

Salton Sea 101



By Steve Horvitz - Superintendent, Salton Sea State Recreation Area

Hardly a day goes by when my staff or I don't get asked, "What's wrong with the Salton Sea?" "Is the salt killing the birds?" "Why does it change colors?" "What about the smell." As the Sea becomes more of a popular environmental cause the questions become more frequent — and more urgent.

I've been asked to post some information about the Sea, it's ills, its positive qualities, why the Sea is so important to us and what's being done to protect this wonderful resource. Consider this a fundamental course about the Salton Sea - called *Salton Sea 101*, it's my attempt to offer a look at what happens at the Sea but certainly not a lesson in biology! There are sites that will provide a much more in-depth clinical picture of the Sea's systems, they're posted in the What's Happening section of saltonseainfo.com. I'd recommend Dr. Hurlbert's Center for Inland Waters Salton Sea Home Page as a must read for those intent on learning about this resource.

After researching the Sea on the Internet, come to our shore as the best way to learn about the Salton Sea is first hand. Visit the Salton Sea State Recreation Area or the Sonny Bono Salton Sea National Wildlife Refuge, understand the value of California's Greatest Resource and appreciate the need to ensure its future.

Now: on to **Salton Sea 101!**

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It's the Salt!

There exists discussion as to which is the most pressing problem facing the Salton Sea. Some will argue that its ever-increasing salt content threatens the existence of the systems within the Sea and they're right; some will offer it's the escalating nutrient load that will be its demise and that's correct too. Both scenarios hold serious ills for this lake. Left unaddressed the Sea, as we understand it now, will no longer exist.

For no other reason than "Salt" is in the name, we'll start our discussion here: how did the salt get into the Salton Sea?

When the Sea was created in 1905 its water came direct from the Colorado River. Almost the entire flow of the river ran unchecked into the Salton Sink for about a year and a half. When finally the engineers of the day were able to stop the flow of water they were left with a huge, relatively fresh water lake in the middle of Southern California's desert.

While the lake at that time was considered fresh it did contain a fair amount of salt as the river itself is on the salty side. Water entered the Sea from the southern most portion of the river — this water had already traveled hundreds, perhaps thousands of miles before being deposited in the Salton Sink. As water passed through the river it picked up salt and brought it to the Sea. In addition salt that was in the soil prior to the Salton Sea "re-dissolved" into the water further increasing the Sea's salt level. While the lake was a little salty after its creation, it certainly had nowhere near the amount of dissolved salt that we struggle with today.

During the past 94 years the Sea has become saltier to the degree that many scientists, politicians and land managers are concerned for its stability. Why does it continue to become

saltier?

Because the water in the Salton Sea comes from the Colorado River.

Beginning in Northern Colorado and flowing some 1450 miles, the Colorado River accumulates salts as it flows toward Imperial and Coachella Valley. River water is used to irrigate crops in the valleys; Colorado River water is salty. It travels from the river, is used for irrigation, picks up more salt as it travels through the soil, and eventually drains into the Salton Sea. Because the Salton Sea has no outlet the salt remains in the lake continuing to increase year after year. About six feet of water evaporates from the Sea annually; that's around 1.3 million-acre feet. Contrariwise, about six feet of water flows into the sea each year, so its level stays pretty much the same. Being in the desert, come summer with our (up to) 128 degrees, water evaporates very fast. As it does, it leaves the salt behind. Simply put, water comes in carrying salt, the water evaporates and the salt stays. About 4 million tons of salt enters the Sea in this manner each year.

You can try experimenting with this at your home by adding water and salt to a pan, leave it outside until it evaporates and see the salt that's left. Add more water and salt; let it sit, and even more salt will remain. That's what happens in the Sea. Left unchecked the salt levels will increase to the point that the present systems will no longer be able to exist. This process is natural — and it would be very difficult to stop. Again, every year the Sea receives an average of 4 million tons more salt — and the salt stays.

Currently the level of dissolved salt in the Sea is around 43 parts per thousand. The Pacific Ocean is around 35 ppt. We expect that as the level of salt in the Sea approaches 45 ppt some of the fish will stop reproducing and by the time that it reaches 60 ppt most of the sport fish will have disappeared from the Sea. Our barnacles, by the way, should survive up to 60 ppt — not that that's a comfort, just interesting.

So what's the concern? Why not simply let this natural process continue? Some argue just that — let the Sea become saltier, after all it is the natural course of the lake. The problem is that as the Sea becomes saltier it will eventually no longer support the fish that are in it. You will often hear that the Sea will "die" in 12 to 15 years. This isn't accurate; the Sea will not "die" from excessive salt. Rather, the fish will no longer be able to reproduce successfully, and their species will "evolve" out of the Sea. The eggs (and larval) stages of the fish are likely to be less salt tolerant than the adults, so they will be the first effected. Without successful reproduction the species will eventually no longer exist in the Sea.

What's the loss of a few (millions of) fish? They aren't significant in the sense that they're a protected species — the species in the Sea are very common worldwide. It's not so much the loss of the fish that worries us — of course it's a shame to see any animal suffer. But from a biological standpoint there would be no threat to these species (globally) if they no longer existed in the Sea. Rather the problem is that hundreds of thousands of birds depend upon the fish for food. Three hundred eighty species of birds have been counted at the Sea. This is close to half of the total species known to exist in the United States. Imagine that. Almost half of the species of birds that exist in our country have been seen at the Sea!

