

COLLABORATION IN MEXICO: RENEWED HOPE FOR THE COLORADO RIVER DELTA

Francisco Zamora-Arroyo,* Osvel Hinojosa-Huerta,**
Edith Santiago,*** Emily Brott,****
and Peter Culp*****

I. INTRODUCTION

A little more than thirty years ago, the Colorado River Delta (the “Delta”) was considered all but a dead ecosystem by scientists and environmental organizations alike. Once one of the largest wetland ecosystems in North America, a century of dam building, upstream water diversions, and agricultural development in the Mexicali Valley had reduced millions of acres of wetland ecosystem to just a few scattered areas of disconnected habitats by the 1970s. However, after flood flows in the 1980s and 1990s helped to revitalize important parts of this ecosystem, a collection of scientists, environmental organizations, public officials, and private business leaders began to take a renewed interest in this ecosystem—and began to explore the possibility that it could be restored.

With more than a decade of determined efforts now behind us, we think that there is renewed hope for the Colorado River Delta. International recognition of the Delta’s ecological and socioeconomic importance has never been

* Dr. Francisco Zamora-Arroyo is Director of the Upper Gulf of California Legacy Program of the Sonoran Institute. Dr. Zamora has ten years of experience working in the Colorado River Delta during which he has developed an integrated analysis and view of the threats and opportunities for conservation and restoration of conservation priority areas. The Sonoran Institute is a not-for-profit organization that inspires and enables community decisions that respect the land and people of the West.

** Dr. Osvel Hinojosa-Huerta is the Director of the Water and Wetlands Program in Pronatura Noroeste. Dr. Hinojosa has coordinated several research and conservation projects in northwest Mexico, particularly about rivers and wetlands in the Sonoran Desert, including the Delta. He has elaborated on conservation and sustainable rural development plans, evaluated the status of endangered species, implemented restoration programs, and applied private and public mechanisms for securing water for instream flows.

*** Edith Santiago is the coordinator of the Sonoran Institute’s field office in Mexicali. She manages on-the-ground activities.

**** Emily Brott is the project manager of the Sonoran Institute for outreach activities in the Delta. She manages the Adopt-the-River Program and environmental education activities.

***** Peter W. Culp is an attorney with the Phoenix office of Squire, Sanders & Dempsey, L.L.P., with a practice focusing on environmental, water, and natural resources law. He has assisted the Sonoran Institute and other NGOs with Colorado River Delta restoration efforts and Colorado River policy matters since 1999.

higher, and people across all levels of society in both Mexico and the U.S. are deepening their commitment to protect and restore it. In an arid and often bleak landscape, the Delta's biological wealth has inspired a renewed passion for nature among many of those who have interacted with it—and has helped to inspire a collaborative effort to preserve and restore this resource.

In an article published in these same proceedings,¹ Professor Bret Birdsong argues that without a legal framework that explicitly addresses environmental needs, collaboration alone will not guarantee dedication of water for the Colorado River Delta. Although we agree with this overall statement, we argue that in many instances the collaboration process has promoted the development of innovative legal and economic frameworks to advance the conservation and sustainable development of the Delta. In some cases, existing frameworks for conservation have only recently been explored and highlighted due to collaborative initiatives; one example of this is a current investigation by Pronatura² into the “environmental use” of water as defined by Mexico's recently-amended National Water Law.

This Article focuses on how collaborative initiatives in Mexico have advanced conservation of the Delta. The models highlighted here show that significant conservation progress has been made in Mexico by promoting collaboration across different levels of society, including local residents and users of the Colorado River, civic and conservation organizations, and local, regional, and federal government agencies. We have found that a key factor to maintaining momentum for collaborative conservation is to plan for short-term on-the-ground successes that stimulate continued participation and attract new supporters, while maintaining the course for a long-term, ecosystem-based vision that provides the framework for the actions.

Conservation of the Delta is a shared responsibility between Mexico and the United States, between governmental and non-governmental institutions, and between all water users; at a minimum, binational cooperation is needed to provide the legal framework required for collaborative efforts to succeed. As discussed further in this Article, we are optimistic that current efforts to improve binational cooperation in water management will ultimately lead to the legal changes necessary to make long-term restoration possible in the Delta. However, it is also evident that awareness-raising is urgently needed in Mexico to rally popular support for saving the Delta, a process that requires a significant investment of time and resources. The last examples in this Article show how Mexican domestic collaboration is a critical first step to successfully promoting binational cooperative initiatives that support the Delta.

¹ Bret C. Birdsong, *Séances, Ciénegas, and Slop: Can Collaboration Save the Delta?*, 8 NEV. L.J. 853 (2008).

² Pronatura (www.pronatura.org.mx) is a non-profit conservation organization funded in Mexico in 1983, and established in Sonora in 1993, conducting projects to protect nature and improve the relationship of people and the environment, combining scientific, policy, and legal tools. The organization, now as Pronatura Noroeste (www.pronatura-noroeste.org), has been working on the restoration of the Colorado River Delta since 1996.

II. CONSERVATION PRIORITY AREAS: A SOLID FOUNDATION FOR COLLABORATION

Neither the Colorado River Compact of 1922³ nor the International Treaty between the U.S. and Mexico of 1944⁴ took into consideration the need for protecting environmental values in the Delta. However, in the last two to three decades, a growing interest in better understanding the resilience and functioning of the Delta has resulted in an increasing amount of research conducted by academic, governmental, and non-governmental organizations (“NGOs”). The results of this research have underscored the Delta’s importance to human and natural systems, have been widely disseminated in journal articles, theses, and reports since the 1990s, and have led to a growing understanding of the importance of the Delta resource among Colorado River stakeholders.

