35 ELR 10550 8-2005



Solutions Lie Between the Extremes: The Evolution of International Watercourse Law on the Colorado River

by Karen Hyun

Editors' Summary: Looking at extremes may seem futile when dealing with important environmental issues: the outcome on either end of the spectrum is almost always objectionable. Yet they are the bounds within which the solution lies. Thus, finding the balance between the endpoints is imperative. The Colorado River and its related international water law is the story of how the context of the times drives the evolution of law within such extremes. This Article looks at the evolution of international fluvial law surrounding the Colorado River regarding quantity, quality, conservation, and ecological needs, which will continue to adapt slowly as society changes where the balance is struck.

I. Introduction

Law is not a static set of rules, but a dynamic process that allows for change. These constant changes often result from the unending search for a balance between two extremes. These extremes are epitomized in "all or nothing" situations. Even though the situations are exact opposites, they share one similarity: both outcomes are usually undesirable. For example, in many debates, conservation and utilization are often pitted against each other. Full conservation and no utilization of natural resources, however, would result in an elimination of human action and perhaps the eventual extinction of our own species, while full utilization and no conservation of natural resources would result in the elimination of the ecosystems that support us and in our own demise. Both outcomes are obviously objectionable, and finding the balance between the two extremes is imperative. Yet that delicate point is in a constant state of flux as circumstances change our priorities and law establishes new equilibriums.

Extremes, then, seem impractical as solutions but are, in fact, a helpful way to frame problems: the balance is struck along the spectrum between these endpoints. It is particularly useful in looking at the dynamics of the Colorado River and international watercourse law, which, like the rivers it

Karen Hyun received a B.S. and an M.S. from Stanford University in earth systems, an interdisciplinary program in environmental science and policy. Following this, she spent nine months in South Korea on a Fulbright Scholarship categorizing national fisheries statistics using artificial neural networks. Currently, she is a Ph.D. candidate at the University of Rhode Island in the Marine Affairs Program. Her dissertation work explores ecological and social indicators of ecosystem health in the Colorado River Delta. She would like to thank Prof. Lawrence Juda from the Marine Affairs Program at the University of Rhode Island for his invaluable guidance, support, and critique.

legislates, is in a constant state of flux. The Colorado River serves as a prime example of the issues surrounding international watercourse law because it runs through seven U.S. and two Mexican states, emerging in the estuary of the Gulf of California.

This Article first looks at the 1944 Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande—Treaty Between the United States of America and Mexico (U.S.-Mexican Water Treaty)¹ as a response to the "all or nothing" situation regarding the quantity of water crossing this international border. The Article then shows how Minute 242, an amendment to the treaty, addressed the balance between freshwater and wastewater. Next, the Article looks at one aspect of the conservation-utilization debate through the lens of the Endangered Species Act (ESA) and its application internationally.3 Lastly, a discussion of the non-navigable uses of international watercourses will demonstrate the need for balance between absolute territorial and absolute integrated sovereignty, where the former gives states complete freedom of action regardless of any harm done to other states and the latter denies action by upstream states to prevent harm to downstream states. The evolution of international fluvial law surrounding the Colorado River from quantity, to quality, and currently to conser-

- 1. Treaty Relating to the Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Feb. 3, 1944, U.S.-Mex., 59 Stat. 1219, T.S. No. 994, 9 Bevans 1166, 3 U.N.T.S. 313, available at http://www.ibwc.state.gov/Files/1944Treaty.pdf (last visited June 17, 2005) [hereinafter U.S.-Mexican Water Treaty].
- Agreement Approving Minute 242 of the International Boundary Water Commission Setting Forth a Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River, Aug. 30, 1973, 24 U.S.T. 1968, T.I.A.S. No. 7708, available at http://www.ibwc.state.gov/Files/Minutes/Min242.pdf (last visited June 9, 2005) [hereinafter Minute 242].

vation and ecological needs will continue to adapt slowly as society changes where the balance is struck.