During the winter migration period if one could count all the birds that use the Sea each day a figure of two to three million has been estimated to be the total. Millions of individual birds use the Sea each winter day! There's more bird and wildlife diversity here than any other place

in California, maybe the nation. If the birds no longer found the high level of food that currently exists at the Sea, available nutrition for their reproductive needs would decrease; stresses would increase. Mortality among juveniles would rise and adult fish-eating birds would be forced to find and use other habitat. Why does this matter?

Because there is nowhere else for them to go.

And here we hit the heart of the efforts behind the reason to stabilize the Sea's salt level.

We have consumed our wetlands throughout Southern California. Our coastal riparian areas now host our buildings and roads; the Colorado River is mostly channelized and homes lace its shore. We have done very well at building homes and infrastructure for us — not so well at preserving a part of nature that is so important for all of us. If the Sea can no longer support the bird population because there are no fish, because the salt has increased to the point that they don't reproduce, many of the birds that use this lake will no longer be able to survive here.

That's why so many are struggling with the concept of trying to reduce the level of salt in the Salton Sea. Many believe salt is the most important factor affecting the survivability of the fish, and birds in this lake. And it is this that governmental entities such as the Salton Sea Authority and Bureau of Reclamation are struggling to address.

We are very close to the point where the salt will reduce the population of the fish. As I said some predict that within 12 years the Sea will be so salty that its biological systems will fail.



Photo: S. Horvitz, June 1998

Mecca Beach Campground, Salton Sea State Recreation Area

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Or is it Nutrient Loading?

So we know that the Salton Sea is salty, and, left unchecked, the salt will increase to the point where fish reproduction will cease and their populations will be eliminated.

Are there other problems? Yes! Several!

The Salton Sea is an agricultural sump, meaning that water from agriculture drains into it. Besides being salty the water brings other “qualities” that aren’t necessarily friendly to the systems of the Sea.

On one hand, it’s agriculture that supports/maintains the Salton Sea. Without the water that’s used for crops draining into the Sea, after 96 years of evaporating in extreme summer heat, the Sea most likely would not exist today. So “ag” water is essential to keep the Sea alive. But it’s a double-edged sword— with the water comes salt, excessive nutrients, and some other “uglies.”

Fertilizers are used to promote growth on farmland. They make their way into the Salton Sea with the drain water. The fertilizers do not directly harm the systems of the Sea, but they do add to its nutrient load, which has some “unpleasant” side effects.

Causing even more problems are the municipal wastewaters that drain into the Sea from the towns and cities in the watershed. As the human population increases, disposal of waste becomes a greater problem. Most human waste travels to treatment plants that are effective in rendering it safe. However, phosphates from this waste makes their way into the Sea. You add phosphate to your lawn to encourage growth. Phosphates added to the Sea cause plant life to bloom. Please don’t get the impression that “raw sewage” flows into the Sea, it doesn’t; the phosphates do.

The Salton Sea is so nutrient-rich because of these “fertilizers” that great portions of the lake will experience algal blooms. The Sea turns green, or brown and sometimes small portions even show a reddish color when algal species bloom. I’ve seen the Sea turn bright green in a matter of hours as the plant life bursts into action, spurred on as the result of the nutrients in the Sea. When this happens, you better hang on to your hat, or run for the hills. Because the alga will bloom and quickly die. When they die they pull oxygen from the water of the Sea. So much so that more often than not, not enough oxygen remains to sustain the fish and large-scale fish die-offs will follow within a day or so.

We know from our tests that the oxygen profiles of the Sea during these periods are very dramatic. Sometimes only the first inch or so of water has oxygen in it. Often below a meter or two we find no dissolved oxygen. So we see the fish at the surface of the lake gulping for “air.”

The introduction of external nitrates and phosphates isn’t the only event to blame for excessive nutrients in the Sea. The great abundance of natural life in the Sea causes its own waste. Life makes waste, all the fish, birds, and plants will eventually die. When they do, their nutrient load is made available to others in the Sea. In this manner nutrients are “recycled”, life dies, becomes food for more life that dies, becomes food, dies, becomes food, dies, food . . .

There are so many fish here that when I take a boat upon the Sea often I see fish jumping out of the way. During the spring, fishers catch fish every few seconds from the Salton Sea. One

recent Saturday I counted a group of fishers taking tilapia on the average of one every 17 seconds, per person, from the Jetty. I know, you've most likely heard different, that the Sea is void of life. Not so — there is so much life here that it encumbers its systems.

Perhaps it will help if you picture a ten-gallon fish tank sitting in your home. You have ten fish in it, a few plants, you circulate the water, add oxygen and food — life is good. Add forty more fish, stop circulating the water, throw in several cans worth of fish food, warm the water real nice and what do you expect will happen? You're right: system collapse.

As the Salton Sea's nutrient level increases life becomes more difficult. Eventually its systems will fail due to this over abundance of life.

I wrote that a discussion exists between those who think the salt level of the Sea will cause its failure first, and those who offer its high nutrient loads as the highest priority. There was a time when I fell on the side of salt and championed this as the immediate problem facing the Salton Sea. Recently, I've come to believe that while salt is a serious and known threat, it is in fact the Sea's nutrient load that will cause a system collapse before salt.

And when this happens it will be particularly nasty!

Since I've been at the Sea I've seen the fishery come back with abundance. I've also noted recently that we are experiencing a greater number of fish die offs, and that the die offs seem to occur all the time in one form or another. There has also been an increased bird mortality level. I believe that the system will experience a catastrophic event within a matter of several years due in part to the excessive nutrient load. When it does, fish will die outright. They will not simply stop reproducing, as in the case of high salt levels. They will die by the millions, float to the surface and wash ashore. This is beginning to happen as we have more algal blooms that cause localized ecosystem collapses. These "local" events seem to get bigger year by year. I think we will see "the big one" happen pretty soon.

