

September/October 2008

WESTERN WATER

A photograph of a calm body of water at sunset or sunrise. The sky is a mix of light blue and orange. The water is still, reflecting the sky and the surrounding reeds. In the foreground, the dark, pointed bow of a boat is visible on the left side, with ropes extending into the water. The reeds are dark and silhouetted against the water.

**Just Add Water?
Restoring the Colorado River Delta**

Published by the Water Education Foundation

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On the Cover

The Colorado River Delta is the focus of a growing restoration effort on both sides of the border.

La Ciénega at sunrise. Photo by Mark Lellouch, Sonoran Institute

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Editor's Desk

IBWC Commissioners Killed in Plane Crash

The news that our friends, the U.S. and Mexican International Boundary and Water Commission (IBWC) Commissioners, died in a small plane crash Sept. 15 about 13 miles over the Texas border in Mexico hit us hard at the Foundation. U.S. Commissioner Carlos Marin and Mexican Commissioner Arturo Herrera were assessing Rio Grande flood conditions in the border areas to coordinate joint response efforts with local officials and the Mexican government. Jake Brisbin, Jr., Executive Director of the Rio Grande Council of Governments, and the pilot also were killed.

The water world is a small community that includes stakeholders, government officials and we who cover them. We have been friends with both Commissioners for several years. Commissioner Herrera served on the Foundation's Colorado

River Project Advisory Committee. He was helpful in guiding our program as we analyzed Colorado River border issues.

Both Commissioners Herrera and Marin spoke at many of our conferences and reviewed many of our publications. I know that the word "gentleman" is an old-fashioned word but to me it personifies the way both these men conducted themselves. It's not surprising that they died while working together to coordinate efforts.

Last May I was with both Commissioners at a conference we conducted in San Diego on border infrastructure issues. I remember at the reception talking to Commissioner Marin and Commissioner Herrera about U.S. and Mexican domestic politics. We shared a couple of humorous stories about those politics. I remember Commissioner Marin saying how public service still was valuable and important in his life. This picture of both Commissioners was taken at that border infrastructure reception.

It's always sad when we lose respected colleagues in the prime of their careers. These men were devoted to the goal of furthering cooperation between the United States and Mexico on a number of border issues. We truly will miss them.

Let's remind ourselves that because life is short we need to redouble our efforts to reach agreements and cooperate to solve issues. That would be a fitting tribute. ❖

**See page 14 for more on WEF's latest activities,
or visit our web site at www.watereducation.org**



U.S. IBWC Commissioner Carlos Marin, left, and Mexican IBWC Commissioner Arturo Herrera, at our May conference.

In the News

Results of Glen Canyon High-Flow Experiment 'Mixed But Encouraging'

High-flow releases into the Grand Canyon have the ability to rebuild sandbars but whether they can be maintained is questionable because of the required river flows to meet summer energy needs, federal scientists said.

The preliminary findings come from a March 2008 flood release from Glen Canyon Dam into the Grand Canyon. Three federal agencies coordinated on the 60-hour flood release to see whether high-flow releases are capable of rebuilding and maintaining sandbars used by wildlife and backcountry campers and to determine if such releases have the ability to create habitat and other advantages for native fish.

"Preliminary findings about how the experiment affected sand resources indicate that the results were mixed but generally encouraging," said Ted Melis, deputy chief for the U.S. Geological Survey's (USGS) Grand Canyon Monitoring and Research Center in Flagstaff, Ariz. "Given the size and diversity of the Colorado River ecosystem found below Glen Canyon Dam, it is unsurprising that the overall response of sandbars to the high-flow release was complex and continues to change. It's just impossible at this point to say whether it was a net positive or a net negative."

Glen Canyon Dam, built in 1963, is located 15 miles above Grand Canyon National Park on the Arizona-Utah border. The dam stops most sand and finer sediment moving downstream, causing erosion and shrinkage of river sandbars in the park. The U.S. Department of the Interior, which manages both the park and the dam, has been experimenting with the use of strategically timed high-flow releases from the dam to improve downstream resources. Similar releases occurred in 1996 and 2004.

The March 5 release sent about 41,500 cubic feet per second of Colorado River water into the Grand Canyon. Since that time, USGS scientists have been gathering data, some of which reveals the impact of the regulated flow releases from Lake Powell.

"The resumption of normal dam operations during the summer has resulted in erosion of much of the sandbar created at river mile 45," said Paul Grams, supervisory physical scientist. "Whether these high-flow events can result in a net increase in sandbars for more than a few months is one of the questions scientists are trying to answer with continued field measurements."

Scientists also have been monitoring the response of sports fish and native fish populations, including the endangered humpback chub. According to USGS, the rainbow trout recreational fishery at Lees Ferry, Ariz. was "little affected" by the high flow release, nor were the chub, which live near the mouth of the Little Colorado River. However, continuing data collection could alter the understanding of fish populations respond to high flows. "It will be a few years before scientists can draw definite conclusions about how the 2008 high flows affected fishes because these animals grow fairly slowly," said Matthew Andersen, supervisory biologist.

