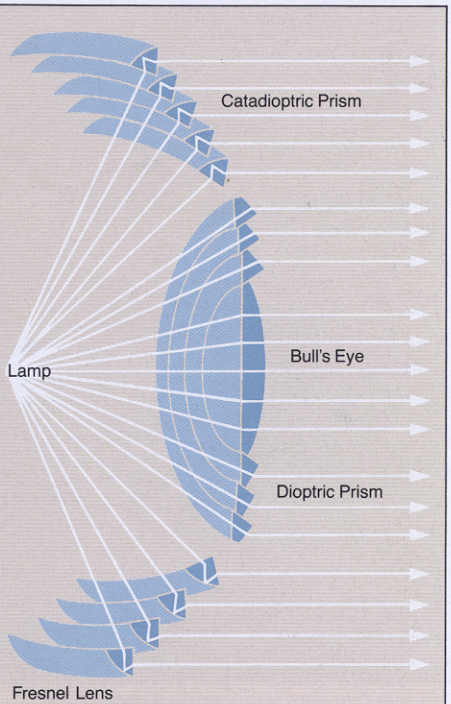
In spite of the wondrous beauty and typically non-threatening appearance of the rugged Northern California Coast, exploration of tide pools, rocks and cliffs can be dangerous.

Remember to stay well back from cliff edges where softened soils, particularly during rainy periods, often slide easily. Rocks moistened by rain or surf can be slippery, and powerful, unexpected waves can quickly throw one off balance. Watch for incoming tides and always wear non-slip, protective footgear for rock climbing and tide pool exploration. Northern coastal waters are extremely cold, and dangerous currents are prevalent. Swimming is inadvisable in most areas.

Lighthouses

As the lumbering industry flourished along California's northern coast, the need to warn seafaring vessels of shoreline rocks and reefs became increasingly important. Early lighthouses, modeled after already-existing New England models, were originally fueled by whale oil and lard. Frenchman Augustine Fresnel invented the first lenses. Made of glass prisms, they were capable of throwing light up to 20 miles. The operation of lighthouses along the Northern California Coast is today the responsibility of the U.S. Coast Guard's 12th District.

Identified by experts as the greatest lighthouse in America, the St. George Light, named after England's patron saint, was almost certainly the most difficult and expensive to build. Storms continually battered hardy, long-suffering crews who spent nearly ten years constructing it atop its 54 foot rock pedestal. Even after its completion, life at the storm-battered outpost was extremely dangerous and lonely, and keepers often resigned or requested transfers to less difficult assignments. Former functions of the remarkable St. George Light, permanently abandoned in 1975, are today performed by a large automated buoy.



