SALTON SEA Restoration Project

SEA NOTES

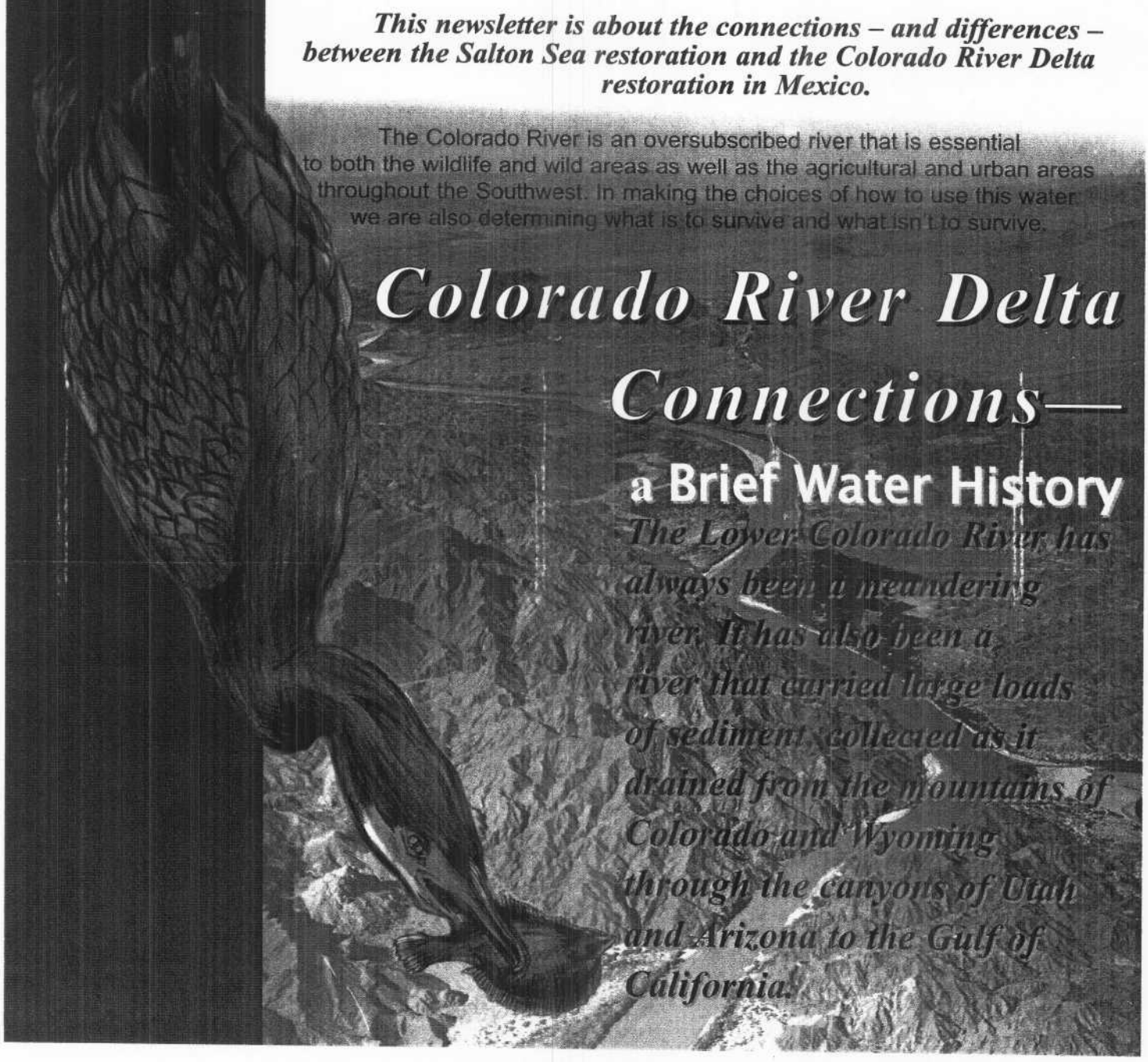
August 2001

A newsletter of the Salton Sea Restoration Project

Newspapers and news broadcasts in recent months have been filled with stories about decisions regarding water and wildlife in the West. However, listening to the news, it is not always obvious how these decisions are intertwined. Further, many misperceptions exist.

This newsletter is about the connections – and differences – between the Salton Sea restoration and the Colorado River Delta restoration in Mexico.

