

RESOLVING INTERSTATE WATER CONFLICTS:

**A Comparison of the Way India and the United States
Address Disputes on Interstate Rivers**

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RESOLVING INTERSTATE WATER DISPUTES

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I. INTRODUCTION

India and the United States are both federations with distinct regions and complex water problems. Their internal borders, however, reflect the vagaries of history and political compromise and bear little relation to the natural contours of river basins. The same can be said for virtually every other nation. What makes India and the United States unique is the size of the two countries and the number of States within their respective borders: 28 in India and 48 in the continental United States. Small wonder is that both countries have serious interstate water disputes, some of which linger for years.

In 1901, the year that Queen Victoria died and Rudyard Kipling wrote *Kim*, the State of Kansas sued the State of Colorado for diverting so much water from the Arkansas River in the central United States that it ran dry in summer. The two States eventually signed a contract with each other¹ but they became embroiled in a dispute over what the terms of the agreement meant. Legal battles continued intermittently until the U.S. Supreme Court issued a decision in 2004.²

The disputes in India over the Cauvery River began in 1807, the year Beethoven first performed his Fourth Symphony and 12 years before Sir Stamford Raffles landed in Singapore. In that year, the Presidency of Madras (now the State of Tamil Nadu) complained about excessive upstream use of Cauvery River water by the Princely State of Mysore (now Karnataka).³ The dispute led to an 1892 agreement, followed

¹ The Arkansas River Compact of 1949, Pub. L. No. 81-82, 63 Stat. 145.

² *Kansas v. Colorado*, 543 U.S. 86 (2004).

³ Dodda Srinivasa Rao, *Inter-state Water Disputes in India* (Deep & Deep Publications 1998), at p. 65.

by another dispute, an arbitration decision, an appeal of the arbitration decision to the Secretary of State in London, and then another agreement in 1924. That agreement ultimately proved inadequate to solve modern-day needs and led to a new round of disagreements, which continued intermittently until a tribunal in India issued an award in 2007, two hundred years after the first recorded disagreement. And yet the dispute continues, even to this day, because several parties have filed appeals in the Supreme Court.

In this paper, we take a closer look at the causes and solutions of interstate river disputes within India and the United States. By “interstate,” we mean a river that crosses an internal State border or that serves as the State border. We do not address international water disagreements that India and the United States have had with neighboring countries. Rather, we focus on how India and the United States divide water between their own respective States and how they resolve competing claims, particularly during shortages.

The rest of the paper is organized as follows:

- Section II provides background information about India and the United States and how they use water.
- Section III summarizes the common legal heritage of both countries.
- Section IV contains an overview of the mechanics of the doctrine of “equitable apportionment.”
- Section V describes how the United States resolves interstate water disputes.
- Section VI describes how India resolves interstate water disputes.
- Section VII examines a case study in India: the Krishna River.
- Section VIII examines a case study in the United States: the Potomac River.
- Section IX describes alternatives to litigation as a means of resolving interstate river conflicts, particularly in times of drought.
- Finally, the concluding section contains a comparative evaluation of how India and the United States resolve interstate water disputes.

II. COMPARING INDIA AND THE UNITED STATES

India is roughly 40% of the size of the continental United States but has four times the number of people (See Table 1). Few cities in India, including those with a population more than one million, have a clean, predictable water supply. Two-thirds of India's population still lacks access to basic sanitation facilities. Rapid population growth and industrialization have severely damaged water quality of many rivers. India's challenge is therefore to provide clean water for its population while at the same time expanding its economy and creating jobs in the competitive international marketplace.

But India faces a water storage problem.⁴ Its annual demand for water is more than two times the available storage behind reservoirs. In the United States, in contrast, annual water demand and storage are roughly equal. The lack of significant reservoir storage in India puts it at a disadvantage: it must rely on precipitation during the annual monsoon season (usually May through September).⁵ In many areas of the country, only 10-15 days a year bring most of the rainfall.⁶ Farmers are especially vulnerable to those weather patterns because they depend heavily on river water for irrigation. Approximately 83% of India's diversions from rivers go for irrigation.⁷

⁴ Water storage need not only occur behind large dams. Decentralized storage – such as “rainwater harvesting,” which involves the accumulation and storing of rainwater before it reaches a river or aquifer – is an option. Another option is aquifer storage and recovery, where water is stored underground and pumped to the surface when needed.

