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# Dredging for Diplomacy? Colorado River Management at the United States–Mexico Border

*Jennifer Pitt\**

## I. INTRODUCTION

The Colorado River runs some 1400 miles from its headwaters in the Rocky Mountains of Colorado to the hot, sandy expanse of the Sonoran Desert before it empties into the Gulf of California. Near the end of its route, the river becomes binational, crossing from the United States into Mexico. For a short 23.7 miles, the river actually forms the border between the two countries. This border reach is known in certain circles as the limitrophe, a unique nomenclature that means “at the border” in both English and Spanish.

The limitrophe, which extends from Yuma, Arizona, in the United States, to San Luis Rio Colorado in Mexico, exists in a kind of limbo that is neither here nor there. While this reach of the Colorado belongs to both countries, it has been a priority for neither. Natural resource departments have traditionally shied away from management here, and the agencies with the greatest presence on both sides of the limitrophe—the local sheriff’s office, the U.S. Border Patrol, and the Mexican Police—are the ones charged with intercepting people trying to get across it.<sup>1</sup>

Despite the neglect of natural resources managers, the limitrophe remains a green oasis. It is a rare spot on the Colorado River where dense gallery forests shelter birds making the long journey from Central America to Canada and back again, as well as all of the birds and other wildlife that call it home.

Lately, however, the limitrophe has gained a new visibility. The past few years have seen the start of several planning processes charting quite different courses for the river. Some processes bode ill for the future of the limitrophe’s native riparian habitat. The U.S. International Boundary and Water Commission (“IBWC”) is planning for flood control and maintenance of the international boundary. The U.S. Bureau of Reclamation (“Reclamation”), the manager of many great western dams and “water master” of the Lower Colorado River, is planning to increase system operations efficiency, which will eliminate the small amount of water that flows through the limitrophe. Reclamation is also working with the states of the Lower Colorado River Basin to craft a plan to mitigate for endangered species losses resulting from river management,<sup>2</sup> but it is likely to focus on restoration sites elsewhere. At the same time, a series of efforts were

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1. Letter from Ralph E. Ogden, Sheriff, Yuma County Sheriff’s Office, to Jim Cherry, Area Manager, United States Bureau of Reclamation (May 5, 2005) (on file with the author).

2. Bureau of Reclamation, Lower Colorado River Multi-Species Conservation Program, Final Environmental Impact Statement (2005) [hereinafter Final Environmental Impact Statement].

initiated to protect and restore the limitrophe habitat. The Cocopah Tribe, whose reservation spans about fifteen miles on the U.S. side of the limitrophe, proposed making the entire limitrophe an international protected area.<sup>3</sup> Inspired by the tribe's interest, the U.S. Bureau of Land Management ("BLM") is contemplating designation of the limitrophe as an "area of critical environmental concern."<sup>4</sup> In a parallel effort, Mexican nongovernmental organizations ("NGOs") are working to secure designation of the limitrophe as a special restoration area.

Depending on the outcomes of these various processes, the limitrophe could end up as a sterile swath of sand, or a verdant corridor teeming with even more wildlife than it is today. This article examines the limitrophe's natural resources, reviews the various planning processes, and argues for a future that provides a reasonable degree of protection for life and property, maximizes habitat for endangered species, and minimizes the cost to taxpayers.

## II. THE LIMITROPHE

The limitrophe reach of the Colorado River is the northernmost extent of the Colorado River Delta. It is the reach directly below the last structure on the river, Morelos Dam, where Mexico diverts its allocation of Colorado River water. Before the extensive development of the Colorado River in the twentieth century, the limitrophe was part of the delta's alluvial fan, a broad, sandy waterway inundated with large floods every year in late spring. Today, however, water users in the United States consume nearly 12 million acre-feet of Colorado River water, and water users in Mexico consume some 1.5 million acre-feet. In addition, more than one million acre-feet are lost to evaporation from large reservoirs. By the time the Colorado winds its way down to the limitrophe, only a trickle of water is left.