The Colorado River is an oversubscribed river that is essential to both the wildlife and wild areas as well as the agricultural and urban areas throughout the Southwest. In making the choices of how to use this water we are also determining what is to survive and what isn't to survive.



Colorado River Delta Connections—

a Brief Water History

The Lower 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 basin to present day Indio. The river intersected the Gulf near what is now Yuma (Figure 1). As deposits of sediment built up in the former delta, a low 10 -mile wide berm was created which extended 30 miles from Yuma to the Cocopah Mountains on the west side of the valley (Figure 2).

Eventually, the berm divided the north and south sides of the Gulf. The lake left to the north dried up. The Gulf to the south was pushed further and further south as sediments continued to be deposited (Figure 3).

The river itself was fickle in where it flowed. Depending upon its sediment deposits, it would change course, flowing sometimes south around the large berm to th Gulf and sometimes north to the Salton basin (Figures 4 an 5). Today's New and Alamo rivers flow in former Colorad River water courses. For roughly the last three million years the river has changed course, leaving sediments on bot sides of the berm and freshwater lakes behind in the Salto Sink.

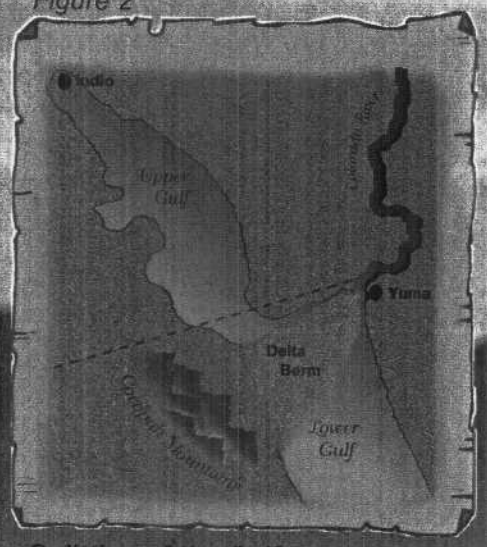
In a December 2000 report, entitled "An Inventory an Evaluation of Lake Cahuilla Cultural Resources along Imperia Irrigation District's SA-Line," authors Jerry Schaefer, Ph.D. RPA and Ken Moslak, Associate Archaeologist, note tha "One of the most dynamic and dramatic aspects of th Colorado Desert paleoenvironment to effect human occupa-

Chronology for the Colorado River Delta

Figure 1

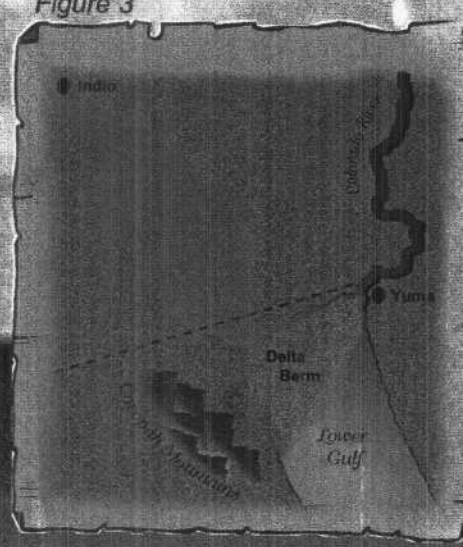
The Gulf, millions of years ago...

Figure 2



Splitting of the Gulf...

Figure 3

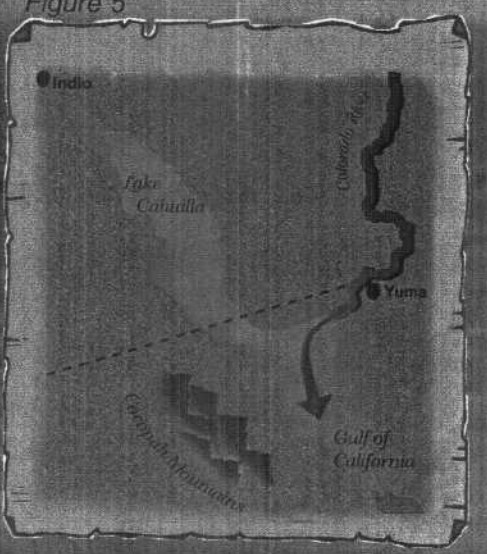


The lake to the north dries up...