⁵ Biswas, A.K., Rangachari, R., and Tortajada, Cecilia, *Water Resources of the Indian Continent* (Oxford University Press 2008) at p.180.

⁶ *Id.* at p.180. See, also, Central Water Commission, 2009-10 Annual Report (inset), “India – Land and Water Resources: Facts.” The regional variation in precipitation is significant. India's arid parts (e.g., in the northwest) receive only 100 mm (3.9 inches) per year but the wettest part of the country (e.g., the eastern river deltas) can receive as much about 11,000 mm (433 inches).

⁷ Biswas, note 5 *supra*, at p.158.

Table 1
India and the United States at a Glance

	India:	United States:
Size ⁸	3.3 million sq. km	8 million sq. km
Population (2011) ⁹	1.2 billion	313 million
No. of Cities >1 Million (2010) ¹⁰	43	9
People Without Water (2008) ¹¹	128 million	Negligible *
People Without Sanitation (2008) ¹²	839 million	Negligible *
Per Capita Income (2010) ¹³	\$1,265	\$47,284
Hydroelectric Capacity (2009) ¹⁴	37,000 MW	80,000 MW
Annual Water Demand (2005) ¹⁵	629 BCM	567 BCM
Existing Water Storage (2005) ¹⁶	289 BCM	595 BCM

⁸ India's area is equivalent to 1.27 million square miles. The area of the continental (contiguous) United States is equivalent to approximately 3 million square miles (excluding Alaska and Hawaii).

⁹ Based on estimated population in July 2011. Source: CIA "World Fact Book."

¹⁰ See http://en.wikipedia.org/wiki/List_of_most_populous_cities_in_India.

¹¹ See http://en.wikipedia.org/wiki/Water_supply_and_sanitation_in_India, and CIA "World Fact Book," note 9 *supra*.

¹² *Id.*

¹³ See [http://en.wikipedia.org/wiki/List_of_countries_by_GDP_\(nominal\)_per_capita](http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(nominal)_per_capita). According to the International Monetary Fund, the U.S. ranks 9 in the world, and India ranks 138 (out of 183 countries).

¹⁴ "MW" means *megawatt* (million watts). It is a common measure of electrical generating capacity. Source: <http://en.wikipedia.org/wiki/hydroelectricity> The U.S. Department of Energy lists a total hydroelectric capacity of 95,000 MW, but this figure includes pumped-storage facilities. www.energy.gov/energysources/hydropower.htm.

¹⁵ "BCM" means *billion cubic meters*. A cubic meter is equal to .0008107 *acre feet* (the common measure of reservoir volume in the United States). An acre foot is the amount of water needed to cover one acre of land (40% of a hectare) with one foot of water. Figures for annual water demand come from the Central Water Commission of India, *Handbook of Water Related Statistics* (2005), and the U.S. Geological Survey ("U.S.G.S."), *Estimated Use of Water in the United States* (2005), Circular 1344. Measured in *millions of acre feet* ("MAF"), the United States uses approximately 460 MAF each year. India uses about 510 MAF.

** The number of people in the United States without any water or sanitation facilities is extremely small and is generally limited to rural isolated communities.*

Groundwater, in contrast, typically supplies cities. In some areas of the country, India's groundwater supplies are plentiful.¹⁷ In other regions, however, there are worrisome indications that groundwater "mining" for commercial purposes is far outstripping natural replenishment.¹⁸

The United States, with an established industrialized economy, has its own set of water problems. They may pale in comparison with India's but they exist, nonetheless. Much of the U.S. water distribution infrastructure is aging, particularly in the older eastern cities. The population is also increasing – albeit at a rate much slower than India's – but the United States will likely face serious water shortages in certain parts of the country, particularly in the arid Southwest.

In the United States, half of all water diverted from rivers is used for generating electricity in thermal power plants (coal and nuclear). Only about 31% of the water goes for agriculture.¹⁹ This figure changes in the American West, where agriculture depends heavily on sophisticated irrigation infrastructure (e.g., dams, canals, pumping

¹⁶ *Id.* Measured in MAF, the United States has reservoir storage of approximately 482 MAF. India can store 234 MAF.

¹⁷ Central Water Commission of India, 2009-10 Annual Report, note 6, *supra*. See, also, Biswas, note 5 *supra*, at pp. 154-156, identifying groundwater extraction areas where the water table is falling.

