State Water Resources Control Board
Hearing Name IID Transfer - Phase 2
Exhibit: 13
For Ident: _____ In Evidence: _____

SALTON SEA AUTHORITY

The Salton Sea Authority

is a joint powers agency formed in 1993 by

- the Coachella Valley Water District
- the Imperial Irrigation District
- Riverside County
- Imperial County

The Authority's Board of Directors is comprised of elected officials from each of these member agencies.

The Torres Martinez Desert Cahuilla Indian Tribe and Federal, State and regional agencies are also represented within the Authority.

The Authority was formed to bring together the many stakeholders interested in understanding and addressing the Sea's challenges and making the most of the Sea's opportunities. The Authority believes restoration of the Sea is a unique opportunity to improve the environment and enjoy economic benefits in doing so.

The Salton Sea Authority is committed to maintaining the Sea as an agricultural drainage reservoir protecting and enhancing the Sea as a critical link along the Pacific Flyway, stimulating recreational use and providing an environment for economic development. Before 1997, the Authority relied on funds provided by the member agencies and a small grant to carry out its mission. Since then, the Authority has received, or will receive, over nineteen million dollars from Federal and State appropriations and a State bond measure to further its mission.

The Authority has entered into a joint agreement with our Federal partner, the U.S. Department of Interior's Bureau of Reclamation. Together, our agencies are providing the engineering and environmental analysis to provide a restoration report to Congress to meet the terms of the 1998 Salton Sea Reclamation Act. Additionally, the Salton Sea Authority has provided, through a federal appropriation, all of the funding supporting the work of the Salton Sea Science Subcommittee. Their efforts led to the greatest degree of ecological understanding of the Sea ever compiled. The Authority is now supporting a series of pilot projects. The first underway is a wildlife disease program in concert with the U.S. Fish & Wildlife Service, Department of Fish and Game and National Wildlife Health Center. Other pilot projects will address desalinization, harvesting fish and cleaning up the shoreline.

While the Authority's budget and activities have expanded, its commitment to action, entrepreneurialism, and partnerships has not waned. Over 90% of the Authority's budget goes to contractors to provide environmental planning, scientific, engineering, construction and operation services. The Authority's ability to maximize its use of funds is furthered by inherent and fostered relationships with federal, state, tribal, environmental and other agencies and organizations.

BOARD OF DIRECTORS

Roy Wilson
Supervisor, District 4
County of Riverside

Andy Horne
Imperial Irrigation District

James Venable
Supervisor, District 3
County of Riverside

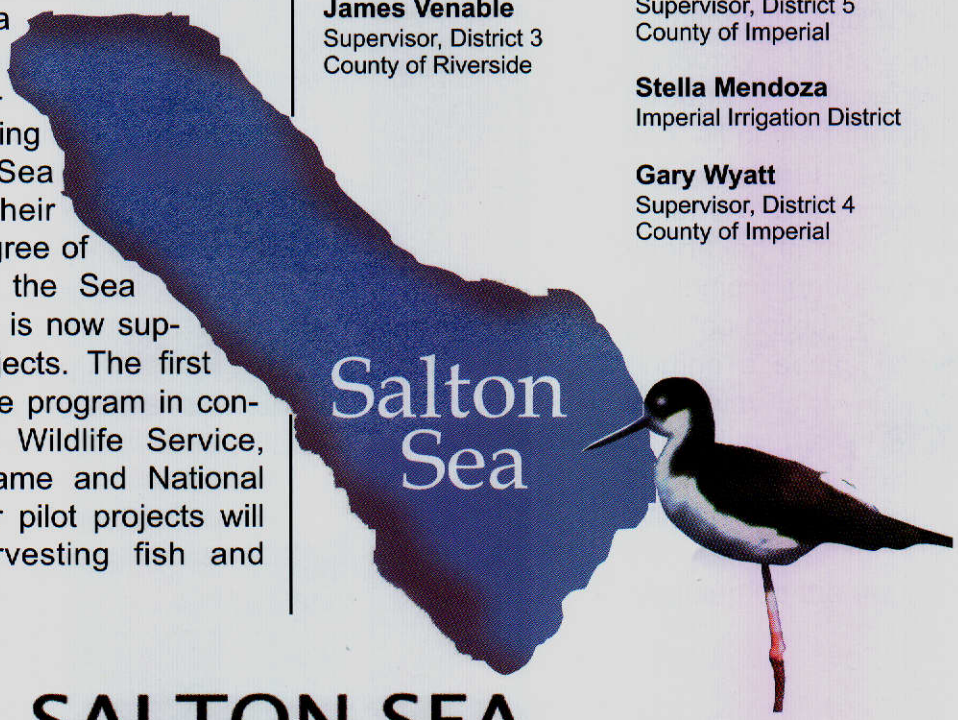
Peter Nelson
Coachella Valley Water District

Corky Larson
Coachella Valley Water District

Wally Leimgruber
Supervisor, District 5
County of Imperial

Stella Mendoza
Imperial Irrigation District

Gary Wyatt
Supervisor, District 4
County of Imperial



Tom Kirk
Executive Director
Linda Quesnell
Executive Secretary

SALTON SEA AUTHORITY

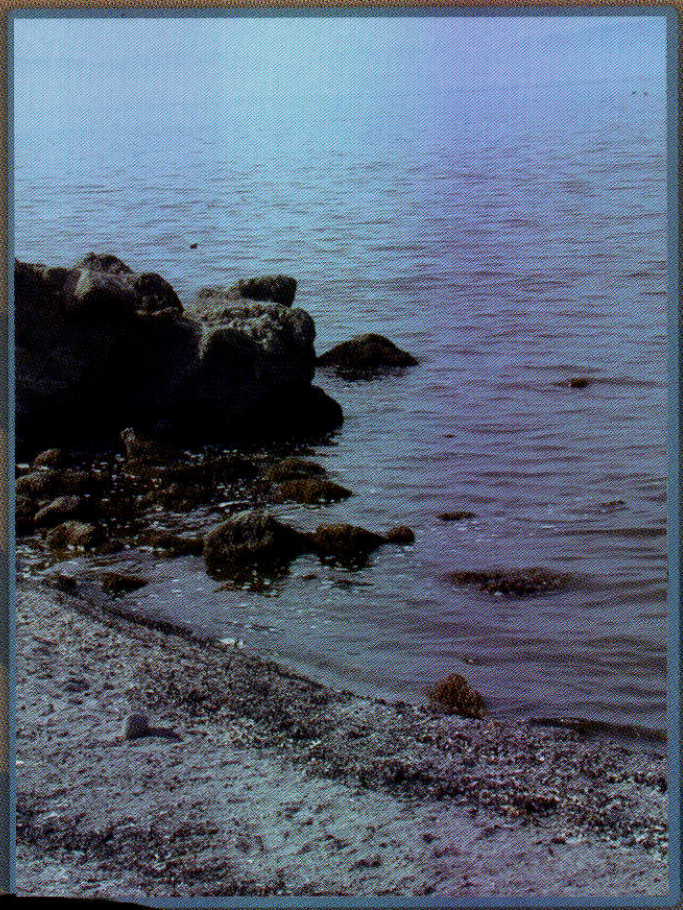
78-401 Highway 111
Suite T
La Quinta, CA 92253

www.saltonsea.ca.gov
(760) 564-4888

Debunking the Myths

Restoration of the Salton Sea is a unique opportunity to improve the environment and enjoy economic benefits of a major natural resource. The Salton Sea Authority stands committed to maintaining the Sea as a critical link along the Pacific Flyway, stimulating recreational use and providing an environment for economic development, and maintaining the Sea as an agricultural drainage reservoir.

As we begin to realize these goals, everyone involved in this effort can also assist by helping to dispel the numerous myths about the Sea that have spread throughout the country. These myths have made it more difficult to define the Sea's problems, explore and understand the Sea's possibilities and take the steps necessary to travel from understanding the problems to creating the possibilities.



Myths and Realities

Myth No. 1

"Given its man-made origin, the Sea should simply dry up and revert to its dusty and dry natural beginnings. Dust to Dust."

The Facts

This myth begins with the factual history of the Sea. Massive flooding in 1905 caused the Colorado River to break through an irrigation canal head works and flow freely into the Salton Basin for a year and a half. Man's "intervention" may have been to stop, in 1907, what had been a natural process for thousands of years.

Myth No.1 assumes that a static, dry, "natural" state exists in the basin. It does not. There have been numerous occurrences of flooding of the Salton Trough by the Colorado River since the mid-1800's. There have been at least 4 previous Salton Seas of greater magnitude during historic times. The last Lake Cahuilla disappeared around 300-500 years ago.

Indians made use of a massive Sea's bounty during the 1500's, leaving behind artifacts recording their practices. Each time and countless times before, the Colorado River has meandered west and filled the Salton Basin with fresh water.

Drainage from 500,000 acres of farms in the two Valleys now sustains the Sea. The Sea is a designated Federal repository of agricultural run-off and agriculture is a billion dollar mainstay of the Valleys' economies. Agricultural use will continue into the future.

Myth No. 2

"The Salton Sea is a Marginal Ecological Resource"

The Facts

The Sea is increasingly important to the Pacific Flyway because over 92% of the wetlands that provided habitat value to birds along the Pacific Flyway in California have disappeared.

Several million birds migrate and inhabit the area every year. The Sea provides wintering habitat for over 450,000 ducks and up to 30,000 Snow and Ross geese. In fact, over 400 species of birds have been spotted at and around the Sea, more than any other place in the U.S. other than the Gulf Coast of Texas. Endangered species also make the Sea their home, including the Brown Pelican and Yuma Clapper Rail.

The U.S. Fish and Wildlife Service was prepared to de-list the Brown Pelican until 1400 died at the Salton Sea in 1996, decimating approximately 1/3 of the California population. This and other bird die-offs is a significant issue but must be put into perspective with the safe, healthy refuge the Sea provides to millions of other birds every year.

Myth No. 3

"The Salton Sea is a Marginal Economic Resource."

The Facts

Before 1985, the Sea's State Park had more visitor days per year than did Yosemite National Park and press reports from the 1960's highlight the popularity of the Sea as a recreational destination. Complaints about overcrowding and conflict between boats and swimmers on the 350+ square-mile lake were common.

A 1985 California Fish and Game study found that the Sea was more productive (fish caught per angler hour) than any California marine fishery and equal to the most productive freshwater fisheries. A study now underway indicates that the fishery may be the most productive in the world.

Business and academic interests have suggested that a restored Sea could drive the regional economy for years to come.

Myth No. 4

"Mexicali Pollution is causing all of the problems at Salton Sea."

The Facts

While much publicized, water carried by the New River from Mexico is not a major contributor to the Sea's problems. In fact, only about 12% of the Sea's inflow originates in Mexico.

By the time water containing human and industrial wastes crosses the border and traverses the 60 miles to its delta at the Sea, the New River's water quality is nearly equivalent to that of the nearby Alamo River's. Waste from Mexico undergoes natural treatment in the River and is diluted by agricultural drainwater from the Imperial Valley. Additionally a wastewater treatment plant is being constructed in Mexicali to improve water quality in the New River.

Myth #5

"The Sea is a Toxic Dump Created by Agriculture"

The Facts

Pesticides are not found at any significant level in the Sea. Pesticide levels are periodically found to be high at some drains, but the Sea's shear volume and most pesticides' ability to biodegrade seems to limit their impact pact.

This was further validated with two independent studies conducted by the Salton Sea Science Subcommittee. This research indicated there were no pesticides detected in the sediment and water quality of the Salton Sea. A third study found extremely low levels of contaminants in the Sea's barnacles, a finding which surprised the researchers because the levels were much lower than found in the waters of San Diego.

