

The scenic Salton Sea draws migrating birds from far and wide, but some species are now at risk there.

Meanwhile, rising salinity and pollution have ruined attempts (like one above) to use it for popular resorts.

By Robert H. Boyle

Photographs by Chad Slattery

Life—or death— for the Salton Sea?

This huge California lake was a haven for birds and fish, and aimed to be a Paradise for man—but chemicals and salt may do it in

You half expect to hear Captain Kirk say, "Beam me down, Scotty. This is the strangest lake I've ever seen." Illuminated by a G-Class star and flanked by Martian-like mountains with ancient dry washes, the reddish brown lake covers 380 square miles of a deep desert bowl. Mud volcanoes bubble along its southeastern shore, the rottenegg stench of hydrogen sulfide pervades its backwaters, and yet hundreds of thousands of birds, many strange to the eye, feed along the edges of the lake or bob on the open water. And there on the western shore lies the outline of a lost city.

This bizarre body of water is not on some strange planet in a distant galaxy. It is the Salton Sea in the

southeastern corner of California near the Mexican border; the lost city is Salton City, laid out for 40,000 people and never finished.

That was in the late 1950s, when the Salton Sea was supposed to become the Golden State's great new playground, a whole new concept of Southern California living, with an 'alluring combination of the desert and the sea.' M. Penn Phillips and other developers of Salton City bought 19,600 acres that they subdivided on paper for house lots, shops, schools, parks and churches. They spent \$1 million on a freshwater distribution system with 260 miles of water lines. They put in power lines and 250 miles of paved streets in elegantly contoured



provides the only inland nesting sites in the United States for gull-billed terns and provides three of only five nesting sites that exist in the Western U.S. for black skimmers."

In recent years, though, there have been increasing signs of trouble. Early in 1992, Radke was appalled to see a number of eared grebes stagger up on shore to die. Many were so disoriented that they stood still while gulls tore into their flesh and began eating them on the spot. This continued well into March, until the final death toll rose, by conservative estimates, to 150,000 grebes. Radke helped collect 40,000 carcasses. Necropsies ruled out infectious disease as the cause of death, but the tissues of some of the dead birds contained three times more selenium than that of grebes he had tested at the Salton Sea three years earlier.

Selenium is a mysterious, sulphur-like element. deposited by prehistoric volcanic eruptions. It is found in many dry parts of the West, and when seleniferous land is irrigated, selenium can be carried into a watercourse. Though it is an essential trace element for growth in animals and humans, there is a narrow tolerance margin between beneficial and toxic doses. As little as two parts per billion in water can render aquatic vegetation and invertebrates hazardous to birds that eat them.

At present, the selenium level in Salton water is only one part per billion—not yet dangerous. But at the sea's silted bottom, the level ranges from 200 to 2,500 times higher. Pile worms live in the silt and are eaten by fish, which in turn are preyed on by fish-eating birds such as grebes. In the winter of 1994, another 10,000 to 20,000 eared grebes died at the sea after behaving in the same strange fashion as the birds Radke had observed in 1992. The exact cause is not yet known. Stuart Hurlbert of San Diego State University believes that toxic phytoplankton is responsible, and recent studies reinforce this view. But in 1994, Joseph Skorupa, a biologist with the U.S. Fish and Wildlife Service who has been working on selenium contamination elsewhere in California, pointed out that "virtually any time birds are exposed to above background concentrations of selenium, as they clearly are at the Salton Sea, the potential for increased susceptibility to disease exists."