¹⁸ See National Geographic News, "*Mining*" Groundwater in India Reaches New Lows, December 2010. Over-pumping has led to legal proceedings. In 2010, for example, the State of Kerala charged Coca Cola with depleting and polluting groundwater, and it recommended the company pay the equivalent of US \$48 million in damages.

¹⁹ See U.S. Geological Survey publication, note 15 *supra*, at p.8 (Table 2B).

stations) to move water, sometimes hundreds of miles.²⁰

III. LEGAL HERITAGE

The American and Indian legal systems bear a striking resemblance when it comes to the mechanisms for addressing interstate water disputes, despite differences between the two countries in culture, history and religion.

Both countries were once part of the British Empire, and their jurisprudence, even to this day, reflects elements of that common legal heritage. In the intervening years since they became independent (the United States in 1783 and India in 1947), both countries have established procedures for adjudicating interstate water rights. In both countries, “equitable apportionment” is commonly accepted as the preferred means for dividing interstate waters. Both countries permit their States to sign contracts with each other to allocate water from rivers. Both countries have attempted to create special boards or commissions to manage rivers, or parts of rivers, in a more coordinated and efficient manner. [See Annex for a summary of the key features of the legal systems in both countries.]

On paper, India has adopted a cooperative, non-litigation means of resolving interstate water problems. In 1956, Parliament enacted the River Boards Act that allows the

²⁰ In the Colorado River Basin in the Southwest part of the United States, for example, approximately two-thirds of the water goes for irrigation. That figure is likely to drop in the future. The demands of cities, particularly in Southern California, have put pressure to transfer water from farms to cities, a change with significant social and economic impacts.

Central Government, upon request and after consultation with the States, to create basin-wide river boards to provide advice on virtually every aspect of river management, including flood control, navigation, irrigation, power generation and environmental issues. But this authority has never been invoked in the 55 years since it was authorized by the Parliament because of State Government suspicions of Central Government control.²¹

The United States has no similar national mechanism, but it is home to a number of established river commissions and innovative water sharing agreements involving water banking, sharing of operation and maintenance expenses and other mechanisms that will likely prove more durable than court decisions.

IV. THE MEANING OF EQUITABLE APPORTIONMENT

“Equitable apportionment” is the term commonly used to denote the division of water among competing parties.²² It is usually a slow and sometimes contentious process

²¹ River boards cannot build infrastructure or allocate water. But the proposed range of their activities in providing advice suggests they could foster basin-wide cooperation in a number of important areas. The river boards can prepare plans for the States to execute and can advise States on implementing the scheme.

²² This paper focuses on “equitable apportionment” in the context of domestic interstate rivers, though the principle (sometimes called “equitable and reasonable utilization”) is used in the field of international law. See, for example, the 1966 “Helsinki Rules” of the International Law Association, and the 1997 U.N. Convention on the Law of the Non-Navigational Uses of International Watercourses, 36 I.L.M. 700. The U.N. General Assembly approved the Convention but it is not in force because a sufficient number of nations have not ratified it. A detailed discussion of equitable apportionment on

that involves hydrology, economics, engineering, law and sometimes the resolution of ethnic politics or historical claims from decades ago. Equitable apportionment, the U.S. Supreme Court has said, is a flexible doctrine that calls for the “exercise of an informed judgment” after considering many factors, including physical conditions and climate, the use of water, the character and rate of return flows, the extent of established uses, the availability of storage water and the practical effects of wasteful uses.²³

In this context, “equity” is clearly an elusive concept. By definition, it implicates issues of fairness, a subjective standard. Most vested interests in a river basin want more than their current share of the water in the name of “fairness.” Other interests in the basin typically do not want to accommodate the request because they have a different (and sometimes more parochial) idea of “equity.” This is a zero-sum game: when one party (a State, city or industry) gets a larger share, it comes at the expense of someone else.

And even if the parties reach agreement, new problems potentially threaten the accord. Rising population, pollution, and the effects of floods or drought can force the parties to go back and re-open prior decisions.

Nonetheless, there are a number of workable interstate agreements (some decided voluntarily, others imposed by a court) in both India and the United States. The

international rivers (i.e., that cross international borders) is beyond the scope of this paper.