USGS anticipates that initial reports from the experiment will be provided to the public in late 2008 and early 2009 with a complete synthesis of the results tests to be provided in 2010. ❖ – Gary Pitzer



Where We Are

October 2-3

Water Education Foundation
Russian River Tour
Judy Maben, tour coordinator
Santa Rosa, CA

October 24

Project WET Facilitator's Training
Brian Brown, California WET
coordinator
Cosumnes River Preserve
Galt, CA

October 15

California State Grange Annual
Convention Water Seminar
Rita Schmidt Sudman, speaker
Sacramento, CA

October 31-November 1

The Fate and Future of the Colorado
River conference
Huntington-USC Institute on
California and the West
Water Education Foundation,
cosponsors
The Huntington Library
San Marino, CA

November 12-13

Water Education Foundation
San Joaquin River Restoration Tour
Judy Maben, tour coordinator
Fresno, CA

November 13-14

Climate Change Summit
California DWR and Water
Education Foundation, cosponsors
Long Beach, CA

November 18-20

Colorado River Basin Science and
Resource Management Symposium
Water Education Foundation,
cosponsor
Scottsdale, AZ

December 1

Water Education Foundation Board
of Directors Meeting
William Mills, president
Long Beach, CA

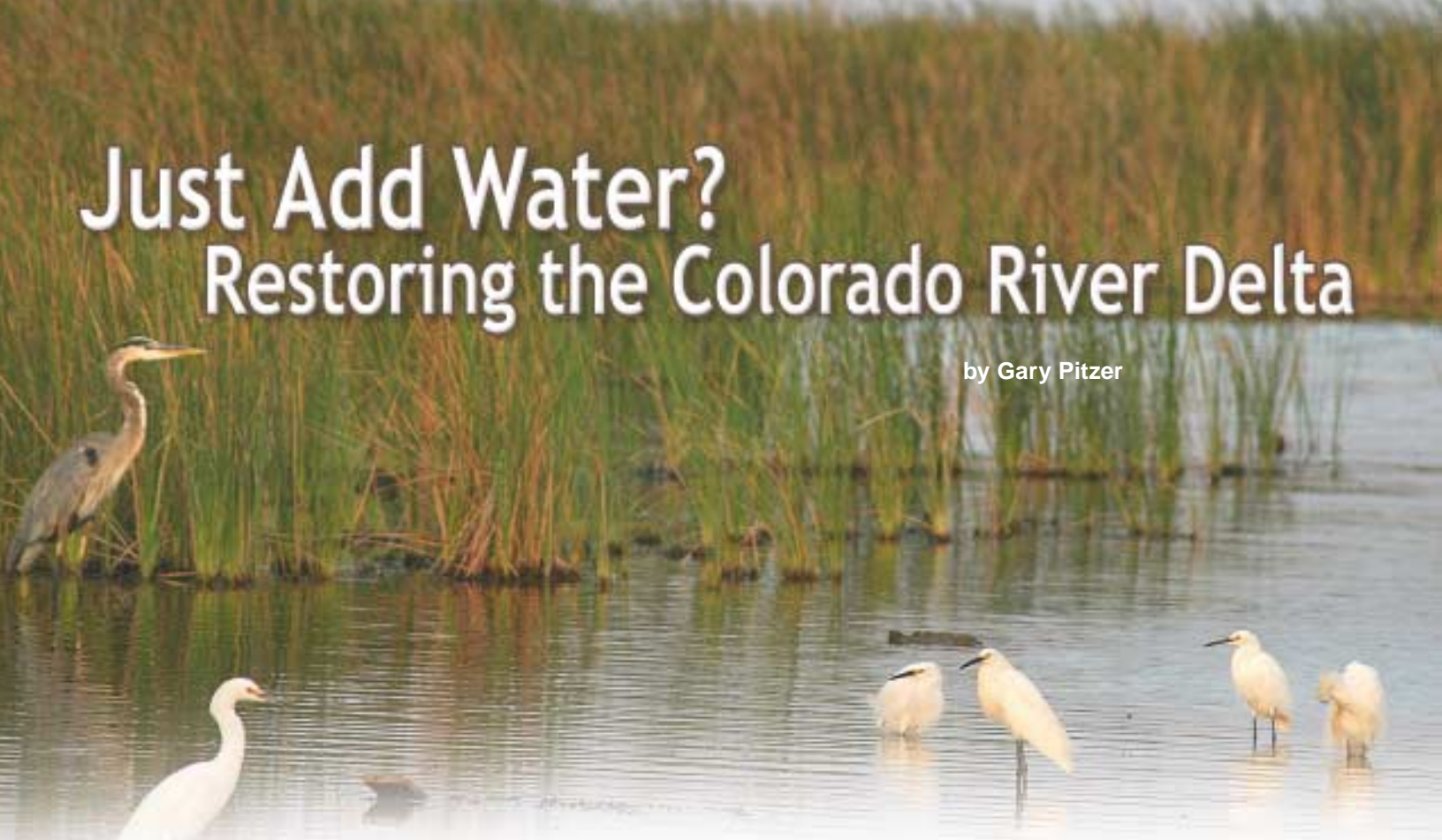
December 2-4

Water Education Foundation Exhibit
Association of California Water
Agencies Conference
Jean Nordmann, exhibit coordinator
Long Beach, CA

Just Add Water?

Restoring the Colorado River Delta

by Gary Pitzer



One of the many intriguing questions in Western water issues is the fate of the Colorado River Delta. The subject of extensive consultation at the local, state, national and international levels, the Delta is a beguiling place that is either at the cusp of rejuvenation or teetering toward oblivion, depending on who's consulted. Left forgotten for decades as Colorado River water was sent to farms and growing cities, the Delta today shows glimmers of its legacy – a promise of restoration that has spurred people in the United States and Mexico to seek a renewed vision of its future.

"There's been tremendous progress over the past 10 years, but we've also driven 10 years closer to the edge," said Peter Culp, an attorney who has worked on Colorado River Delta issues for the past nine years.

The Colorado River Delta – located south of the U.S.-Mexico border – is today less than 1 percent of its original size. Diversions between the headwaters and Morelos Dam have tapped much of the Colorado River's downstream flow and the river that once carried large steamboats has

shrunk considerably; stopping entirely about 100 miles north from what was once its mouth. Morelos Dam is where Mexico receives most of its Colorado River allocation. The remaining Delta wetlands owe their existence to groundwater seepage, farm runoff and unintentional water releases from the United States into Mexico. Nonetheless, the Delta has shown a remarkable ability to endure, considering the degree to which it's been altered.