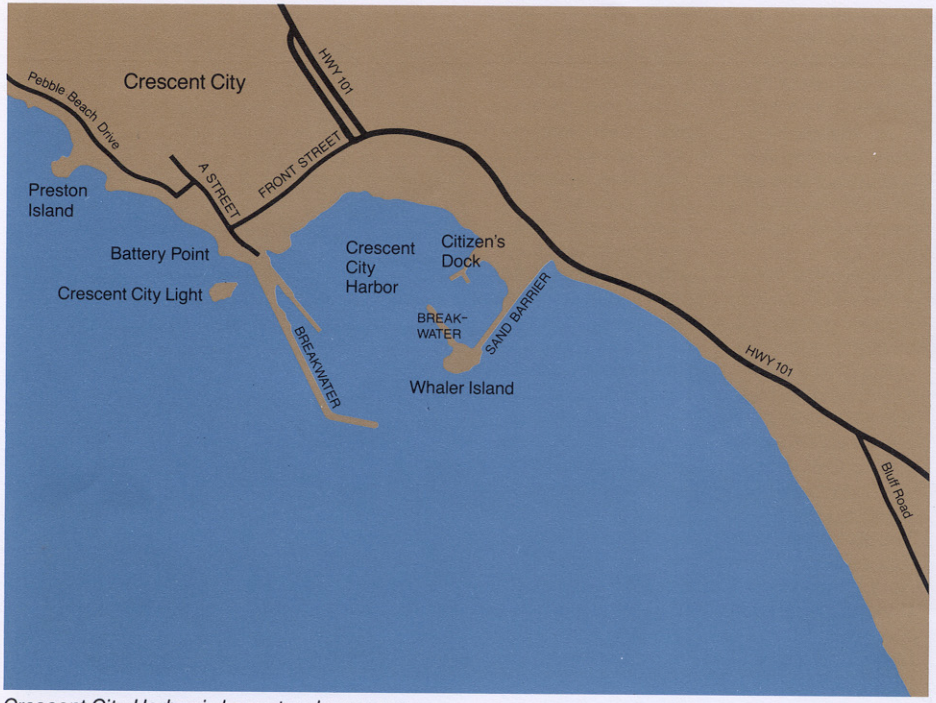
9 Crescent City Harbor

Crescent City Harbor, first discovered by Jedediah Smith in 1828, was finally settled in the fall of 1852 when the Schooner Pomona brought the city's first settlers. The port once served as a primary shipping point for Oregon and Klamath mine diggings and later became a key element of the local lumbering industry.

Crescent City, with a population of 4,000, lies at the southern end of the Smith River plain about 275 miles north of San Francisco. It takes its name from the curved or crescent-shaped bay on which it is located. The bay's crescent formation results from the action of waves approaching predominantly from a northwesterly direction and refracting around the erosion resistant upcoast outcroppings in the vicinity of Battery Point. Downcoast of the harbor, the influence of wave refraction becomes less pronounced, and the shoreline straightens.

The Corps of Engineers-constructed 4,700 foot breakwater, which forms the outer harbor from the foot of A Street, serves as a fine example of the San Francisco District's coastal protection projects. Designed to protect the harbor from waves which range up to 35 feet in height during stormy winter months, the breakwater was constructed in 1930. In 1973 and 1974, additional reinforcement was added in the form of 1,900 tetrapods weighing 25 tons each. These four-footed concrete giants are scientifically designed to dissipate a maximum amount of energy from incident waves. A tetrapod monument, located at the southern edge of the city near Highway 101, allows a close-up look at this giant armor. Forty ton dolosse have also been used to reinforce the Crescent City breakwater. These massive concrete units were first developed in South Africa and were named "dolosse," an Afrikaans word, for their similarity in appearance to the ankle bone of a small goat. The entire length of the Corps breakwater is capped by a 20 foot wide concrete cap and, although views of the harbor are excellent from the breakwater's tip, visitors should be advised of the danger of unexpected waves washing over the structure.

Additional harbor protection is provided by the Corps of Engineers-constructed 1,200 foot inner breakwater extending from Whaler Island and the 2,400 foot sand barrier which runs from the island to the harbor's southeastern shore. The sand barrier was constructed to prevent ocean waves and currents from transporting sands upcoast into the



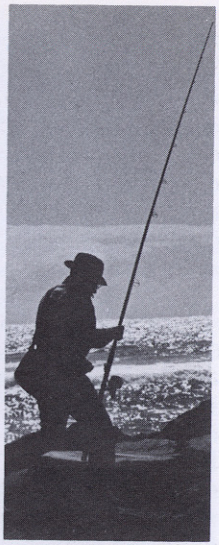
Crescent City Harbor is home to a large commercial fishing fleet. Figures from the Department of Fish and Game for the State of California indicate that 16,784,367 pounds of fish and shellfish with an estimated value of $6,828,528 were unloaded here in 1976.

The Corps of Engineers' 4,700 foot breakwater protects Crescent City Harbor.

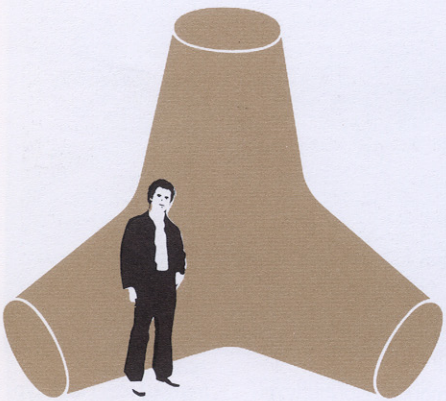
inner harbor area.