²³ *Colorado v. New Mexico*, 459 U.S. 176, 183 (1982)(“*Vermejo I*”), quoting *Nebraska v. Wyoming*, 325 U.S. 589 (1945).

details of these agreements are often fiendishly complex but they come down to three basic approaches:

- The States can divide the water by territory or by the amount of flow that each State contributes. If, for example, State A occupies 60% of the basin or contributes 60% of the flow, then it gets 60% of the water. (If a State occupies 60% of the land area but contributes 30% of the flow then some sort of compromise is required.)
- The States can divide the water based on historical claims. A State that has traditionally used 60% of the water in the river in the past can assert a claim based on prior diversions. “We used the river before you did” is the assertion a State makes to its neighbor. This is the “prior appropriation” approach: first in time, first in right.
- The States can divide the water based on a priority of uses. Irrigation and municipal (domestic) supply, for example, could take priority over industrial uses and navigation, or vice versa. Environmental protection – water for a river delta to sustain fisheries, for example – could receive higher or lower protection depending on the value the States place on ecological (and related economic) benefits.

Sometimes all three of those approaches are mixed together in a complex compromise agreed upon voluntarily by the States themselves or imposed by the courts.²⁴

²⁴ States in India and the United States often rely on a combination of approaches and factors, tempered by political considerations, when they negotiate equitable

V. INTERSTATE WATER DISPUTES IN THE UNITED STATES

The United States contains some of the largest interstate river basins in the world. The Mississippi River, for example, drains roughly 40% of the continental United States. In size, it is roughly equal to the entire area of India. Other large river basins include the Columbia, which begins in Canada and empties into the Pacific Ocean, west of Portland, in the State of Oregon. In the desert Southwest, the Colorado River and Rio Grande play a huge impact, providing water for irrigation and drinking water.

The internal borders of the continental (contiguous) United States are comparatively stable: the State boundaries have not changed significantly for 100 years.²⁵ India, however, redrew its State boundaries in 1956 and has added new States since then.

apportionment agreements. As a result, there is no easy way to classify interstate contracts by approach (e.g., territory, historical claims, usage). In the case of the Colorado River in the United States, for example, the basin States agreed in 1922 to divide up the water equally between the Upper Basin (which contained most of water) and the arid Lower Basin by allocating 7.5 MAF per year per basin. The agreement was based in large part on a political compromise that recognized California's use of water for irrigation and municipal purposes under the prior appropriations doctrine (and by implication, its political clout to maintain its share of Colorado River water). When it came time to divide the water within the Upper Basin, however, the States in 1948 apportioned the Upper Basin according to what each State historically contributed to annual flows. Thus, each State in the Upper Basin was given a fixed percent allocation (e.g., the State of Colorado received a permanent 51.75% share of annual flows.)

²⁵ The States of New Mexico and Arizona, for example, joined the Union in 1912 but they were both territories in their own right before that date, and their boundaries did not change significantly. The two newest States, Alaska and Hawaii, are not in the continental U.S. and have no interstate rivers.

A. The Role of the Federal Government

In the United States, the federal (central) government plays a dominant role in the construction and operation of dams, locks, canals and other infrastructure on interstate rivers. The two lead federal agencies are the U.S. Army Corps of Engineers (“Army Corps”) and the U.S. Bureau of Reclamation.²⁶

The Army Corps is the oldest of the dam-building agencies and traces its origins to the War of Independence from Great Britain (1775-1783). Over the years, the Army Corps has built dozens of dams for flood control, navigation, power and other purposes. It is not limited to a geographic area, though historically the agency has not built dams for water supply and irrigation, which means that in many parts of the American West, its role is limited.²⁷

The Army Corps has exclusive responsibility for flood control and navigation. It owns and maintains a network of 19,000 kilometers (12,000 miles) of inland and coastal waterways. Among its facilities are 200 navigation locks.

The Bureau of Reclamation was created 1902 to build irrigation and water storage projects in the arid West – usually defined as the area west of the Mississippi River. The wide swaths of desert were virtually useless without water. The Bureau’s mission was to “reclaim” them, to turn remote, uninhabited scrubland into productive farmland,

²⁶ The Army Corps is part of the U.S. Department of Defense. The Bureau of Reclamation is part of the U.S. Department of Interior.

²⁷ See the U.S. Army Corps of Engineers website, www.usace.army.mil.

to make “the desert bloom.” In the last century, the Bureau has done just that.