In Mexico, the Colorado River Delta includes the mainstem of the Colorado River from the last water diversion point (Morelos Dam) to the estuarine portion of the Upper Gulf of California and the Colorado River Delta Biosphere Reserve. Despite the drastic deterioration of some areas, the Delta is of global ecological importance. It is an important stopover on the Pacific Flyway with 368 documented bird species breeding, wintering, and/or migrating through the area, representing 55% of the total bird species in North America.⁵ Over 400,000 migratory water birds visit the Delta every winter, and over 70% of the total population of the Yuma Clapper Rail, a binationally protected marsh bird, inhabits this region.⁶ In addition, the river continues to deliver a steady, albeit drastically reduced flow of freshwater to estuarine environments in the Upper Gulf of California. These estuarine areas are important breeding and nursery grounds for diverse and economically important marine fisheries (e.g., shrimp, finfish, shellfish), as well as endangered species such as the totoaba, a marine fish endemic to the Upper Gulf of California (once an important sport fishery in its own right).

As water managers and other stakeholders in Mexico and the U.S. began to understand the environmental values associated with the Delta, the question of who was responsible for conservation of the Delta began to surface. In the United States, the prevailing view has been that because the Delta ecosystem is overwhelmingly located in Mexico, it is Mexico’s responsibility to protect and restore it. By contrast, although Mexico recognized that it owned part of this responsibility, Mexico has argued that the U.S. ultimately controls the Colorado River and that U.S. management practices have led to severely degraded

³ Colorado River Compact of 1922, 70 CONG. REC. 324 (1928).

⁴ Treaty on the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, U.S.-Mex., Feb. 3, 1944, 59 Stat. 1219 [hereinafter U.S.-Mex. Treaty].

⁵ Osvel Hinojosa-Huerta et al., *Hovering over the Alto Golfo: The Status and Conservation of Birds from the Río Colorado to the Gran Desierto*, in DRY BORDERS: GREAT NATURAL RESERVES OF THE SONORAN DESERT 383 (Richard Stephen Felger & Bill Broyles eds., 2007).

⁶ OSVEL HINOJOSA-HUERTA ET AL., BIRD CONSERVATION PLAN FOR THE COLORADO RIVER DELTA 27-29 (2004), available at <http://www.sonoranjv.org/planning/deltabcp/BCPColoradoDelta.pdf>.

water quality and deteriorated habitat.⁷ These opposing perspectives initially precluded an open dialogue about ways to collaborate to protect and restore the Delta.

By 2002, several academic institutions and Mexican and international non-governmental organizations had established formal and informal collaborative initiatives to study the Delta ecosystem and determine how its different habitat types and wildlife species had been impacted by the reduction of water flows and other threats. Building on these early research initiatives, in early 2002, Environmental Defense⁸ and the Sonoran Institute secured funding to bring scientists, NGOs, and water managers from Mexico and the U.S. together over a two-day workshop to achieve a common goal: identify the most important areas in the Delta from an ecosystem perspective and identify the water, restoration, and protection efforts necessary for these areas to survive and thrive as part of the ecosystem.

During the workshop, experts used knowledge derived from the previous twenty years of scientific research as well as traditional knowledge provided by representatives of the local community and the Cucapá indigenous tribe. After the workshop, many experts also contributed time, information, and expertise to better document and refine the conservation priority areas that had been identified by the group. Fifteen priority conservation areas were ultimately identified in the workshop report produced out of this process, *Conservation Priorities in the Colorado River Delta: Mexico and the United States*.⁹ These fifteen areas represent a “map of the possible” for Delta conservation and restoration, and are divided into those that need restoration actions, such as the riparian corridor and estuarine areas, and those that need protection actions, like the Ciénega de Santa Clara and El Doctor Wetlands. In the absence of a formal framework to guide the activities of the various organizations working in the Delta, the report has become a common guide for moving forward in the Delta and has promoted new collaborative initiatives that are exploring improved ways to manage water resources to protect and restore critical habitat.

In addition to identifying priority areas for conservation, the report identifies major threats and the opportunities that exist to reduce or eliminate these threats. The following sections describe how different collaborative initiatives are reducing or eliminating these threats and restoring some of the critical areas. We focus only on those areas along the Colorado and Hardy Rivers in Mexico; other priority areas such as the Ciénega de Santa Clara have been described by Professor Birdsong in these same proceedings.¹⁰

⁷ For description of early binational efforts to address the ecological needs of the Delta, see UNITED STATES – MEXICO: COLORADO RIVER DELTA SYMPOSIUM (2001), available at <http://www.ibwc.state.gov/FAO/CRDS0901/EnglishSymposium.pdf>.

⁸ Environmental Defense has recently been renamed “Environmental Defense Fund.”

⁹ FRANCISCO ZAMORA-ARROYO ET AL., CONSERVATION PRIORITIES IN THE COLORADO RIVER DELTA: MEXICO AND THE UNITED STATES (2005), available at http://sonoran.org/index.php?option=com_content&task=view&id=157&Itemid=27.

¹⁰ See generally Birdsong, *supra* note 1.

III. CAN INSTREAM FLOWS TO THE DELTA BE SECURED AND PROTECTED?

Restoring fluvial dynamics is critical to develop functional ecological systems in the Delta, including the riparian corridor as well as estuarine areas. Two components are critical to the fluvial dynamics of an arid river like the Colorado, a base flow and a pulse flow.¹¹ For the Delta, estimated base flow needs also vary between the Colorado River, the Hardy River, or the estuary, which have different needs not only in terms of the amount of water needed but also in the frequency and water quality of base and pulse flows. In this Part, we describe progress made by different collaborative initiatives and new opportunities to secure base and pulse flows for these priority areas.

A. *Securing a Base Flow for the Colorado River Mainstem*

The Colorado River Riparian Corridor priority area is the natural area located along the Colorado River channel between the Morelos Dam and the junction with the Hardy River. Several estimates have been generated for the base flow needs of this area. Currently, several NGOs¹² have set as a goal the procurement of a base flow of at least 51,000 acre-feet (“af”) at seventy cubic feet per second per year. This base flow estimate assumes that existing surface and subsurface flows from agricultural drain water continue to reach natural areas along the riparian corridor. These water sources are necessary to maintain a shallow floodplain aquifer and support permanent riparian vegetation.¹³

After analyzing different opportunities and mechanisms, Pronatura Noroeste and the Sonoran Institute ultimately determined that the best short-term strategy to secure a base flow in Mexico is through the purchase of water rights in the Mexicali Irrigation District in voluntary transactions.¹⁴ These transactions consist of direct purchase of water rights from willing sellers (farmers), using existing water market mechanisms in the Mexicali Valley, which link water rights to land rights. One hectare (10,000 square meters or 2.47 acres) of irrigation land within the Mexicali agricultural valley has a water right to 10,000 cubic meters per year (8.1 af per year). These water rights can be separated from the land and transferred (on a temporal or permanent basis) somewhere else within the valley through a private market transaction, for the same or for a different purpose as compared to the original water right. Mexican water law allows this activity to occur through the approval of the National Water Commission (“CONAGUA”) and the local water district.