"Most people had written off the Delta as beyond hope until the mid- to late 1980s when accidental flows demonstrated how resilient the system was," said Professor Karl Flessa, head of the Department of Geosciences at the University of Arizona. "It was a matter of 'just add water' and the habitats came back. For Western water, that's a positive message."

The Delta's restoration is all the more important given its status as a sanctuary for endangered species. The Colorado River provides water to more than 25 million people and 3 million acres of farmland, but its development has caused adverse consequences to the environment. The Delta is home to several threatened or endangered

species, and many see its rehabilitation as key to meeting the requirements of the Endangered Species Act (ESA).

On the U.S. side of the border, much of the restoration activity falls within the Lower Colorado River Multi-Species Conservation Plan (MSCP), a 50-year blueprint for ESA compliance in exchange for continued river operations. The MSCP calls for the creation of 8,100 acres of new habitat, including the planting of mesquite, cottonwood and willows and the creation of some marsh land between Hoover Dam and the border. "We clearly have a program to establish habitat creation and we are working on joint activities with environmental groups to look at opportunities in several different areas," said Lorri Gray, regional director of the U.S. Bureau of Reclamation's (Reclamation) Lower Colorado Region.

Even as the states and Reclamation work on the U.S. side of the border, Mexico and the United States are involved in multi-party talks designed to better factor in the environment in the water equation – an important development given the

many ecological and economic values that could be realized with Delta restoration.

"The big challenge these days is allocating water for nature," said Flessa, who has been researching the Delta since 1992. "Nature has no place at the bargaining table."

Environmentalists are encouraged by discussions with Mexico regarding the possibilities of participating in reservoir storage activities similar to the Lower Basin's Intentionally Created Surplus (ICS) program – which allows water users to undertake extraordinary conservation activities to reduce their annual use of Colorado River water and account for that conserved water in Lake Mead.

Improved water management has sparked greater cooperative efforts, marked by the seven-state agreement designed to address shortage criteria. Talks have extended to the international stage as a means to increase recognition of the value of water on both sides of the border. But conflicts have arisen, such as the dispute over the lining of the All-American Canal now under construction. While aimed to stop water leakage in the United States, the matter flared tensions because of the concern of the adverse effect on Mexico's natural habitat and farm economy.

"I do think things came to a head in the dispute over the All-American Canal," said Jennifer Pitt, senior resource analyst with the Environmental Defense Fund (EDF). "People now seem to want to say, 'let's go forward and look at ways to help each other.'"

The binational consultation process underway aims to find opportunities for cooperative, comprehensive ventures that are mutually beneficial. This could be done through improved water use efficiency in Mexico, creating "new" water through ocean desalination, environmental restoration and modified system operations. It is believed there is an amount of water that could be saved by more efficient water use practices in Mexico that could go toward boosting the amount

needed for environmental restoration. "The kinds of potential things that have been discussed include implementing water conservation projects in Mexico, and storing some of it in Lake Mead for later release down stream into the Colorado River and eventually below Morelos Dam as pulse flows," said Bill Rinne, director of surface water resources with the Southern Nevada Water Authority (SNWA).

Activists in Mexico have got the ball rolling through a "water trust" account designed to get flows into the river to facilitate riparian and habitat restoration. Purchasing water rights from farmers in the Mexicali Valley, the conservation group ProNatura Noroeste, the Sonoran Institute and EDF are building toward holding the rights to 50,000 acre-feet of water.

"The biggest thing we are considering is that as time goes on, and with the climate change predictions, water use and distribution in the basin will become tighter and tighter, and there will be no more 'free' water for the environment," said Osvel Hinojosa, water and wetlands program director for ProNatura. "In that context, we need to get a legal allocation for all the water needs that we identify in the Colorado River Delta."

Under terms of a 1944 treaty, the United States is obligated to provide 1.5 million acre-feet of Colorado River water annually to Mexico, most of which is used to support agriculture. Since the treaty was signed, a series of "minutes," or addendums, have been agreed to, including Minute 306 in 2000, which describes the means to address ecological issues in the Delta.

"Minute 306 documents the interest of both the U.S. and Mexico in the Delta and people often refer to it to set that context," Pitt said. "The more recent binational discussions take discussions of Delta restoration far beyond Minute 306 into the issue of water for environmental resources."

Environmentalists at one time pushed the idea of dedicating 1 percent of the river's flow to the Delta, but the law governing water alloca-

"Most people had written off the Delta as beyond hope until the mid-to late 1980s when accidental flows demonstrated how resilient the system was. It was a matter of 'just add water' and the habitats came back. For Western water, that's a positive message."

– Karl Flessa,
University of Arizona

tions “stood firmly in the way against this idea, because there was no way to transfer the conserved water to an environmental use,” said Pitt. “In a sense, the campaign has been renewed and revised in the efforts of many groups to secure environmental flows for the Delta via transfers of water use either in Mexico or the U.S.,” she said. “We hope there will soon be a way to secure that 1 percent ... with Reclamation’s newly adopted policy to allow water banking in Lake Mead ... and with the United States and Mexico negotiating new terms of holistic river management.”

This issue of *Western Water* examines the Colorado River Delta, its ecological significance and the lengths to which international, state and local efforts are targeted and achieving environmental restoration while recognizing the needs of the entire river’s many users.