II. Full Flow Versus Full Diversion

Political boundaries are often disconnected from ecological boundaries. This is true for the western border between Mexico and the United States that turned the Colorado River into a successive international watercourse. ⁴ Article 5 of the 1848 Treaty of Guadalupe-Hidalgo stated that this section of delimitation would "consist of a straight line drawn from the middle of the Rio Gila, where it unites with the Colorado, to a point on the coast of the Pacific Ocean, distant one marine league due south of the southernmost point of the port of San Diego." ⁵ The Colorado River crosses this political boundary and the repercussions of drawing this line were felt early in the following century. The evolution of international watercourse law surrounding the Colorado River commenced over the issue of quantity.

The two extremes in relation to quantity are: (1) allow the full flow of the Colorado River to enter Mexico; or (2) allow the river to be completely diverted before crossing the boundary between these two countries. The outcomes of both situations are not desirable, as the former would drastically inhibit development of the arid western United States and the latter would prevent the same in Baja and Sonora, Mexico. However, when the effects of U.S. alterations to the Colorado River were felt by Mexico, a balance between full diversion and full flow was needed. To prevent an undesirable outcome, international watercourse law needed to adapt to changing situations.

A. The Colorado River

The historical context of Colorado River diversions are important in understanding the evolution of international watercourse law. This section highlights how this full diversion was essentially reached. In 1922, the Colorado River Compact was negotiated between seven U.S. states—the upper basin states of Colorado, New Mexico, Utah, and Wyoming, and the lower basin states of Arizona, California, and Nevada. Although the river ends its journey in the Mexican delta, Mexico was not included in these negotiations. At that time, estimation of annual flow of the Colorado River was averaged at 17 million acre-feet. Seven and one-half million acre-feet were apportioned to the upper and lower basins each. The remaining two million acre-feet were left for later settlements with Native American tribes.

From the start, the Colorado River Compact overallocated river water because the initial estimations of average

- 3. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.
- 4. International watercourse law can be divided into the study of two types of situations: (1) contiguous watercourses are aligned with political boundaries; and (2) successive watercourses cross them. The Treaty of Guadalupe-Hidalgo, *infra* note 5, establishes both types of boundaries, with the Rio Grande (Rio Bravo) forming a contiguous watercourse along the border of Mexico and Texas.
- 5. Treaty of Guadalupe-Hidalgo, Feb. 2, 1848, U.S.-Mex., art. 5, 9 Stat. 922, T.S. No. 207, 9 Bevans 791.
- 6. Colorado River Compact of 1922, 45 Stat. 1057.
- An acre-foot is equivalent to one acre covered in one foot of water, 325,851 gallons, or approximately the average amount used by a U.S. household of four in one year.

annual acre-feet were based on two of the wettest decades in the previous 500 years. Current paleontological studies reconstruct actual average annual flow from tree rings and clamshells to be approximately 13 million acre-feet. In addition, Mexico was not included in the compact and user conflicts ensued.

In 1935, the completion of the Hoover Dam drastically changed the amount and timing of the flow of the river. These alterations were felt downstream in Mexico and, in addition to other nontangential politics, led to the signing of the U.S.-Mexican Water Treaty. This treaty allocated 1.5 million acre-feet to Mexico and established the International Boundary and Water Commission (IBWC), which continues to regulate and amend this treaty.

B. U.S.-Mexican Water Treaty

The U.S.-Mexican Water Treaty struck a balance between full diversion and full flow. Article 10 guaranteed 1.5 million acre-feet of Colorado River water to be delivered to Mexico annually and delivery schedules were established in Article 15. 11

This negotiation over quantity demonstrated the importance of water for this arid region. The priority for this water was use. In fact, this treaty's Preamble states that,

It is clear that utilization was paramount and non-use was considered inefficient waste.

Perhaps the strongest evidence of this full utilization mentality was the prioritization of uses for Colorado River water. Article 3 stated:

In matters in which the Commission may be called upon to make provision for the joint use of international waters, the following order of preferences shall serve as a guide:

- 1. Domestic and municipal uses.
- 2. Agriculture and stockraising.
- 3. Electric power.
- 4. Other industrial uses.
- 5. Navigation.
- 6. Fishing and hunting.
- 7. Any other beneficial uses which may be determined by the [IBWC], ¹³

This Article places utilization, either directly or indirectly for human consumption, at the forefront and diversion projects ahead of uses requiring instream flow.