Both the salt and nutrient load problems are very serious. Both must be addressed. Failing to reduce the Sea's nutrient level but reducing its salt load may only give us a less salty lake that fish and birds die in. Reducing the nutrient level and not addressing the salt will give us a lake facing a system devoid of fish, and then fish eating-birds. This will probably have a devastating affect on the migrating bird populations in the western states. Both issues have to be addressed for a healthy Sea.





Photo: S. Horvitz, June, 1998

Varner Harbor, Headquarters Area, Salton Sea State Recreation Area

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Oxygen!

Oxygen? “We don’t need no stinking oxygen!”

Oh yes we do! And we need lots more than we got!

Remember the Salton Sea is salty, it gets very warm, 90 plus degrees in the summer and the Sea is full of nutrients and life.

It is more difficult for water to hold oxygen in warmer water than in cooler water, and it is more difficult for water to hold oxygen in salt water than in fresh water. Most of the life that is in the Sea consumes oxygen; fish respire it, and the vegetation “burns” it when they die and rot.

We learned in the last segment that the Sea is so nutrient-rich that it supports tremendous algal populations. As I said, you can actually see algal blooms grow, becoming larger by the hour. This alga will die almost as quickly as it grows. When it does it will rot. Oxygen is pulled from the water of the Sea to help the algae decay; respiration by bacteria and fungi during the decomposition process pulls oxygen from the water. When this happens during late summer at the time that the Sea is at its warmest (90 degrees and more!) there is little dissolved oxygen in the water to begin with, the algae use much of what exists — leaving very little for the fish.

We test the oxygen profile of the water column in the Salton Sea. Sometimes only the first inch below the surface has usable oxygen. During the worst conditions if we test a meter and a half further down we find no oxygen. Typically, these conditions occur after a heavy wind. Wind will in effect “stir” the Sea, causing its nutrient load to move toward the surface, effectively “fertilizing” the alga that exists there, causing them to bloom, then decay and pull oxygen out of the water.

Shortly after these events we notice that fish come to the surface and “gulp” for oxygen. Generally there is not enough oxygen in the water to sustain them and many will die. This is a very common effect at the Salton Sea. Massive fish die offs as a result of low oxygen have been occurring for many years. The cycle gets worse when the fish die because the fact that they will rot in the water causes even more oxygen to be used, more fish die, more oxygen is used, and you get the picture!

If we are able to reduce the salt level of the Sea and, more importantly, if we reduce the nutrient level within the water, and by doing so reduce or eliminate the algal blooms, our fish will be much more comfortable!

The Salton Sea's oxygen profile is so dramatic that it changes by the hour. During the summer if you test the water for oxygen just before sunrise you will find just trace amounts and see lots of gulping fish. If you test in the late afternoon you'll find the first inch or so to be super-saturated with oxygen, more than in the atmosphere and the fish are happy. What happens? During the day the plant life makes oxygen through the photosynthetic process. After sunset oxygen is lost to respiration and putrefaction.

The effect that reduced oxygen has upon the fish in the Sea is even more dramatic when one factors in a particular species of alga that tends to retard oxygen exchange within the fish's body, and when you understand that gill structures of the fish are often coated with parasites. More on this in the next session! Until then, if you're a fish and you want to make the Salton Sea your home — bring your own oxygen! B.Y.O.O!

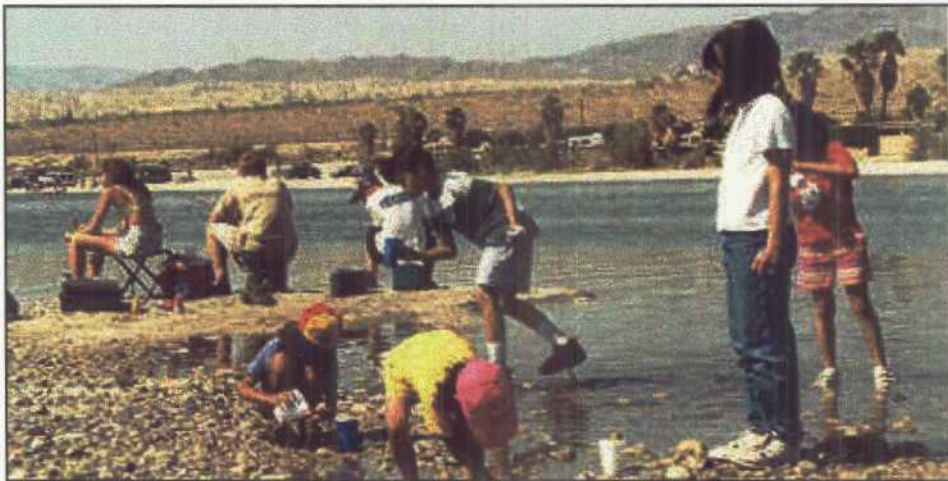


Photo: S. Horvitz, June, 1998

Varner Harbor, Salton Sea State Recreation Area

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Alga - the good, the bad and the ugly!

Talk about an interesting and newly-developing research subject! We are beginning to understand the importance that individual alga species may have on the systems of the Salton Sea.

This aspect of the Sea's troubled systems is the most cumbersome for me to discuss because it is a topic that hasn't been researched in great depth. But there are a few things that I may be able to shed some light on. There have been some very interesting findings made by San Diego State University recently that we'll talk about.