In most years, water flows in the limitrophe are limited to the quantities that seep through the dam structure and flow into the channel from groundwater. Additionally, a very small amount of Colorado River water comes from the Yuma area. Unused water from the Yuma area is channeled through a couple of wasteways that enter the river downstream from Morelos Dam. Average low flows in the limitrophe are in the vicinity of 45-50 cubic-feet per second ("cfs"), which is about 34,000 acre-feet annually.<sup>5</sup> However, there are times when the limitrophe is subjected to floods, some of which are quite large. This occurs when Colorado River flows exceed both consumptive uses and the capacity of

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3. Resolution Number CT-02-14 of the Governing Body of the Cocopah Tribe of the Cocopah Reservation: "A Resolution of the Governing Body of the Cocopah Indian Tribe to Support the Concept of the Wildlife Refuge in the Limitrophe Area," adopted May 8, 2002.

4. Bureau of Land Management, Preliminary Range of Alternatives, Yuma Field Office, Resource Management Plan Revision July 2005 [hereinafter Preliminary Range of Alternatives].

5. MICHAEL COHEN AND CHRISTINE HENGES-JECK, MISSING WATER: THE USES AND FLOWS OF WATER IN THE COLORADO RIVER DELTA REGION 18 (2001).

storage facilities (U.S. dam managers spill water from Lake Mead to create room for anticipated inflows), or during the rare occasions when there is significant rainfall in the lower basin and flows exceed storage capacity in the lower river. Sometimes, these flows can be sent to lower basin water users in place of releases from Lake Mead, but more often, rainfall prompts lower basin water users to cancel their orders after releases have been made from Lake Mead. Storage capacity on the lower river is insufficient to capture these flows, and the capacity of Mexico's diversion at Morelos Dam is insufficient to divert them, so Mexican dam operators send the flows downstream into the limitrophe.

These floods can inundate the limitrophe's entire floodplain. The limitrophe channel is narrow, especially in its northern half, where it is only fifty-feet wide. The entire limitrophe is bounded by levees, which are closer to the river at its northern end than its southern end. A 1997 flood was found to have covered the limitrophe's floodplain from levee to levee.<sup>6</sup> Further evidence of this inundation is found in the extent of native cottonwood and willow trees that grow in the riparian corridor.

The limitrophe was considered a dead ecosystem in 1980, as all excess inflows from the Upper Basin were captured in Lake Powell as it filled for the first time. But a series of wet years that occurred immediately following the filling of Lake Powell resulted in large floods during several years from 1981-1998.<sup>7</sup> As a result, the floodplain in the limitrophe was inundated numerous times. These floods established the extensive stands of native cottonwood and willow trees in the limitrophe riparian corridor, a rare, native habitat for the Colorado River. The floods, which scoured the limitrophe's banks and inundated the floodplain out to the levees, helped eliminate invasive Salt cedar and provide optimal conditions for the germination of native trees. The floods also washed out salts in floodplain soils that are deposited by Salt cedar, and when present, preclude native tree germination.

The limitrophe, and not the Colorado River further upstream, developed native tree habitat after two decades of floods because of the varying size of the river channel. Above Morelos Dam, the channel is wide, accommodating a year-round flow of 2200 cfs—which is the year-round rate of Colorado River water delivery to Mexico. Below Morelos Dam, however, average non-flood flows drop to approximately 47 cfs. The channel was reduced in size in 1993 by silt deposits from a rare flood of the Gila River, a tributary joining the Colorado in Yuma. Colorado River waters remain instream in significant quantities as far downstream as Morelos Dam in order to supply legally mandated deliveries of water for consumptive use. At Imperial Dam, twenty miles upstream, more than

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6. DANIEL F. LUECKE, ET AL, A DELTA ONCE MORE: RESTORING RIPARIAN AND WETLAND HABITAT IN THE COLORADO RIVER DELTA 20 (1999), available at [http://www.environmentaldefense.org/documents/425\\_Delta.pdf](http://www.environmentaldefense.org/documents/425_Delta.pdf).

7. Large floods during this period occurred in 1979-81, 1983-88, 1993, and 1997-99. COHEN, *supra* note 5, at 16.

four million acre-feet are delivered annually for use in Southern Arizona and California. Additionally, some one million acre-feet are diverted to power generating facilities in this area owned by the Imperial Irrigation District and then returned to the mainstem at Pilot Knob, where the water flows a few miles downstream before it is again diverted at Morelos Dam for delivery to Mexico.