Selenium is another concern. Selenium is a naturally occurring element in Colorado River water, the source of the vast majority of the Sea's water, not in the soils of the Imperial and Coachella Valleys. The infamous culprit at Kesterson reservoir in central California is found at about 1 microgram per liter in the Sea water, with some localized areas with higher concentrations. For comparison, the federal standard is 5 micrograms per liter and at Kesterson the level was about 80 micrograms per liter.

Then what are the Sea's actual problems?

The Facts

One is its immensity and complexity. It is California's largest inland body of water and supports an ecosystem of introduced and endemic biota. Another is its location. Far from urban centers and the usually vigilant eye of environmental interest, the Sea has been largely ignored. With the recent massive bird die-offs, the environmental community is waking to the Sea's problems and possibilities (the Audubon Society has made the Sea a #1 priority).

We do not know all that there is to know about the Sea. But we do know its problems include bird disease outbreaks, fluctuating surface levels, nutrient-rich water, algal blooms and fish kills. We are also certain of at least one factor that has and continues to contribute to the Sea's downward spiral of ecological and economic health: salinity. The Sea's salinity has steadily increased over the years. Now at 44 parts per thousand, or 25 % greater than the ocean, the hyper-saline environment is jeopardizing the survival of fish and will ultimately jeopardize the survival of much of the Sea's biological bounty.

And that is why we must act while there is still time to develop short term and ultimately long term solutions to restoring the Sea. We must not cave in to the myths that have contributed to public confusion for so many years now. The Sea's immensity, complexity and remoteness may in the past have combined to create the Sea's greatest threat: uncertainty leading to unease resulting in inaction.

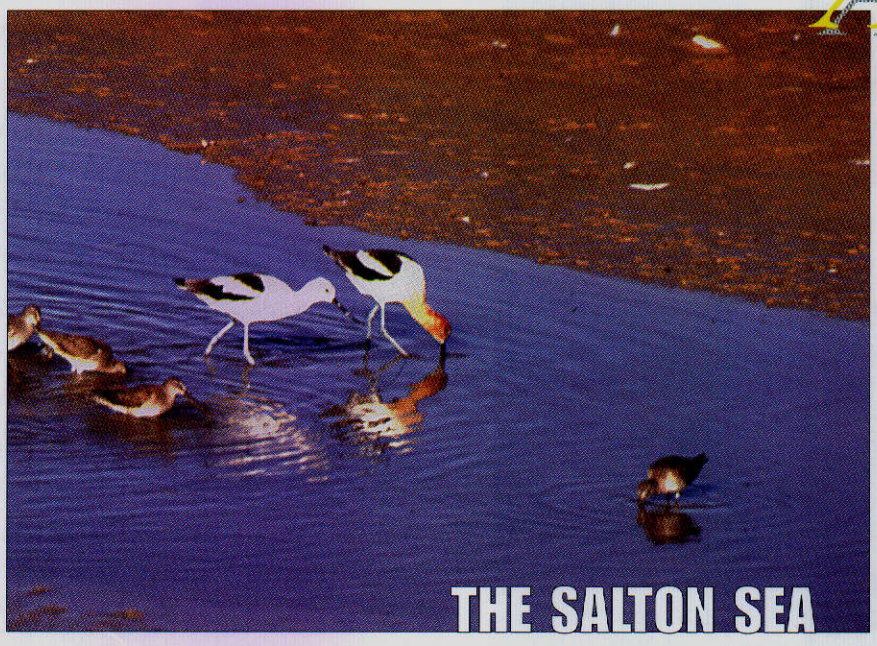
However, the knowledge developed from the extensive research on the real problems, coupled with the political will to take responsible action have made it a new day.

SALTON SEA AUTHORITY

www.saltonsea.ca.gov

FISH AND WILDLIFE SEA FACTS

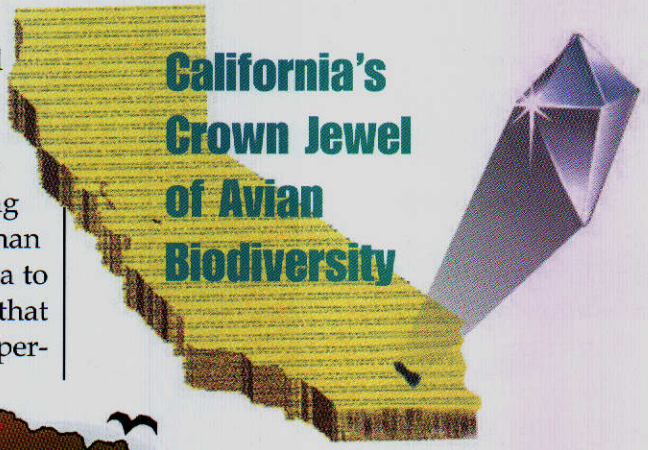
SALTON SEA Restoration Project



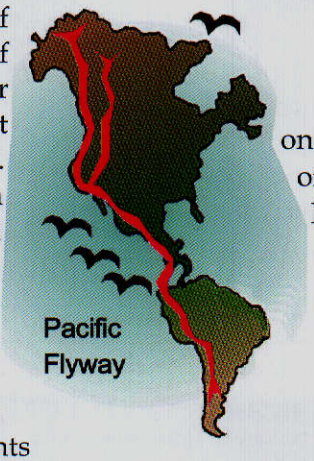
A visit to the shoreline along the Salton Sea reveals one of the most alluring aspects of California's largest lake: an abundance of birds.

And just below the water's surface is the reason: an abundance of fish.

That is why some scientists have called the Salton Sea "California's crown jewel of avian biodiversity" and perhaps the most productive fishery in the world.



With its marine, freshwater, desert, wetland and agricultural habitats, the Sea has the second highest count of different species in the nation. Only the Texas Gulf Coast is higher. Over 400 species have been recorded in the area, including 100 breeding species. But even more important than the diversity of species is the importance of the Sea to major portions of total populations of some birds that use it. For example, in some years as many as 95 percent of the North American population of eared grebes may use the Sea, 80 percent of American white pelicans, 50 percent of ruddy ducks or 40 percent of Yuma clapper rails. All of those species are of concern, at either regional, continental or global scales. Other sensitive species found at the Sea include brown pelicans, the white-faced ibis, mountain plovers, black terns, burrowing owls, fulvous whistling ducks, least bitterns, wood storks, black rails and snowy plovers.



In addition, the Salton Sea has the largest breeding colony of double-crested cormorants on the West Coast. The wintering population of gulls is the largest at any inland site in North America. Over 70,000 shorebirds were counted at the Sea, making it one of the most important sites in the interior of North America for migratory and wintering shorebirds.

The pelicans, both brown and white, provide an interesting example of the importance of the Sea. The Sea is the only

place on their migratory paths where the two species overlap. But even more important is the presence of the brown pelican at all. The brown pelicans used to be found only on the coast. Their presence at the Sea shows both range expansion for this endangered bird and their first inland occurrence as a breeding bird. It is clear that the Salton Sea has become an important ecological area on its own merits.

All the fish were introduced with the exception of the endangered desert pupfish.

TILAPIA

The abundance of fish is due in large part to the fact that the tilapia is a prolific breeder and well adapted to the Salton Sea. The tilapia are both an important food source for birds and fish and is a popular game fish. They can weigh more than 3 pounds.

GULF CROAKER

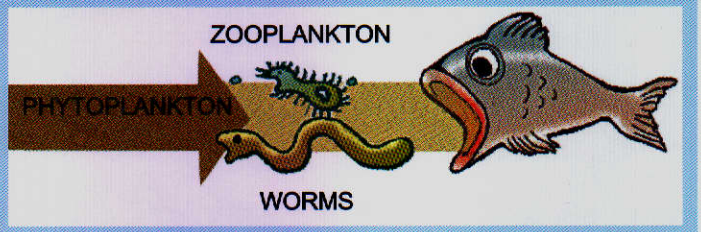
The gulf croaker is a small but important food fish for the orange mouth corvina which were introduced from the Gulf of California.

ORANGE MOUTH CORVINA

Orange mouth corvina have become the chief game fish in the Salton Sea. Corvina can weigh up to 30 pounds and grow to 42 inches.

SARGO

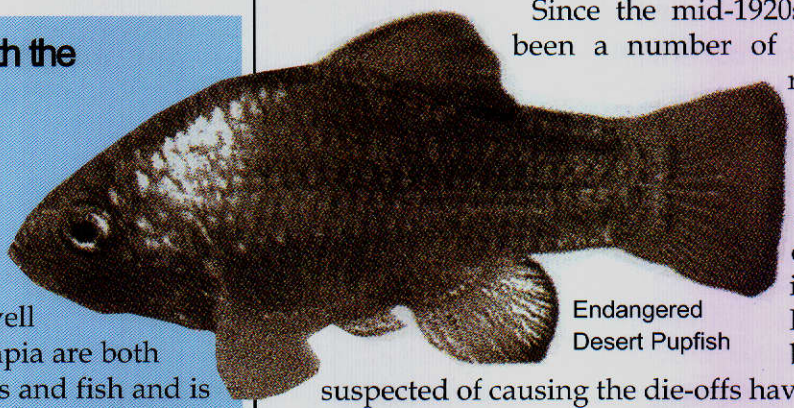
Sargo also has been an important game and forage fish, but its numbers are declining.



Fish thrive in the lake because there is plenty to eat. The aquatic ecosystem is extremely productive because of the large amounts of nutrients it receives. The nutrients stimulate growth of phytoplankton and algae, which in turn support zooplankton and worms. And all of that provides a continuing supply of "gourmet meals" for the fish.

But as area residents and visitors know, there is a downside to all of this abundance of nutrients. The Salton Sea has become crowded with fish – especially tilapia.

Periodically, decomposition of large algal blooms diminishes the dissolved oxygen in the lake. This decomposition has been tied to the sizable fish die-offs that have been occurring each year.

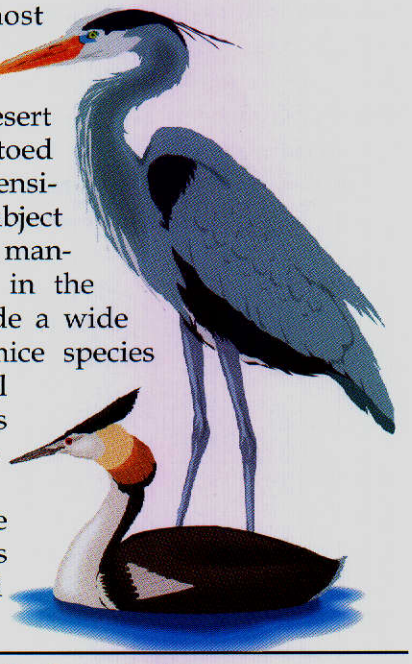

Endangered Desert Pupfish

Since the mid-1920s, there have been a number of bird die-offs recorded. In the 1990s, the frequency and severity of the bird die-offs increased. Most of the bird diseases suspected of causing the die-offs have been identified as bacterial or viral pathogens. These pathogens are common throughout the Pacific Flyway. However, some of the causes remain unknown, but research continues as does the increasingly fruitful rescue and rehabilitation of sick birds.

At the same time, testing is underway on projects to reduce fish population. For example, tilapia is being evaluated as a possible source of pet food or fertilizer.

While the Salton Sea is known best for its fish and bird populations, it is also home to much more. There are 24 reptiles and over 20 mammals, with most species being found in the desert and wetland areas. The desert tortoise and fringed toed lizard are listed as sensitive species and the subject of intensive study and management. Mammals in the Salton Sea area include a wide variety of bat and mice species along with the typical desert dwellers such as coyotes, deer, bobcat and bighorn sheep.

