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Over a Cliff

NORTHERN ELEPHANT SEALS' CALIFORNIA COMEBACK CHALLENGED BY SEA LEVEL RISE, INBREEDING

BY CHERYL LYN DYBAS

PHOTOS BY ILYA RASKIN

"Steep Cliffs!" warns a map of California's Point Reyes National Seashore, 72 kilometers northwest of San Francisco. "The cliffs of the Point Reyes Headlands are likely to crumble and slide," the notation continues. "Climbing on them invites catastrophe. Because of falling rocks, walking below cliffs is dangerous. Keep away!"

The alerts are understatements, as Point Reyes National Seashore ecologist Sarah Codde knows. At the edge of a rock face near the headlands and above Drakes Beach far below, Codde braces against a biting February wind. "The beach is off-limits to people at this time of year because there are so many mating elephant seals," says Codde. "We're protecting the seals—and the people who might become trapped between two bulls fighting over a cow. We're also watching out for newborn seals."

The peak of northern elephant seal (*Mirounga angustirostris*) mating season coincides with the mid-February dates around Valentine's Day. Today is the 17th; seals have come ashore at Point Reyes by the hundreds.

Adult northern elephant seals make their way to California beaches twice each year. Females arrive in early winter to deliver and nurse their pups, then mate. In spring, immature seals and adult females return to molt. Males flop onto beaches during mating season in February, then again in summer to molt.

Elephant seals spend more than 85% of their lives in the open North Pacific. The seals, so named as the males' noses resemble elephant trunks, deep dive to more than 1,500 meters, where they feast on sharks, flatfish, ratfish, crabs, squids, and octopuses.

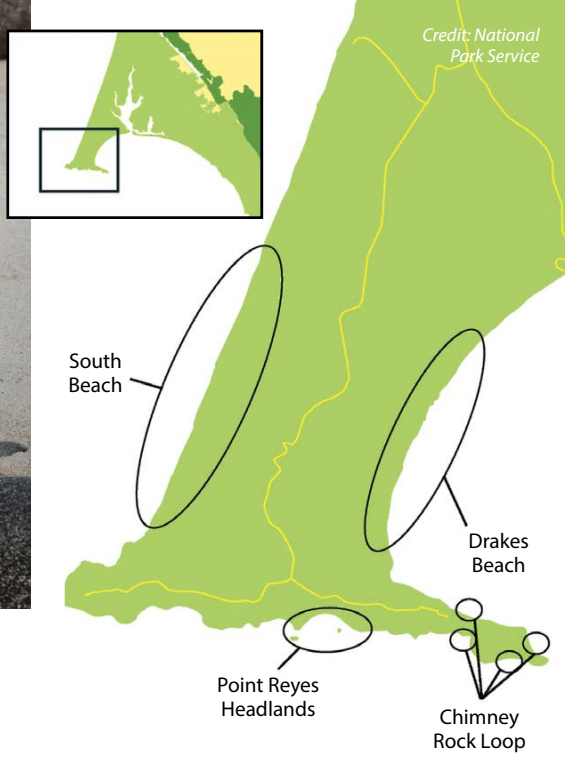
For most of the year, adult male and female seals travel the high seas thousands of kilometers apart. To complete their annual round trips from beach to open ocean and back again, females journey more than 17,700 kilometers and males some 21,000 kilometers. Males feed in areas off the Aleutian Islands, while females head to the northeastern Pacific or to the waters near Hawaii.

"Then after a few months, it's back to land," says Codde. "Mating takes precedence in the magic month of February."

NO BEACH LOUNGING FOR ELEPHANT SEALS

As I look over the craggy edge to Drakes Beach, I think not of elephant seal love, but of the hazards of getting to the seals, let alone walking among them. But navigating these challenges is exactly what Codde has planned. Point Reyes National Park managers have given permission for the biologist to serve as escort down a knife-edge path from clifftop to boulder-lined beach.

If February is elephant seal time along the California coast, it's also the season of the so-called Pineapple Express, an atmospheric



river that brings driving rainstorms from the Hawaiian Islands across the Pacific Ocean and onto California shores. A soaking rain has just ended, leaving coastal grasses glistening in the sun—and the track to the beach a slurry of mud.

A year ago, a strong El Niño swept ashore here, bringing gusty rainstorms and hazardous surf—for seals and for people.

"Last February we had numerous road closures, and access to the beach was very difficult due to the risk of landslides," says Codde. For the seals, it was a bad time indeed. "We lost a lot of pups," Codde laments. "They were pulled into the surf and drowned, starved or died of injuries sustained while being thrashed around in the water." Some 30% to 40% of the 2017 season pups were lost to rough seas. "When elephant seals are young," says Codde, "they're far from good swimmers."