Most of the time, any floodwaters that reach the limitrophe are relatively small compared to the large, scheduled flows in the river than run as far south as Morelos.<sup>8</sup> However, the floodwaters are significant past Morelos Dam. Compared to the Colorado River channel upstream, the limitrophe channel is narrow, due to silts that have been deposited there from the rare Gila River floods, combined with a more pervasive pattern of limited flows that sustains vegetation along the floodplain. The limitrophe also contains numerous meanders, oxbows, and backwaters—channel features that are rare in the Lower Colorado upstream. When large flows passed Morelos Dam in the 1990s, they exceeded the channel capacity and spread into the floodplain in the limitrophe, but stayed instream above Morelos. Thus, the limitrophe is the only place on the Lower Colorado River that in recent years has regularly worked like a river in the desert southwest: with occasional flooding, a floodplain covered with native vegetation, and a channel moving with the variances of flows.

The native riparian forest in the limitrophe floodplain was identified as the largest extent of dense stands of cottonwoods and willows on the Lower Colorado River. Cottonwood-willow habitat is important for a number of riparian obligate species, including the southwest willow flycatcher, a neotropical migrant on the U.S. endangered list. NGOs that worked broadly on conservation and restoration of the Colorado River Delta identified the limitrophe as a priority for conservation and restoration.<sup>9</sup>

Some of the very best native riparian habitat in the entire lower Colorado River (indeed in the entire arid southwest of the North American continent) is found in the southernmost reach of the river, where native tree coverage is 18%, while on the rest of the lower Colorado mainstem it is only 1-2%.<sup>10</sup> This reach below Morelos Dam is the only remaining segment of the lower Colorado where overbank flooding has been available in recent decades to sustain native vegetation, such as cottonwood and willow trees. The resulting habitat sustains several species listed as endangered in the United States, including the Southwestern willow flycatcher and the Yuma clapper rail; Mexico also lists the

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8. The floods of 1983-84 were so large that they also flooded some of the riparian corridor upstream of Morelos Dam. William E. Schmidt, *Floods along Colorado River Set Off a Debate Over Blame*, NEW YORK TIMES, July 17, 1983.

9. FRANCISCO ZAMORA-ARROYO, ET AL., SONORAN INSTITUTE, CONSERVATION PRIORITIES IN THE COLORADO RIVER DELTA 19 (2005), available at [http://www.sonoran.org/programs/sonoran\\_desert/si\\_sdep\\_delta\\_priorities.html](http://www.sonoran.org/programs/sonoran_desert/si_sdep_delta_priorities.html) (last visited September 8, 2006).

10. Francisco Zamora-Arroyo et al., *Regeneration of native trees in response to flood releases from the United States into the delta of the Colorado River, Mexico*, 49 J. OF ARID ENVIRONMENTS 60 (2001).

clapper rail as threatened. A rapid biological assessment conducted in 2003 documents the local, regional, and continental significance of this habitat.<sup>11</sup>

The regeneration and maintenance of native trees along the limitrophe represent one of the most important conservation opportunities on the Colorado River. A report on conservation priorities for the Colorado River Delta identifies the limitrophe as a priority for both conservation and restoration.<sup>12</sup> The Bird Conservation Plan,<sup>13</sup> prepared for numerous U.S. and Mexican agencies with a stake in the Colorado River Delta and the Pacific Flyway, gives clear indication of the importance of conserving this reach by specifying the following recommendations:

- Protect habitat, in particular the cottonwood and willow forests, in the Colorado River floodplain;<sup>14</sup>
- Restore cottonwood-willow forests and mesquite terraces along the floodplain of the Colorado River<sup>15</sup> . . . the target area includes the floodplain of the river delimited by the levee system that traverses the Mexicali Valley, starting in the north at Morelos Dam and extending down to the confluence of the Hardy and Colorado Rivers;<sup>16</sup> and finally
- *Limit management practices in the floodplain that damage riparian vegetation, including vegetation clearing and river canalization.*<sup>17</sup>