A Valuable Riparian Habitat

The Colorado River Delta once covered 9,650 square miles in the United States and Mexico, or slightly more than the combined area of Massachusetts and Rhode Island. Until the early 20th century, the

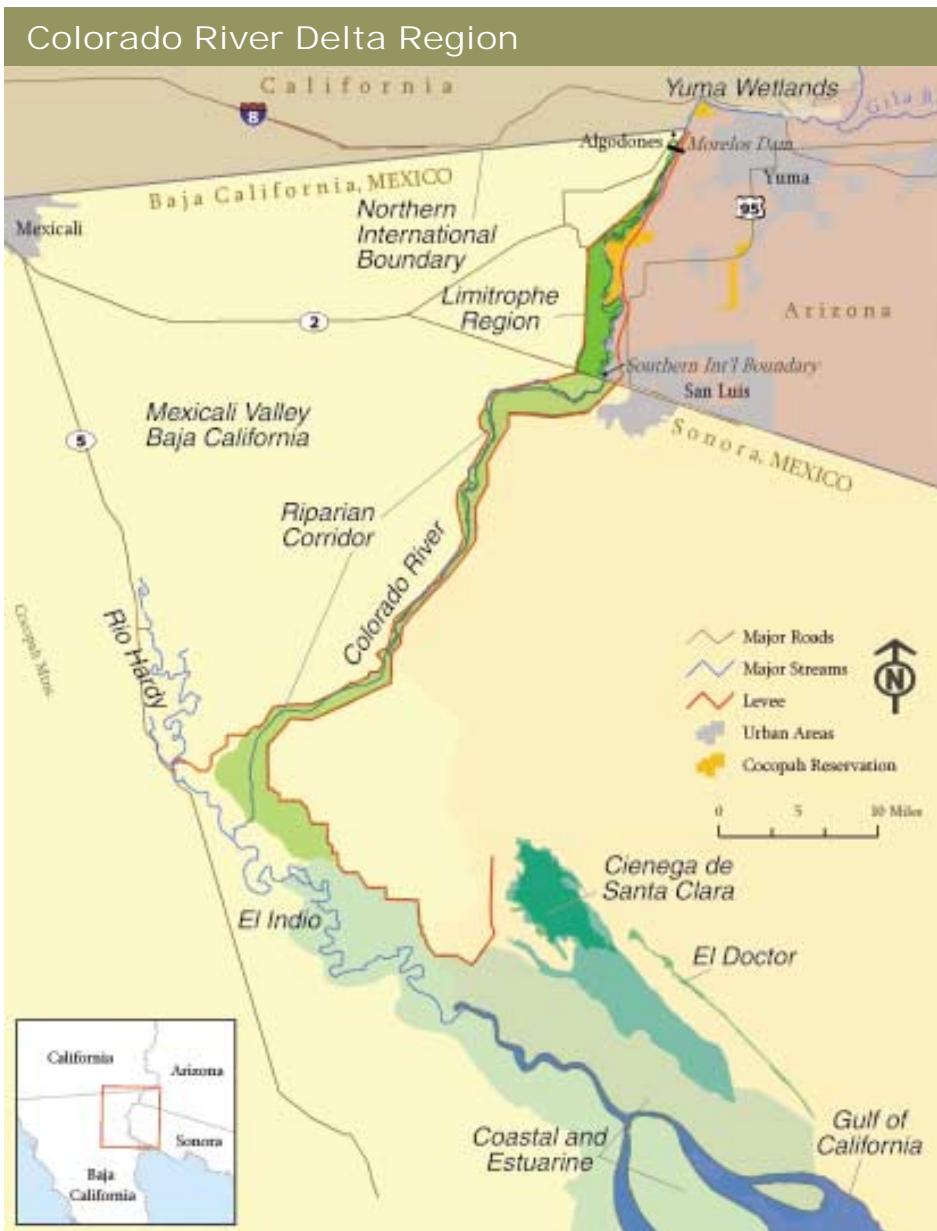
Colorado River flowed unhindered from its headwaters in the Rocky Mountains of Colorado and Wyoming south into Mexico, where it usually emptied into the Gulf of California. Sometimes, however, it would meander north and fill the Salton Sea basin. Along the way, silt from the massive drainage basin washed downstream, creating the vast Delta.

The Delta contained vast areas of woodland, wetlands and open water habitat, each of which fluctuated in response to the annual flows in the river and provided complex and varied ecological habitats in the midst of desert.

“Only the satellite photographs clearly demonstrate the reality of a river no longer attaining its historical outlet to the sea, a river so greatly diminished along its 1,700-mile journey from the furthest point on the Continental Divide that before reaching its proper ending the limp water simply evaporates from shallow ponds into the azure skies of the hottest region on the continent,” Philip Fradkin wrote in his 1981 book, *A River No More*.

But the Lower Colorado River remains an important ecological resource for migratory and wetland birds, including the endangered Southwestern willow flycatcher and the Yuma clapper rail. The Limitrophe – the 23-river mile section that forms the natural Southern International Boundary between Mexico and Arizona – includes sections of native cottonwood, willow and mesquite. It “is one of the last best places as far as habitat goes, on the river,” said Garrit Voggesser, senior manager with the National Wildlife Federation’s Tribal Lands Conservation Program. “The two issues are water and money,” he said. “The goal here is to restore and protect as much as possible.”

The Limitrophe is a “critical link” between the Cocopah Indian tribe and their traditional homeland, according to Voggesser. “We’ve worked with the tribe for six years at their request to protect that stretch of the river,” he said. “They have set a goal to restore



the riparian corridor. The native habitat has been hit hard by invasive salt cedar and they want to bring back the native plants – the cottonwood, willow and mesquite.”