To secure the 51,000 af needed for a base flow (absent the dedication of water from other sources), NGOs will need to acquire water rights associated with 6000 hectares (14,800 acres), or approximately 3% of the farmland in the irrigation district. To implement this program, the Colorado River Delta Water Trust (known as Fideicomiso de Agua para la Restauración del Delta del Río

¹¹ See J.C. Stromberg et al., *Importance of Low-Flow and High-Flow Characteristics to Restoration of Riparian Vegetation Along Rivers in Arid South-Western United States*, 52 FRESHWATER BIOLOGY 651 (2007).

¹² These NGOs include Pronatura Noroeste, the Sonoran Institute, Environmental Defense, and The Nature Conservancy.

¹³ See ZAMORA-ARROYO ET AL., *supra* note 9, at 69.

¹⁴ These NGOs include Pronatura and the Sonoran Institute.

Colorado) was created to regulate and operate the acquisition of water rights, in which public and private organizations that are directly involved in the restoration of the Colorado River Delta can participate.¹⁵

Some of the specific objectives of the Water Trust include:

1. Acquire temporal or permanent water rights, in the charge of the Trust, with the goal of maintaining and restoring the necessary flows for the conservation of the Colorado River Delta.
2. Acquire land with the purpose of (i) conserving the ecosystem and natural richness of the region, for the benefit of present and future generations; (ii) working with municipal, state, and federal agencies for the implementation of a scientifically-designed restoration program that guarantees the conservation of the ecosystems in the region; and (iii) establishing nurseries and demonstration sites for restoration, management, research, monitoring, and environmental education.
3. Establish contracts with landowners to guarantee long-term conservation and implementation of restoration actions, such as conservation easements, usufructs, acquisition of use rights, leases, etc.
4. Establish fundraising strategies to allow for the accomplishment of the Water Trust's goals.
5. Establish guidelines for the administration of water rights and other properties that comprise the assets of the Trust to guarantee the restoration, conservation, and monitoring of the Colorado River wetlands in Mexico, securing the generation of environmental services that provide benefits to society.

The trust mechanism under Mexican law provides the basis for the acquisition and management of land and water resources, managed by an institutional fiduciary under the guidance of a representative technical committee. The significant commonalities between U.S. and Mexican trust law, combined with the unique fiduciary requirements associated with the trust relationship, make this mechanism a nearly ideal method for structuring joint investment in and acquisition of water resources, while ensuring that the resources invested in the trust are used for the purposes intended and can continue to be controlled by the trust's managers.

In the last two years, 1300 af per year of water rights have been purchased from farmers in the Irrigation District 014 in the Mexicali Valley and are being dedicated for environmental purposes in the Colorado River in Mexico. This effort has been led by several NGOs¹⁶ and private foundations from the U.S. and Mexico, but has been made possible through collaboration with government agencies, particularly CONAGUA, the National Institute of Ecology, and the Secretary of Environment and Natural Resources in Mexico, and the Department of the Interior's Fish and Wildlife Service in the U.S. Through the North American Wetlands Conservation Act,¹⁷ and with the support of the

¹⁵ The complete text of the Water Trust can be obtained from the authors at ohinojosa@pronatura-noroeste.org.

¹⁶ Pronatura Noroeste and the Sonoran Institute led the formation of the Water Trust, and all water acquisition transactions have been implemented by Pronatura Noroeste.

¹⁷ See North American Wetlands Conservation Act, Pub. L. No. 101-233, 103 Stat. 1968 (1989) (codified at 16 U.S.C. §§ 4401-4414 (2000)).

binational Sonoran Joint Venture,¹⁸ seed funds were obtained to conduct both the legal research for the water strategy and the initial water acquisitions. By offering proactive alternatives to environmental issues, NGOs have been able to establish a more positive dialogue with the government agencies. This dialogue has made it possible to explore the creative use of Mexican environmental regulations to develop a framework for the restoration of the Colorado River Delta.

B. Securing a Base Flow for the Hardy River

The Hardy River is a tributary to the Colorado River. Until 2007, the only source of water to the Hardy River was agricultural return water from the southwest portion of the Irrigation District 014. In a normal year (no excess flows from the Colorado River), the Hardy River receives an annual average flow of 21,000 af of agricultural return water, with greater flows during the high irrigation season of October to May, and a drastic reduction in the summer season. Despite its high salinity content (annual average of three to five parts per thousand¹⁹), the Hardy River is one of the conservation priority areas with greatest potential for restoration. This restoration potential is associated with the opportunity to increase the amount and quality of water to the river.

The need to secure additional sources of water was one of the priority actions identified in the Hardy River Management Plan, developed collaboratively in 2006 by Mexican government agencies, local citizens, and NGOs.²⁰ This process opened up new mechanisms for cooperation between the Ministry of the Environment for Baja California and environmental NGOs working in the Delta.²¹ Although the common goal was to secure water for the Hardy River, the most appropriate way to do so was not immediately apparent; NGOs also needed to demonstrate the socioeconomic benefits of increasing flows in the Hardy River and weigh these against the costs. Thanks to more than five years of previous work to promote Hardy River restoration and local economic development, NGOs were able to show clearly a linkage between ecological restoration and improvements in local economies.