A sizeable commercial fishing fleet makes its headquarters in the Crescent City harbor. Visitors may enjoy watching fishermen as they unload shrimp, crab, rockfish and salmon at Citizen's Dock on the harbor's east side. Crescent City Harbor also serves as a major port for the delivery of petroleum, and here, too, lumber is loaded on huge ocean-going barges.

Stops at the Redwood National Park Headquarters located at Second and K Streets and the Chamber of Commerce Visitor Information Center on Front Street will provide details on the availability of coastal interpretive and educational programs as well as visitor accommodations.



Fishing in Crescent City Harbor.

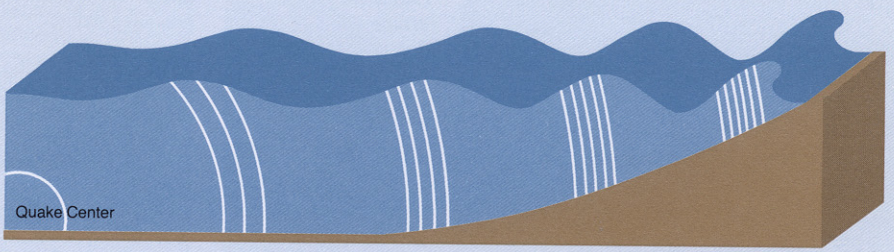


Twenty-five ton concrete tetrapods, similar in appearance to children's jacks, have been used to reinforce the Crescent City breakwater. The U.S. Army Corps of Engineers first used this innovative French invention in Crescent City, giving it the distinction of being the first city so protected in the Western Hemisphere.

Tsunamis

Tsunamis, also known as tidal waves, are caused by sudden movements of the ocean floor resulting from volcanic eruption, submarine slide or fault movement. The great 1964 Alaskan quake, which registered 8.5 on the Richter scale and produced extensive local damage, gave Crescent City the unique distinction of having suffered the greatest tidal wave damage ever experienced on the west coast of the Continental United States.

Tremendous oscillations caused by the ocean floor's vertical displacement resulted in the rapidly moving waves which, although traveling thousands of miles, lost little energy and increased in height as they reached the more shallow coastal waters. The majority of the city's business district was damaged or destroyed by the 1964 tsunami and property losses were estimated to be as high as $27 million. Emergency work, including cleanup and repair of streets, roads and storm drain systems, the removal of debris, dock repair and demolition of damaged structures totaled hundreds of thousands of dollars. The block nearest Crescent City's waterfront has never been rebuilt.



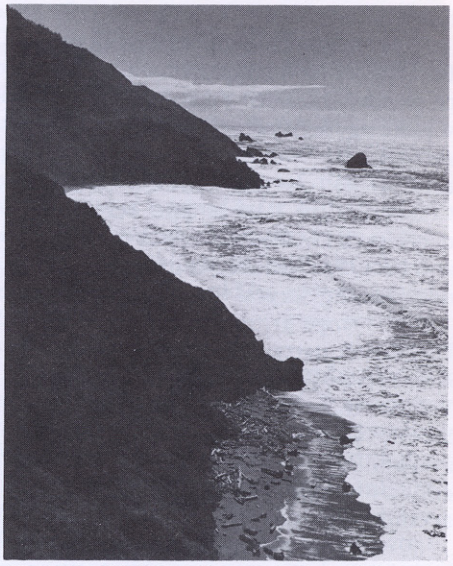
10 Crescent Beach and Overlook

To reach Crescent Beach, make a right turn off Highway 101 on Bluff Road just south of the Crescent City limits. Continue downcoast to a "Crescent Beach" sign where a right turn leads to a large parking area, picnic tables, grills, fresh water and restroom facilities.