The Delta’s value as a stopover on the Pacific Flyway is immeasurable, considering the vast amount of wetlands in the western North America that no longer exist. The Flyway is the major north-south migratory route for countless numbers of birds. At the Ciénega de Santa Clara, about 350,000 ducks, geese and other birds stop to feed before continuing their journey.

The presence of so many birds is an economic boon, spurring an ecotourism industry sustained by people eager to catch a glimpse of a wide variety of species. This has raised hopes that restoration of key areas will assume even more significance.

Activists say protection and restoration of the Limitrophe is important because it will help complete a link among national wildlife refuges and other protected areas along the Lower Colorado, creating a complete ecosystem rather than fragmented areas. “Part of my interest is to create multiple sites for migrating birds and other species to use,” said Michael Cohen, senior research associate with the Pacific Institute. He is working to restore the Laguna Reach of the river in what’s viewed as the uppermost reach of the former Delta. The process, modeled after the successful Yuma East Wetlands Project, “is pretty much starting from scratch,” meaning participants must

undo years of environmental transformation to achieve the desired results of a functioning ecosystem.

The Limitrophe is part of the longer Colorado River riparian corridor that stretches from Morelos Dam to the Gulf of California. It is recognized as having the most valuable riparian habitat. Zamora is now working on a demonstration project of 4,400 acres, the first of its kind at the mainstem portion of the river.

“We call it a demonstration site because we are using and testing different restoration techniques under different site conditions that will help us expand restoration actions in the future,” he said. “We are, for example, selectively removing salt cedar – we remove it only in areas where native trees will be planted – and in addition to planting trees, we want to promote natural germination of cottonwoods and willows by inundating suitable areas and [also] promote local stewardship for restoration by implementing outreach and educational activities.”

Salt cedar, also known as tamarisk, is a problem because of its low habitat value and ability to displace native species, Cohen said. Imported as an ornamental feature in the 19th century, salt cedar grows quickly, has no natural predators and is well adapted to the degraded conditions of the river. “It prevents other plants from growing and regenerates very quickly after a fire,” he said. “It grows back unless you completely remove it and plant something else.”

Because of that, restoration involves more than just clearing salt

“At the beginning, we were looking and understanding the ecology of the Delta and getting to know the wetlands, we started to do research and the first thing we found was there was a wide open water market in the Mexicali Valley.”

– Osvel Hinojosa,
ProNatura



Above, the dry Colorado River bed near San Luis Rio Colorado, just south of the Limitrophe area, in Sonora. The water in the photo is a small leak from a nearby irrigation canal.

cedar and constructing backchannels to recreate the river's meandering course. "Salt cedar removal by itself doesn't make sense," Cohen said. "You have to do something afterwards. If you nurture native species, they will take hold."

Other small but valuable wetlands are in the Rio Hardy, a Colorado River tributary, and the El Indio Wetlands at the southwestern end of the Mexicali Valley. The reappearance of wetlands reflects an ecosystem that has been described as highly resilient, with the ability to revive some of its vestigial features when water is available.

Working Together on Both Sides of the Border

How to restore the Delta with limited water remains the key question. Efforts are centered on Mexico and the United States forging a binding agreement that results in quantified, dedicated sources of water through a binational agreement, national policy or market-based mechanisms. Recognizing the benefit and availability of water marketing, ProNatura has set a goal of purchasing the rights to 50,000 acre-feet of water to restore parts of the riparian corridor.

"Acquiring water rights is one mechanism. We're also using ag drainage water and water treatment plants," Hinojosa said. The group has secured an agreement to 30 percent of treated wastewater flows to double the flow of the Rio Hardy, a 16-mile tributary of farm drainage that flows from the Mexicali Valley into the Colorado River.

Mexican officials are engaged in Delta restoration projects and are discussing the details with their counterparts in the United States. A significant motivating factor is the Delta's value as a haven for endangered species. Non-governmental organizations (NGOs) on both sides of the border are working on myriad projects to restore the riparian corridor and create new wetlands. The scarcity of extra water from the Colorado River has spurred creative approaches, such as a water trust to purchase water for environmental purposes.

"At the beginning, we were looking and understanding the ecology of the Delta and getting to know the wetlands, we started to do research and the first thing we found was there was a wide open water market in the Mexicali Valley," Hinojosa said.

The water trust is a product of a 2004 change in Mexican water law setting a mandate to try and establish instream flows and protect wetlands, an important distinction because most of the wetlands in Mexico are on federal property. The change has coincided with the concession of federal lands for restoration, "an indication of the support we are getting from the government," said Zamora.

Besides the river, the Delta's other main source of water is drainage from Arizona farms that flows to a lush wetland in Mexico called the Ciénega de Santa Clara. However, there is concern about the future of the salty drainage flows if water is instead sent to the Yuma Desalting Plant (YDP). The plant was built to treat the water from these fields to remove the salt before returning it to the river above Morelos Dam where it would become part of Mexico's 1.5 million acre-feet allocation, but operated for only a short period in the 1990s. Environmentalists are concerned that if the desalting plant operates as it was authorized, the wetland would be destroyed by the higher salinity and lower quantity "reject stream" water.

In 2005, a workgroup identified a suite of solutions that would allow for YDP operations while protecting the interests of water users – and even potentially enhancing environmental resources in the Ciénega through adaptive management, Culp said. However, the past three years have raised the stakes somewhat because the workgroup's recommendations have not been implemented by Reclamation. A group of California, Nevada and Arizona water agencies are now exploring whether the plant could be funded and operated by the agencies themselves to generate water for the agencies' use rather than for the system as a whole.