Figure 4

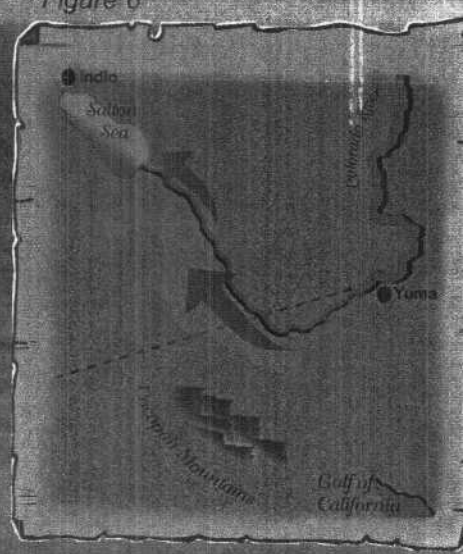
At times, the river flowed north to the Salton Basin...

Figure 5



At times, it flowed south to the Gulf ...

Figure 6



Formation of the Salton Sea, 1905

tion was the flooding of the Salton Trough to form ancient Lake Cahuilla..." (Figure 4)

When the Salton basin filled completely, the lake was approximately six times the size of the current Salton Sea.

"The Imperial and Coachella Valleys filled with water in about 18 years to form the largest fresh water lake in California. It was 110 miles long, 32 miles wide, and over 280 feet deep at the center. The lake filled to an elevation of 40 ft above sea level, the height of the Colorado Delta that acted as a dam," according to the Schaefer report. It adds "Radiocarbon dates from marsh deposits and archaeological sites around the lake indicate from three to four major lacustrine [periods when the lake was filled] phases over the last 2000 years, each lasting for several hundred years."

In fact, while more research is needed, it is possible the river may have flowed north to the Salton basin more often than it did to the Gulf over that time. Schaefer's studies conclude that "for the last 1,300 years, the Colorado River flowed into the Salton Trough 55% of the time while directly emptying into the Gulf 45% of the time. Even so, with the long periods of recession, there was water in the trough more often than not." Other studies concur with these same findings (See table on page 4).

"There were also partial infillings and many fluctuations in lake levels. Recent research has also demonstrated that there was at least a partial infilling as recently as A.D. 1600-1700 (Schaefer 1994, 2000; Laylander 1994, 1995)," Schaefer writes.

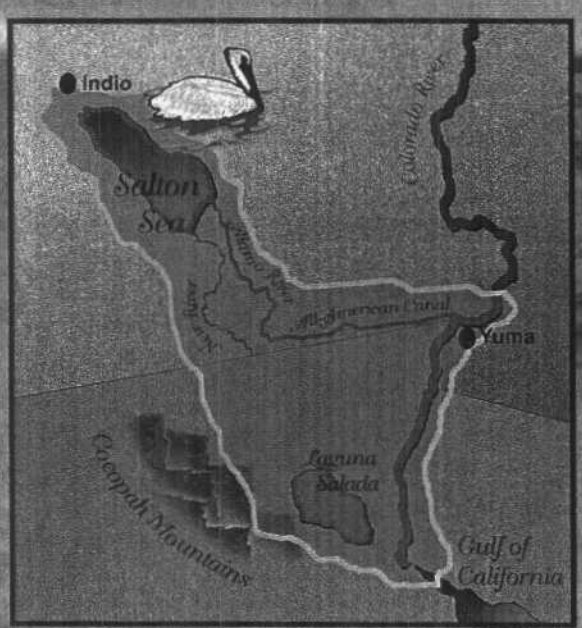
A number of smaller lakes existed after 1600, including nine during the 1800s. According to Godfrey Sykes, who wrote several scientific articles on the Colorado River Delta between 1914 and 1937, water from the river entered the Salton Sink five times in the middle of the nineteenth century and one other time in the latter part of that century.

Sykes said the Colorado River entered the sink in 1840 (probably when the New River was formed), 1842, 1852, 1853, 1859, and 1867. In June 1891, the river flowed into the Salton Sink and created a 100,000 acre lake, according to Sykes. Shoreline evidence of travertine deposits, mollusk and fish remains, vegetative evidence, and tribal sites document the history of the lakes.