And, of course, there are snakes and lizards normally found in arid desert regions.



The Geography of the Sea

SALTON SEA Restoration Project

SEA FACTS

"Partly cloudy, highs near 105. With the humidity and heat, a chance of isolated thunderstorms in the area this afternoon through Thursday."

—Forecast for Imperial Valley, July 7, 1999

Typical summer weather? Yes it is, for this southeastern corner of California. An unlikely setting for the largest lake in California? Well, yes and no. In fact, the Salton Sea area is part of the Colorado Desert ecosystem, whose annual precipitation rarely exceeds four inches. The meager rainfall supports such drought-tolerant vegetation as desert scrub, creosote bush, saltbush, and tamarisk; the area's streams and springs, which ultimately drain into the Salton Sea, support cottonwood, willow, and other plants found in freshwater marshes. Of course, the botanical landscape also includes acres of agricultural lands, with crops that owe their existence almost solely to water imported from the Colorado River to the east.

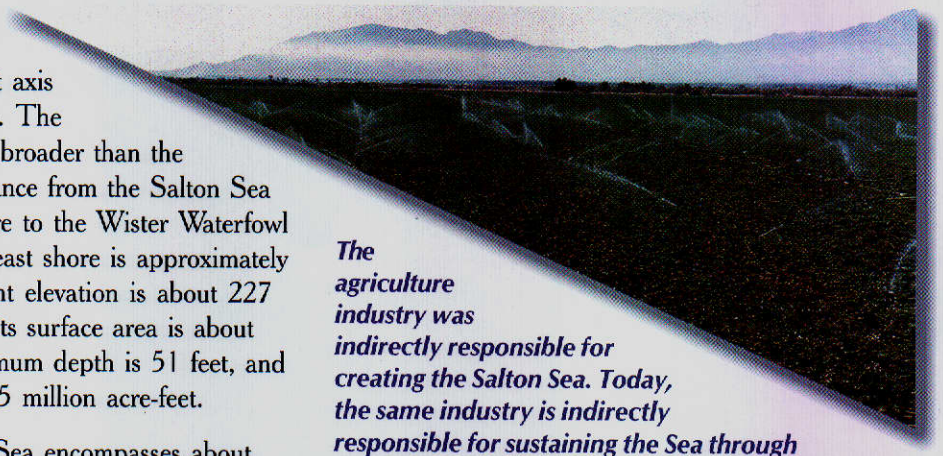
The Salton Sea is not the first body of water to occupy the Salton Basin. Historic evidence and geologic studies have shown that the Colorado River has spilled over into the Salton Basin on numerous occasions over the millennia, creating intermittent lakes. Evidence of an ancient shoreline suggests that Lake Cahuilla occupied the basin until about 300 years ago. From 1828 to 1904, Colorado River flows flooded the Salton Basin no fewer than eight times. For example, an 1840 flood created a salt lake three quarters of a mile long and half a mile wide, and in June 1891, another outpouring of Colorado River water created a lake 30 miles long, 10 miles wide, and six feet deep. So, how many times has Nature filled the basin with water over geologic time? There's no way we can know for sure, but humans have been responsible for inundating the basin only once.

In 1901 the California Development Company, seeking to exploit the Imperial Valley's potential for unlimited agricultural productivity, dug irrigation canals from the Colorado River. But heavy silt loads inhibited the flow, and new residents of the valley became worried, prompting the engineers to create a cut in the western bank of the Colorado, to allow more water to reach the valley. Unfortunately, water broke through the engineered canal and nearly all of the river's flow rushed into the valley. By the time the breech was closed, the present-day Salton Sea was created.

The Sea occupies the lowest portion of a structural basin called the Salton Trough, a seismically active valley that lies at the southern end of the San Andreas Fault and marks the northern extent of the Gulf of California Rift Zone. The northern end of the Salton Trough is bounded by the San Jacinto and Santa Rosa mountains to the west, the Orocopia Mountains to the north, and the Chocolate Mountains to the east. The area's highest mountain is Rabbit Peak, in the Santa Rosa Mountains, at 6,623 feet. The Salton Sea is longer than it is wide and stretches

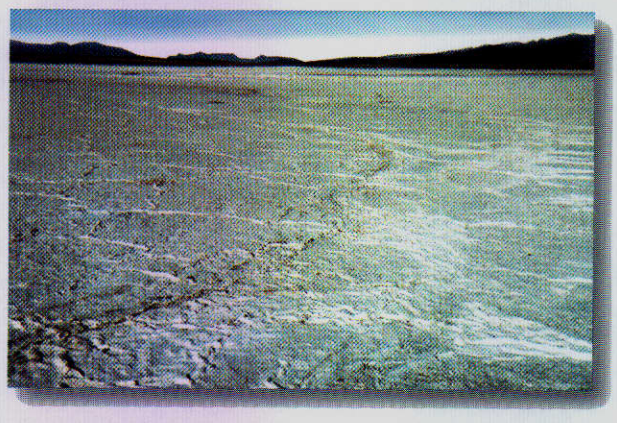
THE GEOGRAPHY OF THE SEA (PAGE 2)

along a northwest/southeast axis for approximately 35 miles. The southern half of the Sea is broader than the northern half, and the distance from the Salton Sea Test Base on the west shore to the Wister Waterfowl Management Unit on the east shore is approximately 15 miles. The Sea's current elevation is about 227 feet below mean sea level, its surface area is about 376 square miles, its maximum depth is 51 feet, and its total volume is about 7.5 million acre-feet.



The agriculture industry was indirectly responsible for creating the Salton Sea. Today, the same industry is indirectly responsible for sustaining the Sea through runoff.

The watershed of the Sea encompasses about 8,360 square miles and includes a small corner of San Bernardino County, some of Riverside County, most of Imperial County, the eastern portion of San Diego County, and part of the state of Baja California in the Republic of Mexico.



This salt flat near Bombay Beach is four to six inches thick. Water from the Sea periodically floods such low-lying areas, where it evaporates and leaves the salt behind. In the last century, entrepreneurs mined the area for salt, as the native people had done for generations.

Before the Salton Sea existed, the Salton Basin was well known to native people, explorers, and desert wanderers as a place with high concentrations of salt. You can still see portions of the trails walked by Native Americans of the Colorado River and the Pacific Coast on their long treks to bring salt from the Salton Basin to their villages. As early as 1815, ox-drawn carts were making the month-long expedition from Los Angeles to the Sea to supply new settlers with the essential mineral, salt. In 1884, the economic value of salt was realized, and commercial mining began.

More recent economic activities in the area include the development of geothermal energy sources. Geothermal exploration began in 1957, and today several plants operate in Imperial County near Niland.

Ironically, the industry that played a supporting role in the Sea's creation—commercial agriculture—now has the lead in maintaining it, as the Sea is sustained primarily by agricultural drainage from the Imperial, Coachella, and Mexicali valleys (smaller contributions come from municipal effluent and stormwater runoff). Combined agricultural production in Imperial and Riverside counties amounts to well over $2 billion annually. In 1998, the top five agricultural products of Imperial County were cattle, alfalfa, head and leaf lettuce, and carrots[1]; in 1997, the top five agricultural products in Riverside County were milk, table grapes, eggs, nursery products, and hay.[2]

The Salton Sea offers many opportunities for recreation and is a popular destination for retirees seeking the serenity of the desert and the seemingly endless vistas of water, land, and sky—the Sea is so large that the distant shores are not visible in some areas due to Earth's curvature. The Salton Sea State Recreation Area occupies the northeast shoreline, while the Sonny Bono National Wildlife Refuge,

[1]Imperial County Farm Bureau

[2]Riverside County Farm Bureau

THE GEOGRAPHY OF THE SEA (PAGE 3)

operated by the US Fish and Wildlife Service, spans the southern shoreline.

Because its salt content (somewhat greater than the Pacific Ocean) causes vessels to be more buoyant, surface travel on the Sea is known to be the fastest in the nation. The Sea is so far below sea level, its high atmospheric density causes engines to perform much more powerfully than on other lakes. In fact, most of the world's aquatic speed records have been broken here.

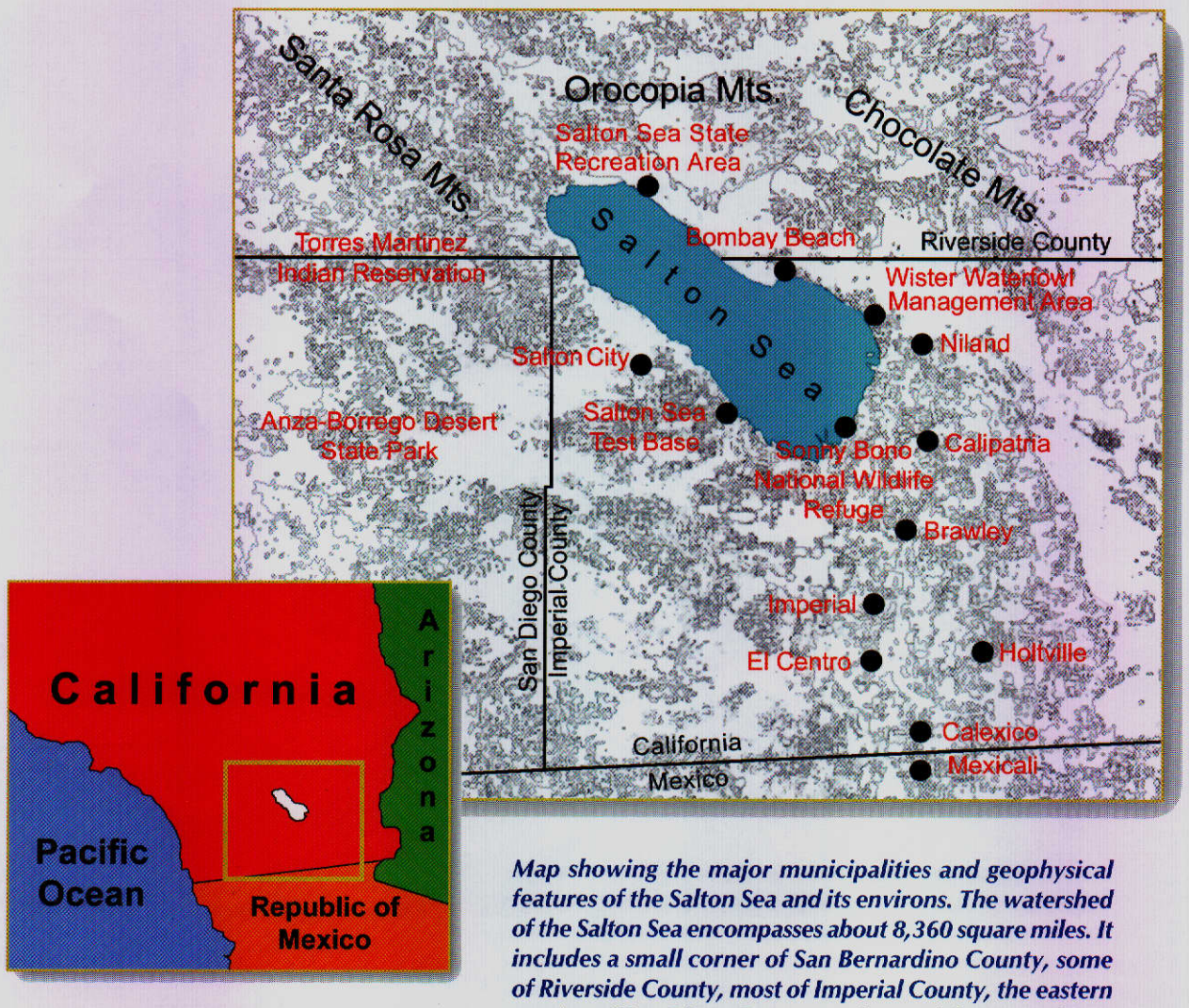
The popular sport fishery has been augmented over the years by numerous introductions of various fish species—striped bass in 1929, anchovy in 1948, halibut, croaker, bairdiella, mullet, and orangemouth corvina in 1950, grunion, flounder, sargo, and wrasse in 1951, threadfin shad in 1955, and tilapia in 1964. Such diversity has led to such fishing-oriented recreational developments as the Salton Bay Yacht Club, constructed in the 1950s, when the Sea was experiencing widespread popularity. In February

In this color-enhanced satellite photo, red represents mineral and rock types and green represents vegetation. The Salton Sea is in the center of the image, with the Orocopia Mountains to the northeast and the Santa Rosa Mountains to the northwest. The bright green area southeast of the Sea is the Imperial Valley, and the bright green to the northwest is the Coachella Valley. The diagonal strip to the southeast of the Salton Sea is the Algodones sand dunes. (Image processed by Lisa Heizer, San Diego State University, March 1994.)