Algal species are very active in the Salton Sea, in great part due to the Sea's high nutrient content. Because of this, it makes it a wonderful place for plant life to flourish. We keep

“dumping” loads of “fertilizers” into the lake, causing algae to grow and bloom at an ever-increasing rate.

But put that thought on hold for a second. Before we get to the science we’ll talk fishing! The old timers that fished the Sea during the 50’s and 60’s would always say if you want to catch fish “fish the brown water.” Brown water means fish, and the water is brown due to algae. This type of algae seems to add oxygen to the water, it doesn’t bloom real fast, and more importantly it doesn’t die off en masse causing the oxygen of the Sea to deplete. Tilapia are often found at the lower levels of the brown algae, and below the tilapia one is very likely to find the corvina. Tilapia feed on the algae, and the corvina feed on the tilapia. So if you want to fish the Salton Sea look for a deep rich chocolate water color, and have at it.

I know! Brown water! Yuck! No . . . it’s just algae, nothing more.

Green water on the other hand deserves the yuck! The alga that tends to turn the water a green color are the ones that give us trouble, often cause fish die offs, and produce a unpleasant odor. These species bloom with abundance during the right times of the year and proper conditions. These species die quickly taking with them the oxygen and causing the fish to struggle. Fishing is generally poor during periods of green algal blooms.

Remember: Brown: Good . . . Green: Bad! At least for fishing.

We don’t know much about the individual species of algae in the Sea but we do believe that there is at least one kind that causes fish to die. Thanks to the tireless efforts of researchers from San Diego State University, we have some insight as to the limnology of the Sea. We have a better understanding of what happens here.

SDSU recently went public with the discovery of *Chattonella subsalsa*, an ichthyotoxic alga — it can be toxic to fish. It has been found in plankton samples from the Sea in high density. *Chattonella* becomes abundant in the Sea when the water temperatures reach around 75 degrees. It’s possible that the species needs this temperature for vegetative growth and “excystment.” During cooler periods the algae may “encyst” and “live” in the sediments of the Sea’s bed.

Interesting! And it gets better!

Scanning electron microscopy performed on tilapia gills shows the presence of “swollen tips of filaments” and “fused second lamellae.” Tilapia observed during this time appeared to be “gulping” for oxygen at the water surface. When *Chattonella* blooms are dense enough, and the fish have accumulated them in high numbers in their gill structures the toxin that they release retards the transfer of oxygen in the fish’s blood.

So, getting back to oxygen, nutrients, and salt . . . the sea is a warm salty body of water; oxygen dissolves less easily in warm and salty water. The Sea is highly nutrient-rich and makes a great place for algae to live. *Chattonella* is a type of algae that produces a toxin that restricts the fish’s ability to exchange oxygen. During the summer, when we have hot water and algal blooms the fish have very little oxygen to respire to begin with and they are affected by toxic algae which makes it even more difficult for them to “breathe” . . . and we wonder why we see ever increasing fish mortality events here?

If we allow the Sea to remain salty, if we allow its nutrient levels to increase we will see these events happen with greater frequency every year.

Isn't it interesting how everything is linked together? It makes it easy to see just how complex a system this is, and just how difficult it will be to set it right.

You'll see algae come up again in our discussion when we get to "the smell" section. Until then please remember that the colors that you see in the Sea come from different species of algae. Often clumps of algae will break off the bottom of the Sea and float to the surface. This is particularly common during late summer. People will visit the Sea during the summer when the algae is blooming and assume that the chocolate color is something nasty and the "clumps" are worse ... it isn't, it's just algae

... the good the bad and the ugly ...



Photo: S. Horvitz, June, 1998

Mecca Beach Campground, Salton Sea State Recreation Area

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How Many Fish are Too Many Fish?

We don't know ... but we do know that the Salton Sea is full of fish!!

There are four sport fish in the Salton Sea. Corvina (*Cynoscion xanthulus*) are the largest and most popular. The largest reported corvina taken from the Sea was in the mid '80's and weighed in at 37 pounds. It was estimated that this fish was 30 years old. Corvina are commonly caught in excess of 20 pounds. A 32 pound corvina was caught in midsummer of 1998. Gulf Croaker (*Bairdiella icistius*) are a smallish fish that range from half a pound up to a

rare three pounds. Croaker come from the Gulf of California and were planted in the Sea in an attempt to offer a unique sport fish. Their populations have suffered recently, perhaps due to high salt levels; heavy winter rain in the 1994/5 season caused the Sea's salt content to drop and a population rebound was seen for this fish. Croaker are a main forage fish for the corvina. Sargo (*Anisotremus davidsoni*) also from the Gulf of California, range from one half to three pounds. In 1951, 65 sargo were planted in the Sea and quickly populated this large lake. For many years they were the most popular and most abundant fish caught. Recently, though, their population has declined (presumably due to the Sea's high salt content) and now while we do receive reports of some limits of sargo being taken, they are not often caught. Finally tilapia (*Oreochromis mossambicus*) come from East Africa. The manner that they were introduced into the Salton Sea is unclear. Some claim that tilapia "escaped" from private fish farms and entered the Sea; some say the tilapia that were placed in the irrigation canals to clear vegetation found their way into the Sea. Those that may share accountability for the tilapia population here are quick to deny any responsibility to the species being in the Sea. The frequency that tilapia die due to low oxygen, and cold water, cause some unpleasant "sensory perception" events. Tilapia range from tiny, to up to four pounds and reproduce at a stunning rate.