Land ownership in the limitrophe reach, inside of the levees, is varied. In the United States, landowners include the Cocopah Tribe, whose reservation spans fifteen miles of the limitrophe; the BLM, which owns nearly all the remaining lands; and a handful of private landowners, who account for just a few acres in the corridor. In Mexico, the federal government completely owns the limitrophe, under the jurisdiction of the Comisión Nacional de Aguas (“CONAGUA”). Until recently, private individuals owned land inside the levees on the Mexican side of the limitrophe, but now have been bought out by the federal government. The farms that cover much of the floodplain in Mexico are leased from the federal government. The same is true for the few (less than ten) residences located there. The Commissioner of Mexico’s Comisión Internacional de Límites y Aguas

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11. Hinojosa-Huerta et al., Environmental Defense Fund, Rapid Biological Assessment of the Colorado River Limitrophe (2003).

12. ZAMORA-ARROYO, *supra* note 9, at 19.

13. HINOJOSA-HUERTA ET AL., SONORAN INSTITUTE, BIRD CONSERVATION PLAN FOR THE COLORADO RIVER DELTA, BAJA CALIFORNIA AND SONORA, MEXICO (February 2004), available at <http://www.sonoranjv.org/BCPColoradoDelta.pdf>.

14. *Id.* at 37.

15. *Id.* at 6.

16. *Id.* at 37.

17. *Id.* at 39 (emphasis added).

(“CILA”) stated that it may be possible for these individuals to be moved out of the floodplain, but that a dialogue on this topic would need to be initiated with the government of the state of Baja California.<sup>18</sup>

### III. DREDGING: THE INTERNATIONAL BOUNDARY AND WATER COMMISSION

In 1999, the IBWC announced plans to begin work in the limitrophe.<sup>19</sup> Specifically, the IBWC proposed the following: work on the preservation of the boundary; improvements in the channel and carrying capacity; and maintenance activities.<sup>20</sup> Several years later, the agency held a public meeting where it announced a plan to dredge this reach of the Colorado in order to expand flood capacity, and to restore the U.S.–Mexico border.

Although the plan was still in development, all alternatives presented at the IBWC’s public meeting proposed clearing a path through the riparian corridor in order to expand the existing channel, which ranges from 30 to 50 feet wide in the northern end, to a channel ranging between 350 and 700 feet wide.

The IBWC project in the limitrophe is meant to satisfy two obligations: first, the need to maintain flood capacity; and second, to maintain the U.S.–Mexico boundary where the river forms the border. These obligations are derived from a number of historic agreements between the two countries.

Minute 217 to the U.S.–Mexico Colorado River Treaty<sup>21</sup> specifies that the IBWC is obligated to maintain flood capacity in the limitrophe reach of the Colorado River. Signed in 1964 by the commissioners of both IBWC and CILA, the minute’s title is “Clearing of the Colorado River Channel Downstream from Morelos Dam,” and specifies that the United States shall be responsible for clearing the channel according to the “Joint Report of the Principal Engineers Concerning the Necessity for Clearing the Channel of the Colorado River Below Morelos Dam,” which specifies a flood capacity of 140,000 cfs. Minute 291 to the Treaty, signed in 1994, specifies an emergency need to clear around the Morelos Dam due to the presence of sediments deposited in the 1993 Gila River flood.<sup>22</sup> Minute 291 reiterates the design flood capacity of 140,000 cfs.

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18. Interview with Arturo Herrera, International Boundary and Water Commission (IBWC), Comision Nacional des Limites y Aguas (March 2004).

19. The last comprehensive maintenance project conducted by IBWC in the limitrophe was in the early 1970s, immediately following the adoption of the 1970 Border Treaty. Interview with Carlos Marin, Principal Engineer, International Boundary and Water Commission (March 2004).

20. Intent to Prepare an Environmental Impact Statement for the Lower Colorado River Boundary and Capacity Preservation Project, Yuma County, AZ, 64 Fed. Reg. 98 (May 21, 1999).

21. International Boundary and Water Commission, Clearing of the Colorado River Channel downstream from Morelos Dam, Minute 217 (November 30, 1964).

22. International Boundary and Water Commission, Improvements to the Conveying Capacity of the International Boundary Segment of the Colorado River, Minute 291 (July 16, 1994).