THE GEOGRAPHY OF THE SEA (PAGE 4)

1955, the Salton Sea State Park, later to become the Salton Sea State Recreation Area, was dedicated. At the time, it was the second largest state park in California.

The Sea and the wetlands along its shoreline are a critical part of the Pacific Flyway, providing permanent habitat and seasonal refuge to millions of birds, representing hundreds of species. The Salton Sea is important to numerous migrating, wintering, and breeding bird species, particularly waterbirds. The Sea and adjacent wetlands, river systems, natural habitats, and agricultural fields also provide foraging and roosting opportunities. Typical mammals that inhabit the desert include bats and rodents, although most of the animals that flourish in this somewhat extreme environment are amphibians and reptiles.



Map showing the major municipalities and geophysical features of the Salton Sea and its environs. The watershed of the Salton Sea encompasses about 8,360 square miles. It includes a small corner of San Bernardino County, some of Riverside County, most of Imperial County, the eastern portion of San Diego County, and part of the state of Baja California in the Republic of Mexico. The Salton Sea occupies the lowest portion of a structural basin called the Salton Trough, a seismically active valley at the southern end of the San Andreas Fault.

WATER QUALITY SEA FACTS

SALTON SEA Restoration Project

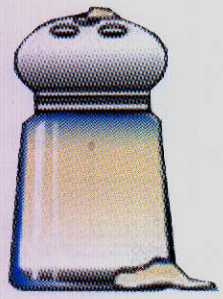
California's largest lake is a unique environment, with very complex water quality issues.

It is both very saline, with water approximately 25 percent saltier than the ocean, and eutrophic -- rich with nutrients, algae and fish. The salinity is a result of the high evaporation rates in the hot desert climate. Water flowing into the Sea adds the equivalent of a train of salt each day: several million tons a year. The nutrients enter the Sea's waters in the inflows that come from agricultural fields and urban settings.

The presence of nutrients has led to a Sea that is the equivalent of a tropical rainforest, teeming with life.

Restoration efforts currently underway aim to control the levels of both salinity and nutrients.

Scientists are examining the dynamics of both and there are lots of questions to be answered.



THE SALINITY LEVEL at the Salton Sea is 44 parts per thousand (ppt) an estimated 500 million tons of salt, presently.

How can salt and nutrients entering the Sea be reduced?
How can amounts in the Sea be lowered?
What will the effects be if they are lowered?
How can lower levels be maintained over time?

The Concerns

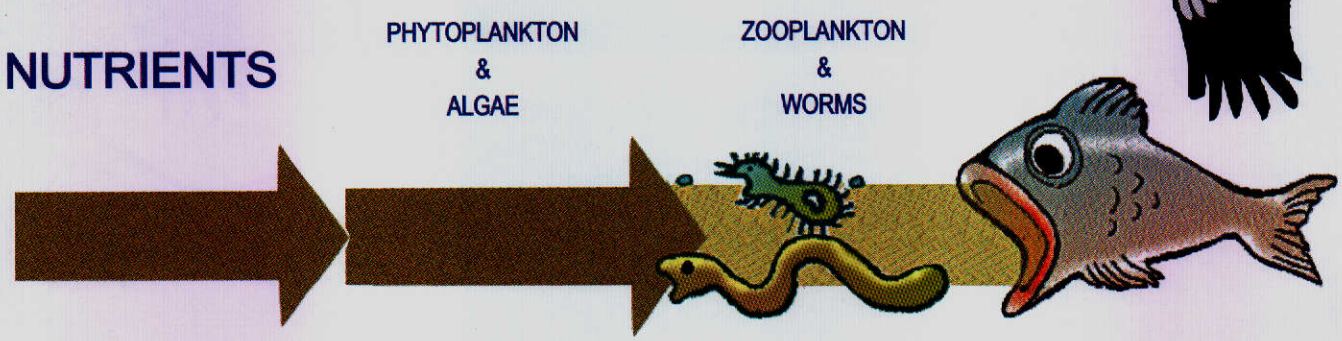
Salinity

The lake is continuing to grow more saline as salts are delivered every year. While some salts may precipitate out as they reach the Sea, salinity continues to rise. Scientists are concerned that even a small increase could be enough to affect fish reproduction and ultimately survival, which in turn could affect bird populations that rely on the fish as a food source. The loss of the Sea as a productive fishery will profoundly impact the economy that relies on fishing and recreation as a tourist industry.

Nutrients

The nutrients entering the Salton Sea result from runoff of agricultural fertilizers and municipal discharges, particularly from Mexicali, that contain nitrates and phosphates. Scientists believe phosphates are the limiting, or critical, nutrients that cause increasing eutrophication of the lake. Eutrophic lakes everywhere periodically have odors associated with them.

Water quality regulatory agencies such as the Regional Water Quality Control Board and EPA, along with scientists, environmental organizations, and others are concerned about nutrient buildup. The nature and extent of the Sea's eutrophic character is under study by the restoration team's researchers. As the causes and effects are better clarified, remedial actions can be designed and implemented.



Nutrients stimulate growth of phytoplankton and algae, which in turn support zooplankton and worms. This ongoing process provides an abundant food source for fish at the Sea, and, consequently, for the birds that feed on them.

Temperature

Water temperature is not usually listed as a water quality concern, but in the case of the Salton Sea it contributes. The high temperatures reached in the summer reduce the amount of oxygen which can dissolve in water. When those high temperatures combine with dying algae blooms, oxygen levels in the water become too low, and fish die-offs occur.

Apparent Nonissues

Toxics

Despite some popular misperceptions, no significant levels of traditional "toxics" have been detected. Some metals occur, but they are found in the sediments, not the water. Elevated levels of pesticides have been found in the inflows to the Sea, but are not at significant levels in the Sea. In fact, while pesticides have been known to kill a couple of birds every year on agricultural fields, not a single bird is known to have died from pesticides at the Sea itself.

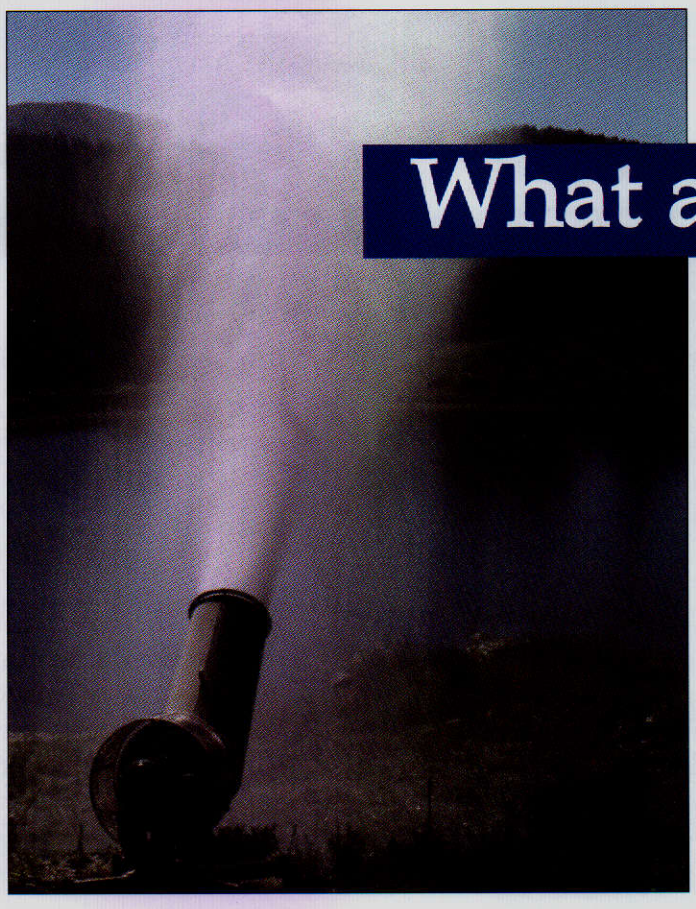
As part of the restoration of the Sea, however, scientists will continue to monitor the level of toxics, both in the Sea and in animals using the Sea. Experience in other areas has shown that even small amounts of toxics can become concentrated in the food chain.

Selenium

Selenium is not found in the waters of the Sea at levels above safety standards, despite elevated counts in the rivers entering the Sea. In fact, there is less selenium in the water of the Salton Sea than in San Francisco's drinking water. Selenium has been identified at slightly elevated levels in the sediments in the deepest parts of the Sea. At these deep levels, it is not available to the food chain.

Selenium can become concentrated in the food chain, and some studies have found elevated levels in fish. While selenium at low levels is essential for health, too much can have adverse effects. As a result, an advisory has been issued warning against eating fish from the Sea more often than once every two weeks.

> ***"One of the most significant findings of this study was the number of organic chemicals commonly used in agriculture earlier this century that were not detected at elevated concentrations, such as DDT."***
>
> Taken from a summary of a study conducted by LFR Levine Fricke



What are the Options?

Salt removal

Tests are being conducted on ways to reduce salinity levels using either evaporation ponds or enhanced evaporation systems. The goal is to remove several million tons of salt annually.

Enhanced evaporation systems, such as the one shown here, have been explored to reduce salinity. Its concept is to evaporate the water to concentrate the salt. The evaporation is enhanced, or sped up, by spraying the water in a fine mist and capturing the salt.

Nutrients

Fish harvesting may be one technique for reducing nutrients, especially phosphates. Tilapia, a very prolific breeder, may have commercial value for cat food, animal feed or fertilizer. Cleanup of dead fish, while being done primarily for aesthetic reasons, will also help. Present regulations prohibiting fish harvesting would need to be modified in the case of the Salton Sea. Controlling nutrients in the inflows to the Sea is a second technique for reducing nutrients.

Manmade wetlands, like this one which was constructed along the New River, are one option for improving water quality.

Wetland Creation

Wetland creation as a means to clean water and provide habitat is being tested on the New River and being considered for the Whitewater River. Questions need to be answered whether wetlands will consume too much water and whether they will concentrate pollutants. Because they extend and improve habitat, it is important that they not become threats to wildlife. Unfortunately, efforts to improve wastewater systems in Mexicali have not been planned to reduce nutrients (phosphates).

A Word or Two of Caution

The Salton Sea has no water rights of its own, so it benefits only from whatever runoff occurs. Without it, the Sea would quickly dry up, concentrating salts and nutrients further. The water is now allowed to run off because it is not of high enough quality to be worth recapturing and reusing. Concerns have been raised that if present users are forced to clean up their runoff, it may have value to other users and no longer be available to the Sea. Or the "cleanup" burdens may make it too expensive to farm, thus drying up the major source of inflows.