So tilapia, corvina, sargo and croaker are the four main sport fish. Additionally a few other species still exist in the Sea. Very rarely a type of a stripped bass is caught on the south side of the Sea, and three years ago two mullet were taken and a shad was recently netted. Desert Pupfish, an endangered species, are found in some of the rivers that drain into the Sea, and there are a few mollies and mudsuckers still around.

Let's take a look at the difficulties that tilapia have in this resource, they are a most interesting fish. They love warm water, but can't survive in temperatures less than 55 degrees. Occasionally the water temperature of the Sea will dip below 55 for several days (during unusually cold periods — that seem to happen every 5 - 10 years) and many thousands (maybe millions) of tilapia will die. This species is caught for sport in abundance during the summer. It's almost as easy as backing your truck up to the shoreline and lowering your tailgate — it's as if they jump right in. Fishers fish for a day and leave with over 100 tilapia. There is no legal limit to the number of tilapia that you can catch, nor any size limit.

Varner Harbor, which is by the Recreation Area's headquarters, is a breeding ground for tilapia. From late February through July tilapia come into the harbor to spawn. When they do there are so many small fry that the water is alive and sparkling with their silver sides that catch and reflect the sunlight. If you happen to startle the fish you may see a ripple affect that goes all the way across the harbor. During the summer if you boat upon the Sea and pass through schools of tilapia you see them literally jumping to get out of the way of the boat. Corvina feed upon the tilapia, and when they're feeding you'll witness great areas of the Sea boiling with tilapia jumping to escape the corvina. It's common for people to believe that the Salton Sea is dead — that it contains no fish. This isn't the case, it is absolutely packed full of fish.

Tilapia are often the preferred fish for aquaculture operations throughout the world. This is because they are very protein rich, they serve as a wonderful food source, and they breed often and at a young age so the time frame from small fry to usable product is very quick. The species is extremely prolific — but also seem to be the first fish to die en masse when oxygen or temperature conditions become extreme in the Salton Sea.

Over the last few years we have had some terrible bird mortality events at the Sea. Hundreds

of thousands of birds were lost, and tens of thousands of pelicans died as the result of avian botulism. We know that tilapia may at times contract a vibrio class of bacteria. This bacterium is very common in salt water fish; tuna and sardines in particular are often found with vibrio. Vibrio will kill tilapia. It has a particularly nasty manner of affecting the fish. Now, if you just ate, you may not want to read this next passage, as fish affected with vibrio tend to rot from the inside out while they are alive. When this occurs there will be portions of their bodies that are void of oxygen, making good habitat for botulism. There appear to be unique interactions occurring between tilapia, pelicans, and fish-eating birds that results in live, but sick tilapia having botulism toxin present in their tissues and serving as a source for intoxication of birds that feed upon them. As the fish struggle in their death they tend to rise to the surface of the lake. When they do they become very attractive to fish eating birds, specifically the pelicans.

Vibrio is passed from one fish to the next; the more fish that are in the Sea the more chance that a larger number of them will become affected by disease. It's like standing in a crowded room full of sick people — chances are that you'll get sick too. If we reduce the fish population, perhaps we'll retard the botulism outbreaks.

Some suggest that the tilapia population must be reduced by thousands of tons of fish each year. I suspect that if we don't, very shortly we'll see a system breakdown that starts with a massive tilapia die off. There has been some investigation into the possibility of harvesting the tilapia commercially. Years back some proposals were made to the Department of Fish and Game. Should a harvesting plan be implemented, it will go a long way to aiding the Sea.

So, go get a fishing pole and come on down — fish tacos!

You might find it interesting that tilapia are used by many fast food restaurants in their fish products. They make good fishmeal for animals and some biblical scholars have told me that they believe it was the tilapia that Jesus used to “feed the masses.”

Be that as it may . . . there is little argument that for the long-term health of the Sea, its fish population needs to be harvested. This should to be addressed as we try to find a method to drop the Sea's excessive salt and nutrient levels. Remember my example of a ten-gallon fish tank with 40 fish in it . . .

By the way, while we're talking fish . . . there was once a report of an octopus being taken from the Sea, and my staff found a live crab in Varner Harbor just this last summer! Really!

O.K., end of the fish section . . . you can eat your lunch now!





Photo: S. Horvitz, June, 1998

Headquarters Main Beach, Salton Sea State Recreation Area

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"The Smell"

Smell?! . . . What Smell?!

Several years ago I received a phone call from a fellow that identified himself as a “lawyer from Palm Springs.” He was very agitated over the fact that he (while in Palm Springs) smelled an odor that he blamed on the Salton Sea. So mad was he that he insisted that I personally do something about it or he was going to sue me. He continued, saying that since I was the Superintendent of the Recreation Area on the Salton Sea, it was my responsibility to ensure that any offensive odors not interfere with his life-style in Palm Springs. I explained that I didn’t quite have the ability to do as he asked. He ended the conversation with the warning that I could expect to be served.

. . . Of course, the summons never came.

. . . I was disappointed.

Then there was the time when the Fire Chief from Lake Havasu called our office and complained about the smell that was coming from the Salton Sea and settling on Lake Havasu. Lake Havasu? I don’t think so! Not that far away. However, there are times when we can very much get the attention of our neighbors!

What causes the smell at the Salton Sea?

You recall that algal blooms are driven by the Sea’s high nutrient loads and occur when winds (or a collapsing temperature inversion) bring nutrients to the surface of the water. Algal blooms commence very fast and with great vigor but quickly ebb and the alga dies. Microorganisms move in to “digest” the alga consuming oxygen and emitting a sulfur smelling gas! It’s these massive algal blooms that trigger the smell — it is the gasses produced by the decomposing bloom that you notice.