The Bureau has constructed an extensive network of dams and irrigation canals for moving water in 17 western States. In some cases, the Bureau transports water hundreds of miles through harsh terrain and high mountains.²⁸

A third federal agency, the Tennessee Valley Authority (“TVA”), has a regional mission in a seven-State area in the South. TVA is a federal corporation, created in 1933 in the early days of the New Deal, soon after Franklin D. Roosevelt was elected president.²⁹

Because of the extensive investment in dams, locks and irrigation canals, virtually all interstate rivers and many *intrastate* rivers in the United States have been “federalized,” meaning that the central government manages the river in one form or another. Furthermore, the Federal Energy Regulatory Commission (“FERC”) issues construction and operating permits for non-federal dams. As a result, there is often an uneasy relationship between the two levels of government.

Water rights -- the issue of who gets what from the rivers -- remain a State issue. The States are the ones who issue permits for water diversions, and their procedures

²⁸ See the U.S. Bureau of Reclamation website, www.usbr.gov. The Bureau has created a reclamation history website and posted an extensive bibliography there, www.usbr.gov/history/index.html. For a critic’s view of the Bureau’s activities, see Marc Reisner, *Cadillac Desert: The American West and Its Disappearing Water* (Penguin Books 1993).

²⁹ See the Tennessee Valley Authority website, www.tva.gov.

differ significantly between States.³⁰

The distribution of water to retail consumers is typically the responsibility of local governments -- counties, cities and towns that have their own water utilities. About 90% of the American public is served by these public entities. In the West, several investor-owned utilities (corporations listed on the New York Stock Exchange) own large dams, but the primary purpose of these structures is to generate electricity, not irrigate land or supply retail consumers with water.³¹

B. The Constitution

The U.S. Constitution makes no mention of water. But the document, which went into effect in 1789, addresses the role of the federal government and States, and expressly grants powers to Congress to regulate interstate commerce.³² As early as the 1800s, the

³⁰ In eastern States (usually defined as east of the Mississippi River), the traditional riparian rights model prevails. “The fundamental principle of the riparian doctrine is that the owner of land bordering a waterbody acquires certain rights to use the water. Each landowner bordering on a waterway may [therefore] make reasonable use of the water on riparian land if the use does not interfere with reasonable uses of other riparians.” David H. Getches, *Water Law in a Nutshell, Third Edition* (West Publishing 1997) at p.15. In western States, the “prior appropriation” model of State water rights is common. It was developed in the 19th century and is based on the principle of “first in time, first in right.” Under the prior appropriation doctrine, owners of land (even if they are not adjacent to the river) can claim water based on diversions for beneficial use. If they used the water before someone else, they have priority. A number of States have enacted hybrid statutes that rely on both riparian and prior appropriation principles.

³¹ Idaho Power Corp., with headquarters in Boise (State of Idaho), is an example. The company owns large hydroelectric dams on the Snake River, a tributary of the Columbia River.

³² Article I, § 8, cl. 3. The power of Congress includes the authority to “regulate commerce with foreign nations, and among the several States, and with the Indian

U.S. Supreme Court held that interstate commerce included shipping and navigation.³³ In more recent times, the U.S. Supreme Court has held that water sold across state lines implicates the interstate commerce clause; States may therefore not impose unreasonable bans or restrictions on the movement of interstate water.³⁴

C. The Legal Mechanisms for Resolving Disputes

There are three different legal mechanisms in the United States for apportioning (dividing) water and resolving disputes on interstate rivers.

1. Congressional Apportionment

Congress may apportion waters in an interstate river by statute, though it has done so only twice in U.S. history. The complexity of most water allocation schemes, the competing State interests and the sheer amount of time needed to understand the technical issues have all deterred Congress from allocating interstate waters itself.

The first time occurred in 1928, when Congress approved the Boulder Canyon Project Act that authorized construction of Boulder (now Hoover) Dam on the Colorado River.³⁵ Congress also consented in the Act to the Colorado River Compact of 1922 that divided the waters of the river between an Upper and Lower Basin.³⁶ In addition, Congress also consented in advance to a proposed interstate compact that apportioned

Tribes.”

³³ *Gibbons v. Ogden*, 22 U.S. 1 (1824).

³⁴ *Sporhase v. Nebraska, ex. rel. Douglas*, 458 U.S. 941 (1982).

³⁵ 43 U.S.C. § 617.

³⁶ The Colorado River drains parts of seven States: Colorado; New Mexico; Utah; Wyoming; Arizona; California; and Nevada.

waters between three States in the Lower Basin: Arizona, California and Nevada.