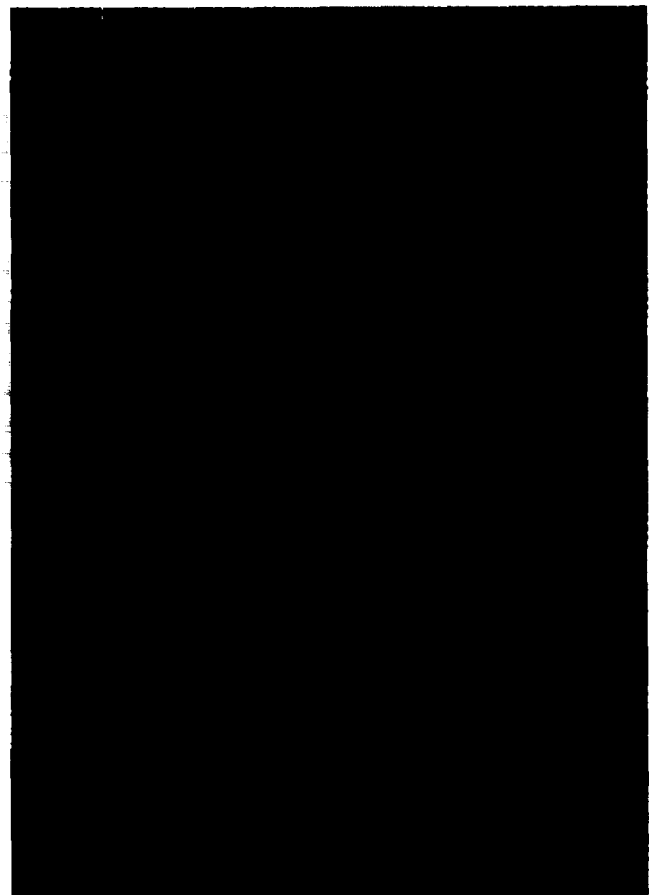
Until recently, almost nothing was really done to try to end problems affecting the sea. This is partly because they have evolved so slowly and partly because they involve conflicting claims to water-sharing in the desert; in a prime agricultural area, such claims will clearly be difficult and expensive to rectify. But the threat of selenium and effluents to bird life has helped draw attention to the sea's multiple troubles.

Its water level tends to rise erratically, damaging the little towns that cling to its western shore, where waterfronts are constantly eroded and trees are destroyed. In the village of Desert Shores recently, the Imperial Irriga-

tion District had to bulldoze a dike into place but still found itself obliged to buy up a few waterfront lots rather than risk lawsuits. For years a successful saltwater fishery, the sea may soon be so salty that even ocean fish won't survive in it. Rich in nutrients from Imperial Valley drainoff, it often has a red-brown algal bloom. Even worse, on bad days—mostly in summer—when the wind is right, the stench of the sea is said to reach 50 miles, all the way up to Palm Springs.

Fortunately, this unusual sea has an unusual champion. He is Norman E. Niver, a 66-year-old musician who now and then used to play bass for his actor friends Alice Faye and the late Phil Harris. "Phil liked the sea," Niver says, "but Alice thought it was a toilet bowl." Niver, a compact, 239-pound, gray-haired bundle of energy, and his wife, Connie, a bar manager, live on the water in the failed resort center of Salton City. They bought their house in 1977. Lots were already cheap and, at as little as \$2,500 per quarter-acre, are cheaper still today.

The Nivers and some 5,000 other folks, including



Trees die when inundated by saltwater, becoming fine perches for cormorants and other fishing birds.



Illustration shows sea with its connecting canals and streams. An ill-advised cut in the Colorado River

let floods (broken lines) rush west and north in 1905 toward the then-empty basin, 278 feet below sea level.

flocks of 'snowbirds' who from October to March migrate to trailer and RV parks in the three or four towns beside the scenic sea, constitute a close-knit, convivial community heavily sprinkled with retirees, They are attracted to tiny Desert Shores, Salton City and Salton Sea Beach by bargain-basement prices, an almost frontier-like camaraderie and a beakerful of the warm South. (Space for trailers and RVs ranges from \$150 to \$210 per month.) This is pancake breakfast country, given to pickup classes in painting and ceramics, "Golden Girls" amateur shows, Easter egg hunts, and brisk rounds on a nearly defunct golf course.

"Let's face it," says David Barrett, 73, "by golf course standards it's a wreck, but it gives a lot of people pleasure." Like a good many snowbirds, Barrett, a World War II bomber pilot from Vancouver, British Columbia, is a Canadian. He is also the leader of an over-60 group called the Rat Pack whose members regularly bang around the rugged desert nearby on motorcycles. Indeed, at the seaside, wheels rather than water seem to provide most of the excitement. The highlight of the winter season is Treasure Trails, an event in which hundreds of people blast off into the desert in dune buggies, pickups, motorcycles, jeeps and "rails" (cars with no sides) in search of 175 or so buried treasure chests artfully hidden by the event's sponsors.