"In one sense the [plant] is a microcosm of a whole bunch of binational water issues," Culp said. "The Ciénega was allowed to survive and flourish by accident, an unin-

tended consequence of the inefficient use of water. Now we want the water back. However, the resource cannot be cut off without affecting the environmental integrity of what remains of the Delta and damaging an important interest of Mexico. It's a shared responsibility. The United States bears some of the responsibility by virtue of creating it. We can't now pretend we didn't know what was happening when we sent the water down there; on the other hand Mexico can't pretend they don't benefit from the resource as it exists today. Over the long term, neither party will get what it wants from the situation unless we work together to find a solution that benefits us both."

Hinojosa said there is "full recognition and respect" of the water needed for the Ciénega and credited Reclamation's "very supportive" stance in finding a way to proceed without putting the Ciénega's future at risk. While no resolution has occurred, discussion about the YDP and the Ciénega has produced "very surprising dialogue and exchange" between water managers and NGOs, he said.

Pitt said "while we think there may be some sympathy protecting the Ciénega through the maintenance of water the quantity and quality that supplies the wetland today by replacing any water that gets removed in the desalting process, it is by no means a done deal." She is "optimistic" the YDP can be operated in a way that fully protects the Ciénega.

Reclamation spokesperson Bob Walsh said a report will be issued on the outcome of the YDP demonstration, which last year operated on a limited basis. "We are also completing a bypass/replacement study to look at alternatives for replacing the 108,000 acre-feet of water that are now being lost to the system each year by bypassing the ... drainage water around the desalting plant and into Mexico instead of capturing and desalting a portion of it," he said. "That study is scheduled to be done by the end of this year."

Meeting all the demands placed on the Colorado River has resulted in system efficiency projects including the Drop 2 Storage Reservoir Project near the All-American Canal, 25 miles west of Yuma. Drop 2 is designed to provide additional regulating capacity of river releases from upstream dams. The reservoir would be used to capture U.S. allocations of Colorado River water that, because of inclement weather, higher-than-normal flow periods, or other factors, can't be immediately accessed and instead flows into Mexico.

Drop 2 could save on average approximately 70,000 acre-feet of Colorado River water per year, ultimately reducing the amount of water released from Lake Mead. Water users say the investment is part of a comprehensive strategy to better manage the river but Pitt fears it will cause dire circumstances.

"Drop 2 comes at the direct expense of the riparian corridor," Pitt said. "We did some analysis based on Reclamation's numbers. [Drop 2] will eliminate water flowing into the river through the gates at Morelos Dam such that 97 percent of the time there is zero flow, a 20 percent increase from today. That is a big problem."

University of Montana student Stephen Handler helps install a drip irrigation system in the Laguna Grande restoration site; the first restoration site along the main stem of the Colorado River in Mexico. More than 2,000 cottonwoods, willow and mesquite trees were planted on this site.





This cottonwood tree sprouted naturally in places being irrigated.

According to Reclamation's environmental analysis, "indirect effects" of the reservoir could include reduced flows south of Morelos Dam. These impacts are to be partially offset through a restoration project in the Limitrophe.

Economic Prosperity and Environmental Health

While it is agreed the Delta would benefit from additional water, the details of achieving that goal are complicated and remain under scrutiny. Environmentalists say part of the Delta flow would have to come in "pulse flows," which mimic the impact of the periodic floods that used to replenish the lower ecosystem. Because the United States "controls the entire water works," it would be responsible for providing those pulse flows, even if the water needed for them ultimately came from Mexico, said Pitt. "Mexico has no storage capacity," she said. "[Its] piece of the river is alluvial; they can't go build a reservoir. The Delta needs some water all the time [and] there is a fundamental ecological need ... to have a flushing flow that comes through."

Scientific research conducted by the University of Arizona in the wake of the 1997 flooding determined that there should be a pulse flow of 260,000 acre-feet of water for a period of one to two months once every four years on average. Even then, there would have to be some way to assure the additional flows would be used for environmental purposes, rather than used to grow crops or supply urban areas.

"The situation would be very different if the Colorado River Delta was completely within the United States," said Flessa, who alluded to restoration projects in the Sacramento-San Joaquin Delta, the Florida Everglades and Chesapeake Bay. "People recognize water that flows to the sea is not wasted and there are benefits to having functioning estuaries."

Although Mexico's Colorado River allotment is used for urban and agricultural areas, there is recognition

in Mexico of the environment as a legitimate user of water. The administration of new President Felipe Calderón is involved in binational discussions regarding proposed conservation and restoration activities in the Delta.

"This relatively new Mexican administration has been extremely helpful in bringing the Delta issues to a higher priority," Hinojosa said. "Both Juan Elvira, head of SEMARNAT (Mexico's equivalent to the U.S. Department of Interior), and Jose Luis Luege, head of CONAGUA (National Water Commission), have shown great support for the initiative, and this is providing a great basis to plan work during the six years of this administration."

Talk of restoring flows south of the border has involved the possible participation of Mexico in the ICS program or a similar mechanism. Culp, who calls ICS "a novel concept ... that will produce real system benefits," said that providing a similar mechanism to Mexico could be used by the United States to help foster Delta restoration. "Clearly, each country has a sovereign interest in its own resources and can't presume what the other should do," he said. "On the other hand ... from an environmental perspective, both countries have a strong interest in managing the system together to achieve what they want to see."

Reclamation's Gray said "there is some quantity of water" that could be used for developing some kind of mechanism which Mexico could access stored water for users or the environment. "I think it's something to be explored," she said, noting that any storage would have to be in accordance with the 1944 treaty.

A year ago, the Department of the Interior announced that officials in U.S. and Mexico agreed that "cooperative, innovative and holistic measures" should be part of the overall plan to ensure the Colorado River meets the environmental, agricultural and urban needs of both countries. Under the auspices of the International Boundary

and Water Commission (IBWC) – the organization responsible for the boundary and water treaties of the United States and Mexico – stakeholders are in the midst of a process that, among other things, identifies Delta restoration and opportunities for more efficient water deliveries to Mexico.