The second obligation stems from the 1970 Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and Colorado River as the International Boundary (the "Boundary Treaty").<sup>23</sup> The Boundary Treaty requires the United States and Mexico to participate in the maintenance of the Colorado River channel as the boundary between Arizona and Baja California. Instead of requiring that the river channel remain static, the Boundary Treaty requires that it be moved periodically to rectify any acreage that shifted from one side of the river to the other.

In addition to these two mandates, the IBWC included in their plans an objective not based on any formal international agreements, specifically the construction of a "pilot channel" with a capacity of 15,000 cfs.<sup>24</sup> Agency officials cited an informal agreement with the CILA as the basis for this requirement.<sup>25</sup> The agency justified the pilot channel as having three purposes: to accommodate low flows that occur on a more regular basis, to allow the limitrophe corridor to accommodate a flow of 140,000 cfs without having to raise the levees, and to serve as the boundary marker.

Environmental Defense, along with several other NGOs, expressed concern over IBWC's plans for the limitrophe. An investigation of the agency's legal authorities began, and in the process, a set of principles was formulated for any flood control and boundary work to be done in that reach of the river. These concerns were submitted to IBWC in early 2004.

The principal concern of the environmental groups was that such extensive dredging as proposed by the IBWC would eliminate much of the limitrophe's native habitat. The extensive widening of the channel would require the actual removal of habitat in the northern end of the limitrophe where the channel is narrow and the levees are close to the channel. Further south in the limitrophe where the levees broaden considerably, the channel would either be widened in place, or widened and moved away from its existing location. While the latter alternative would spare existing vegetation from the dredge, the forest would eventually disappear without access to the channel and the water flowing in it. The habitat value of these stranded trees would also diminish, as the birds that use them also require a food base of insects produced in nearby still waters.

Although IBWC's plans were based on mandates in a number of binational agreements, not only might there be ecologically preferable ways to implement

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23. Treaty to Resolve Pending Boundary Differences and Maintain the Rio Grande and the Colorado River as the International Boundary, U.S.-Mex. November 23, 1970, 23 U.S.T. 371.

24. IBWC calculates a 26% probability of flows of at least 15,000 cfs below Morelos Dam; in other words, the IWBC predicts this rate of flow on average every four years. (IBWC, Position Paper: Design of the Pilot Channel Capacity for the Lower Colorado River in the Limitrophe Section, no date.) However, the U.S. Bureau of Reclamation, which runs the Riverware model for the Colorado River, predicted a probability of less than 25% of the floods in the limitrophe would exceed 8000 cfs as early as 2006, with the probability of an 8000 cfs or larger flood diminishing to less than 10% by 2050. DEPARTMENT OF THE INTERIOR, II INTERIM SURPLUS GUIDELINES FINAL ENVIRONMENTAL IMPACT STATEMENT N-26 (2000).

25. Interview with Carlos Marin, Deputy Commissioner US IBWC (2004).



these mandates, but in some cases the mandates are flawed. Specifically, the mandate to maintain a flood capacity of 140,000 cfs in the channel is problematic for a number of reasons. The Engineers' Report submitted in 1963<sup>26</sup> establishes this standard, but references a study conducted in the 1940s as its justification. In turn, the 1940s study offers an approximation, stating that 140,000 cfs is *at least* the 100-year flood,<sup>27</sup> rather than a precise analysis. In the 1940s, there were only about fifty years of historic Colorado River flow records; so even a rigorous analysis would likely not have been an accurate predictor of flood frequencies. Moreover, the 1940s study preceded a great deal of the development on the Colorado River, including Lake Powell and the Central Arizona Project, as well as the growth of cities in the Southwest such as Los Angeles, Phoenix, and Las Vegas. These and other developments have dramatically reduced the flow of the Colorado River in its southern reaches. Here lies the first and perhaps the most glaring problem: during the latter half of the twentieth century, development of the Colorado River was so extensive that today, the 100-year flood at Morelos Dam would be in the vicinity of 53,000 cfs.<sup>28</sup> A flow of 140,000 cfs would be the 10,000-year flood.<sup>29</sup>