While these events happen rather frequently at the Sea during late summer and early spring, more often than not the Sea has a normal bio-smell. As the ocean has an odor of decaying vegetation, the Sea does too. As lakes smell when they turn over, so does the Sea. The Salton Sea is not bottled water quality; it will always have the smell of life. And this does not represent a negative biological event.

However, the odor that comes from massive algal blooms does signal a system that is in trouble just by the size of these events. We already understand that we can greatly reduce these algal blooms, subsequent fish die offs, and sulfur odor by drawing down the Sea's nutrient load and to a degree by reducing its salt content. You'll remember that I wrote that salt and nutrients are the major biological problems facing the Sea. Address these and we go a long way to creating a system that will be much healthier for a long time — and smell better too!



Photo: S. Horvitz, June, 1998

Fishing Jetty at Varner Harbor, Salton Sea State Recreation Area

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Water, water, everywhere . . . but not for long

The preceding sections describe some of the problems facing the Salton Sea and suggest a degree of urgency for us to get off the mark and do something. While a number of challenging biological problems do exist, there's another, maybe more pressing issue that if allowed to continue unmitigated, will render this important resource useless for wildlife and recreation.

It's not often discussed.

Some time ago I was at the Recreation Area giving a presentation about the Salton Sea to a group of water consumers; water agencies and districts. When the presentation was finished, all the questions asked and almost everyone was on the bus, a fellow came to me who represented a large Southern California water District and he told me:

"You know 1.3 million acre-feet of water flow into the Sea each year."

I agreed

“That water is worth a great deal of money to us.”

I said yes, I understand the value of water in the state of California.

He said: “It’s a waste to allow this water to flow into the Sea . . . we want it . . . we’re going to get it . . . and there’s nothing that you can do to stop us.”

I remembered his words exactly; these are direct quotes.

The problem is, he may be right.

As I write this, there exists a number of claims for water that flows into the Salton Sea from three Southern California water districts. If these requests for water rights are granted, a total of 575,000 acre feet of water will be diverted from the Sea for other uses. Additionally 200,000 acre-feet of water has been approved for transfer by the California State Water Resources Control Board from the Colorado River at Lake Havasu for San Diego. This water belongs to the Imperial Irrigation District. They intend to sell it to San Diego. Much of this 200,000 acre-feet of water would otherwise have found its way into the Salton Sea.

I mentioned that around 1.3 million-acre feet of water flows into the Sea each year. While the water carries salt and nutrients, which cause problems, the water is essential for the survival of the Sea. If 575,000 acre feet (annually) of water is removed from the Sea the salinity and nutrient loading problems will be aggravated, hastening the collapse of essential biological systems unless methods for intervention are quickly initiated.

It’s interesting that there is very little mention of this in the media, or discussion about these water transfers and claims by environmental groups. It’s as if we’ve turned a blind eye to the damage this will cause the Salton Sea. Understand the effect these water transfers may have on the Sea — and be afraid for this system.

It was the cry for water in Imperial Valley that caused the creation of the Salton Sea. It is the need for water in Southern California cities that may very well cause its demise.

California draws water from the Colorado River. We use more than our allotment by about one million-acre feet each year. The State is being held to stay within the allowed 4.4 million af by the Interior Department. The State needs to look for a way to utilize other water in Southern California, or to conserve. And . . . as 1.3 million af of water flow into the Sea, several water districts have targeted this water as a method to solve the shortage.

Owens Valley was faced with this problem many years ago — their water was taken — their lakes dried — and dust blows.

I hope we are able to address this before it’s too late — but sadly the fellow from the water agency that told me “you can’t stop us” may very well be right. Water politics is very strong in California. It is this that has driven much of what’s happened in the state, and here at the Sea.

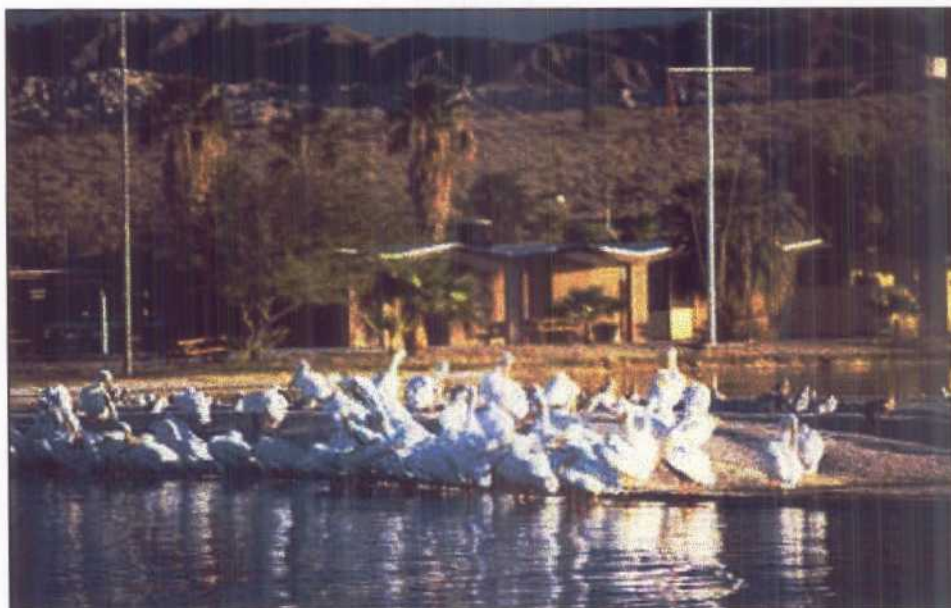


Photo: S. Horvitz, November 1997

Varner Harbor, Salton Sea State Recreation Area

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Debunking the myths!