Barrett, who has been coming back to the sea for 15

years, says "There's no necessity to put foot in the water.' Every year there have been rumors of plans to fix up the sea, he says, but he doubts anything will happen in his lifetime. He is philosophical about it, perhaps in part because "if the sea were clean, this place would be another Palm Springs, and goodbye to us all."

Norm Niver also defends the sea for its virtues and mes to overlook its faults. The only drawback to living by the sea Niver will admit to is his air-conditioning bill. With summer temperatures that hit 117 in the shade, it costs \$300 a month to cool the house down to 80, and then he has to keep wiping the condensation off the windows. But he is a year-round resident, a birder and a fisherman, and he does not take the condition of the sea philosophically at all. Even though health officials have warned since 1986 that no one should eat more than eight ounces of any Salton Sea fish in a two-week period, and that women of childbearing age and children under 14 should abstain completely, Niver regularly eats the orangemouth corvina he catches. "They're delicious," he insists, adding with a grin that he also fed 'tons' of corvina to his cat Charles, who died a couple of years ago at the hoary age of 19.

Niver's immediate fear is that increasing salinity will put an end to the fish, with reverberating effects on some 60 species of fish-eating birds that use the sea. In the 1960s and '70s, the Salton Sea was one of Califor-

nia's most productive sport fisheries, with huge schools of **corvina**, **some** weighing up to **32 pounds**. **Now**, Niver admits, the number of corvina has dropped and the fish are generally on the small side, **4 to 10 pounds**. Though thousands of Californians still camp out in the state recreational areas along the eastern shore, anglers don't use **the sea** in anything like the numbers that they once did. On the western shore, the few motels that once housed them are abandoned. Experts **say** that if the salinity continues **to** increase at its present rate of about **0.8 parts per thousand per year**, in less than ten years almost **all** fish will be gone.

By 1992 Niver's never-ending warnings about increasing salinity helped **goad** local politicians into setting up **the Salton Sea Authority to improve** water quality. "He's been **a great help**," **says** Brad Luckey, **an** Imperial Valley farmer and county supervisor and one of the eight directors of the authority. Luckey put Niver **on the Imperial County Planning Commission** and **last year** named him the **very first** appointee **to** a brand-new Citizens Advisory Committee to the Salton Sea Authority.

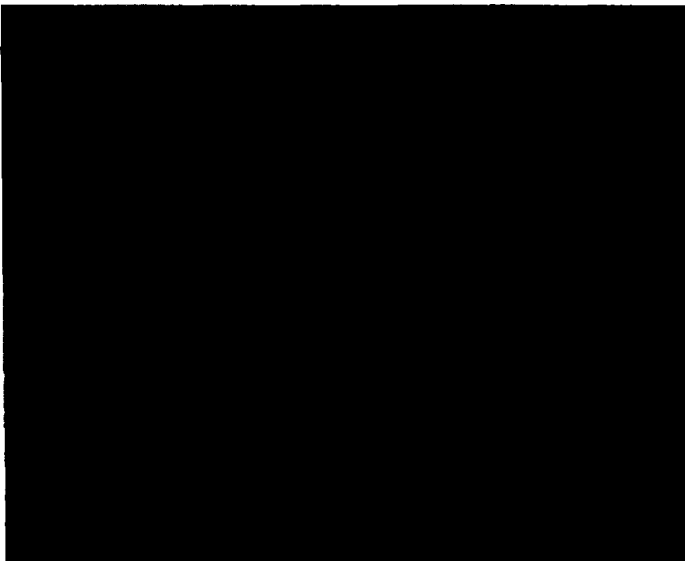
Over the years, according **to** Niver, there has been little **or** no support from any **major** environmental group. **Gary** Polakovic of the Riverside **Press-Enterprise** reports criticism **of** environmental groups like the Sierra Club and **the Audubon Society** for doing nothing about the plight **of Salton Sea wildlife**. Niver adds, They apparently think that if they get involved here, they'll lose on other water issues in **the state**."