An appropriate level of protection for flood events remains to be determined for the limitrophe. IBWC and CILA are expected to negotiate a new standard. For the purpose of comparison, it is useful to look at flood protection standards elsewhere in the United States. While the United States does not have a national flood control policy, standard practice calls for the development of measures that protect properties adjacent to rivers from the 100-year flood.<sup>30</sup> In cases where large cities are located on rivers, the standard may be increased, such as in the case of Sacramento, which is protected from the 150-year flood, and St. Louis, which is protected from the 500-year flood. IBWC's use of a 10,000-year standard for flood protection of the limitrophe, where the nearby landscape primarily consists of irrigated agriculture, is a vastly more protective policy. The language in the original limitrophe flood study actually suggests that the engineers at that time were contemplating use of the 100-year flood for the protection standard.

Another inconsistency in IBWC's plan to protect against a flood of 140,000 cfs in the limitrophe is the fact that flood control policy upstream from Morelos

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26. International Boundary and Water Commission, Joint Report of the Principle Engineers Concerning the Necessity for Clearing the Channel of the Colorado River Below Morelos Dam (January 28, 1963).

27. Bureau of Reclamation, Report on Improvement of Levee System Near Yuma, AZ, Preliminary Survey, Colorado River Front Work and Levee System Report No. RC-3-1 (July 1949).

28. K. Hucklebridge & J. Dracup, Results from Hydrologic Modeling of the Limitrophe section of the Colorado River, 10 (2004) (unpublished manuscript, on file with author).

29. Bureau of Reclamation, Morelos Diversion Dam Flood Frequency Study (draft) (2004).

30. The Federal Flood Insurance Program policy provides coverage for properties inside the 100-year floodplain. See Federal Emergency Management Agency, National Flood Insurance Program, Program Description (August 1, 2002), available at <http://www.fema.gov/doc/library/nfipdescrip.doc>.

Dam, implemented by Reclamation, protects against floods up to 40,000 cfs.<sup>31</sup> The city of Yuma, Arizona, does not support a levee system, and is susceptible to floods of a much smaller magnitude. In the unlikely event that a flood of larger magnitude should occur, the floodwaters would leave the Colorado's channel upstream before reaching Morelos Dam.

The second component of IBWC's plan was to dredge a pilot channel. Essentially, this involves the creation of a new river channel within the limitrophe, the clearance of vegetation to create a path of bare sand ranging from 350 to 700 feet wide to accommodate smaller floods, and the demarcation of the international border. IBWC proposed that this would require the physical removal of significant native habitat, and would strand existing habitat by removing its water source. According to IBWC consultants, even the "environmental" alternative considered by the agency would result in considerable loss of native cottonwoods and willows due to tree removal, which is a channel design that would significantly decrease the overbank flooding that regenerates these trees, and would lower the groundwater table that sustains them.

With the limitrophe bounded by levees, it is unclear what advantage is gained by clearing a pilot channel. The consequence of flows exceeding 15,000 cfs in the limitrophe is an inundation of the floodplain inside the protective levees. Levees may be vulnerable to erosion when subjected to large floods, but it would take a flood much larger than 15,000 cfs to cause damage to the limitrophe levees, which were built to accommodate much larger flows of 140,000 cfs.

The goals of establishing a pilot channel to contain most flows in the limitrophe and to maximize available habitat thus appear to be at odds. Riparian habitat in the southwestern desert is a product of, and reliant on, overbank flooding. Dredging a channel to eliminate overbank flooding in all but the most severe floods spells the demise of riparian habitat. The environmental impacts of IBWC's plan for the limitrophe was analyzed by consultants and presented at a public meeting in 2004. Their results indicate that at least 25% of the existing cottonwood-willow habitat would be lost due to the dredging of the pilot channel, even if IBWC implements its most environmentally friendly alternative for the project.<sup>32</sup>

In order to minimize ecological damage in the limitrophe, IBWC would need to not only revisit their mandates, but also incorporate environmental goals into their project. Specifically, the agency would need to:

1. Consider doing nothing where habitat values are highest: the native riparian deciduous forest that dominates much of the limitrophe regenerated during the 1980-90s without intervention, responding naturally to the presence of water and occasional flooding. If left alone, it will continue to thrive as long as water continues to flow.