The Salton Sea has too much salt, it is excessively rich in nutrients, at times not enough oxygen exists in the water, algae is not always our friend, “what smell?” and . . . we’re running out of water. These are all difficulties that this valuable resource faces.

No doubt you’ve heard of other problems with the Salton Sea but much of what has been presented is inaccurate — a product of one-dimensional reporting and some reporters, politicians and governmental offices sensationalizing the effects at the Sea.

This section will “debunk” some of those myths!

Myth 1: Pollution from Mexico enters the Salton Sea

That the New River polluting the Salton Sea is something that you have probably heard. Actually, the water carried by the New River doesn’t appear to be a major factor for the Sea’s difficulties. Yes, the New River is polluted. Yes, biological and industrial waste flows into it in Mexico. Yet only 30 percent of the water in the New River comes from Mexicali, and most of that is agricultural discharge. By the time the water crosses the border and travels the 67 miles to the Salton Sea its quality is similar to that of the Alamo River. Waste from Mexico is treated naturally in the river and is diluted by agricultural drain water from Imperial Valley.

Myth 2: The problem is pesticides from agriculture

The State Water Resources Control Board tests water in the Salton Sea twice a year. Pesticides at any significant level are not found in the Sea.

The greater problem from agriculture is the fertilizers.

Myth 3: Selenium exists in the water of the Salton Sea at harmful levels

It does not. While selenium is a concern (it is a naturally occurring element that is in Colorado River water) it is not found in great amounts in the water of the Sea. There are uncomfortably high levels of selenium in the soil that make up the lake bed of the Sea, and the selenium level in some bird flesh is of concern. A human health advisory exists on consuming too much fish from the Sea due to selenium. Selenium will have to be tracked at this resource, but for now it does not rate number one on the list.

Myth 4: The Sea is an insignificant ecological resource

The sea is extremely important to the birds that use the Pacific Flyway. Its wetlands provide habitat to millions of birds. Several endangered species are known to make the Sea their home including the Brown Pelican and Yuma Clapper Rail. The environmental resources at the Sea are among the most diverse and important in the state.

Myth 5: The Sea is an insignificant economic resource

The Salton Sea has the potential to be a major local and regional economic player. Once most people have an understanding of the quality of the Salton Sea there is little argument that a stabilized lake will have tremendous positive impact upon the region. A recent University of Redlands study suggests that over 300 million dollars can be generated at the Salton Sea each year. More recent studies suggest a positive economic boost into the billions with a "saved Sea."

The potential for negative impact is just as great. Imagine a failed, smelly and ruined 380 square-mile lake that rests just 20 miles from some of the richest communities in California. Billions of dollars may be lost with a failed Sea in the neighborhood.





Photo: S. Horvitz, December 1996

Boat Dock at Varner Harbor, Salton Sea State Recreation Area

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A Problem of Image!

For over thirty years we've struggled with the problems of the Salton Sea. As we've tried to address the lake's needs and bring attention to its plight, some have taken the tack that the best way to raise concern and support for the Salton Sea is to present it in the worst possible light — even exaggerating its problems.

Early in the summer of 1998 I attended a field session for congressional testimony about the Salton Sea. At the conclusion of the meeting I was asked by CNN to give a quick interview. As I waited my turn in front of the camera I watched as a well-known and respected Congressman spoke to the camera, answering a reporter's questions.

The Congressman announced that the Sea had to be saved because it was so polluted, and contaminated that no one uses it any more. "No one would want to because it's so bad there — there are signs posted telling people to stay out of the water." I was amazed to hear him speak like this about the Salton Sea because I know that many, many people use, boat upon, swim in, and fish the Sea. In fact, visitation is increasing; the Salton Sea State Recreation Area had 250,000 people visit during the 1997/8 fiscal year. This is the highest level in the last 12 years. I also know that it's beautiful at the Salton Sea and its beauty draws many people to its shore.

Later in the week I called the Congressman's office and asked him why he described the Sea as he did. I told him that our visitation is up, the Sea is not closed to contact, and it is a pleasant place. He agreed, saying, "Yes, I know." I said, then what you're telling people is wrong. He said, "Yes, it is." I appreciated his candor, but I was amazed that he was so frank in his admission that he mislead CNN's viewers. I asked him why he made these statements. He said that it is his belief, and that of many of his fellows in Congress and the Senate that in order to solve the problems of the Salton Sea, it must be presented in the worst possible light. In other words, the worse people think it is, the more inclined they will be to support the efforts to salvage its ill systems.

It's a matter of politics. I suppose he's correct — he's the politician, but I took and continue to take issue with this manner of "building support" for the Salton Sea. This is the method we've used for the last thirty years and it hasn't worked yet. All we've done is to scare people away from the Sea. We have not educated them about it.

There are some very real, very serious biological and political problems with the Salton Sea. We don't have to exaggerate its ills. We think that we can't swim in the lake, that the water will harm us — it won't. Many think that we can't catch and eat the fish — we can and do. A survey that was taken in 1989 illustrates that more than half of the people that used to come to the Sea don't because they fear it in some manner.