The vision of Baja California's Environmental Minister (Enrique Villegas Ibarra) was instrumental in this collaboration; he worked diligently with the NGOs for almost two years to develop and implement a strategy for bringing effluent from a newly completed wastewater treatment plant (Las Arenitas) to the Hardy River. However, the socioeconomic benefits from environmental restoration were determined to be primarily associated with the tourism industry and the potential for increasing the number of visitors to the Hardy River. This in turn brought the Ministry of Tourism for Baja California into the collaborative process. The vision and support from this office led to the joint development of the Hardy River Ecotourism Route concept. Support from the Ministries of the Environment and Tourism for Baja California helped to garner

¹⁸ See Sonoran Joint Venture: Binational Bird Conservation, http://www.sonoranjv.org/index_ENG.html (last visited May 28, 2008).

¹⁹ ZAMORA-ARROYO ET AL., *supra* note 9, at 71.

²⁰ See *infra* Part V (discussing the Plan in further detail).

²¹ These NGOs include the Sonoran Institute, the Ecological Association of Hardy-Colo- rado River Users or AEURHYC, and Pronatura Noroeste.

further support from other state agencies, mainly the State Water Commission, and the Governor of Baja California.

After almost two years, in the summer of 2007, NGOs submitted a formal request to the State of Baja California for the dedication of 30% of the effluent from the newly-completed wastewater treatment plant to the Hardy River. Early in the process, partners recognized that dedicating 100% of effluent flow was not appropriate given the need for additional water to meet urban (mainly industrial) and agricultural demands; however, even 30% (12,300 af at full capacity) of the total effluent from the plant to the Hardy River would increase flows to the Hardy by over 50%. This new flow would be particularly significant during the summer months, when flows from agricultural return water are nearly zero. This also brings certainty to the amount of flow that can be expected in the river, although water quality continues to be a concern.

The next step in the process was to select an appropriate mechanism to ensure that the water would be delivered to the river. In November 2007, the State of Baja California, with the concurrence of the National Water Commission, signed an agreement with the Mexican NGOs involved in the process, which formally dedicated a flow of at least 12,300 af of treated water for the Hardy River.²²

The resulting agreement is the first of its kind in Mexico. As part of the agreement, each member committed to implement a series of activities to ensure implementation of the agreement. For example, the Ecological Association of Hardy-Colorado River Users ("AEURHYC") and Pronatura committed to monitor water quality and ecological conditions in the Hardy River. The Sonoran Institute, AEURHYC, and Pronatura continue to work with partners to monitor the water quality of the effluent.

C. *Base Flows for the Estuary*

In order to restore the Colorado River Delta successfully, it is critical that riverine and estuarine restoration efforts be complementary. Although significant progress about the research and analysis needed to guide restoration of the riverine portion of the Delta has been made, this is not the case for the Delta's estuary. The water needs of the estuary are just beginning to be understood, and although there are some preliminary estimates,²³ there is a need to conduct additional research to characterize the conditions of the estuary, its water needs, and opportunities for restoration.

A new collaborative initiative has recently been developed to address this research need. A group of academic organizations, NGOs, and community members are working together to determine if the estuary can be restored when freshwater is a limiting factor and in spite of the fact that climate change threatens to reduce supplies further. This basic approach is needed because the estuary, which lies within the Colorado River Delta and Upper Gulf Biosphere Reserve, has not received the same level of attention by scientists and Biosphere Reserve managers as have fisheries management issues. This collabora-

²² A digital copy of the signed agreement for dedication of treated water to the Hardy River can be obtained from the authors at fzamora@sonoran.org.

²³ ZAMORA-ARROYO ET AL., *supra* note 9, at 57-58.

tion is based on the opportunity to mix agricultural run-off from the Hardy and Colorado Rivers with tidal influx from the Gulf of California. Currently, this agricultural water is contained behind a small, community-built check-dam, locally known as El Tapón or “The Cork.” This is a perfect time to begin this initiative, as treated effluent has now begun flowing into the Hardy River as described above,²⁴ almost doubling the amount of water in the system.

Below the check-dam is an area of approximately 12,000 acres that is subject for recreating small-scale estuarine conditions by mixing small volumes of agricultural run-off and seawater, while maintaining approximately 2500 acres of upstream wetlands. Small water-controlled structures at the check-dam are now in place to facilitate connectivity and exchange of water between the river and estuarine areas.

The Research Coordination Network for the Colorado River Delta (“RCN-CRD”) and the Sonoran Institute have been facilitating the initial phases of this collaboration; the RCN-CRD is itself a cooperative network that includes natural scientists, social scientists, humanists, and legal scholars and facilitates interdisciplinary, inter-institutional, and binational research on the Colorado River Delta of the U.S. and Mexico. The RCN-CRD focuses on how natural and human-caused variation in water supply affects the biotas, landscapes, and societal activities on the Colorado River Delta in the United States and Mexico. Major disciplines represented include ecology, geology, oceanography, fisheries biology, limnology, hydrology, history, economics, sociology, anthropology, environmental policy, and law.²⁵

The estuary collaboration initiative will collect information on the topography, water quality, vegetation, fish, and human use of the estuarine area to understand the following better: (1) the hydrological and ecological relationships; (2) the existing and potential spatial extent of the estuary; (3) the instream flows necessary for enhancement of the ecological attributes of the estuary; (4) the degree to which these estuarine enhancements would support populations of commercial and endangered species in the Upper Gulf of California; and (5) the potential impacts of climate change on restoration efforts and potential responses to these impacts. Among the expected products is a restoration strategy that identifies specific management recommendations and restoration actions to sustain fish, wildlife, and local economies. This collaboration effort is already ongoing. The second year of a fish population-monitoring program is now underway, and in the near term other studies will begin to monitor water quality, bird populations, and the connectivity between the river and estuary.

D. *Securing Pulse Flows*

The pulse or spring flood flow needed for restoration of the native vegetation regime in the Colorado River Delta has been estimated at 260,000 af every four to five years.²⁶ While base flows could potentially be acquired exclu-

²⁴ See *supra* Part III.B.

²⁵ Colorado River Delta/Delta Del Rio Colorado—Research Coordination Network, <http://www.geo.arizona.edu/rcncrd/> (last visited May 18, 2008).