It is not surprising that preference for domestic and agricultural use were the top two uses in the treaty. After all,

- 8. Discover a Watershed: The Colorado (The Watercourse
- 9. U.S.-Mexican Water Treaty, supra note 1.
- 10. Id. art. 10.
- 11. Id. art. 15.
- 12. *Id*. pmbl.
- 13. Id. art. 3.

Mexico had been protesting U.S. diversions since the early 1900s. The issue became even more urgent because of water disputes over the Rio Grande and with the expansion of ejidos¹⁴ in Baja and Sonora, Mexico. In the late 1930s, Mexican President Lazaro Cardenas expanded this tenant-farming system, especially into the Mexicali Valley, and the need for water to intensify and extend agricultural production was recognized. ¹⁵ In the North, the expansion of U.S. territory into the arid West was based on the water principles of "prior appropriation," which gave water rights to settlers based on the commencement of beneficial use. In other words, the right to use water was tied to the date the water right was first established. 16 In addition, the definition of "beneficial" was unclear, but the U.S.-Mexican Water Treaty indirectly gave insight into its definition. Beneficial use, as defined by the list in Article 3, related to direct and indirect human consumption. The last vague provision—any other beneficial uses—recognized potential future uses that were unforeseen by the negotiators and became an area of debate. As circumstances changed, those gray areas became arenas for evolution in international watercourse law.

III. Freshwater Versus Wastewater

While the U.S.-Mexican Water Treaty sought to address water quantity issues across this international boundary, the quality of water was not discussed. Unfortunately, water-courses often become the sewage system for our waste. The result, particularly with regard to successive watercourses, is that the consequences of actions collect downstream. The evolution of international fluvial law surrounding the Colorado River thus continued over the issue of quality.

The two extremes in relation to quality are: (1) prevent pollution and treat all Colorado River water that crosses into Mexico; or (2) use the river, essentially, as a sewage and wastewater pipe. The former would be extremely expensive and perhaps impossible to regulate with such high water quality standards, and the absurdity of the latter would cause serious harm to human health and the environment along the entire watercourse. However, as agricultural and municipal growth increased in the watershed, a balance between freshwater and wastewater was necessary. To avoid swinging too far toward extreme wastewater flow, the U.S.-Mexican Water Treaty was adapted accordingly, ultimately demonstrating how international law served to strike a balance.

A. Impact of Agriculture and Growth

The historical context surrounding the issue of water quality is helpful in understanding the adaptation of international watercourse law. Agricultural production causes salts to accumulate in the Colorado River, as runoff from farmland

leaches salts out of the soil. The results downstream include plumbing corrosion, waterworks damage, and decreased agricultural output. This last consequence became especially apparent in the 1960s, when the salt content of water delivered to Mexico exceeded 2,000 parts per million (ppm). This was the direct result of a Bureau of Reclamation project in the Welton-Mohawk district along the Gila River, a tributary of the Colorado River. The irrigation project extracted water from a saline aquifer, used it for agriculture, and produced runoff with a salinity of 6,000 ppm. ¹⁷ The consequent decline in crop production in the Mexicali Valley resulted in protest. Although the U.S.-Mexican Water Treaty explicitly listed and prioritized uses, ironically, it did not specifically state that the water needed to be useable. The addition of Minute 242—an amendment, in essence, to the U.S.-Mexican Water Treaty—addressed this issue of water quality.

B. Minute 242

Minute 242 states that "[t]he United States shall adopt measures to assure that . . . the approximately 1,360,000 acre-feet (1,677,545,000 cubic meters) delivered to Mexico upstream of Morelos Dam, have an annual average salinity of no more than 115 ppm +/- 30 ppm U.S. count (121 ppm +/- 30 ppm Mexican count) However, making this amendment operational has been more difficult than merely establishing a water quality standard. Section 4 of Minute 242 states that "at the expense of the United States, [Mexico] shall construct, operate, and maintain an extension of the concrete-lined bypass drain from the Arizona-Sonora international boundary to the Santa Clara Slough of a capacity of 353 cubic feet (10 cubic meters) per second." To address this section, the Welton-Mohawk Canal was built, transferring salty wastewater from the Welton-Mohawk district to the delta in Mexico. Unexpectedly, this wastewater created La Ciénaga de Santa Clara, a wetland.²⁰