Restoration of the Sea requires a careful balancing act. Despite popular perception, the Sea has relatively good water quality. Making the most of this "waste" water is central to managing and sustaining this ecosystem.

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SALT PROBLEMS

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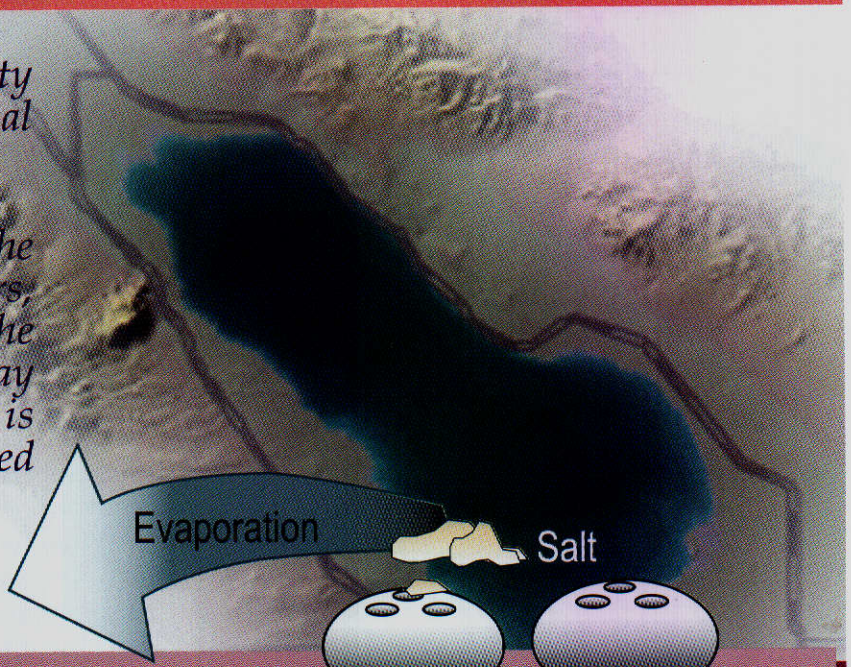
SEA FACTS

The Salton Sea has a salinity problem because it is a "terminal lake," meaning it has no outlets.

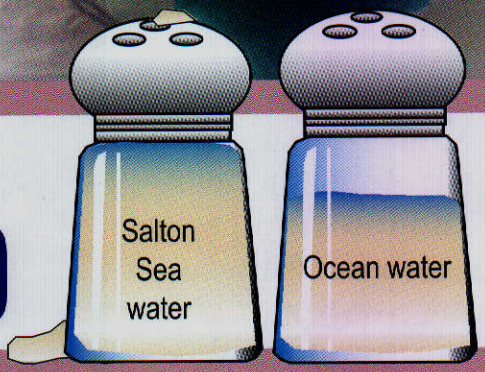
Water flows into the lake from the Whitewater, Alamo and New rivers, bringing with it salt from the Colorado River. The only way Salton Sea water can leave is through evaporation. The imported salt is left behind.



SALTS

pose a serious problem because of the level of salinity in the lake. The Salton Sea is currently 25 percent saltier than the ocean and getting saltier every day. There are an estimated 500 million tons of salt in the Salton Sea.

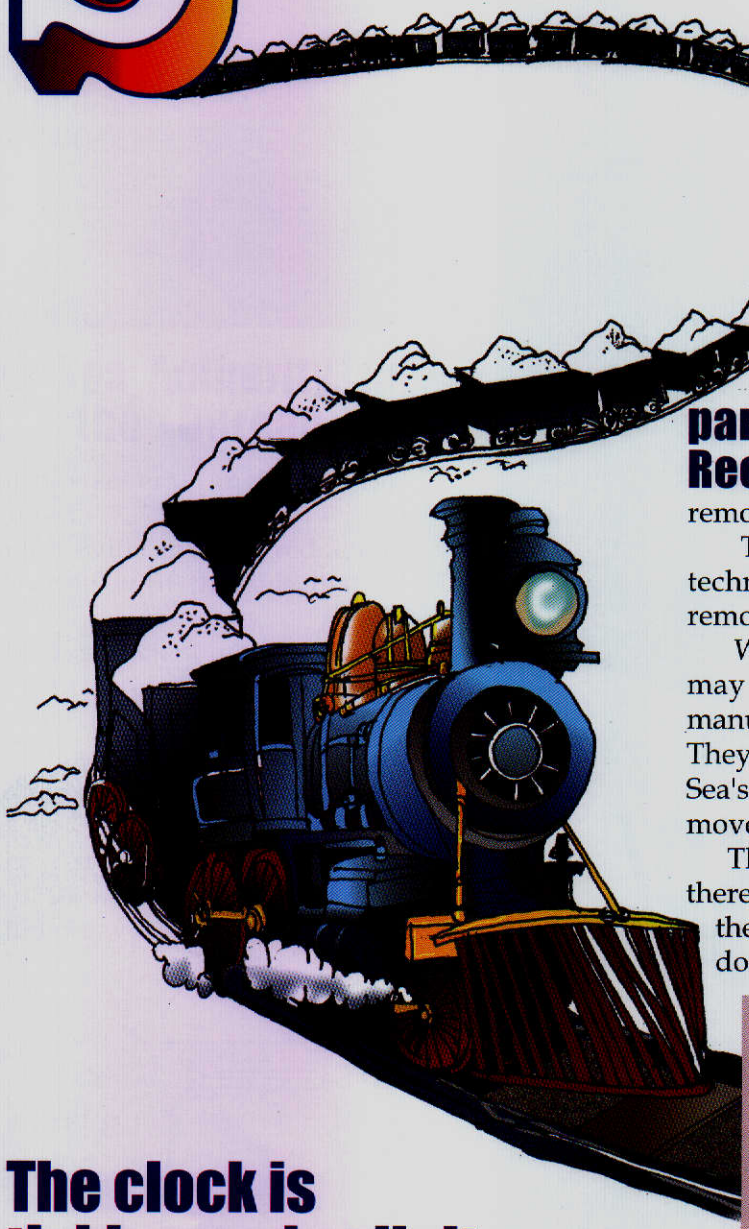
25%



Salinity has been called Salton Sea's "time bomb." Scientists are concerned that even a small increase could be enough to affect fish reproduction and ultimately survival, affecting not only fish but the birds that feed on them. The economic development of the area also could be adversely affected if salinity is not controlled.

Several million tons of salt are added to the lake every year - an estimated train load every day. Even if that "train" were to be stopped, salinity would not be reduced because of continuing evaporation.

The use of enhanced evaporation systems is one of the methods being tested for removing salt from the Salton Sea.



The Salton Sea Authority, in partnership with the Bureau of Reclamation, is testing several methods for removing salt from the Salton Sea.

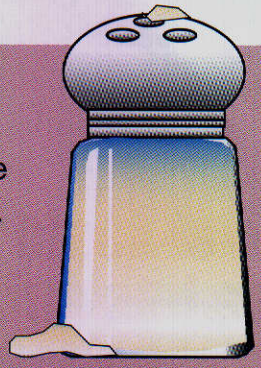
There is a dilemna, though, with any salt reduction technique: what should be done with the salt that is removed from the lake?

While the material may be of sufficient quality that it may be attractive to commercial markets, salt manufacturers are doubtful that it would be profitable. They say that high transportation costs from the Salton Sea's remote location to market centers may make such a move financially impractical.

The disposal problem, then, remains an issue. Perhaps there could be uses for some of the salts that come out of the water. However, much more work needs to be done.

The Challenges

- To remove salt at a scale never before attempted.
- To dispose of the salt removed.



The clock is ticking and salinity reduction is a priority.

The ultimate solution lies in a cost-effective, efficient method that stabilizes salinity levels so that we don't lose the fishery. The Salton Sea will never be a clear freshwater lake. But then again, our responsibility is to insure it does not become a dead sea.

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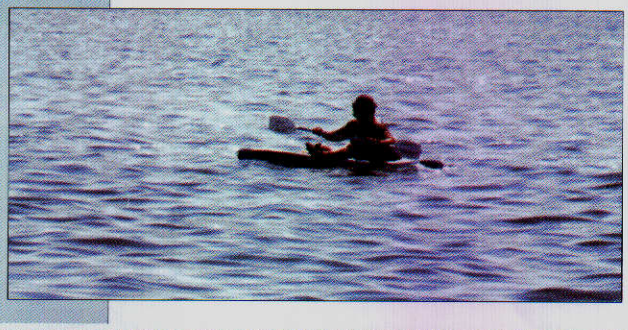
RECREATION SEA FACTS

The Salton Sea: Southern California's Largest Inland Water Recreation Area

The Salton Sea is located in one of California's most scenic desert areas. California's largest lake is loaded with recreational opportunity. At 35 miles long and 15 miles wide—with a surface area of nearly 380 square miles—the Salton Sea offers something for virtually anyone wanting to spend time outdoors. (By comparison, Lake Tahoe is 193 square miles and Mono Lake, 60 square miles.) The Sea is available for recreation year round.



Recreation Opportunities

The Salton Sea and its immediate vicinity have many recreational activities to offer, including: camping; bird watching; fishing; hiking; boating; use of personal watercraft; hunting; and off-roading.

FISHING

The fishery at the Salton Sea has been called one of the most productive in the world. The Sea has tilapia, Gulf croaker, corvina and sargo. The tilapia weigh up to 3.5 pounds, and the corvina have weighed up to 30 pounds and measured 42 inches.

BOATING

Salton Sea offers unlimited boating opportunities. There are boat launch facilities all around the lake and kayak trails at the State Recreation Area. There are no tides, and water temperatures range from a chilly 55 degrees in the winter to a very warm 90 degrees in the summer. Because its salt content causes vessels to be more buoyant, surface travel on the Sea is known as the fastest in the nation.

CAMPING AND HIKING

There are over 2000 campsites located around the shores of the Salton Sea. There are dozens of hiking trails near Salton City and the Dos Palmas area on the east side. Some campsites offer all the amenities (water, showers, restrooms, paved parking, full hook-ups, electric and sewer), but the majority of campsites are more primitive with only limited amenities, and some have no developed facilities.

The Salton Sea State Recreation Area, located on the northeastern side of the Sea, hosts hundreds of thousands of visitors each year at five different campgrounds with 1400 camp sites. The five camp sites, New Camp, Corvina Beach, Salt Creek, Bombay Beach and Mecca Beach, offer a variety of camping experiences.

OFF ROAD VEHICLES

The Ocotillo Wells State Vehicular Recreation Area is located just west of Salton City, and world famous Algodones Dunes are located east of the Salton Sea.

Bombay Beach Marina - Open daily, gravel launch ramp.
Red Hill Marina County Park - Open daily, paved launch ramp.
Salton Sea Beach Marina - Open daily, paved launch ramp, fuel.

BIRD WATCHING AND HUNTING

The Sea is one of the most important wetlands along the Pacific Flyway. Several million birds migrate and inhabit the area every year. Over 400 species of birds use the lake's environment, including eared grebes, burrowing owls, great blue herons, endangered brown pelicans, ospreys and gulls. Each winter, it is home for the annual Salton Sea International Bird Festival.

The Sonny Bono Salton Sea National Wildlife Refuge has the second largest number of species of birds within the National Wildlife Refuge system, and, along with the Wister Unit of the Imperial Wildlife Area, offer public access. Hunting is a popular recreational activity around both of these sites.