Flessa said “it was especially great to see an explicit recognition of the environmental – as well as the traditional agricultural and urban – demands on Colorado River water on both sides of the border,” and that the IBWC “provides an excellent binational forum for a consideration of those demands and how they can be met.”

A binational core group established in March developed a set of four workgroups to analyze four areas – conservation, new water sources, environment and system operations. Environmental workgroup members – including government officials and NGO representatives – are developing a map of water needs in the Colorado River Delta and looking to identify sources to deliver flows to the region. The conservation workgroup is looking at the way water is delivered in the farm-rich Mexicali Valley and the implementation of modernization efforts, such as the lining of the many irrigation canals, according to IBWC spokesperson Sally Spener.

Efforts to restore the Lower Colorado River in the United States and Mexico have taken decades to gain momentum, but activity has quickened recently on both sides of the border. Mexican restoration work began in 2001, and has thus far been small-scale projects with NGOs partnering with local communities and sponsoring groups. “So far a total of 50 acres of mesquite bosque and 24 acres of riparian habitat have been enhanced along the Rio Hardy, Colorado River and El Doctor wetlands,” Zamora said. “Now we are in the process of expanding to 50 acres or more per year. In terms of outreach, we are expanding local and international participation through what we call the ‘Adopt-the-River’ Program.”



Upper Rio Hardy

Conservation Priorities

The **Yuma East Wetlands** is a restoration site in Arizona covering about 1,400 acres of native riparian, wetland and aquatic habitats along the Lower Colorado River. The project includes reshaping the river channel and altering flows to reinvigorate wetland and aquatic habitats.

The **Limitrophe** is the 23-river mile section that forms the natural border between the United States and Mexico. Home to the Cocopah Indian Reservation on the U.S. side, it contains significant stands of native cottonwood, willow and mesquite. The Limitrophe provides vital wetland and riparian habitat for the survival of migratory songbirds, waterfowl and other wetland species.

The **Colorado River Demonstration Site** is located in the central portion of the Colorado River corridor in the Mexicali Valley, covering 4,440 acres. Different restoration and protection policy strategies are being implemented at the area, including removal of salt cedar and re-vegetation with native trees.

The **Rio Hardy** is a tributary of the Colorado River that flows approximately 25 miles through the Mexicali Valley before meeting the Colorado River. The Río Hardy carries 6,000 to 11,000 acre-feet of agricultural drainage water per year. Despite being supported by brackish water, it is an important corridor for water birds and songbirds, and provides habitat for commercially important fisheries.

The **Ciénega de Santa Clara** is a 14,000-acre wetland in Mexico sustained by brackish drainage flows from the Wellton-Mohawk Irrigation and Drainage District in Arizona. The Ciénega, the largest freshwater wetland in the Delta, supports vegetation and a diverse population of birds and animals, including the endangered Yuma clapper rail and the desert pupfish. Because operation of the Yuma Desalting Plant would lower the quality and quantity of the drainage flows, government officials, water users and environmentalists have sought ways to augment the lost drainage flows to protect the Ciénega.



Susan Dingalin planting bulrush plugs.

The program's goal is to increase "community ownership" of the Colorado and Rio Hardy, said Zamora. Activities include cleanup, preparation, planting, monitoring and maintenance of restoration sites, as well as outreach and environmental education activities. "The final outcome will be a gradual transfer of stewardship responsibilities to local institutions to achieve long-term sustainability and permanence of the restoration actions," he said.

In the United States, the MSCP's ambitious plan aims to combine species protection and habitat rehabilitation with the continued certainty of existing river water and power operations. "Basically, we need to create new habitat and we are out there looking for opportunities," Gray said. "We are looking at about 1,000 acres in the Cibola [operational division] and about 1,300 acres in the Palo Verde area." The Department of the Interior will provide half of the estimated \$626 million cost (in 2005 dollars) of the program over its life span, and the three Lower Basin states will provide the other 50 percent.

A Shared Vision

The area north of the Limitrophe is the site of some impressive restoration

efforts, including the Yuma Crossing National Heritage Area (YCNHA), a congressionally authorized conservation and enhancement project involving riverfront park development that recognizes the area's historical significance. The Yuma East Wetlands project has resuscitated a stretch of river once completely overrun with nonnative vegetation and which was described as a no-man's land of homeless camps and methamphetamine production.

Prompted by the question of what exactly could be accomplished, a diverse group of tribal members and landowners came together and ended up completing nearly 500 acres worth of restoration, said Charles Flynn, executive director of the YCNHA. The success of Yuma East Wetlands spurred talk of what could be done along the 23-mile Limitrophe border area, which has lawless sections that Flynn described as "extremely violent and really bad." Taking steps to reclaim the land and bring it back to life would benefit local communities and the tenor of the U.S.-Mexican relationship, he said.

"What better way to try and build the relationship capacity for the United States and Mexico than to do restoration on the 23 miles we share on the river," he said. "It's a building block to take on bigger issues."

At a "Common Ground" Conference in Yuma, Ariz., in April, representatives from the United States and Mexico pledged to develop a specific restoration plan for 1,000 acres in the Limitrophe. "It is our shared vision that these lands can be safe; they can be beautifully restored; they can provide recreational activities; and that we can only achieve these goals through a binational effort," states a Limitrophe Action Plan released in July.

Zamora said a "significant change" has occurred among government officials, who were mostly concerned with flood control and were "reluctant" to embrace the idea of devoting resources (including water) to environmental restoration. Over time, they

have warmed to the results of the efforts attained by NGOs. "The most important part was the on-the-ground projects," he said. "They were able to see the trees, the birds and understand what we are trying to do with restoration."