Crescent Beach is a long, low strand made up of fine-grained sands. Such a composition results from the low energy wave typical of a protected shoreline. Occasional gravel patches offer good hunting for rock collectors. Driftwood is prevalent, and surfers are frequent visitors. Crescent Beach is backed by extensive tidal marshes, low bluffs and a coastal plain that extends to heavily forested hills. This beach is recognized as one of the most biologically productive areas for invertebrates on the Northern California Coast.

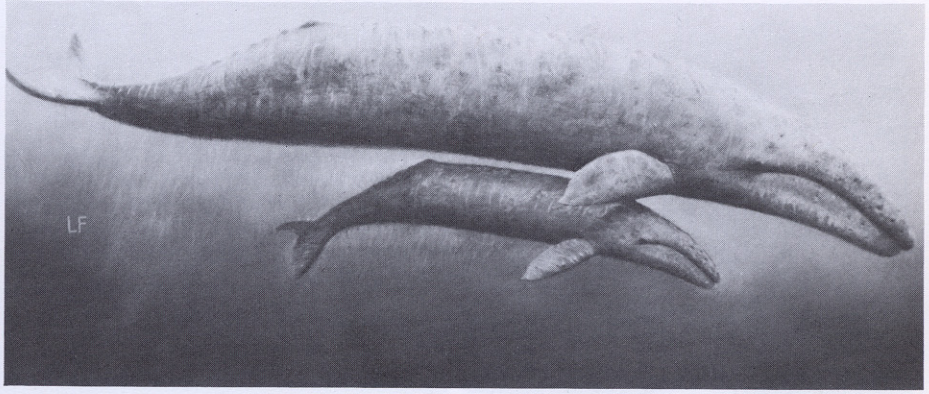
After exploring Crescent Beach, return to Bluff Road, turn right and continue to the Crescent City Overlook. Located on a grassy bluff high above the Pacific, this vantage point offers unexcelled vistas of Crescent City and its harbor, Castle Rock and the backshore wetlands of Crescent Beach. Picnic tables are available and a Redwood National Park marker identifies local landmarks. The overlook is a good place to watch for the spouts of California grey whales as they make their semi-annual migrations.

Enderts Beach, situated at the base of the overlook's steep cliffs, can be reached by following a half mile trail which begins at the end of Bluff Road. The trail terminates at Nickel Creek Campground where picnic facilities are available.



Pocket beach formed by sands deposited between non-erodable promontories.

Crescent City as seen from the Crescent City Overlook.



California Grey Whale

Because it moves close to shore during its semi-annual migration, the California grey whale is perhaps the most familiar of the cetacean species to west coast residents and visitors. Observing its regular movement from numerous shoreline vantage points has become a popular pastime.

The long trip from the Bering Sea and Arctic Ocean, where the grey whale feeds during summer months, to warmer Mexican waters, where breeding and calving occur, is about 6,500 miles in length. Each trip takes from two to three months. Northerly migration can best be observed along the California coast during March and April, while watching the southern movement is best between December and February. The grey whale usually travels in small groups of from two to five.

Adults range in length from 40 to 50 feet, typically weigh between 20 and 40 tons and are black in color with grey mottling. Calves usually measure between 16 and 17 feet long at birth. The grey whale feeds primarily on smaller crustaceans with an occasional fish for added flavor.

11 False Klamath Cove

Our next-featured coastal site is False Klamath Cove. To reach this beautiful part of the Northern California coastline, return along Bluff Road to Highway 101 and continue south through Del Norte Coast Redwoods State Park, which lies within the larger 58,000 square acre Redwood National Park. The coastal area in this vicinity has been designated as an "area of special biological significance" by the California State Water Resources Board because of its outstanding primeval biological qualities. Dominated by offshore rocks and wildly crashing waves, the shoreline, now some distance to the west, runs along the base of high-cut cliffs and steep mountains.

Note numerous memorial groves along this lovely stretch of inland highway and enjoy the cool shadowy protection of California's magnificent coastal redwoods. As the road again nears the coast, several lookout areas provide downcoast vistas of False Klamath Cove, Wilson Rock and False Klamath Rock.