It is clear that the sea's problems will not be solved any time soon. They are the product not merely **of**

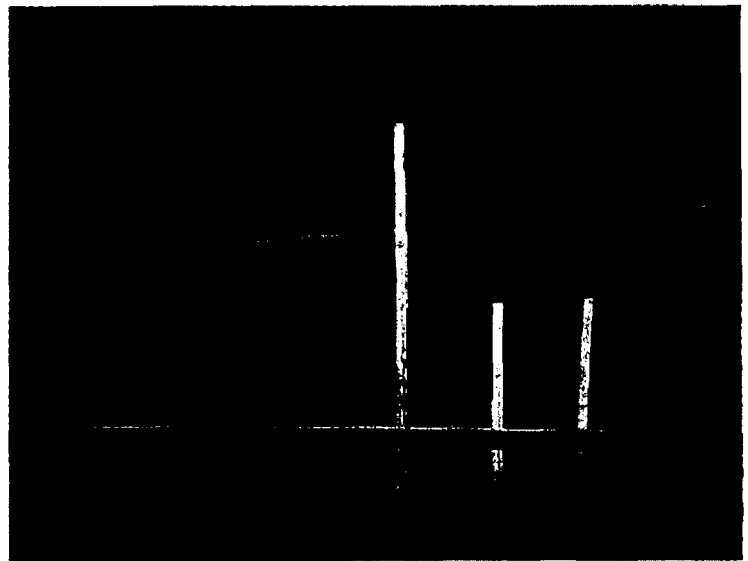
greed and neglect but of geology. The sea, the Coachella Valley **to the north**, and the Imperial Valley with its **500,000 acres of** irrigated fields **to the south**, **all sit in a vast** depression not unlike a serving platter, known as the Salton Sink. Thirty million years ago the sink was part of the **Gulf of California**, the terminus **of** the Colorado River which rises in the Rockies. The river got its name, **Rio Colorado—Red River**—from the loads **of brick-colored silt** it carried on its way **down to the gulf**. The river's silt, **as folk used to say**, was "too thin to plow, too thick to drink." Until **1936**, when Boulder (now Hoover) **Dam** was built to regulate **the Colorado's flow**, the river carried **160 million tons of** suspended sediment a year past Yuma, Arizona.

As the ground leveled and **the river** slowed, approaching its delta at **the Gulf of California**, the suspended sediment—from silt to rocks—kept settling out. Periodically **the buildup of** sediment blocked the river's path **to the delta**. When this happened and **the river exploded** in full flood, it would flip like **a loose garden hose to the west** and, following gravity, **pour** down into **the Salton Sink**.

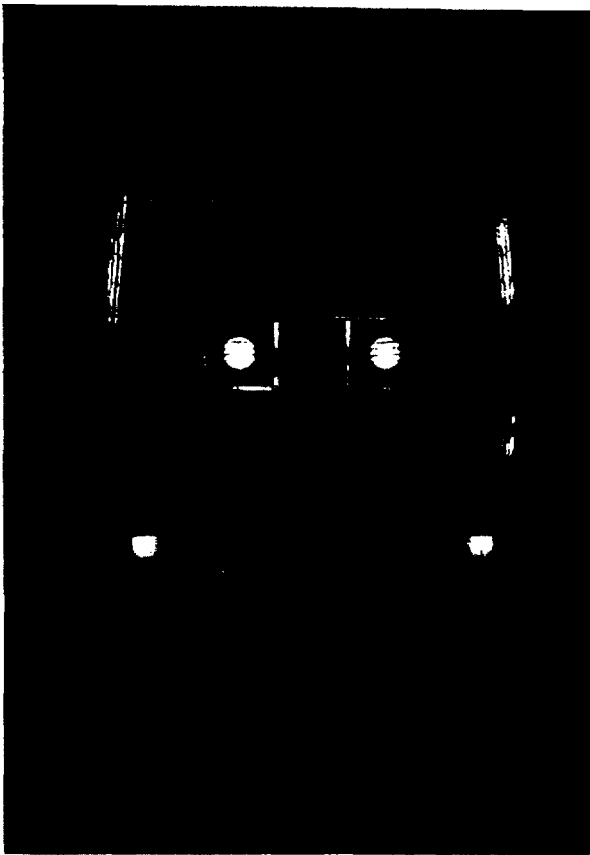
Whenever **a new wall of sediment** blocked the river's path into the sink, the Colorado would flip back **east to** its original course to the delta. Flip-flopping over the ages, the Colorado sluiced **into** the sink often enough to create **a well-worn channel** and a **series of huge Salton Seas**, each of which eventually evaporated when the river stopped flowing into it. In some places in the Imperial Valley, **the sediments**, layered like stacked pancakes, are **12,000 feet deep**. Anyone who has ever won-