Also in response to Minute 242, the United States built the Yuma Desalting Plant to pump filtered water back into the Colorado River through reverse osmosis. Together with the canal, this project cost the United States \$350 million.²¹ Due to excessive operating costs, however, the desalting plant has never come online, and since the wetland started forming in 1977, action was brought to a halt. Yet as the cost of water rises, desalting will become economically feasible and the debate over conserving this "mistake" will continue.

Circumstances changed the interpretation of the original treaty. The U.S.-Mexican Water Treaty prioritized uses, but it never addressed the quality of the delivered water. The need for "useable" water was addressed in Minute 242, but putting it into practice created unintended consequences. Societal values of conservation were the next driving force of international watercourse law evolution.

^{14.} An *ejido* is a communal farm in Mexico, where the land is owned by the government. The intent of a system of these farms was to remedy social injustice and increase subsistence food, but in actuality the system became more similar to tenant farming.

Norris Hundley, Dividing the Waters: A Century of Controversy Between the United States and Mexico 76 (University of California Press 1966).

Marc Reisner, Cadillac Desert: The American West and Its Disappearing Water 47 (Viking 1986).

^{17.} Charles Bergman, Red Delta: Fighting for Life at the End of the Colorado River 46-47 (2002).

^{18.} Minute 242, *supra* note 2.

^{19.} U.S.-Mexican Water Treaty, supra note 1.

Evan R. Ward, Border Oasis 138-41 (University of Arizona Press 2003); William deBuys & Joan Myers, Salt Dreams: Land and Water in Low-Down California 148 (University of New Mexico Press 1999).

^{21.} Bergman, supra note 17, at 48.

IV. Utilization Versus Conservation

People are often pitted against nature; human actions often harm the ecosystems on which we rely. Sadly, certain species cannot adapt quickly enough to these environmental alterations and become endangered. International watercourse law, in regard to the Colorado River, is beginning to adapt to allow for badly needed conservation.

As stated in the introduction, the extremes of full utilization and complete conservation both lead to an undesirable outcome. Full utilization, as inferred from the list of human uses in the U.S.-Mexican Water Treaty, can draw water needed for a healthy ecosystem out of the watercourse. In contrast, full conservation would restrict almost all development in Mexico and the western United States. Societal priorities toward conservation, especially in protecting endangered species, are changing the circumstances under which the original treaty was negotiated. International watercourse law is evolving to address certain environmental issues, as has been the case with endangered species.

A. Endangered Species

The historical context surrounding endangered species is helpful in understanding adaptations of international watercourse law. Changes in the amount and salinity of river water entering the delta has changed the ecosystem drastically. Certain species are more susceptible to these disturbances and cannot adapt readily to these changing conditions. Measureable impacts at the top of the food chain include population decreases in endemic and endangered species like the vaquita, a harbor porpoise, and the totoaba, a fish. Studies show that spawning migrations of the totoaba are linked to the salinity gradient formed during the spring flood from the Colorado River, and totoaba recruitment is hindered by increased salinity.²² Biological changes can also be seen at the bottom of the food chain in filter feeders such as the Mulina coloradoensis, a clam. This endangered species has been out-competed by more salt tolerant clams.²³ In addition, highly migratory birds use this area as a stopover, and some, like the Yuma clapper rail, have become endangered because of reductions of habitat area. Although the U.S.-Mexican Water Treaty did not include nonhuman species as users of Colorado River water, the application of the ESA to this transboundary problem could address the protection of these threatened endemics.