A right turn just after crossing Wilson Creek leads to Wilson Creek Beach, a pocket beach at the north end of False Klamath Cove. High energy waves have produced a steeply sloping beach face made up of coarse sand. Visitors should beware of dangerous currents and the strong backwash of receding waves. The beach is a popular spot for netting surf smelt. When runoff from winter rains opens the creek's mouth, salmon, steelhead and cutthroat trout enter the creek to spawn.

Visitors at False Klamath Rock.

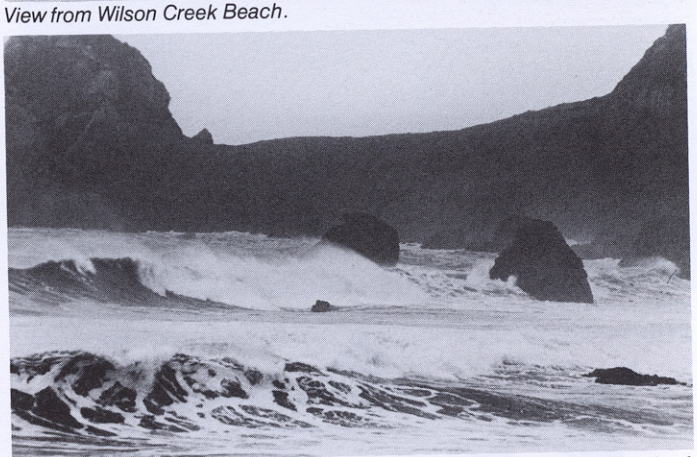
Redwoods

The area's moderate climate with its cool summers and wet winters, heavy rainfall and coastal fog provides ideal growing conditions for one of California's most famous natives, the coast redwood. Taller and more slender than the giant sequoia found in the southern Sierra Mountains, these beautiful awe-inspiring trees are recognized as the world's tallest at heights of more than 300 feet. The tallest known redwood, measuring approximately 368 feet, grows on Redwood Creek Trail near Orick.

Most coast redwoods thrive from sea level to 3,000 feet and are from 500 to 700 years old, although some have been identified as being as old as 2,000 years. Coast redwoods are recognizable not only by their great height, but by their dark reddish bark and flat, somewhat feathery foliage.

Redwoods within Redwood National Park are protected against harvesting. However, lumbering is prevalent on private property and within national forests in areas of Northern California and Southern Oregon. Law requires that lumbered areas be either replanted or left undisturbed so that new trees can reach maturity. Approximately 75 years of growth is necessary before young trees are ready for harvesting.

View from Wilson Creek Beach.

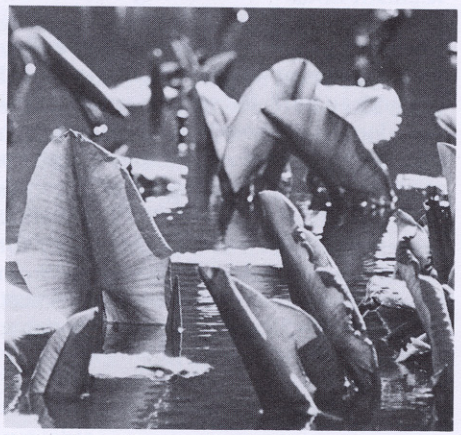


The Northern California Coast is enhanced by the presence of hundreds of seastacks. Made of erosion-resistant rock, they remain behind as the sea carves away materials of softer composition.

12 Lagoon Creek County Park

Lagoon Creek County Park at the southern end of False Klamath Cove is another worthwhile stop featuring a large paved parking area, picnic tables and restroom facilities. The park's serene fresh water lagoon, formerly a mill pond, is covered with water lilies and provides a quiet resting place for a variety of shorebirds. Rainbow trout inhabit its placid waters.

A path at the north end of the parking area leads to the northern trailhead of a scenic four mile coastal trail which passes by Sea Lion Caves and Hidden Beach and ends at the Klamath River overlook on Requa Road near the Klamath's mouth. The half mile, self-guided Yurok Loop Trail originates from Lagoon Creek Park. Take advantage of this delightful opportunity to visit the southern end of False Klamath Cove and enjoy close-up vistas of Wilson and False Klamath Rocks. Tide pool exploration is a popular pastime during low tide periods.