Battered bilingual sign warns people **to** keep clear of the filthy New River where it **flows** north to the sea.



The Central Main Canal near **El Centro** discourages citizens from tossing in tires and old furniture.



Brad Luckey, an alfalfa farmer, is a director of the commission set up to solve the sea's water problems.

dered what happened to the earth and rock that used to be in the Grand Canyon, should wonder no more: a fair amount lies deposited in the Salton Sink.

The last of these prehistoric Salton Seas, named Lake Cahuilla after a local Indian tribe, dried up 400 years ago. A hundred miles long and as much as 35 miles wide, Lake Cahuilla left a bathtub ring of calcium carbonate and mollusk shells on the cliffs, more than 200 feet above the Salton Sea today. The bottom of the present sea lies 278 feet below sea level, only 4 feet shy of the lowest point in the United States, the bottom of Death Valley.

The idea of irrigating the valley with Colorado water and farming the salty desert had been around for years. But nothing came of it until 1900. That year, one Charles Robinson Rockwood of the California Development Company met with George Chaffey, a self-educated irrigation engineer from Canada. Chaffey and his brother William had already built irrigation settlements near Los Angeles, so Rockwood proposed that they join forces to develop the southern half of the Salton Sink for agriculture. The soil was deep and rich; because of the year-round growing season, farmers could harvest two crops and multiple cuttings of alfalfa a year. The Southern Pacific's main line passed nearby so that fresh produce could be rushed East in winter at high prices.

The sink could be irrigated by a gravity-flow canal from the Colorado River, which flowed into Mexico only 50 miles to the east and at a level several hundred feet higher than the sink's floor.

Then as now, shifting Sahara-like sand dunes lay between the river and the sink in California. There were no dunes just south of the border, so Chaffey decided to run a canal through Mexico using the Colorado's old channel to the sink. The canal turned north into the United States east of Mexicali. From there the channel, now known as the Alamo River, led almost straight north. Like a true promoter, Chaffey grandly christened the southern half of the sink the "Imperial Valley," and in May of 1901, Colorado River water began flowing into it. In a few years the valley had 700 miles of irrigation ditches. Settlers piled in, homesteading federal land or buying it outright from the railroad. To get irrigation water, they had to buy stock in water companies controlled by the Imperial Land Company, a front for Chaffey and Rockwood's California Development Company. "Cost of water stock averaged \$22 a share—\$3,520 for a farm of 160 acres," David Lavender notes in *California, Land of New Beginnings*. "Imperial Land was most obliging about selling this stock on credit, taking as security a mortgage on the purchaser's land."

By 1904 there were 100,000 acres under irrigation. Then silt blocked up the head of the canal. Water delivery to farmers was all but cut off. Lawsuits loomed. In the fall of 1904, the California Development Company made a cut in the river to bypass the blockage. During the spring floods of 1905, the Colorado, completely out of control, rushed through the cut and surged on into the Alamo River, its old overflow channel, then plunged on into the New River. Digging into the soft soil, it created a 28-foot-high waterfall, scouring out the river's channel to a width of a quarter-mile.

Birds and scientists flocked to it

For nearly two years the great river continued to pour through the Imperial Valley where impromptu dikes and levees partly protected the agriculture. Most of the water rolled on north into the deepest part of the sink. It was not until February 1907 that a work force of 2,000 laborers, recruited from six Indian tribes, and 3,000 railroad cars of rock and gravel finally succeeded in turning the Colorado back toward the gulf. This desperate engineering feat was hailed as a victory of capitalism over nature. In 1911 it inspired a book, *The Winning of Barbara Worth* by popular novelist Harold Bell Wright, and in 1926 a movie version starring Ronald Colman, which marked the film debut of Gary Cooper. But it cost the Southern Pacific \$3 million.