²⁶ ZAMORA-ARROYO ET AL., *supra* note 9, at 69.

sively in Mexico, securing pulse flows requires binational collaboration due to the limited flexibility afforded under present interpretations of the Treaty of 1944 and resulting accounting strategies that effectively limit Colorado River water deliveries to Mexico to a consistent delivery of 1.5 million acre-feet per year.²⁷ Given the size of the required pulse flow in comparison to this annual delivery limit, it is not feasible to periodically remove this much water from other beneficial uses. Rather, the pulse flow will almost certainly need to be derived from the multi-year storage of smaller amounts of water, which can then be released in a pulse flow once a sufficient quantity of stored water has accrued. With effectively all system storage located in the United States, this can only be accomplished through a binational program that allows storage and release activities to occur within the Treaty framework.

In this regard, the ongoing drought conditions on the Colorado River are generating a unique, if unfortunate, opportunity to improve transboundary collaboration on Delta conservation. With the Lower Colorado River Basin facing the real possibility of shortage conditions in the near future, pressures are mounting to find creative responses that will minimize shortage impacts in both countries. Recent progress among the seven U.S. Colorado River Basin states in identifying and implementing creative new policy solutions has generated significant momentum that could open the door to making required adjustments to the international framework governing the Colorado River to allow for the long-term success of Delta restoration efforts and the reintroduction of pulse flows into the Delta ecosystem.

In December 2007, the seven Colorado River Basin states and the U.S. Department of the Interior signed a landmark agreement, formalized in accompanying federal guidelines on the management of the Colorado River,²⁸ which may represent the most significant change in river management since the decision of the U.S. Supreme Court in *Arizona v. California*²⁹ nearly fifty years ago. This agreement and the accompanying guidelines generate significant new flexibility in the management of the Colorado River that will help to meet growing municipal demand and manage future shortage conditions within the United States.

Through collaboration with government agencies and Colorado River stakeholders, NGOs were able to provide input into the policies ultimately adopted by the seven basin states to ensure consideration of environmental needs in future river management and to help secure new tools for environmental management on the Colorado River.³⁰ This collaboration consisted of NGO participation in the development and evaluation of policy alternatives during the creation of the seven basin states' agreement, including working directly

²⁷ See U.S.-Mex. Treaty, *supra* note 4, art. 10(a).

²⁸ U.S. DEP'T OF THE INTERIOR, RECORD OF DECISION—COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND THE COORDINATED OPERATIONS OF LAKE POWELL AND LAKE MEAD (Dec. 2007), available at <http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>.

²⁹ *Arizona v. California*, 373 U.S. 546 (1963).

³⁰ NGOs involved in these discussions included, among others, the Sonoran Institute, Environmental Defense, Defenders of Wildlife, Pacific Institute, Sierra Club, and The Nature Conservancy.

Spring 2008]

COLLABORATION IN MEXICO

881

with the U.S. Bureau of Reclamation modelers to evaluate and fine-tune policy options. This participation was so extensive that NGOs were invited to draft one of the two alternatives that were given serious consideration in the Draft and Final Environmental Impact Statements for the federal National Environmental Policy Act (“NEPA”) process evaluating the implementation of the seven basin states’ agreement.

Among the critical elements of the NGO proposal was the promotion of a conceptual paper, “Taking ICS to Mexico,” that identified the potential benefits associated with widening the scope of the policies developed through the seven basin states’ agreement to allow Mexico’s participation in multi-year water storage and release activities in Lake Mead, both as a means of shortage mitigation and as a means of improving flexibility in water management and providing for the restoration of pulse flows to the Delta ecosystem. This proposal, which was published by the U.S. Bureau of Reclamation in the NEPA process,³¹ developed widespread support within the basin states as a means of improving binational water management.

NGOs subsequently worked with water management agencies in Arizona, Nevada, and California and key experts in Mexico to initiate an informal dialogue about opportunities for direct cooperation between state, federal, and local stakeholders in the U.S. and Mexico to advance various municipal, agricultural, and environmental objectives. The enthusiasm associated with this initial, informal dialogue was such that it was expanded and folded into a new binational process through the International Boundary and Water Commission (“IBWC”) and the Comisión Internacional de Límites y Aguas, which was announced in a joint U.S.-Mexico press release in August of 2007.³²

This process, which was finalized through an exchange of letters by the IBWC Commissioners in March of 2008, involves a core stakeholder group that is meeting regularly to identify common goals and objectives, discuss and develop proposed collaborative projects to meet municipal, agricultural, and environmental needs, and recommend projects for implementation through IBWC.³³ Thanks to their integral role in assisting with the development of the initial, informal discussions, NGO representatives were appointed to both the U.S. and Mexican core groups. There is great optimism that this process will result in the near-term implementation of binational Delta restoration efforts as well as new guidelines that would allow for the implementation of pulse flows to the Colorado River Delta.

³¹ 4 U.S. DEP’T OF THE INTERIOR, BUREAU OF RECLAMATION, FINAL ENVIRONMENTAL IMPACT STATEMENT: COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD, at G-25 to -55 (2007), available at <http://www.usbr.gov/lc/region/programs/strategies/FEIS/index.html>.

³² Press Release, U.S. Dep’t of the Interior, Secretary Kempthorne Announces Joint U.S.-Mexico Statement on Lower Colorado River Issues (Aug. 13, 2007), available at http://www.doi.gov/news/07_News_Releases/070813.html.

³³ Press Release, Int’l Boundary & Water Comm’n, U.S. and Mexico Meet in Phoenix, Arizona to Address Cooperative Actions for the Colorado River Basin (Mar. 13, 2008), available at http://www.ibwc.state.gov/Files/PressRelease_031308.pdf.

IV. PROTECTING AND MANAGING INSTREAM FLOWS AND RIPARIAN HABITAT

One common concern among decision makers and NGOs regarding restoration of the Delta is the need to establish the mechanisms to protect instream flows once they have been secured and to provide ongoing management for natural areas, including those recently restored or those to be restored in the future. In this Part, we describe some of the legal mechanisms that NGOs and government officials have identified to protect instream flows and to manage land for conservation use in Mexico.