Additional information on all recreation opportunities may be obtained from:

West Shores Chamber of Commerce – (760) 394-4112
Salton Sea State Recreation Area – (760) 393-3052
Wister Wildlife Area – (760) 359-0577
Salton Sea State Recreation Area – (760) 393-3052
Sonny Bono Memorial Salton Sea National Wildlife Refuge – (760) 359-0577
Salton Sea Bird Trail – (760) 394-0062

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The History and Culture of the Sea

SALTON SEA Restoration Project

SEA FACTS

The history of the Salton Sea area has been scrutinized in the last decade more closely, perhaps, than ever before, especially as the culture and history of the region's land and people are studied for environmental impacts. Although there may have been no historical events of global significance associated with the Sea, the creation of the Sea itself and the rise of the region's agricultural industry are two very important chapters in local and California history.

From an anthropological standpoint, the Salton Basin is rich in Native American history. Nine different Native American groups have occupied the area around the Salton Sea Basin, including the Cahuilla people, from whom the members of the present-day Torres Martinez Desert Cahuilla Indians are descended. When the Spanish made contact with the Cahuilla people in 1774, there were about 6,000 members of the tribe. In 1876, the US government established the 24,800-acre Torres Martinez Desert Cahuilla Indian Reservation; thirty years later, nearly half of the reservation was submerged when the basin flooded with Colorado River water to form the Salton Sea.

The University of California's Bancroft Library maintains a collection of Imperial County photographs from the turn of the 20th century. Many of the photographers were amateurs, who nonetheless often captured images of daily life of the Native American and early nonnative residents. At right is a photo of Antonio Martinez, a full-blooded Cahuilla man from Indio. A typical Desert Cahuilla Indian dwelling (below) was made of brush secured to a frame of branches.

Photos courtesy of Bancroft Library, University of California

Although Native Americans had occupied the Salton Basin for at least 12,000 years, it wasn't until 1771 that the first Europeans laid eyes on the Imperial Valley. As early as 1853, the valley was recognized as a potential garden spot in the desert, if only it could be adequately irrigated. This dream became reality with the building of the Imperial Canal in 1901. This event led to an agricultural boom in the Imperial Valley, and land speculators moved in, spawning such new towns as Calexico, Heber, Imperial, and Brawley. But in only three years, the canal could no longer supply the valley with water—its flow had become blocked with silt. The temporary diversion of the Colorado River that was constructed to replace the water from the blocked canal was breached

in 1905 during a flood, which proved to be the most significant natural event since Lake Cahuilla dried up: by the time the breach had been repaired, the overflow had created the Salton Sea.

Repairing the breach was an impressive engineering feat in itself. A railroad trestle, destroyed by the flood waters, was replaced by two trestles built across the breach to allow railcars to bring in fill material. Carloads of boulders, gravel, and sand were brought in 24 hours a day to build a dike, which, sixteen months later, would cut off the flow of Colorado River water to the Sea.

In 1911, the Imperial Irrigation District was established and began promoting a new canal to supply water to the valley. Congress authorized building the All-American Canal in 1928, and by 1942 the canal was supplying the Imperial Valley with water; the Coachella branch of the canal began carrying water in 1948. Today, the agricultural industry uses approximately 98 percent of the region's water supply.

As early as 1907, one of the first recreational pastimes that was promoted for the Salton Sea was sport fishing. When it began to catch on, the California Department of Fish and Game started stocking the Sea with game fish. By the 1950s, all manner of recreational pursuits had been promoted, including hunting, swimming, boating, water-skiing, birding, and hiking. With the recreational enthusiasts came other kinds of tourists, and with the tourists came hotels, resorts, restaurants, marinas, and a state park.

Today it's up to the Salton Sea Authority and the US Bureau of Reclamation, along with the many stakeholders and residents of the Salton Sea area, to find ways to make sure that the Sea has a future.

Photo courtesy of Bancroft Library, University of California

Mr. F. S. Miller reads while his daughter enjoys a slice of watermelon. Mr. Miller built Brawley's first hotel, The Bungalow, and the first school building, which doubled as a church on Sundays. Before moving to a new home, the Miller family lived in a tent "until the scare about the Colorado River overflowing and the danger of it flooding the Imperial Valley. Then the fun was all over and fear filled our souls."

Photos courtesy of Imperial Irrigation District

When the Colorado River breached, the force of the water all but destroyed the railway trestle that ran across one of its banks (top left). To mend the breach, two trestles were built; then carloads of boulders, gravel, and sand were brought in 24 hours a day to contain the outflow (below left).

SALINITY REDUCTION: WHAT WON'T WORK

SALTON SEA Restoration Project

SEA FACTS

The Salton Sea is a unique environment and needs to be preserved as a highly productive link in the Pacific Flyway. For the first time, there is hard science to guide decisions and improve the chance of success.

But, as we actually begin work to restore California's largest lake after more than 50 years of studies, one thing has become evident: there is no silver bullet to reduce salinity.

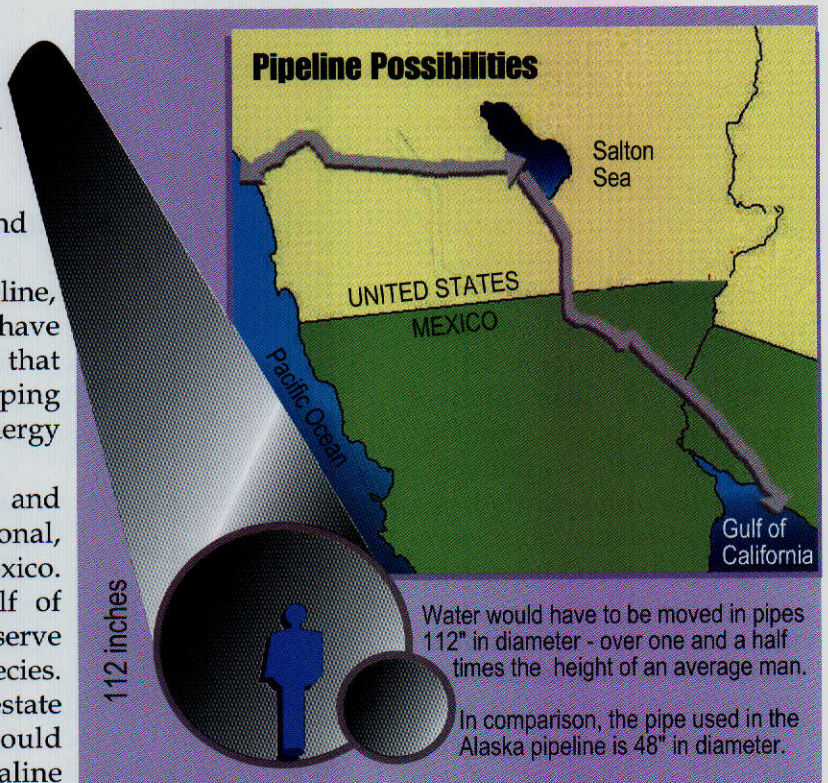
So, why don't we just transport the lake's water to the ocean through pipes to create an outlet for the Salton Sea and bring ocean water back? It sounds appealing.

PIPELINES could pump Salton Sea water out to the Gulf of California or the Pacific Ocean and pump ocean water back in. The problem, though, is much more complex. In fact, the practicality of this idea evaporates when costs and environmental issues are closely examined.

The cost, both to build and to operate a pipeline, is estimated at $3 billion. Each pipeline would have to be huge to handle the volume of water that would need to be moved. Multiple pumping stations would be required and the annual energy demand would be large.

Permits and rights of way for construction and operation would be needed from local, regional, state and federal governments, including Mexico. Parts of the Colorado River Delta and Gulf of California are in an international biosphere reserve with both land- and sea-based endangered species. The California coast contains expensive real estate with influential owners. Neither area would welcome massive pipelines disposing of saline water, and court challenges and appeals would be inevitable.

Scientists and environmentalists are concerned about the inability to control any "little critters" that might be transferred from the ocean to the Salton Sea or vice-versa. Transferring unwanted new species, bacteria and disease, or pollution could be an unwanted outcome and is also prohibited under federal regulations.



Even if all the above issues could be resolved, the pipelines would be unlikely to make a dent in reducing salinity. Ocean water is just about as saline as Salton Sea water. As a result, the salt coming in would greatly increase the demand on systems to remove salt and would greatly lengthen the time it would take to reduce salinity.

Okay. Can a shipping canal work better?

Again, it sounds great. After all, it could be used by boats and be a boost to economic development in the region. But getting the necessary agreements in place to exchange ocean and Salton Sea water would take too long to help the wildlife that is dependent on the lake. And, shipping canals are less effective than the pipelines in moving water.

What about desalinization?

The Salton Sea Authority, in partnership with the Bureau of Reclamation, is presently evaluating the potential of reducing salinity with a combination of passive and active desalinization techniques. Other options that have been proposed include reverse osmosis, bioremediation and collecting and recycling the water as it evaporates from the salt. None of these options have proven technology at the scale required for the Salton Sea. Desalinization would require both a very expensive desalting facility and an expensive disposal system for the brine in a process that would extract relatively small amounts of salt. While some of these methods may be a cost-effective alternative or adjunct in the future, the Salton Sea's need is virtually immediate and cannot wait.

We can't afford to be sidetracked.

Whatever actions are undertaken will take time and one single act will not cure all of the problems. There is no silver bullet. However, we have a window of opportunity now. Interest in restoring this vital resource is very high among governmental and non-governmental leaders at local, state and federal levels. We have enough information to get started now. There are cost-effective options available and we must pursue them.

The Salton Sea is too important to ignore.

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The Colorado River Delta Connection

SALTON SEA Restoration Project

SEA FACTS

The Colorado River has always been a meandering river. It has also been a river that carried large loads of sediment, collected as it drained from the mountains of Colorado and Wyoming through the canyons of Utah and Arizona to the Gulf of California.

Millions of years ago, the Gulf extended through the Salton Sink to present day Indio. The river intersected the Gulf near what is now Yuma. As deposits of sediment built up in the former delta, a shallow, 10 mile wide berm was created which extended 30 miles from Yuma to the Cocopah Mountains on the west side of the valley. Eventually, the berm divided the north and south sides of the Gulf. The lake left to the north dried up, leaving rich soil from the 1000 feet deep sediments which had been deposited. The Gulf to the south was pushed further and further south as sediments continued to be deposited, creating the rich soils in the Mexicali valley.

The river itself was fickle in where it flowed. Depending on its sediment deposits, it would change course, flowing sometimes south around the large berm to the Gulf and sometimes north to the Salton Sink. Today's New and Alamo Rivers flow in former Colorado River water courses.

The lake which would be formed in the Salton Sink was sometimes a much larger lake than the current Salton Sea. High water lines are easily visible on the mountains on the west side of today's Salton Sea.

Long before European explorers, Colorado River tribes living in present day Imperial County would alternate between fishing in the lake, planting crops in the river's floodplain and planting in the Imperial dunes. The last large infilling of what is now called Lake Cahuilla occurred in the early 1500s; however, at least 6 times during the 1800s water spilled into the sink. In 1891, the lake was 30 miles long, 10 miles wide and 6 feet deep, just 16 years before flooding breached a temporary canal to create today's Salton Sea.

When not flowing into the Salton Sink, the Colorado River continued on its path to the Mexican Delta we think of today. As recently as 50 years ago, the Mexican Delta was a very large marshy area with multiple channels, rich wetlands and abundant wildlife. When the Colorado River was tamed by man's intervention, it stopped its meandering. Because of diversions in the U.S. and Mexico, little water now reaches the Delta regularly. The water diversions, however, do sustain the Salton Sea, the Laguna Salada and the surrounding agriculture and cities.