Adult seals showed up in places researchers had rarely or never seen them. The storm pushed the seals out of their normal breeding grounds and onto new ones. In fact their preferred breeding locations at Point Reyes may be changing, Codde says, from open headlands to semi-protected beaches like Drakes. Take the case of one of the oldest northern elephant seals on record.

On March 5, 2000, Point Reyes biologists placed a numbered pink identification tag on a female seal pup's flipper. At the time, the pup was on the Point Reyes Headlands beach. "She hadn't been seen since that day," says Codde. "We don't do tag surveys anymore at that seal colony because the cliffs are too high—and too far from the seals—to read the tag numbers with our spotting scopes. We used to go down to the site once a year to mark weaned pups, but we stopped because it became too dangerous to hike down the eroding cliffs."

On January 29, 2018, the same pink-tagged seal was spotted on Drakes Beach. "We're assuming she was part of the Point Reyes Headlands colony for most of those 18 years, then moved to Drakes Beach because of the high surf at the headlands," says Codde. Pups born at Point Reyes have been glimpsed in Alaska, Canada, and Russia, however, "so who knows where she may have been in between those sightings," Codde says.

New pink tags in hand, Codde decides that time and tide are right to mark this year's Drakes Beach pups. Looking at the rock face, she admits that getting to the seals isn't for the faint of heart.

ROCK CHUTE TO THE SEALS

We start down a deceptively easy path bordered by ice plant. The spiky plant is an invasive species native to the coast of South Africa; it now carpets seaside bluffs from Baja California to the Oregon border. Along the way, we pass Elephant Seal Overlook, where visitors can watch seals from high above, holding onto the sturdy railing of a viewing platform that's anchored on firm ground.

We shimmy around the platform to the top of a pinnacle and carefully place one foot on a steep-sided trail. Small rocks dislodge and ricochet down a narrow, twisting chute. One step at a time, we make our way between boulders and toward the shore. At the track's base, slippery, barnacle-encrusted rocks present the next challenge.

Finally, we're on the grainy sands of Drakes Beach, a narrow strand below the cliff. At first it sounds like the site of a raucous seabird colony—until we round a headland and spot the blackish-brown shapes that lay like overstuffed sausages everywhere on the beach. Barking elephant seals on all sides inch their way up and down the sand. "This beach is pretty small," says Codde, "so there's not a lot of room for the seals to maneuver, especially when they're at peak numbers like they are now."

We scramble out of the way of a nearby female and her seven unwelcome suitors. "She's just trying to get to the water," says Codde, "but these males won't let her." Up and down the beach the pursued seal flippers, attempting to evade the fearsome seven as each one tries to push himself on top of her. After a nail-biting (for the observers) 30 minutes or more, she spies an opening and muscles through the bad-mannered guys to freedom: open waters.

Drakes Beach currently hosts nearly 2,500 seals. From 2005 through 2017, seal numbers averaged 1,500 (females and pups). Now there are more than 1,200 females and 940 pups. In February, male elephant seals come ashore solely to breed, then immediately return to the water.

"This year, numbers of females and pups are much higher," says Codde. "The population is going up every year." Female elephant seals counted at Point Reyes

National Seashore in February surveys increased from 637 in 2008 to 945 in 2014 to 1,354 in 2018.

As more seals choose the protected shores of Drakes Beach, they're forcing park managers to cordon off larger-than-usual areas. Three kilometers of previously open beaches are now closed through March 15, the end of seal breeding.

Two or three months later, with the arrival of spring and the molting season, seal numbers again increase along the beaches "just like they do during the breeding season," says Codde. In spring 2018, park biologists counted almost 900 molting seals along Drakes Beach. The previous year, there were 200, and the year before that, 100. "They're definitely showing new preferences for where they haul out," Codde says.

SEALS ON THE REBOUND... OR ARE THEY?

Even on Drakes Beach, however, the seals aren't on easy street. They're still facing twin specters: inbreeding that may leave them more vulnerable to disease, and sea level rise that may wash away the beaches they breed on.

The inbreeding problem began in the mid-1800s. American whaler Charles Scammon spotted northern elephant seals hauled out on beaches from Baja California in Mexico to Point Reyes. Scammon was one of the first to hunt the seals, according to Point Reyes National Seashore documents, but many other whalers (or sealers) followed. Because the seals must make their way onto beaches to mate, give birth, nurse their pups and molt, they're more easily hunted than other marine mammals, such as whales, that never come ashore.

Commercial elephant seal hunting began in 1846. Early accounts told of the seals' extraordinary abundance. Whalers and sealers harvested elephant seals for their oil-containing blubber. The blubber of one male could produce up to 95 liters of oil. But 15 years after the start of seal hunting, northern elephant seals were decimated. By 1884, not one elephant seal was sighted, and the species had gone extinct.