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31. Colorado River Floodway Protection Act, 43 U.S.C. § 1600 (1986).

32. International Boundary and Water Commission Public Meeting, Meeting Minutes (March 4, 2004).

The levee-to-levee capacity already exceeds a flow of 75,000 cfs, which is considerably greater than the 100-year flood.<sup>33</sup> In fact, the levees can contain 140,000 cfs in all but the northernmost reach of the limitrophe.<sup>34</sup> The international boundary could be adjusted in the southern reach of the limitrophe where ecological values are lower, if necessary.

2. Maximize the use of levees to minimize the risk to streamside habitat: IBWC's intent to dredge in the northernmost extent of the limitrophe in order to increase levee-to-levee capacity would eliminate significant native riparian habitat. A preferable approach to increasing flood flow capacity in this reach would be to raise the levees rather than dredging.
3. Reconsider the need for a pilot channel: dredging a pilot channel of 15,000 cfs would remove or deny water to native vegetation in the limitrophe. Because the United States and Mexico have not entered into a formal agreement to dredge a pilot channel of a given capacity, IBWC and CILA should have the flexibility to reconsider the need for dredging a pilot channel. A design solution using multiple channels, allowable under the 1970 Boundary Treaty, could alleviate the need to impact native habitat.
4. Assess inside-levee flood risk: where homes exist inside the levees (mostly located in the southern half of the limitrophe on relatively high ground), IBWC and CILA should assess flood risk. Should any homes be at risk of frequent flooding, the Mexican government could consider buying the property, ending the concession, or in the case of illegal occupation, help the residents find alternative housing. The removal of homes with high flood risk rather than dredging a huge channel for flood protection would be considerably less expensive as well as less damaging to the environment.
5. Identify and protect areas with significant habitat value: should IBWC find it necessary to modify the limitrophe channel, it could minimize ecological damage by avoiding any modifications in the northern half of the limitrophe where native riparian habitat values are high. The agency could prevent stranding existing native riparian forest by avoiding the need to divert the existing channel and the flows it conveys. Finally, IBWC could make boundary adjustments, as needed, in the southern half of the limitrophe where native riparian habitat values are lower.

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33. Bureau of Reclamation, *Flood Frequency Determinations for the Lower Colorado River Review* (September 2000).

34. See Hucklebridge, *supra* note 28.

6. Emphasize habitat restoration: it is entirely possible that IBWC could incorporate ecosystem management as a co-equal goal along with flood control and boundary maintenance; and in doing so, incorporate restoration of cottonwood-willow trees, oxbows and backwaters, and other important riparian habitats into a final plan for the limitrophe.

Environmental Defense recently embarked on a project to use these principles to develop a preliminary channel restoration design alternative for the limitrophe. The alternative will protect against the 100-year flood, rectify the boundary, and improve riparian habitat by adding oxbows and backwaters that would augment habitat quantity and quality. With an increase in these channel features, the limitrophe habitat will benefit from both an increased structural diversity and a quantitative increase in habitat.

#### IV. ELIMINATING THE WATER: COLORADO RIVER WATER MANAGEMENT AND THE LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PLAN

Reclamation, working with Lower Colorado River basin states, has nearly finalized a “Multi-Species Conservation Plan for the Lower Colorado River” (“MSCP”). This plan intends to mitigate losses for endangered species that results from river management and consumptive uses on the Lower Colorado, including the limitrophe reach.<sup>35</sup> While it is irrefutable that upstream management of the Colorado River results in the elimination of flows in the limitrophe (and may increasingly do so in the future),<sup>36</sup> MSCP stakeholders have not committed to mitigate for habitat losses in the area. Reclamation cites the IBWC’s dredging project as justification for escaping an obligation to mitigate in the limitrophe, as the existing habitat may be eliminated.<sup>37</sup> Reclamation also claims an inability to release Colorado River water for environmental purposes, citing the Supreme Court Decree of 1964 as precluding the release of Colorado River water for purposes other than river regulation, navigation, flood control, irrigation, domestic uses, and power generation.<sup>38</sup> Notably, Reclamation does not explain how it could use water for habitat creation upstream of Morelos Dam (which is the principle method of endangered species loss mitigation in the MSCP), but not use water for habitat creation below it.