Governmental and non-governmental organizations have recognized the ecological importance of the lower portion of the Delta. Mexico has designated the Upper Gulf and a portion of the lower Delta as an international biosphere reserve. Flood flows that have reached the Mexican portion of the Delta in recent years have demonstrated that both vegetation and wildlife can make a rapid recovery.

The Current Connection

The historic and geographic Delta extends from the Coachella Valley to the mouth of the Colorado and from the Santa Rosa and Cocopah Mountains to the area just downstream of Yuma.

The Salton Sea and the Mexican portion of the Delta today still share important ecological connections. Besides being part of the same geologic basin, they are connected by riparian corridors along the Colorado, Hardy, New and Alamo Rivers. They share desert corridors through the Cocopah and Coyote Mountains. Both areas support critical diverse habitat types.

Between the 175,000 plus birds which are found at the Mexican delta and 3 million plus found at the Sea on peak winter days, these areas are important wetlands along the Pacific Flyway amid impoverished habitat for migratory waterbirds. Over 90 percent of natural inland wetlands have been lost in California. The endangered Yuma clapper rail, while more frequently found in the Santa Clara Slough in Mexico, relies on both areas for its existence. Some birds from the Sea of Cortez, such as juvenile brown pelicans, disperse to the Sea to take advantage of its abundant food resources.

The upper and lower deltas share strong cultural connections, as well as common challenges. Shared tribal history, agricultural economies and attractions for tourists and those seeking recreation suggest that the efforts to restore the area to abundance can benefit both sides of the border. Figuring out how to proceed in the face of growth and its demands for scarce water resources, dealing with elevated levels of salt and selenium in river water and restoring habitat which is critical to the Pacific flyway call for joint research and cooperative management.

Birds of the Sea

400 bird species found at the Sea

100 breeding bird species

95% of total grebe population use the Sea in some years

80% of white pelican population can be found at the Sea

50% of brown pelican population may be found at the Sea

Let it dry up?

Some advocate restoring the Mexican part of the Delta and letting the Salton Sea dry up. Their reasoning? The Sea was formed by accident. It is fed by runoff from agricultural fields and polluted rivers. The environs are mostly barren desert or cultivated fields. Man has introduced all but one of the species of fish in the lake. The Sea suffers from occasional fish die-offs and outbreaks of bird diseases.

Pristine? - hardly!

In fact, for some humans, the Salton Sea is an easy place to dislike and write off. But the birds and fish don't agree. It is the most productive fishery in the nation, perhaps the world. That is due, in great part, to the little critters - algae and other microinvertebrates present in the Sea which form the base of the food chain. Recent scientific studies found dozens of species not previously identified at the Sea as well as approximately 20 species of microorganisms new to science. In addition to the fish and other life in the Sea, nearby agricultural fields are abundant sources of food for birds.

The reality is that neither the Colorado River nor the Salton Sea remains natural. Both are strongly affected by human intervention, as are many other natural places around the world. An ecological resource should not be judged solely by its natural purity. Both the U.S. portion of the Delta (the Salton Sea and its environs) and the Mexican portion of the Delta (part of the same ecosystem) offer excellent opportunities to experiment with management of manmade systems to rehabilitate damaged water resources. Restoring the Salton Sea starts with our existing, vitally important resources. It's the literal bird in the hand.

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A Chronology

SEA FACTS

SALTON SEA Restoration Project

10,000 BC (Approx)		Native Americans occupy the Salton Basin.
700 AD	**FLOOD!**	Lake Cahuilla forms in the Salton Sink when the Colorado River silts up its normal outlet to the Gulf of California and swings northward through two overflow channels. Lake is subjected to wet and dry climatic cycles over intervening years, filling up and drying out multiple times.
700 AD	**FLOOD!**	In what is today eastern Imperial County, riverine tribes practice farming. After planting seeds and kernels in the Colorado floodplain, they cross the Algodones dunes to exploit the lakeshore and return home for summer harvest.
About 1500	**FLOOD!**	A large inflow of water from the Colorado River fills the lake to a body of water 26 times the volume of the current Salton Sea. Its former water line is still visible on the nearby mountains.
1540		Colorado River Delta first explored by Spanish. Melchior Diaz journeys up the mouth of a river now known as the Colorado from the Gulf of California and sends expeditions from the river to present day Imperial Valley.
1604		Don Juan de Ornate, Spanish Governor of New Mexico, explores the river that he names the Colorado.
1774		Don Juan Bautista de Anza leads the first large European party through what is now the Imperial Valley.

Throughout its 10,000-year life span, Lake Cahuilla – -which since 1905 has been known as The Salton Sea – has had a tough existence.

The meandering Colorado River changed course numerous times over the centuries and filled the "Salton Sink" area of the desert Southwest. Lake Cahuilla came and went, came and went, came and went until the dawn of the 20th Century when it finally stayed.

Not only has this lake, today the largest in California, been subjected to the whims of nature over the course of its existence, but also in recent years it has developed a bad reputation. That reputation is fed mostly by misconceptions.

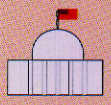
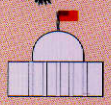
Some like to say the Salton Sea is a man-made accident, formed less than 100 years ago by an engineering mishap that diverted the Colorado River into the Salton Sink. Its value is as a "sump" for agriculture.

True, the accidental diversion did occur. And instead of evaporating over a period of years as had occurred previously, today's Salton Sea is maintained in large part by agricultural runoff from irrigation in the Imperial and Coachella valleys.

Irrigation of those fertile valleys not only supports the Salton Sea but also an industry that helps feed the world. Agricultural fields in the region join with the Salton Sea to support an ecosystem that attracts hundreds of species of birds and other wildlife. It is a crucial link in the Pacific Flyway, a very important part of the Colorado River Delta.

Agriculture in the region – and the wildlife habitat – go back at least 10,000 years.

Indeed, Lake Cahuilla – the Salton Sea – is no modern "accident."

1774		Spanish make first contact with the Cahuilla people, ancestors of present day Torres Martinez Desert and other Cahuilla Indians.
About 1825		Trappers, including Kit Carson, Jedediah Smith and Wm. Wolfskill make trips to the lower Colorado and the Salton Sink.
1840	**FLOOD!**	Colorado River flooding recorded in the Salton Sink. New River possibly formed at this time.
1849	**FLOOD!**	Oliver M. Wozencraft records a flood by the Colorado River into the Salton Sink.
1849		'49ers begin crossing Imperial Valley on their way to California gold fields, crossing the mountains via Carriso Creek and Warner's Hot Springs.
1852	**FLOOD!**	More Colorado River flooding recorded in the Salton Sink.
1853		Imperial Valley recognized as potential desert "garden spot" if it can be adequately irrigated.
1859	**FLOOD!**	More Colorado River flooding recorded in the Salton Sink.
1867	**FLOOD!**	More Colorado River flooding recorded in the Salton Sink.
1876		U.S. Government establishes Torres Martinez Desert Cahuilla Indian Reservation with a grant of 640 acres.
1891	**FLOOD!**	More Colorado River flooding recorded to the Salton Sink, forming 100,000-acre lake. Explorers discover mouth of Alamo River and connection between the Sea and the Colorado River. Lake evaporates.
1891		20,000 acres of land on the northern side of the Salton Sink are withdrawn from public use for the Torres Martinez Band of Desert Cahuilla Indians.
1892		New Liverpool Salt Company mines salt from a salt marsh centered west of the railroad station named "Salton."
1901		Canal brings water from the Colorado River to the Imperial Valley.
1904		Silt blocks the canal, preventing it from supplying water to the Imperial Valley.
1905		Temporary diversion of the Colorado River, constructed to replace water from the blocked canal, is breached by floodwaters. River changes course and flows into Salton Sink.
1906	**FLOOD!**	Floodwaters continue to fill the Salton Sea, washing away a chain of lakes along the route and threatening Imperial Valley's fledgling agriculture industry.
1906		George Wharton James explores the flooded areas and reports seeing large concentrations of waterfowl, pelicans and other birds in the Salton Sea area.
1906		The Salton Sea is recorded at –195 feet below sea level..
1907	**FLOOD!**	Floodwaters continue to fill Salton Sea until, in February, Southern Pacific Railroad closes the river breach.
1908		Joseph Grinnell surveys the refilled lake and finds breeding colonies of cormorants, white pelicans and other birds.
1909		Thinking the Salton Sea would be gone by the 1920s, the U.S. Government reserves in trust an additional 10,000 acres of land under the Sea for the benefit of the Torres Martinez Band.
1911		Harold Bell Wright chronicles the floods and efforts to close the break in his best-selling novel, <u>The Winning of Barbara Worth.</u>
1911		Imperial Irrigation District formed; discussions begin promoting a new canal to supply water to the Valley.

About 1917	Seining of Mullet becomes profitable industry at Salton Sea during world War I.
About 1920	Mullet Island on south end of Salton Sea and nearby mud pots become popular tourist attractions.
1924	President Coolidge issues an executive order, setting aside lands under the Salton Sea as a permanent drainage reservoir.
1928	Congress authorizes construction of Boulder Dam and the All American Canal that will result in control of the Colorado and elimination of flooding.
1930	Salton Sea Wildlife Refuge established.
1934	Construction begins on the All American Canal.
1938	Construction of Coachella Canal begins.
1941-45	Commercial fishermen use Salton Sea to supply mullet to coastal fish markets after German submarines make ocean fishing hazardous.
1942	The All American Canal begins supplying water to Imperial Valley; use of old Imperial Canal discontinued in U.S.
1944-45	B-29s from the U.S. Army's 393rd Heavy Bombardment Squadron, commanded by Lt. Col. Paul Tibbets, make regular but highly secret practice flights from Wendover Air Base in Utah and drop dummies of a new bomb into the Salton Sea. On Aug. 6, 1945, Tibbets and his crew, in the *Enola Gay,* drop the first Atomic Bomb over Hiroshima, Japan.
1948	The Coachella branch of the canal begins carrying water to Coachella Valley.
1950	Orange mouth corvina becomes the first salt water game fish to be successfully established in the Salton Sea. Short fin corvina and gulf croaker are also successfully transplanted.
1951	65 sargo are introduced into the Salton Sea—they quickly multiply and become the most abundant fish caught in Salton Sea until their numbers begin declining, presumably due to salinity.
1955	Salton Sea State Park dedicated; at the time, the second largest state park in California.
1958	M. Penn Phillips Co. a subsidiary of Holly Corp., maps out a community on the west shore of Salton Sea, calling it Salton City.
1960	North Shore Beach and Yacht Club Estates opened on north side of Sea.
1961	The California Department of Fish and Game predicts the Salton Sea will eventually die by 1980 or 1990 because of increasing salinity levels .
1968	Salton Sea's surface elevation recorded at –233 feet below sea level.
1968	Tracey Henderson in her book, Imperial Valley, writes that the Salton Sea's "salinity threat is constant and is growing more serious each year." She notes that by 1972, it may be too late to save the sea.
1974	A plan is discussed to reduce salinity levels with a diking system. After a meeting on the matter in North Shore, a leading proponent of the Sea, Congressman Jerry Pettis, is killed in a plane crash. His wife replaces him in Congress and takes up the cause.
1976	Tropical Storm Kathleen sweeps through Imperial Valley, flooding farming and increasing the level of Salton Sea. Above average rainfall for the next seven years, along with increased agricultural runoff and increased flows from Mexico, cause flooding of shoreline resorts.
1977	Tropical Storm Doreen sweeps through Imperial Valley, the second "100 year storm" in two years.
1979	Salton Sea's surface elevation recorded at -228 feet below sea level.