Water lilies at Lagoon Creek mill pond.

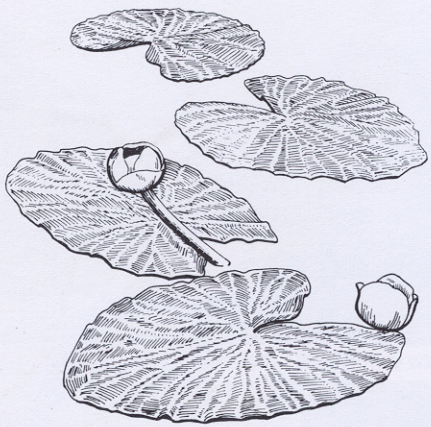
13 Klamath River Mouth

To reach the mouth of the beautiful Klamath River, continue downcoast on Highway 101 through a statuesque redwood forest rich with lush undergrowth. Watch for a Redwood National Park ranger station approximately a mile south of False Klamath Cove where a variety of information on area wildlife, plants, coastal ecology and park interpretive programs is available.

An overlook located high above the Klamath's mouth provides exceptional downcoast views. To reach this vantage point, turn right on Requa Road, pass through the town of Requa, and continue about a mile to a large parking lot where restroom facilities are available. Requa, rich in Yurok Indian lore, is now primarily a resort and fishing center. Located just below a U.S. Air Force radar

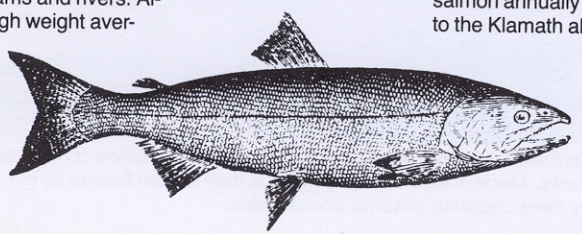
Water Lily

The water lily, common to fresh water lowland marshes and ponds along the Northern California Coast, was once used as food by local Indians. Its large, heart-shaped leaves are from 6 to 12 inches wide and are attached by long stems to a common root stock. Muskrats and water birds find the water lily a valuable food source. It also serves as a micro environment for a variety of aquatic invertebrates.



King Salmon

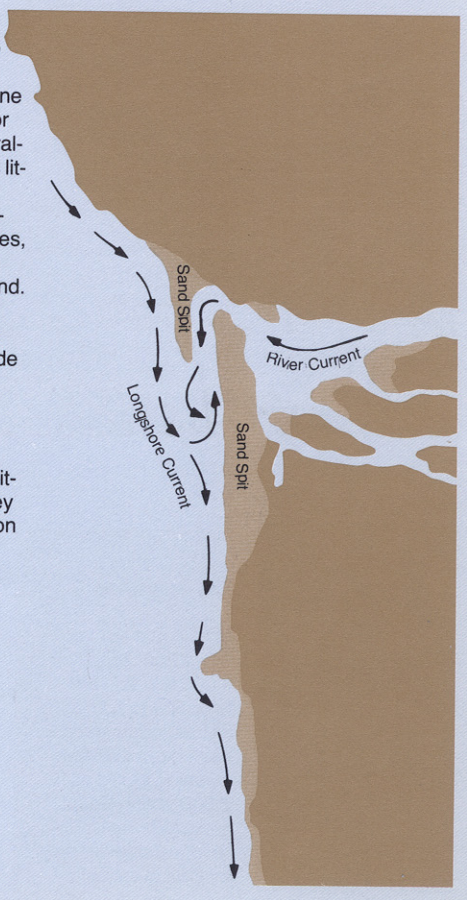
The king or chinook salmon is the largest of the game fish that annually attracts thousands of avid sports fishermen to Northern California streams and rivers. Although weight averages 12 pounds, a 30-pound specimen is not uncommon. Spawning runs occur in both spring and fall, with the fall being most important. Young fish spend their early lives in the river's fresh water, then swim downstream to the sea to mature before returning from three to five years later to spawn. It is believed that approximately 170,000 king salmon annually return to the Klamath alone.