The 2000 Schaefer report: "Each time the lake filled, Indians from the Colorado River on the east and the Peninsular Range and desert fringes to the west established seasonal settlements along the sandy beaches of the shore line...The lake provided abundant fish, a species of freshwater mollusk, migratory waterfowl, cattail, reeds, and other marsh vegetation...Especially on the western side of the lake, stone fish traps were constructed in the shallow waters to take advantage of natural fish behavior to hide in rocky enclosures when startled or during spawning. Today, parallel lines of these V-shaped stone traps can be seen from aerial photographs in the now dry desert where the prehistoric ancestors of the Cahuilla and Kumeyaay (Kamia) Indians fished and where they built new lines of traps as the lake waters receded."

The Schaefer report notes that "formation of Lake Cahuilla was so important that at least one Cahuilla lineage preserved the oral history of the event, describing how they were forced from the low basin by the rising waters but then returned down to the shoreline to fish, gradually descending to lower elevations as the waters retreated."

See CONNECTIONS, Page 5



The Whole Colorado River Delta

is bounded loosely at the north by Indio and surrounding areas, to the east by the Colorado River at Yuma, to the south by the mouth of the Gulf of California and to the west by the Cocopah Mountains (as outlined in white in the figure to the left).

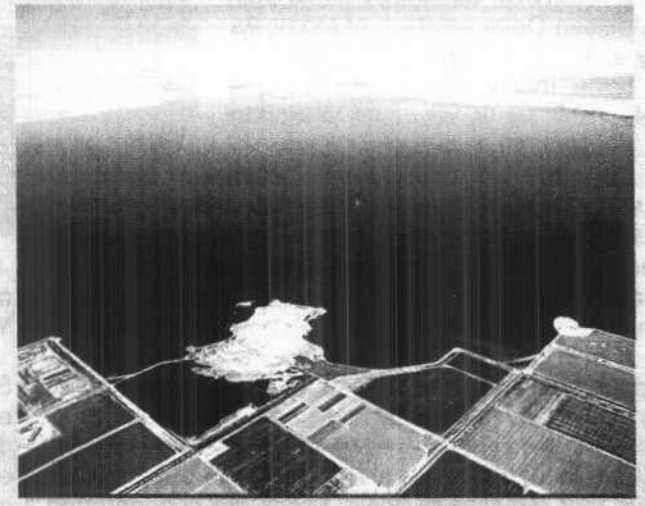
Redlands Database to deal with Whole Historic Delta

The Salton Sea Database Program at the University of Redlands is developing information on the historic and pre-historic flows of the Colorado River.

The Redlands team is working on integrating historical hydrological data, geomorphological evidence, and lacustrine evidence of Lake Cahuilla to tell the story of the greater Colorado River Delta which includes the Salton Trough.

"The purpose of this work is to provide better information to decision-makers, the public and stakeholders about the "natural" flows of the Colorado River and the resulting distribution of water across the entire Delta," according to Dr. Tim Krantz, Professor of Environmental Studies and Salton Sea Database Program Manager at Redlands.

The project is expected to be completed in September.

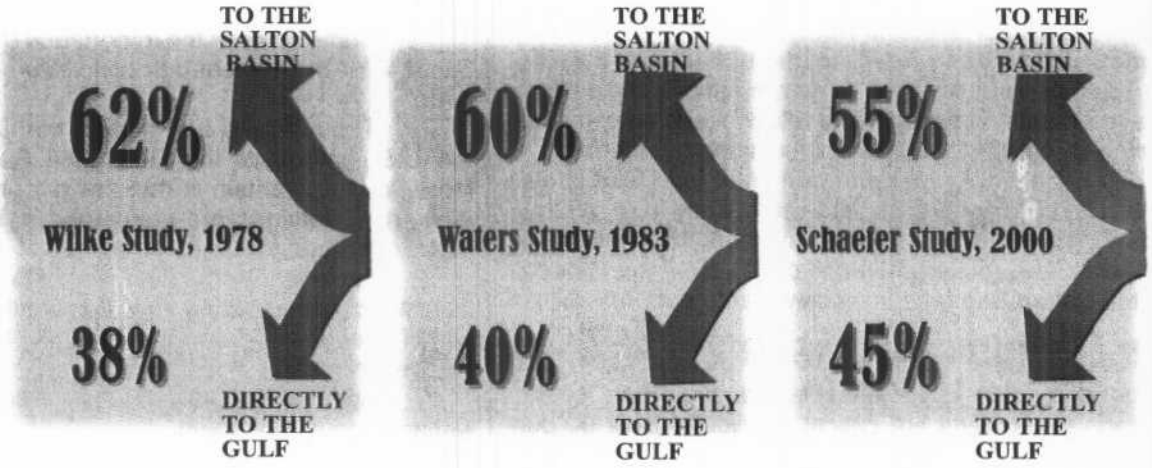


Aerial view of Salton Sea and surrounding agricultural areas.
(Bureau of Reclamation photo)

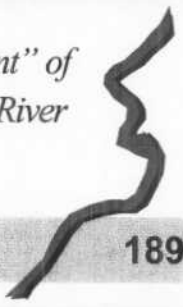
Where did the Colorado River "naturally" flow?