1985	Salinity of the Salton Sea exceeds 40 ppt.
1986	State issues advisory suggesting adults limit their intake of fish due to selenium threats.
1988	Salton Sea Task Force formed. It was the forerunner of the Salton Sea Authority, consisting of representatives from local government agencies.
1992	150,000 eared grebes die at Salton Sea.
1993	Salton Sea Authority formed in a joint powers agreement among the counties of Riverside and Imperial, the Coachella Valley Water District and the Imperial Irrigation District.
1994	Die-off of eared grebes claims 20,000 birds.
1995	Salinity of the Salton Sea approaches 45 ppt.
1996	Type C avian botulism causes large-scale mortalities of white and brown pelicans. This die-off focuses national attention on the Sea. An estimated 15 to 20 percent of the western population of white pelicans and more than 1,000 endangered brown pelicans die. This is the largest reported die-off of an endangered species.
1996	California voters pass Proposition 204, providing funding to the Salton Sea Authority to match federal funds.
1997	Congressman Sonny Bono resolves to champion restoration of the Salton Sea and forms the Congressional Salton Sea Task Force.
1997	Interior Secretary Bruce Babbitt launches multi-agency effort to restore the Sea; warns IID to cut water use for transfer to the coastal plain.
1997	The Science subcommittee is organized early in the year to conduct research into environmental issues impacting Salton Sea. Dr. Milt Friend is executive director.
1998	Mary Bono, widow of the late Congressman Bono, is elected to Congress and picks up the banner for the Salton Sea.
1998	Congress passes Salton Sea Reclamation Act directing the Secretary of Interior, acting through the Bureau of Reclamation, to prepare a feasibility study on restoration of the Salton Sea and submit it to congress by Jan. 1, 2000.
1998	In August, 7.6 million tilapia and croakers die from oxygen being depleted due to algae in Salton Sea. Yet scientific studies show the Sea may have the most productive fishery in the world.
1999	Salton Sea Authority and Bureau of Reclamation release alternative plans for Salton Sea restoration.
2000	Pilot projects are approved and years of just talking about the problems end.
2000	Several methods, including an enhanced evaporation system and solar ponds, are tested to determine the best way to reduce salinity.
2000	A wildlife disease program is underway for early detection and response to disease outbreaks as a means for minimizing losses.
2000	The Salton Sea Authority enters into a partnership with the Salton Community Services District to fund a fish cleanup effort on the West Shore.
2000	A pet food manufacturer evaluates Salton Sea tilapia, and commercial harvesting of the prolific fish becomes a possibility.

SALTON SEA RESTORATION PROJECT

(760) 564-4888 or (702) 293-8129

www.saltonsea.ca.gov

Facts about the Sea

SALTON SEA Restoration Project

SEA FACTS

Our very own Salton Sea is unique for reasons that we sometimes take for granted. For that matter, even those who call the Salton Basin home may not know some of the interesting facts that make the Salton Sea one of the most unusual geographic features in the world. To learn more about California's largest landlocked body of water, read on.

The Salton Sea's surface area (376 square miles) as compared to other notable lakes: Mono Lake (60 square miles), Lake Tahoe (193 square miles), and the Great Salt Lake (1,700 square miles).

California's Dwindling Wetlands

1780: 5 million acres

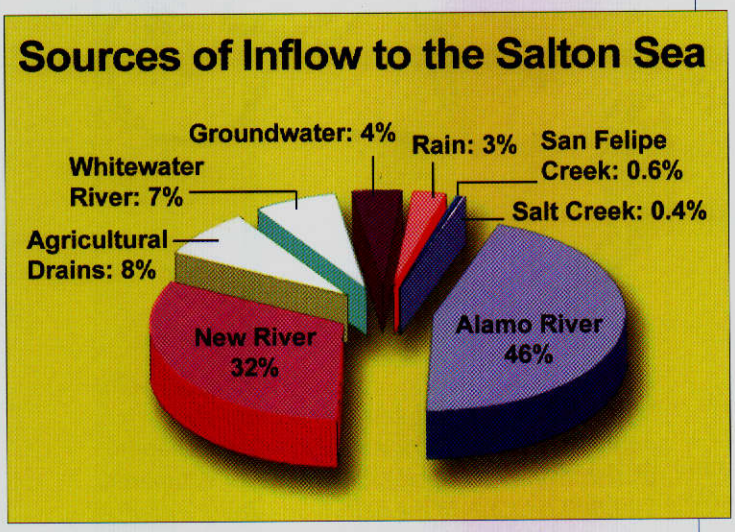
1954: 554,000 acres

1985: 454,000 acres

1999: 450,000 acres

As our wetlands decline, the importance of the Sea as habitat for wetland species increases. Since around 1780, 91 percent of California's wetlands have disappeared—more than from any other state in the US. The Sea's habitats support 40 percent of the entire US population of the threatened Yuma clapper rail, 80 to 90 percent of the American white pelican, and 90 percent of the eared grebe.

Sources of Inflow to the Salton Sea



Almost the entire inflow to the Sea (98 percent) is from agricultural runoff, which is transported to the Sea via rivers, creeks, and agricultural drains and by ground water infiltration.

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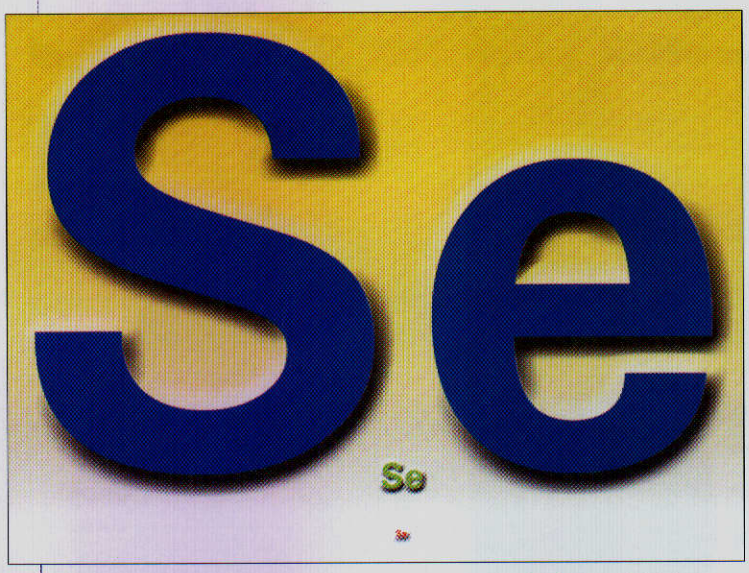
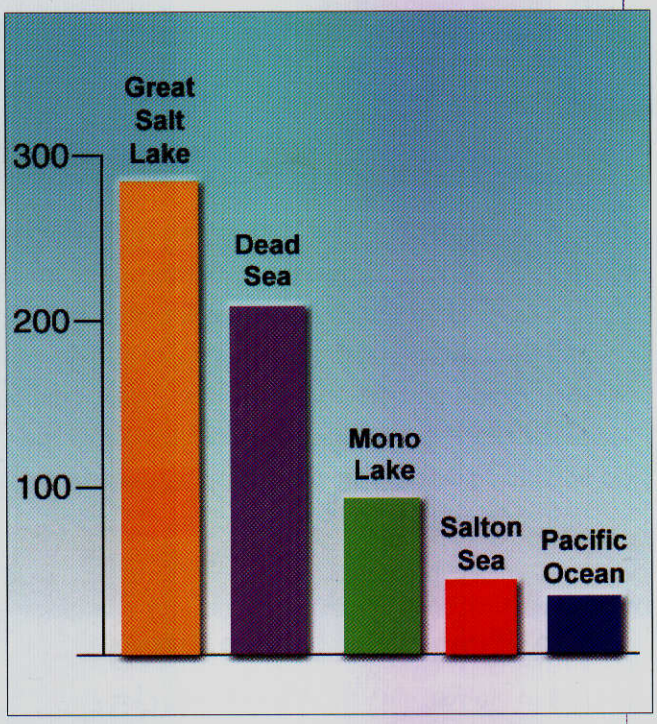
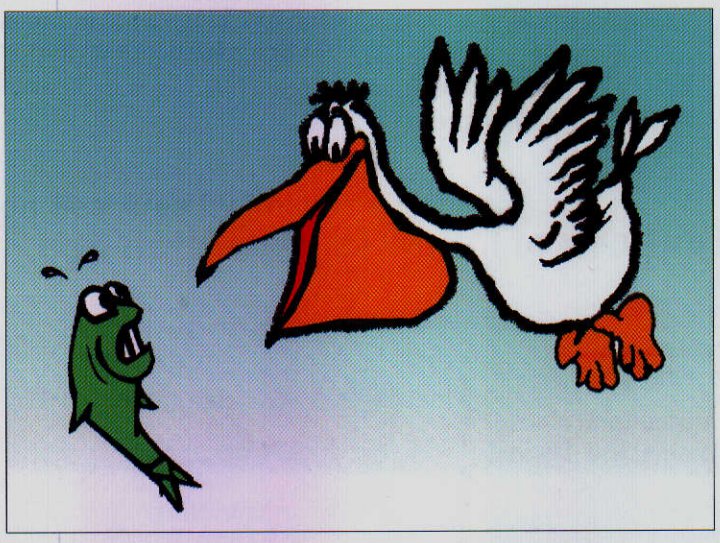
FACTS ABOUT THE SEA (CONTINUED)



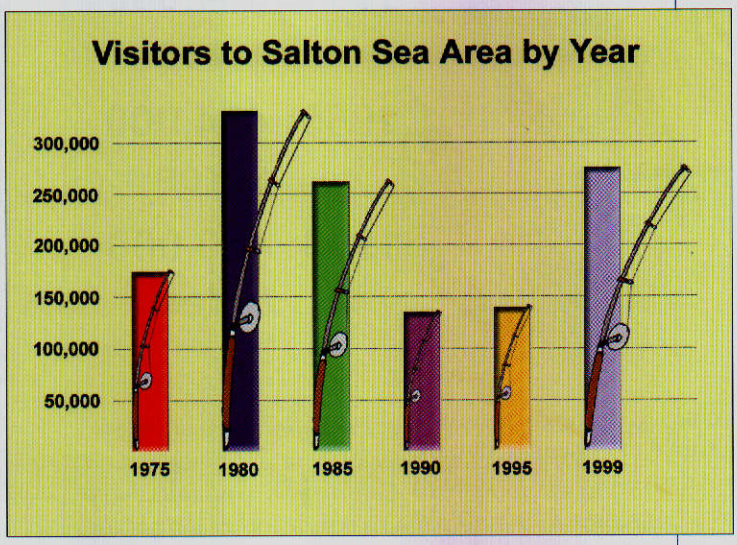
The level of selenium (Se, represented above in blue) recorded at Kesterson near Los Banos was approximately 80 parts per billion, before it was cleaned up; the US EPA's "level of concern" for selenium (represented in green) is five parts per billion. The selenium level at the Salton Sea? One part per billion (represented in red).



The salinity level of the Salton Sea is 44 parts per thousand (ppt), compared to 280 ppt for Utah's Great Salt Lake (at Gunnison Bay), about 210 ppt for Israel's Dead Sea, 87 ppt for Mono Lake, and 35 ppt for the Pacific Ocean.



During the winter, the Salton Sea is host to about 30,000 pelicans. Each bird gobbles up about five pounds of fish daily, for a total of 150,000 pounds of fish every single day. But with an estimated 200,000,000 fish in the Salton Sea, there's plenty to go around.



The numbers of visitors to the Salton Sea area has fluctuated over the past few years. One of the attractions is the Salton Sea State Recreation Area, which has 1,400 campsites in five campgrounds, hundreds of picnic sites, trails, playgrounds, boat ramps, and a visitor center.