The Sonoran Institute and Pronatura worked with the Mexican National Water Commission (“CONAGUA”) and the National Institute of Ecology (“INE”) to identify and promote the establishment of the water and land policy mechanisms necessary for successful restoration and conservation of riparian areas in the Delta. Two such mechanisms were ultimately identified—the use of Mexico’s federal land concession process to implement short-term restoration work in critical areas and manage these for conservation purposes, and the designation of a federal Restoration Zone and/or Water Regulated Zone to secure long-term protection for restored areas.

Almost a year after the original request, in February 2008, Pronatura received approval of the concession of 1146 acres within a 4400-acre Restoration Demonstration Site along the Colorado River mainstem.³⁴ This will allow Pronatura and the Sonoran Institute to change the use of acquired water rights from agricultural use to environmental use immediately by registering acquired water rights on this federal land concession. The concession also allows for the protection of the wetland and riparian areas and provides security for restored sites. In addition, in 2007, AEURHYC received a concession of 150 acres along the banks of the Hardy River.

A different mechanism was needed to promote and ensure the long-term restoration and sustainability of riparian and other wetland areas in the Delta. Pronatura and the Sonoran Institute partnered with the INE to promote a Restoration Zone as a comprehensive mechanism that could be used to restore and protect the entire 80,000-acre riparian corridor in Mexico while still meeting the flood control and other water management operation requirements in the region. The process started with a collaborative process to bring different stakeholders, including federal, state, and municipal governments, NGOs, and direct users of the area, to identify the best mechanisms to accomplish this.

Over eighteen mechanisms were ultimately identified and analyzed by the group. The group identified a Restoration Zone designation as the preferred alternative. This process resulted in a formal request by Pronatura, AEURHYC, and the Sonoran Institute to the Secretary of the Environment and Natural Resources (“SEMARNAT”), in September 2005, to establish the Restoration Zone designation. NGOs continue to work with the different agencies within SEMARNAT to advance this mechanism. However, in December 2006, Pronatura also received notification from CONAGUA indicating that CONAGUA would proceed with a far more ambitious approach—the creation

³⁴ See *infra* Part VI (discussing the Demonstration Site in greater detail).

of a Water Regulated Zone, which is a federal decree under Mexican Water Law.

By law, the Water Regulated Zone will have to determine the terms under which water resources are used in the entire basin in Mexico, including considerations for securing and maintaining instream flows and for maintaining adequate groundwater levels near the riparian areas. During 2007, Pronatura and the Sonoran Institute met with CONAGUA representatives to advance this concept. In the case of the Delta, CONAGUA suggested that the decree could incorporate specifications for assigning a base flow to the river for ecological purposes as well as provide for the management of riparian areas for flood control and ecological restoration. In September 2007, CONAGUA published data relating to water availability within the basin in the federal public registry, one of the requirements for the establishment of the Water Regulated Zone. CONAGUA is currently carrying out other technical studies needed to meet the remaining requirements for establishment of the Zone.

As such, through a collaborative process, this initiative has shifted from a proposal advanced by environmental groups to a joint effort being undertaken with the leadership of CONAGUA. The result is that this project is now being analyzed at high levels in Mexico and in important binational forums, including the Minute 306 Working Group organized by the International Boundary and Water Commission/Comisión Internacional de Límites y Aguas.

V. THE HARDY RIVER COLLABORATIVE INITIATIVE

The Hardy River Management Plan started as a community initiative. River users and people living along its banks proposed working together to find solutions to common problems and to achieve sustainable development. It was within this context in 2005 that AEURHYC and the Sonoran Institute began coordinating efforts to develop a formal Hardy River Management Plan. The Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food ("SAGARPA") took on a leadership role as well, and together the three institutions promoted development of the Plan among government agencies, research and education institutions, and the community at large.

Nine meetings were conducted during 2005 and 2006 that included river users, other community members, and federal, state, and municipal government agencies; Pronatura also solicited input from community members who could not attend the formal meetings. The objective of this effort was to identify goals and specific lines of action to address high-priority problems in the Hardy River watershed. Some of the participating agencies included the following: federal, state, and municipal environmental managers, SAGARPA, Federal Environmental Protection Agency, National Forestation Commission, Indigenous Development Commission, federal and state water managers (CONAGUA and the State Commission of Public Services of Mexicali), Mexicali Planning and Development Committee, State and Municipal Ministries of Tourism, University of Baja California, community members, and local NGOs.

The collaboration of all participants was important because at that time there was not a government program with the goal to restore and promote sustainable economic development of the Hardy River. All government agencies

shared the information that they had about the area for consideration in the Management Plan. Some of the initiatives described in the Plan are already in place and provide clear examples of successful collaborative work between stakeholders. Some examples are as follows:

- An agreement signed by AEURHYC and Pronatura with the State Government of Baja California that designates 30% of the effluent from a new wastewater treatment plant to the Hardy River. As discussed above, this will increase water levels in the river and thereby also benefit restoration activities as well as the local economy.³⁵
- Development of the Hardy River Ecotourism Route with the Ministry of Tourism for Baja California with the objective of creating a compelling new ecotourism destination.
- Collaboration with the Ministry of Tourism on the implementation of the first phase of the Hardy River Ecological Camp concept, including construction of bathrooms and a visitor center.³⁶

In terms of community collaboration, work with the fishing sector was identified as a high priority in order to improve and sustain fish populations in the river. AEURHYC, the Sonoran Institute, and government agencies tasked with resource management are currently helping individual fishermen receive needed training in monitoring and oversight of fish catches within their communities. These fishermen will then report violations and general monitoring results to official resource managers. This concept of community/government/NGO co-management of resources has received wide acceptance among stakeholders.

VI. COLLABORATION AT THE COMMUNITY LEVEL

Water alone is not enough to restore the Colorado River Delta. Active restoration is required in the short term to accelerate the restoration of riparian habitat. In the following sections, we describe examples of on-the-ground restoration actions that have taken place over the last six years in two priority areas through collaboration with local communities and state and federal agencies in Mexico.³⁷

A. *Community-Based Restoration in the Hardy River*

The first restoration project in Mexico began in 2002 at Campo Mosqueda, a tourist camp located on the Hardy River. Restoration began in the Hardy River because of the presence of water in the river and because owners of tourist camps owned land along the river, obviating the need to involve government authorities. In this first project, NGOs partnered with the Mosqueda family to restore fifteen acres of an abandoned farm field into a native mesquite bosque. Success with this project motivated new projects along the Hardy River; to date, six restoration projects have been implemented in different tour-

³⁵ See *supra* Part III.B.