While this hurts the local economy, while the towns, business people and residents around the Sea suffer from this impression, more significantly it has caused so many to believe that the problems of the Sea are too big to solve, or that it is already a wasted body of water, that no life exists in it and the best thing to do is let it dry up, or as one letter to the editor recently suggested "use it as a landfill, it's already a sewer." And . . . so many think this way after hearing thirty years of nothing but the worst; the Sea has lost its support group, lost its "constituency." There is no grass roots support to push home the need to protect this resource such as there was at Mono Lake and in Owens Valley. There is no voice for the Salton Sea; too many think it is already a lost cause.

Some of what I've said in this booklet has probably surprised you. I bet you didn't know that you can swim in the Sea that you can catch fish every 17 seconds on a summer day, that corvina up to 32 pounds were recently taken from the Sea, that you can sit and watch a sunset across sparkling water with the snow capped Santa Rosa Mountains in the distance. You don't often hear about these events — rather you hear the worst; it does make good media fodder.

Don't take to heart all that you read in the media about the Sea, or all that you've heard from politicians about its problems. Come and look for yourself. The Salton Sea has some serious problems; it will fail if left unaddressed. Yet with all its difficulties, there is no reason to fear it, and many reasons to support its longevity.

And don't be afraid to enjoy the Salton Sea today — we, after all have the best sunsets in the desert!



Photo: S. Horvitz, June, 1998

Mecca Beach Campground, Salton Sea State Recreation Area

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Who's Doing What Today

For 50 years we've recognized that the Sea has a limited life expectancy. Those concerned with the Salton Sea have tried to bring attention to its plight and solve its problems three times over the last thirty years. The first two attempts failed, and conditions worsened. The third attempt has had some success.

The Salton Sea Authority a joint powers authority with members made of the Riverside and Imperial County Board of Supervisors and the Imperial Irrigation District and the Coachella Valley Water District was formed in 1994 to address, and solve the Sea's problems. This is the first time that an entity has been created that can enter into contracts on behalf of the Salton Sea. The Salton Sea Authority (SSA) is recognized as the "local representative" for the Salton Sea. The Bureau of Reclamation (BOR), a governmental agency has been appointed to act as the federal entity responsible for working with the SSA to devise a method to stabilize the Sea.

A group of federal legislators, calling themselves the Congressional Salton Sea Task Force has teamed up to try to assist the SSA and the BOR with political support and funding. Last year the Congressional Task Force, led by Congresswoman Mary Bono was successful in placing the Salton Sea in front of the House of Representatives and the U.S. Senate in the form of a bill that sought funding. Both floors voted upon and agreed to support the efforts of the SSA and the BOR. The bill authorizes five million dollars to be appropriated for the effort to stabilize the Sea. While this is a good step forward the bill did not provide new money; only the authority to spend existing money. The authorization has not been matched by an appropriation. However, this was the first time that a bill has been discussed and passed on behalf of this resource. From that perspective the effort was a success. The bill originally sought over 350 million dollars. The five million dollars that it authorized will not be enough to "fix the problem." But it will help to fund the studies that are currently in place to identify the solution to the ills of the Sea. These studies will be finished by January 2000. At that time we hope money is available to implement the project. If not — the Sea will continue to suffer, birds will die, and the problem will worsen. Letters to your representatives can make the difference. Let's let the "voice of the Sea" be heard. Write to your representatives and encourage them to support the efforts to "save the Sea."





Photo: D. Bennett, January, 1998

Newt & Mary, Salton Sea State Recreation

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A Final Word

I hope that you have found this information useful. And I hope you take it as a first step in learning about the Salton Sea. Come to our shore and see for yourself how impressive this resource is and imagine how terrible it would be if we allow it to take the wrong course.

I recently read a letter to the editor in the Los Angeles times. This was when we were having some terrible bird mortality events and there was much discussion about the Sea's problems and how to correct them. During this time we often heard how much money it will cost to set the system right. The fellow that wrote the letter said "Shame on us for allowing the dollar to stand in the way of fixing the Salton Sea." As the money exists in this country to conquer this problem. I'd add: "Shame on us for allowing this problem to exist for so long."

The Salton Sea is 94 years old. In six years it will be 100. We will celebrate the occasion of its creation in 2005.

How wonderful it will be if we can announce at that time that a course has been charted and funded to set the Sea right again.

How terrible if instead we are still talking about a problem that has to be addressed.





Photo: S. Horvitz, January, 1998

Tent camping, Salton Sea State Recreation Area

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How you can help

Write your representatives. Many of our Legislators are lending their weight to the effort to "save the Sea" but they need to hear that you support their attempts. Letters to your representatives, whether they represent California or your home state are important. A particular need is to encourage the State of California to be more supportive with the efforts to secure a bright future for the Salton Sea. Letters to California's Assembly and Senate offices will be most helpful. These are "outside links" when you're finished click your back button to return to this frame.

[U.S. House of Representatives](#)

[Mary Bono](#)[U.S. Senate](#)[Barbara Boxer](#)[Dianne Feinstein](#)[For the State of California](#)[California State Assembly](#)[California State Senate](#)

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Photo: S. Horvitz, December, 1996

Salton Sea-300, 300 mile jet ski race at the Salton Sea State Recreation Area

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Steve Horvitz is the Superintendent of the California State Parks in the southeastern portion of the State. He has worked at the Salton Sea for the last seven years, is educated in wildlife management, wildlife biology, and resource conservation. Steve has been participating in efforts to secure a viable future for the Sea for many years. You may contact him direct at shorvitz@cre8v.com or write the Salton Sea Sector, office of the Superintendent, 100-225 State Park Road, North Shore, Ca 92254, (760) 393-3059.

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