"Just as in the U.S., the degree of priority afforded to environmental values depends upon who you talk to," Culp said. "However, we've seen a rapidly growing interest in environmental values in Mexico, which I think was always strong locally and is growing stronger nationally."

A More Holistic Approach?

There remains much metaphoric "heavy lifting" before proposals move from the conceptual stage to on-the-ground actions, said Rinne with the SNWA, who is impressed with the commitment of the binational core group. "It is very encouraging to see stakeholders working together to address challenges on a river that's been in a severe drought as well as the uncertainty of climate change and long-term yield, and still discussing ways to respect the water needs and rights of users," Rinne said.

Analysis of all the river management issues could lead to some sort of framework agreement by the end of the year, Rinne said, noting the "challenge" is to develop the apparatus to oversee the means for pursuing individual projects.

University of Arizona Professor Flessa is realistic in assessing the future. "Progress on meeting all these needs is going to take more than just talking," he said. "Resources are going to be needed. Allocating water to meet environmental demands will require increased efficiencies in both agricultural and urban water use so that some 'new' water can become available. That's going to be tough in the face of population growth and climate change. I think it can be done, but it will require a real long-term commitment of resources and efforts."

"Equally important" will be how the Colorado River Basin states and the federal government approach restoration efforts and cross-border collaborations. "Historically, I think that we've seen that the federal government prefers that the Basin states work out solutions among themselves," Flessa said. "It seems that the feds step in only when the Basin states can't work it out among themselves. But given that binational solutions are needed to solve restoration problems on the Delta, there may need to be greater federal involvement in the future."

The rejuvenation of some areas and the interest expressed in seeing that success spread has activists cautiously optimistic about the Delta's future, a future that for the first time will be based on the contributions made by NGOs in the negotiation process. "My hope is

that in this new era of optimism, things can be improved on the Lower Colorado River, particularly in the border region," Pitt said.

Those involved say the process has to be kept in perspective. "We're not saying change the whole river system because that's unrealistic," Flynn said. "It's an enormous legal and diplomatic process to get flow beyond Morelos Dam and we're not trying to solve that. We're just saying we're not going to abandon the land."

"We are not going to restore the estuary to what it was 100 years ago," said Zamora. "Just reconnecting the river with the estuary means many fish can travel upstream and downstream."

Those involved with the Delta say restoration can proceed within the overall scope of improved river management. "The [Delta] ecosystem has historically survived on the waste from the system," said Culp. "However, that's not a reason to not seek ways to make the system more efficient. It is a reason to try and manage the system in a more holistic fashion so we can address environmental concerns while doing it." Adding water to the ecosystem has to be accompanied by "deliberate and thoughtful" restoration activity," he said. "To me, you need more than just water if you want a sustainable, long-term solution. It's not just water for the environment. It's meeting the needs of all the users in the Delta region." ♦

Mouth of the Colorado River looking south into the Gulf of California





What's New

Colorado River Science Conference

Information on research and management activities related to the restoration/conservation of the Colorado River and its major tributaries, from the headwaters to the U.S.-Mexico border, will be the focus of a **Nov. 18-20** symposium at the Doubletree Resort Hotel in **Scottsdale, Ariz.**

Coming Together: Coordination of Science and Restoration Activities for the Colorado River Ecosystem, is cosponsored by the Water Education Foundation. The 2-1/2 day symposium will feature plenary sessions and concurrent technical sessions, vendors and poster sessions. Registration for the event is \$250. **A limited number of scholarships are available.**

Visit our website, www.watereducation.org/conferences, to learn more about the symposium, or call 916-444-6240.

Climate Change Summit

A special **Climate Change Summit set for Nov. 13-14 at the Long Beach Hilton** will bring together top experts from local water agencies, cities, and state government to discuss the effects of climate change and adaptation on California's water management. The 1-1/2 day summit, "**Managing Risk & Uncertainty**," is sponsored by the California Department of Water Resources and the Water Education Foundation and cosponsored by the League of California Cities and the California State Association of Counties.

The registration fee is \$250. **Scholarships are available.** Contact the Foundation, 916-444-6240, for more information or visit our website, www.watereducation.org/conferences, to learn more about the symposium.

Water Leaders Class

The Foundation is now accepting applications for the **2009 William "Bill" Gianelli Water Leaders Class**, a yearlong program that educates young professionals from diverse backgrounds about water issues. The **deadline to apply is Dec. 9, and the class begins January 2009.**

Each class member is assigned a top level policy-maker as a mentor as the class researches and analyzes a specific water topic. Class members are expected to attend two Foundation water tours and the March Executive Briefing.

Criteria for acceptance include a commitment to understanding water issues and an interest in seeking leadership roles. Tuition is \$2,500. **Scholarship funding is available from the William R. "Bill" Gianelli, Jean Auer, David Kennedy, and Tom Graff scholarship funds.**

There is a \$25 application fee. Contact the Foundation, 916-444-6240, to receive an application form, or visit the Water Leaders page on our web site, www.watereducation.org.

2007 Colorado River Symposium Proceedings

The written proceedings of the Foundation's 2007 Colorado River Symposium, "The Colorado River Compact at 85 and Changes on the River," is now available. Held in September 2007, this sixth biennial invitation-only symposium brought together the top policymakers in the Colorado River Basin. Symposium discussions focused on the 1922 Compact and its applicability in 2007; Mexican/U.S. border issues; climate change, water supplies and growth; federal funding; and the restoring the riparian system.

Copies of this 180-page softbound book are \$50, plus applicable tax and shipping charges. To order, use the form on the next page or visit our products section at www.watereducation.org.



2008 Water Leaders Class





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