This new Salton Sea soon attracted its first resident birds, and a flock of government scientists who came to

The troubles of the Salton Sea

document evaporation rates. Evaporation caused the sea to shrink. It is only 35 miles long by 15 wide. But it did not dry up as expected, because, to prevent a killing buildup of salts in the soil, drainwater was still being flushed into it from the irrigated fields of the expanding Imperial Valley. In 1928, Congress called for construction of the Hoover Dam and an irrigation canal from the Colorado to the valley, this one entirely within the United States, thus the rah-rah name "All-American Canal."

Besides salts and selenium, Imperial Valley drainage carries high levels of nitrogen and phosphorus, which promote a superabundance of phytoplankton, including the algal dinoflagellates that help turn the water reddish brown and give off an awful stench after they die and decompose. But in dealing with all this, the needs of agriculture, a politically powerful force in California, came first. The Imperial Valley is a gold mine now worth something like \$1 billion a year to the state's farmers. The salts would have been deadly to farming; they didn't seem to do much harm in the sea. And for years the California Fish and Game people found ways to accommodate to salt. By the late 1920s, increasing salinity had done in the rainbow trout and other freshwater fish that washed in with the flood. By 1950, when the sea's salinity was already equal to that of the ocean, state biologists began netting whatever they could in the Gulf of California and dumping the catch in the sea. A few species caught on big, most notably the voracious orangemouth corvina (*Cynoscion xanthulus*), and the little gulf croaker (*Bairdiella icistia*), on which the corvina preyed, which was why, for several decades, the now-scorched sea was one of the great draws in California for poor man's fishing.

In recent years the U.S. Geological Survey and the Fish and Wildlife Service have released joint studies conducted in response to concern about drainwater contamination that could pose a threat to human health and to the survival of fish and wildlife resources

of the Salton Sea area." One study concluded that 'drainwater contaminants, including selenium and DDE [which results from the slow decomposition of DDT], are accumulating in tissues of migratory and resident birds that use food sources in the Imperial Valley and Salton Sea. Selenium concentrations in fish-eating birds, shorebirds. . . could affect reproduction.' Waterfowl and fish-eating birds in the Imperial Valley might be having troubles because of DDE. High concentrations were found in birds feeding in agricultural fields on invertebrates and other food items."

Because the use of DDT was banned in the United States in 1972, it was believed that DDE should have disappeared by now, but it comes from pre-ban applications of DDT in the Imperial Valley. The stuff is simply not breaking down here," Radke says. "It's a different story in the East, where there's a lot of rainfall, but out here DDE seems to sit forever. Significant eggshell thinning is a problem with every fish-eating bird at the sea—all the egrets, night herons, great blue herons and black skimmers. Great blues are down by 95 percent'

Little can be done about the DDE. Whether something can be done about the amount of selenium coming in with the Colorado River irrigation water is another question, and one that will grow hotter as more and more birds are affected.

The most straightforward problem seems to be salinity. Early in 1994, the Salton Sea Authority held its first symposium on the topic. Since then two solutions have been studied. One involves switching more fresh water into the sea from the Colorado River in years of high flow, while simultaneously siphoning off saline water from the sea and piping it 45 miles south to the Laguna Salada in Mexico, a plan that would need the agreement of the Mexican government. Estimated cost \$110 million. Another is to build a dike to seal off one end of the sea, keeping it as a saline drainoff from the Imperial Valley while maintaining a freshwater flow into the other part. Estimated cost \$100 million.

The authority had \$10 million to spend on exploring solutions and agreeing on one. It hopes to come up with a decision by this July. Its members represent both the Imperial County and Riverside County, the two counties that enclose the sea. It is understood that unless they can agree, no help will be coming from the state or from national environmental groups. 'Unless we are willing to stand up and put our money where our mouth is, nobody in the local, state or federal government is going to care,' says Brad Luckey. 'If we don't go get rid of the salt and keep the fishery alive, then we've lost the sea.' ❧

The infamous New River, silvered by late afternoon sun, winds through rich irrigated fields to the sea.