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35. Final Environmental Impact Statement, *supra* note 2; Secretary of the Interior, Record of Decision, Lower Colorado River Multi Species Conservation Program (April 2, 2005).

36. Reclamation is planning to build a new regulatory reservoir at the southern end of its delivery system in the United States, with the purpose of eliminating excess deliveries to Mexico. *See* Bureau of Reclamation, Public Input Sought on Proposed Drop 2 Reservoir Project Environmental Assessment (June 23, 2005), available at [http://www.usbr.gov/lc/yuma/environmental\\_docs/Drop\\_2/Drop\\_2\\_News\\_Release.pdf](http://www.usbr.gov/lc/yuma/environmental_docs/Drop_2/Drop_2_News_Release.pdf).

37. Final Environmental Impact Statement, *supra* note 2, at V-57.

38. *Id.*

## V. EFFORTS TO PROTECT AND RESTORE THE LIMITROPHE

At the same time that the U.S. government engaged in planning processes for the limitrophe that entails the future demise of its riparian habitat, there were a number of initiatives to secure protected-area status and management for this reach of the Colorado. In 2001, the Cocopah Tribe, whose reservation spans fifteen miles of the Colorado River in the limitrophe, passed a tribal resolution expressing a desire to create an international protection area in the entire limitrophe reach. Based on this expression of interest in protecting the river, several NGOs, the Arizona Department of Game and Fish, and several local agencies worked with the tribe to further define the protection and restoration concept and to build support for it.

Local managers of the BLM learned of the Cocopah's initiative, and suggested that as part of its Resource Management Plan update for the Yuma Area, the limitrophe be reviewed for designation as an Area of Critical Environmental Concern ("ACEC"). ACECs are authorized by the Federal Land Policy and Management Act of 1976<sup>39</sup> ("FLPM"), and include public lands where special management attention and direction is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values; to fish or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ACEC designation indicates that BLM recognizes the significant values of the area, and intends to implement management to protect and enhance the resource values. ACECs are considered land use authorization avoidance areas, as they are known to contain resource values that will pose special constraints for, and possibly denial of, applications for land uses that cannot be designed to be compatible with the management objectives and prescriptions for the ACEC. ACEC designation is specifically identified for the limitrophe reach in BLM's Preliminary Range of Alternatives,<sup>40</sup> and the outcome of BLM's ACEC review for the limitrophe is expected in 2007, when the Yuma Resource Management Plan is finalized.

Finally, a group of NGOs is working to secure protected area status in Mexico along the Colorado River, including the limitrophe reach.<sup>41</sup> The goal initially is to get the riparian corridor designated as a "Restoration Zone." This is a federal designation by the Mexican Minister of Environment to "implement actions for the recuperation and reestablishment of the conditions that support the evolution and continuity of the natural processes that used to take place in deteriorated areas." This designation is coupled with a comprehensive restoration program. Although it was mainly used in Mexico to restore forested areas after wildfires, the deteriorating conditions and the ecological importance of the limitrophe fit the criteria for such a designation. The restoration zone designation

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39. The Federal Land Policy and Management Act of 1976 § 202 (c)(3), 43 U.S.C. § 1712 (c)(3) (2006).

40. Preliminary Range of Alternatives, *supra* note 4.

41. Interview with Francisco Zamora-Arroyo, Project Manager, Sonoran Institute (February 14, 2005).

is a temporal designation as established in Mexican law, and may last for ten years as proposed. After that period, the NGOs will seek designation of the limitrophe as a “Natural Protected Area” to provide permanent protection to the riparian corridor.

## VI. CONCLUSION

Despite the institutional and diplomatic challenges of managing the Colorado River at the border, several initiatives appear to be on the verge of success, leading both the United States and Mexico into a cooperative relationship that will benefit the limitrophe’s natural resources. At the same time, several plans in the works threaten to degrade the limitrophe. Predicting how these conflicts will be resolved is not possible. Removal of the border would surely benefit the Colorado River limitrophe, but perhaps more practically, sound planning, international comity, and respect for natural processes will prevail.

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