Littoral Drift

Littoral drift refers to the movement of sand along a coastline by littoral currents, or currents moving parallel to the shore. This littoral current, along with the agitating action of breaking waves, is the major factor in the movement of sand. The degree of sand movement depends upon wave magnitude and direction.

Coastal engineers continually monitor long-term effects of littoral transport as they study shore protection alternatives.



station, the overlook marks the southern end of the four mile Coastal Trail. A short loop trail offers excellent views of the Klamath River delta and the rocky coastline to the south. Listen for the barking of sea lions, especially during spring months as they follow candlefish migrating upriver.

Unlike the Smith River which meanders through an extensive flood plain, the Klamath cuts through rocky canyons with mountains rising to 4,000 feet on either side. The 263 mile long Klamath, California's second largest river, drains approximately 15,000 square miles and is fed by several tributaries including the Shasta, Salmon, Trinity and Scott Rivers. The Klamath's sandy mouth experiences recognizable seasonal changes in the form of accretion and erosion. During summer months when the river's flow is low, ocean currents deposit large quantities of sand which expand the river's north spit. In winter, much of the spit is washed away by rushing waters of the rain-swollen river.

A Yurok Indian village was located near the mouth of the Klamath when the white man arrived in search of gold in 1851. It is believed that the river's name comes from an Indian word meaning "encampment." Today the Klamath is best known as a sports fishing center where hundreds of avid sportsmen annually pursue king and silver salmon and steelhead trout making their way upriver to spawn.

To assist in flood control and prevent extensive erosion of the Klamath's scenic north bank, the Army Corps of Engineers, San Francisco District, constructed a 4,500 foot long revetment, or retaining embankment, about 2.5 miles upstream. To view the revetment, return to Highway 101 and continue a short distance south. Take the Terwer exit and follow Highway 169 east along the river to the former site of Fort Terwer near Klamath Glen. Stabilization of the Klamath's north bank, completed in 1971, has prevented the continuation of an erosion rate that averaged 40 feet a year.

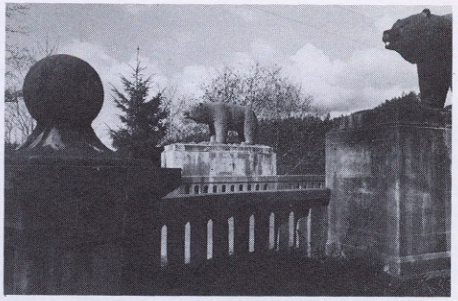
View of Klamath River Mouth from Requa Road overlook.

The Army Corps of Engineers' revetment consists of layers of rock designed to protect the Klamath River's northern bank from erosion.

14 Flint Ridge

A right turn immediately south of the Klamath River Bridge on Klamath Beach Road provides access to a lovely scenic drive that begins along the Klamath River estuary where tides and river flow mix. Watch for the entrance to Douglas Memorial Bridge, a remnant left as a reminder of the extensive destruction suffered during record 1964 floods. Although travelers with trailers and recreational vehicles are advised to proceed left at Alder Camp Road near the former bridge's entrance, others can take advantage of the beautiful drive around Flint Ridge. Turnouts along the way offer dramatic vistas of Flint Rock Head and White Rock, as well as a spectacular stretch of the rugged Northern California coastline. Both routes return directly to Highway 101.

Alder trees line the coastal drive around Flint Ridge.



Entrance to the Klamath River's Douglas Memorial Bridge, which was washed away during 1964 floods.

The Klamath River mouth and south spit as seen from Klamath Beach Road.