Three scientists give surprisingly similar estimates for the past 200 years

Adapted from *An Inventory and Evaluation of Lake Cahuilla Cultural Resources along Imperial Irrigation District's SA-Line, San Diego and Imperial Counties, California,* ASM Affiliates, Inc., December, 2000.



In the fifty years *before the well-known "man-made accident" of the Colorado River floods of 1905 into the Salton trough, the Colorado River NATURALLY flowed into the trough several times in the 1800's.*



1840 1842 1852 1853 1859 1867 1891

A Scientist's Viewpoint

By Milton Friend

The Salton Sea — To Be Or Not To Be — A Matter of Choices.

The Salton Sea is the latest within a series of waterbodies to occupy the Salton Trough over several thousands of years. However, unlike the waterbodies of the past, the Salton Sea is a contemporary water issue, and as such, it is also a contemporary biodiversity issue.

This relationship lies in the fact that the Salton Sea has become an important habitat for migratory birds. That importance is largely due to the loss of more than 90 percent of the interior wetlands within the State of California, wetland losses elsewhere, the dependable food base within the Sea and surrounding agricultural fields and other factors.

At the time of formation of the Salton Sea, water dependent birds had many alternatives to provide the breeding, migratory stopover, wintering and feeding requirements needed to provide for population maintenance and enhancement. That is no longer the case. Also, at the times of earlier "Salton Seas," major fluctuations in wildlife populations were a part of nature, mostly unobserved by humans.

Modern society has chosen to manage wildlife populations both as stewards of those resources for future human generations and to sustain wildlife populations at levels that serve current human values, including economic returns associated with consumptive and non-consumptive uses of those resources.

The environmental quality of the Sea needs to be improved and is the focus for the development of a restoration effort. Nevertheless, millions of birds are annually using the Sea, and the variety of bird species that have been recorded within the geographic area of the Sea and its surrounding exceeds 400 species.

Thus, the Salton Sea has become one of the premier areas for avian biodiversity. The salient points are that the Salton Sea has far greater importance for migratory birds today than that provided by the past waterbodies of the Salton Trough. If the Sea can be sustained at a salinity level close to present conditions, it will likely be of even greater future importance for migratory bird populations as development continues to consume additional areas of habitat.

As always, choices will need to be made to provide sufficient water of suitable quality to sustain bird populations. However, a unique aspect of the Salton Sea is that wastewater provides the foundation for life sustained by the Sea. Wastewater also provides the economic benefits associated with the vibrant fish and avian communities of the Sea.

Wastewater is, by necessity, becoming an increasingly important water source for sustaining free-ranging wildlife populations. The well-being of wetland-dependent wildlife will be greatly affected by our ability, or inability, to obtain and properly manage wastewater for the creation and maintenance of wetlands.

Will we make the choice to do so?

"The Bottom Line"

The Salton Sea has important implications for sustaining global biodiversity. The Sea is a "classroom" where we can learn to address the contemporary issue of water for wildlife vs. water for people. We can have both to a far greater degree than our current course is likely to provide.

This place called the Salton Sea is a "proving ground" that tests our resolve and ingenuity in resolving water management issues both on behalf of society and for the conservation of biological resources. The Salton Sea presents a unique opportunity to apply on a large scale, our ingenuity and technology in a manner that reuses irrigation water from agriculture in a manner to provide an array of major benefits.

We can ill afford not to do so.

Those waters should be considered to be part of global water resources and should be managed accordingly rather than dismissed as waste.

It is time to get on with the task of demonstrating how to do so.

Meetings Schedule
Imperial Irrigation District
81-600 Avenue 58
La Quinta, CA

*August Recess

Technical Advisory Committee:
09/06/01 10:30 a.m.

Board of Directors:
09/13//01 10:00 a.m.