Or so it was thought.

In fact, a small colony of 100 seals survived on Guadalupe Island off Baja California. In 1922, when the Mexican government designated Guadalupe Island a biological reserve, the seals began to bounce back. The United States then enacted protections for elephant seals on the southern Channel Islands; the seals had recolonized the islands in the 1930s. Elephant seals moved north to Año Nuevo Island in 1961, the Southeast Farallon Islands in 1972, Point Reyes National Seashore and Cape San Martin in 1981, and San Simeon in 1992.

From the small Guadalupe colony, seal numbers have increased by about 6% per year. Today there are some 160,000 northern elephant seals along the Pacific Coast, all descended from the 100 or so seals on Guadalupe Island, creating a population bottleneck. These seals retain only a fraction of the genetic diversity of the original, pre-hunting population.

Inbreeding often results in a higher incidence of harmful genetic mutations, which lead to disease. Congenital defects that range from cardiac abnormalities to kidney defects have been discovered in young elephant seals stranded along the California coast.

COMING ASHORE...WHEN THE SHORE IS MISSING

In 30 years, or perhaps sooner, elephant seal stranding—or coming ashore at all—may be a distant memory on California beaches. The sands may be gone with the tide.

Scientists Kota Funayama, Ellen Hines, and Jerry Davis of San Francisco State University and Sarah Allen of Point Reyes National Seashore ran three sea level rise

scenarios. Most current haul-out sites at Point Reyes, the researchers found, will likely be underwater by 2050. The results are reported in a 2013 issue of the journal *Aquatic Conservation: Marine and Freshwater Ecosystems*.

The biologists looked at four Point Reyes breeding sites: Point Reyes Headlands, Chimney Rock Loop, North Drakes Beach, and South Beach.

Point Reyes Headlands is the haul-out where the seals established their first colony at the national seashore. The headlands are a series of isolated rocky, cliff-backed coves and are mostly inaccessible to people. The area offers plenty of breeding space in years with normal storm activity.

When major storms blow in, however, as happened during the 2017 El Niño, the headlands are exposed to high surf and are soon inundated. Then the seals head for cover, making their way around the promontory to Drakes Beach.

Similarly, Chimney Rock Loop on the eastern part of the peninsula is exposed to high surf and is "susceptible to intense erosion," state Funayama and coauthors.

The narrow, cliff-backed sands at North Drakes Beach offer the seals respite. "The area has some space for breeding," says Codde, "and is relatively protected from high swells and intense waves." Sand deposition from intermittent landslides may be creating a larger beach for the seals, hence their increasing numbers at the site.

South Beach is a wide, dune-backed beach in the southernmost section of the Point Reyes Headlands. It might seem like ideal elephant seal habitat, but it's the Point Reyes location most affected by erosion and large waves. During the 1998 El Niño, for example, large swells carved away the beach. Space for the seals was almost nonexistent by the end of the breeding season. The scene was not much better during the 2017 El Niño, says Codde.

THESE ARE THE GOOD OLD DAYS

From an elephant seal's future vantage point, say in 2050 or 2099, the tough winters of 1998 and 2017 may be the good old days.

"Areas of haul-out inundation will consistently increase as sea level rises," state Funayama et al. "The 2050 scenario would flood nearly half the Point Reyes seal habitats, and approximately two-thirds of the habitats would be inundated by 2099."

According to Funayama's models, Limantour Spit, along a curve from Drakes Beach and away from the Point Reyes Headlands, has suitable conditions for seals to establish new breeding colonies in the future.

"Elephant seals aren't using Limantour Spit just yet," says Codde. "We get the occasional sighting of an adult or subadult male there during the breeding season, but it's always a single animal and is, at most, two sightings each year. It's currently a haul-out site, however, for harbor seals."

According to a 2017 report by the California Ocean Science Trust, *Rising Seas in California: An Update on Sea-Level Rise Science,* by 2100 sea level at the Golden Gate Bridge in nearby San Francisco could increase, in an extreme scenario, by as much three meters above the 1991–2009 mean. By 2150, that high estimate rises to 6.7 meters.

"No matter how you look at it," Codde says, "sea level rise isn't good news for elephant seals anywhere along the California coast."

From northern elephant seals' presumed extinction in 1884 at the hands of seal hunters, to their northward expansion from Guadalupe Island and subsequent population explosion to today's 160,000, elephant seals have shown their mettle.

Will their resilience survive another threat, this time from rising waters likely to drown California beaches?

Future Point Reyes maps may carry new warnings: "Dangerous surf. High water. Keep away!"

If only seals could read.

ABOUT THE AUTHOR

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NOTE

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