Seals and Sea Lions

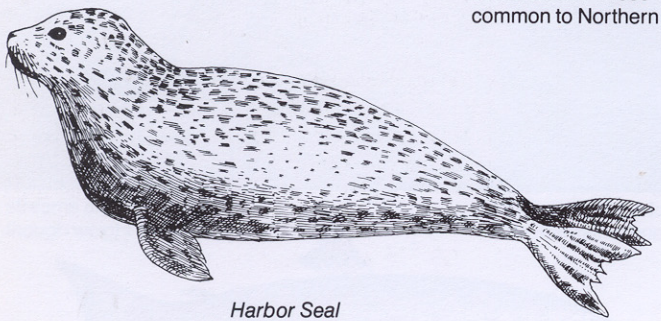
Seals and sea lions are common sights along the Northern California Coast, particularly at river mouths and on nearshore rocks and islands. Two of the most familiar are the northern sea lion, formerly called the steller sea lion, and the harbor seal.

The northern sea lion is the giant of the two. Males often weigh up to 1,800 pounds and can be 13 feet long. Females are more petite, weighing up to 700 pounds. The rocky areas to which they return year after year are preferred breeding grounds where a single male may have a harem of up to 20 females. The northern sea lion, yellowish-brown in color, enjoys a diet consisting mainly of fish and squid.

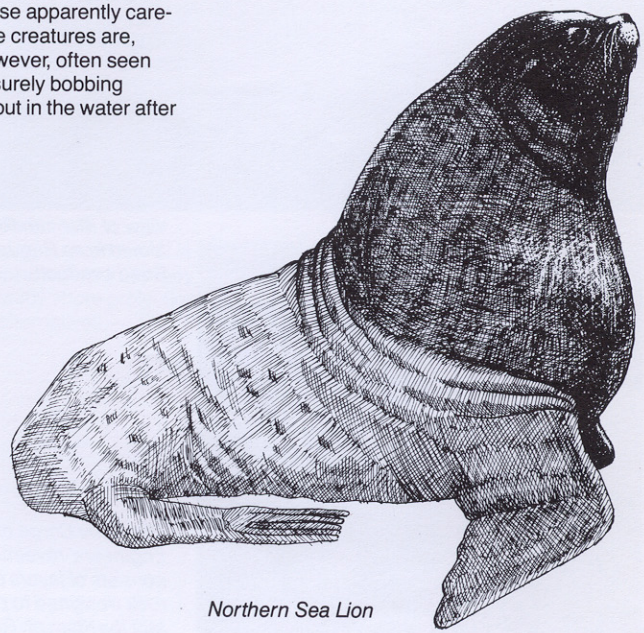
The smaller harbor seal, or leopard seal, is dramatically different in appearance with its lack of external ears, smaller front flippers and short stocky body. Males average six feet in length and may weigh up to 300 pounds, making this pinniped the smallest in western coastal waters. Color varies to some extent. Those common to Northern California waters are normally silvery in color with blackish spots while southern varieties tend to be of a darker color with lighter grey spotting.

Not as numerous as the northern sea lion, these apparently carefree creatures are, however, often seen leisurely bobbing about in the water after what was probably a most satisfactory dinner of small fish and octopus. Harbor seal pups are generally born during June and July.

All seals and sea lions are protected from harassment, hunting and capture under the Marine Mammal Protection Act of 1972.



Harbor Seal



Northern Sea Lion

The Year of the Coast

In keeping with President Carter's declaration of 1980 as "The Year of the Coast," the U.S. Army Corps of Engineers has joined other public agencies and private organizations in focusing attention on the need to manage, preserve and protect our nation's coastal areas. To assist in this worthwhile objective, the San Francisco District of the Army Corps of Engineers will, throughout 1980, publish a series of brochures highlighting key natural and man-made features of the California Coast. It is hoped that this series will both inform the public of coastal features and processes and assist in the development of a greater appreciation of the critical need to insure the protection and management of coastal resources.

For additional details on these brochures and other public information and education programs available from the Corps of Engineers, please contact the following Public Affairs Offices:

South Pacific Division
630 Sansome Street
San Francisco, CA 94111
(415) 556-5630

San Francisco District
211 Main Street
San Francisco, CA 94105
(415) 556-0594

Los Angeles District
300 N. Los Angeles Street
Los Angeles, CA 90012
(213) 688-5320

Sacramento District
650 Capitol Mall
Sacramento, CA 95814
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