Technical Advisory Committee:
10/04/01 10:30 a.m.

Board of Directors:
10/18/01 10:00 a.m.

SALTON SEA AUTHORITY

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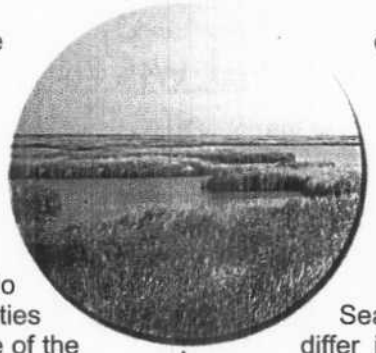
AUG 23 '01

Doug Mende
Salton Sea Database Program
University of Redlands
Redlands CA 92373-0999

Connections *(Continued from Page 3)*

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, that region was a very large marshy area with multiple channels, rich wetlands, and abundant wildlife.



Over the last century, the Colorado River has been harnessed for farms and cities along its entire course. The economic value of the river has far exceeded anything even its earliest visionaries ever imagined. But the cost has been changes to the river's natural world.

A river that once carried nutrients and sediments from upper basin mountains and canyons in Utah and Arizona all the way to the Gulf is now a working river. The water is used and reused over its course. It flows through numerous agricultural fields and then is held behind large reservoirs that regulate its flows. Solids are concentrated as water evaporates and sediments drop out behind dams. The water diversions and the underground aquifers they have created sustain a vast agriculture industry, some of the largest cities in the West, the U.S. portion of the Delta -- including the Salton Sea -- as well as the Mexican portion of the Delta.

Under the existing flow regimes on the Colorado River, the Salton Sea is in balance - inflows of 1.3 million acre feet match evaporation of 1.3 million acre feet. But salinity is increasing. The Mexican portion of the delta has lost the majority of its inland wetlands, but the combination of guaranteed flows under the treaty between the U.S. and Mexico, groundwater recharge, and supplemental releases on the Colorado into Mexico over the last 20 years provide the potential for sustained restoration of wetland habitat. The Mexican portion of the Delta is also helped by agricultural wastewater from the Welton-Mohawk district in the U.S. that sustains the Cienega de La Santa Clara (pictured on this page). Both the Cienega and the Salton Sea rely on wastewater to support wildlife.

The Ecologic Connection – *Wildlife*

Both the U.S. and Mexican portions of the Colorado River Delta are critical to wildlife. Over 90 percent of inland lakes and wetlands in both the U.S. and Mexican Californias have disappeared due to development.

The Sea is the second most important bird area in the U.S. Over 400 species are found there. But it is especially important to water birds - there are millions at certain times - equaling the San Francisco Bay and Great Salt Lake in importance. The combination of fish in the Sea, deep and shallow feeding areas, and nearby agricultural fields provides what is needed for both local and migratory species.

While the bird populations at the Salton Sea and in the Mexican portion of the delta differ in many ways, the river's lower delta in Mexico provides critical habitat for migrating shorebirds, neotropicals, and local endangered species such as the Yuma Clapper Rail.

Fisheries, too, are important in both areas. The Salton Sea, while having no native fish other than the endangered pupfish, is considered one of the most productive fisheries in the world - a positive result of the nutrients flowing into the Sea from farm fields. The lower delta, especially in intertidal areas and the estuaries where the Colorado flows into the Gulf of California, has supported very rich fisheries. Today, with river flows unlikely to reach the Gulf, those fisheries are declining, and species like the Vaquita porpoise and totoaba have become endangered.

Riparian corridors along the Colorado, New, and Alamo rivers and desert corridors through the Cocopah and Coyote Mountains allow birds and other animals to travel throughout the greater Delta.

What does this mean?

Some dismiss the importance of restoring the Sea because of their erroneous conclusion that it is an "accident."

The reality is that neither the Colorado River nor the U.S. portion of the Delta, the Salton Sea nor the Mexican Delta remain in their historic "natural" states. As far as the wetlands are concerned in both regions, that may be fortunate.

If, somehow, the river would be allowed to resume its historical meandering flow, that would mean a resumption of decades of drought, alternating between the upper and lower deltas.

Such a "natural state" is something our fragile wetlands could not stand.

Rather than judging an ecological resource by its natural "purity" or trying to restore it to an earlier condition that is no longer attainable, existing resources have to be assessed for their current and future value to wildlife that must survive in a permanently changed landscape.