B. ESA

Section 7 of the ESA requires that federal agency actions are not "likely to jeopardize the continued existence" or "result in the destruction or adverse modification of habitat" of listed species, ²⁴ and §3(19) defines "take" as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct, "²⁵ where "harm" includes "significant habitat modification or degradation

which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding or sheltering." The importance of these two sections lies in their transboundary application to the Colorado River watershed. If an action in the United States such as damming jeopardizes listed species in Mexico, like the totoaba, then a taking can be argued. Finding of a taking could require compensation or mitigation, even though the impacts occur across political boundaries. ²⁷

The view that endangered species are users of Colorado River water gives rise to this potential international application of U.S. law. Environmental problems require solutions that are transboundary, and since endangered species know no political boundaries, the solutions must work across these borders. Environmental conservation, however, requires much more than endangered species protection. Preserving entire ecosystems is the most current driver of changes in international watercourse law.

V. Absolute Territorial Sovereignty Versus Absolute Integrated Sovereignty

These two extremes of sovereignty, ironically, have very similar outcomes; both generally prove ineffective. Absolute territorial sovereignty is epitomized in the Harmon Doctrine, which argued that "a state has complete freedom of action with regard to the portion of an international watercourse that is situated within its territory, irrespective of any harmful consequences that may ensue for other riparian states."²⁸ Prior to the U.S.-Mexican Water Treaty, U.S. Attorney General Judson Harmon argued that under the law of nations, self-preservation preceded all international servitude.²⁹ The absurdity of this extreme position is evidenced by the fact that the United States never used this doctrine while negotiating the U.S.-Mexican Water Treaty. Today, with a true interconnected international community and "on the basis of policy as well as practice, the 'Harmon Doctrine' of absolute territorial sovereignty should, once and for all, be laid to a richly deserved rest."30

At the opposite extreme is absolute territorial integrity, where the upstream state cannot take action to affect the natural flow of the water into the downstream state. ³¹ As a rule of sovereignty, this proves as ineffective as the Harmon Doctrine because it does not solve concrete controversies. It is impractical to avoid use of an international watercourse, but use does have inherent consequences. As is generally agreed upon in international law, if *sic utere tuo ut alienum non laedas* (use of property as not to harm that of another) is held, then use of a watercourse is allowed, but a community of interests needs to define the balance between users and uses.

^{22.} Miguel A. Cisneros-Mata et al., *Life History and Conservation of* Totoaba Macdonaldi, 9 Conservation Biology 806-14 (1995).

Carlie A. Rodriguez et al., Effects of Upstream Diversion of Colorado River Water on the Estuarine Bivalve Mollusc Mulinia Coloradoensis, 15 Conservation Biology 249-58 (2001).

^{24. 16} U.S.C. §1536.

^{25.} Id. §1532.

^{26. 50} C.F.R. §222.102.

Bridget Kellogg, The Dam Controversy: Does the Endangered Species Act Apply Internationally to Protect Foreign Species Harmed by Dams on the Colorado River?, 447 J. Transnat'l L. & Pol'y 13 (2004).

^{28.} STEPHEN C. McCaffrey, The Law of International Watercourses: Non-Navigational 77 (Oxford Univ. Press 2001).

^{29.} HUNDLEY, supra note 15, at 23.

^{30.} McCaffrey, supra note 28, at 111.

^{31.} Id. at 128.

A. Community of Interests

Transboundary management requires the creation of community around the watercourse, where a community of interests in the water is created by the natural and physical unity of a river. This concept is theoretical, but its tangibility is confirmed by the myriad of organizations of joint governance for internationally shared freshwater resources. The main binational organization along the Colorado River is the IBWC, whose mission is to, inter alia, cooperate and agree on solutions to transboundary problems as they emerge. In 2000, the IBWC, in following its mission statement and in support of this community of interests, developed Minute 306, which serves as a conceptual framework for conservation of the Colorado River Delta.

B. Minute 306

Minute 306 states:

The Commissioners recognized that there was a need for the United States and Mexico to create a framework to formalize a process that will: (1) consider Colorado River [D]elta restoration studies prepared by government, scientific, academic and non-government organizations in the two countries; (2) provide for development of additional studies through the binational technical task force; and (3) formulate recommendations for cooperative projects concerning the Colorado River [D]elta in Mexico to be undertaken by the United States and Mexico based on the principle of an equitable distribution of resources.³⁴

This is a conceptual minute and does not require anything of either country, but each point holds specific importance. The focus on delta restoration shows the recognition of conservation at an ecosystem level. The concern is no longer about how much water is needed for utilization or what quality water is needed for consumption, but instead focuses on the ecological use of water. The second and third points acknowledge necessary cooperation to address conservation of the Colorado River Delta. Minute 306 is a clear example of the growing body of international watercourse law which, among other things, calls for the protection of ecosystems.