³⁶ See *infra* Part VI.D.

³⁷ In 2006, small restoration projects have been initiated in two other priority areas, El Doctor (ten acres) and El Indio Wetlands (thirty acres).

ist camps, totaling forty-five acres of enhanced habitat. In all cases, the owners of the tourist camps participated in the restoration activities and committed to maintain and monitor the sites for at least two years, or until the tree roots reach the groundwater table. The most recent projects have been developed in collaboration with local, state, and federal agencies and have incorporated ecotourism elements into the restoration design.

B. Community-Based Restoration in the Colorado River

Restoration in the Colorado River has presented different challenges than in the Hardy, requiring the collaboration of not only NGOs and local community members, but also the state and federal governments. The main challenge has been that the target restoration area for the mainstem of the Colorado, known as the Restoration Demonstration Site, is located on federal land managed by the National Water Commission ("CONAGUA"). CONAGUA's main management objective for the river is flood control, which has historically been viewed as incompatible with the presence of significant vegetation within the river channel. To address this, Pronatura and the Sonoran Institute have worked closely with CONAGUA to explore opportunities to enhance riparian habitat while maintaining the river's flood capacity. This collaboration has included meetings and field trips to potential restoration areas, the development and analysis of elevation data, and identification of the most appropriate mechanisms to secure management of the land for restoration purposes.

As described above, the result of this effort was the grant by CONAGUA of a management concession of some 1146 acres of federal lands inside the Restoration Demonstration Site (to Pronatura), even as management of the entire riparian corridor (80,000 acres) and management of instream flows are pending through the establishment of a Water Regulated Zone.³⁸ This concession allowed NGOs to initiate on-the-ground restoration actions in the Restoration Demonstration Site in 2006, without waiting for the formal designation of the Water Regulated Zone.

The 4400-acre Restoration Demonstration Site is located in the heart of the riparian corridor in Baja California, between the San Felipe railroad bridge and the Carranza crossing (eight river miles). The initial phase of this initiative was completed in December 2007 by enhancing twenty-four acres of riparian and marsh wetlands in what is called the *Laguna Grande* (Large Lagoon), located in the northern portion of the Demonstration Site. After selective clearing of salt cedar and common reed, a total of 2400 native trees of several tree species, including cottonwoods (*Populus fremontii*), willows (*Salix gooddingii*), honey mesquite (*Prosopis glandulosa*), and screwbean mesquite (*Prosopis pubescens*), were planted.

The main objective at this site is to increase the vegetation cover and structural diversity of existing riparian habitat and to increase and enhance the marsh wetland area along the lagoon for the benefit of bird species and other wildlife. After twelve to eighteen months of growth (up to 2.5 meters in height), planted native trees already represent enhanced habitat for wildlife. Riparian obligate and water bird species are already starting to use the Restora-

³⁸ See *supra* Part IV (discussing details on concessions and the Water Regulated Zone).

tion Demonstration Site, but these species are expected to benefit even more in approximately two years when the native trees mature. Similarly, although emergent plants are beginning to colonize marsh areas, it will take a few more years for them to be fully functional for target species. Planted trees also represent increased food resources for the beaver (*Castor canadensis*), a protected species in Mexico.

The fact that NGOs were able to initiate restoration actions without a formal CONAGUA framework securely in place is an outgrowth of the strong collaborative ties that have developed with other partners, including state agencies, other federal agencies, and people living near the Restoration Demonstration Site. These relationships have proven beneficial for many other aspects of the work and have inspired the community-based “Adopt-the-River” program, described below.

C. *The Adopt-the-River Program*

To ensure that Delta restoration initiatives are responsive to the needs of local people, it is imperative that they be directly engaged in collaborative conservation efforts. Experience working in the Delta has shown that without capacity-building and active local participation, restoration projects are not sustainable over the long term. For over ten years, Pronatura and the Sonoran Institute have collaborated with community groups, including schools and organized groups like AEURHYC, to build local capacity for restoration.

In spring 2007, the Sonoran Institute began the “Adopt-the-River” program to increase community responsibility through direct action. The Adopt-the-River program invites local groups, many of which are not traditionally associated with environmental projects, to “adopt” different components of the restoration initiative. Target groups include agricultural and fishing cooperatives, irrigation districts, government offices, businesses, and schools. The goal of the program is to integrate local perspectives and needs into the restoration initiative and to secure a lasting local commitment to stewardship of the region. Through their work, participants witness first-hand the river’s transformation and as a result develop a personal interest in vocally promoting conservation in their communities. Ultimately, the goal is to promote a gradual transfer of stewardship responsibilities to local institutions and community groups.

Three groups are participating in the Adopt-the-River program to date, including a local motorized racing committee, the municipal environmental ministry, and a local school. All three groups elected to adopt tree-planting, garbage clean-up, and invasive species removal along small stretches of the river bank (greater than one acre). Results from these initial projects are promising. The first group to adopt, the Carranza Crossing Racing Committee, helped organize a community tree-planting day during the Easter week festival on the river. Due to the ephemeral nature of the river’s flow along this reach, an irrigation system for tree maintenance was impossible. The racing committee therefore committed to irrigating the trees by hand (carting large water drums and buckets to the site three to five times per week, depending on the season) long enough for the trees’ roots to reach the water table (about two

years). To date, approximately sixty trees have survived and have reached an average height of 100 centimeters.

The second group to adopt a site, Mexicali County's Ministry of the Environment, is currently developing a restoration and environmental education project for a two-acre site in Laguna Grande. This restoration project will be implemented with participation of the agency's staff in the next year.

The final group to participate in the program as of spring 2008 is CECYTES high school in Sonora. The school adopted a 0.5-acre site and has just begun the clean-up and tree-planting activities necessary for its restoration. This group also plans to work with the Sonoran Institute to provide basic community recreation infrastructure at the site, like benches, picnic tables, shade structures, composting toilets, a small dock for canoe trips, and an area for overnight camping. The ecology teacher is particularly excited to be able to utilize the site as an outdoor, hands-on classroom.

These three adoption projects provide an excellent example of how outreach and relationship-building for one purpose can flourish and inspire different kinds of collaborative initiatives. In this case, outreach necessitated by the lack of a formal, legal framework for implementation resulted in feedback from community members, schools, and other government agencies that indicated their desire to take on additional leadership roles in the restoration effort, as well as increasing support for the implementation of a formal legal framework to secure their investments in restoration. The Sonoran Institute is currently formalizing ongoing collaboration with other groups in Mexico and the U.S. as part of the Adopt-the-River Program.

D. The Hardy River Ecological Camp

One of the key community development and conservation strategies articulated by the collaborative Hardy River Management Plan process³⁹ was creation of a tourist camp that would be devoted to environmental education. To implement this vision, the Sonoran Institute and AEURHYC worked closely with the Ministry of Tourism for Baja California to develop the concept of the Hardy River Ecological Camp. With an investment of \$25,000 from the state and \$25,000 from the federal Ministry of Tourism, and with \$22,000 from the Sonoran Institute, a visitor center, multipurpose room (rehabilitated by installing a roof and remodeling an abandoned building), and bathrooms were installed. Part of the Sonoran Institute's contribution came from the Desert Hot Springs Rotary Club, which donated \$7500. Private foundations, including the Water Education Foundation and the Packard Foundation, are supporting development of an outreach and environmental education strategy for the Ecological Camp, which includes exhibits for the visitor center and outreach materials for tours and interpretive trails.

In addition to these infrastructure and restoration activities, several local and international groups are supporting the development of the Ecological Camp. For example, the Lion's Club of Mexicali, the New College of California School of Law in San Francisco, and the Desert Hotsprings Rotary Club

³⁹ See *supra* Part V.

have each dedicated hundreds of hours of volunteer work to restoring native habitat.

Although no formal tours targeting the regional market have been implemented, several schools from the region, La Ruta de Sonora tours, and Water Education Foundation tours have already visited the Ecological Camp. Formal tours targeting the regional market may be initiated as soon as fall 2008. All tours will have an environmental education component to show the relationships between a healthy environment, culture, and economy, and to promote regional conservation and restoration efforts. The Ecological Camp has been instrumental in increasing the knowledge and appreciation of local and international people about the Colorado River Delta and its natural and cultural resources, showing that restoration and economic development can go hand-in-hand.

VII. CONCLUSION

Collaboration among NGOs, local communities, water users, and state and federal agencies has created a solid framework for restoration of the Colorado River Delta. As a result of local, collaborative efforts at on-the-ground restoration sites, Mexican interest in Delta restoration and protection has grown considerably at the local, state, and even federal levels, such that the importance of environmental protection is now repeatedly emphasized in public statements and policy objectives from Mexican diplomatic representatives. More importantly, these collaborative efforts are translating into specific on-the-ground results, even as accompanying legal and market tools are being developed and used to restore and protect habitat and instream flows.

Two key lessons have emerged from these local, collaborative efforts in the Delta:

- 1) It is not necessary to wait to have a formal collaboration framework in place before acting. Early projects should focus on short-term on-the-ground results and should begin involving stakeholders as early as possible, expanding participation and establishing formal collaborative frameworks as needed.
- 2) Collaboration takes time to develop and requires a facilitator to maintain group focus. This role can be played, at least at the beginning, by an NGO. However, this can present a significant funding challenge due to the staff, time, and travel resources needed to facilitate the process successfully. As such, collaborative efforts must be supported by interested agencies, foundations, and business leaders if the benefits of these approaches are to be fully realized.

It is also critical to recognize that increased domestic collaboration in Mexico and in the U.S. has led to strengthened collaboration at the binational level. This international collaboration will be essential to the creation of a legal framework that can address the environmental needs of the Delta. On-the-ground projects have created important momentum by generating tangible results that prove restoration is possible, building support among skeptics and inspiring local communities to keep the initiative alive.

Spring 2008]

COLLABORATION IN MEXICO

889

The success of other collaborative efforts involving NGOs, stakeholders, and state and federal agencies, has also been key in catalyzing what should prove to be a meaningful binational dialogue between the U.S. and Mexico over Colorado River management through the IBWC process discussed above. More focused collaborative efforts have also met with recent success, notably, the Yuma Desalting Plant (“YDP”)/Ciénega Working Group. The latter process, initiated by the Central Arizona Project, brought together representatives from NGOs, water users, and state and federal water management agencies to seek a collaborative solution to a bitter controversy over the potential impact of the YDP on the Ciénega resource. Following the Working Group’s recommendations, this past year saw both the continued implementation of Lower Basin fallowing programs to assess market interest in providing water for bypass flow to sustain the Ciénega de Santa Clara, and initiation of a pilot operational program to test the YDP and assess the feasibility of its use for potable water supply. A Ciénega monitoring program was also launched to assess the potential impacts of YDP operation and establish baselines for sustainable management of the Ciénega.

We think these collaborative efforts provide reasons to be optimistic about the success of restoration efforts in the Colorado River Delta. When strong relationships are built and maintained, especially across the border, great things can happen. Collaborative efforts have helped disparate interests to move past arms-length relationships and zero-sum outcomes to seek solutions that have mutual benefits. Through their success, the participants in these processes have not only made meaningful steps towards the restoration of the Colorado River Delta, they have illuminated opportunities for change and the potential for a collaborative approach to water management that could better serve the interests of people and the ecosystems on which they depend.

ACKNOWLEDGMENTS

The authors extend their sincere appreciation to the U.S. and Mexican governmental agencies, private foundations, and individuals whose contributions over many years have made conservation work in the Delta possible. Special thanks to the David and Lucile Packard Foundation, the National Fish and Wildlife Foundation, the North America Wetlands Conservation Council, the Christensen Fund, the Tinker Foundation, and an anonymous foundation for their long-term support to the Sonoran Institute and Pronatura Noroeste.