C. Convention on the Law of the Non-Navigational Uses of International Watercourses

The Convention on the Law of the Non-Navigational Uses of International Watercourses was adopted by the U.N. General Assembly on May 21, 1997.³⁵ This was a frame-

- 32. Id. at 149.
- International Boundary and Water Commission, International Boundary and Water Commission, Its Mission, Organization, and Procedures for Solution of Boundary and Water Problems, at http://www.ibwc.state.gov/html/about_us.html (last visited June 9, 2005).
- 34. Minute 306 of the International Boundary and Water Commission, Conceptual Framework for United States-Mexico Studies for Future Recommendations Concerning the Riparian and Estuarine Ecology of the Limitrophe Section of the Colorado River and Its Associated Delta, Dec. 12-13, 2000, available at http://www.ibwc.state.gov/Files/Minutes/Min306.pdf (last visited June 17, 2005).
- G.A. Res. 51/229, U.N. GAOR, 51st Sess., U.N. Doc. A/RES/51/229 (1997), reprinted in 36 I.L.M. 700 (1997), avail-

work convention that set general principles and rules to be tailored to specific situations, such as the transboundary management of the Colorado River. Although the convention has not entered into force, it codifies existing norms of equitable utilization, prevention of harm, and prior notification, and it realizes emerging norms such as ecosystem protection.

International watercourse law grants rights but also states responsibilities. In the case of the Colorado River Delta, two particular articles of the convention establish the emerging obligations to protect this region's ecosystem. Article 20, entitled Protection and Preservation of Ecosystems, is based on an emerging obligation to protect ecosystems of international watercourses. Article 23 is entitled Protection and Preservation of the Marine Environment, which includes the protection and preservation of estuaries such as the Gulf of California. Both of these articles call for a protection of ecosystems, which is a broader concern than solely conservation of endangered species. After all,

the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.³⁶

International watercourse law is progressive in the use of both the precautionary principle and due diligence. The precautionary principle states that even in light of scientific uncertainty, measures should be taken to prevent serious harm to watercourses. Due diligence, which is the capability of preventing harm, ³⁷ is an extremely flexible concept that takes into account both the nature of the threat and the circumstances in which the state is involved. ³⁸ The forthright and adaptive nature of international watercourse law, as stated in the convention, will strike a balance between absolute territorial sovereignty and absolute integrated sovereignty as the realization of emerging norms like ecosystem protection and conservation become concrete.

VI. Conclusion

Extremes are rarely stable and, therefore, an equilibrium must be found between the two endpoints. Looking at extremes may seem futile, but they are the bounds within which the solutions lie. The Colorado River and its related international watercourse law is the story of how the context of the times drives the evolution of law. The balance that is struck falls between the extremes, which are often undesirable outcomes.

In the infancy of this story, use of Colorado River water was solely for direct and indirect human consumption. The U.S.-Mexican Water Treaty was negotiated to swing the pendulum away from the full utilization extreme. Later, poor water quality was addressed to maintain usability of this water, resulting in Minute 242.

able at http://www. un.org/law/ilc/texts/nonnav.htm (last visited June 9, 2005).

^{36.} International Court of Justice, Legality of the Threat or Use of Nuclear Weapons, 1996 I.C.J. 241-42 (July 8, 1996), available at http://www.icj-cij.org/icjwww/icases/iunan/iunanframe.htm (last visited June 17, 2005).

Current societal values of environmental protection, especially in the Gulf of California estuary, are keeping international watercourse law on the Colorado River in a constant state of flux. The possible applications of the ESA to this binational issue and the conceptual Minute

306 both exemplify this emerging value for ecosystem conservation. Our values will undoubtedly continue to shape international watercourse law on the Colorado River as it has for the last century, and it will continue to evolve to fit the changing times.