Thirty-five years later, in response to litigation brought by Arizona, the U.S. Supreme Court held that Congress had apportioned the waters in the Lower Basin when it passed the Boulder Canyon Project Act. Although the three States had not approved the compact, Congress gave the U.S. Bureau of Reclamation broad legal authority to sign water supply contracts with the three States, apportioning water from the Colorado River in the same formula as the proposed interstate compact.³⁷ And the States had voluntarily signed those contracts. Under those circumstances, the Supreme Court concluded that Congress had in effect divided the waters of the Lower Basin. As a result, the three States were entitled to (and bound by) the Congressional apportionment.

The second time Congress apportioned water occurred in 1990, when it enacted the Truckee-Carson-Pyramid Lake Water Settlement Act affecting waters in Nevada and California.³⁸ With the exception of those two statutes, Congress has never apportioned waters of an interstate river.

2. State Petitions to the U.S. Supreme Court for An Equitable Apportionment

The U.S. Constitution allows States to sue each other in the Supreme Court, which has original jurisdiction for those types of cases.³⁹ When a State files a petition under this

³⁷ *Arizona v. California*, 373 U.S. 546 (1963). See, also, *Arizona v. California*, 376 U.S. 340 (1964)(decree).

³⁸ Pub. L. No. 101-618, Title II, 104 Stat. 3294.

³⁹Article III, § 2, cl. 1. The judicial power of the United States extends to all cases including controversies between two or more States. In those disputes, the Supreme

part of the Constitution, the case goes directly to the Supreme Court, which appoints a Special Master (an independent fact-finder) to take evidence and make preliminary rulings.⁴⁰ If the issue implicates an interstate water dispute, the Special Master conducts hearings and proposes an equitable apportionment of the river. This process has taken years on some rivers.⁴¹ The Supreme Court can then approve, reject or modify the Special Master's findings.

There is no formula for deciding “who gets what” from an interstate river. The Special Master and the Supreme Court have significant discretion to do what they believe is best. States are understandably reluctant to go through this time-consuming and uncertain process, which perhaps explains why the list of Supreme Court water apportionment cases is so short.

Table 2
The U.S. Supreme Court's Equitable Apportionment Cases
In Chronological Order

River:	States Involved:	Date of Initial Decision:
Arkansas	Kansas and Colorado	1902
Laramie *	Wyoming and Colorado	1922
Connecticut	Connecticut and Massachusetts	1931
Delaware *	New Jersey and New York	1931
North Platte *	Nebraska and Wyoming	1935
Walla Walla	Washington and Oregon	1936
Colorado	Arizona and California	1936
Vermejo	Colorado and New Mexico	1982

Court has original and exclusive jurisdiction. See 28 U.S.C. § 1251(a).

⁴⁰ For a copy of recent reports from Special Masters on water allocation, state boundary and other disputes between States, see www.supremecourt.gov/SpecMastRpt/SpecMastRpt.aspx.

⁴¹ In the dispute over the Colorado River, for example, it took 12 years between the time Arizona filed its petition (1952) and the Supreme Court's decree (1964).

* Indicates cases that culminated in a final apportionment decree. The initial decision was often followed by years of subsequent litigation.

To date, the Supreme Court has received equitable apportionment petitions on eight rivers but approved a final decree for only three: the Delaware; the Laramie; and the North Platte. In the other five petitions, the Court held that the complaining State did not provide clear and convincing evidence to obtain an apportionment decree.⁴²

3. Interstate Compacts

The States themselves may solve their water dispute by signing a “compact” with each other, subject to approval by Congress.⁴³ A compact is a contract, a binding legal document that has the force of law.

The authority for States to sign these agreements is the “compact clause” of the U.S. Constitution.⁴⁴ Congress approved the first interstate compact soon after the Constitution took effect. That agreement, like many others that followed, altered

⁴² The “clear and convincing evidence” standard can be difficult for the complaining State to meet. See the U.S. Supreme Court’s analysis of this issue in *Colorado v. New Mexico*, 467 U.S. 310, 316 (1984)(“*Vermejo II*”). This case was preceded by *Colorado v. New Mexico*, 459 U.S. 176 (1982)(“*Vermejo I*”), see note 23, *supra*.

⁴³ The origins of the compact go back to the nation’s colonial period, when royal land charters left borders subject to frequent change. To settle disputes, the colonies negotiated boundary compromises submitted for approval to the Privy Council in England.

⁴⁴ Article 1, § 10, cl. 3 of the U.S. Constitution states:

“No state shall, without the consent of Congress...enter into any agreement or compact with another state, or with a foreign power....”

boundary lines between States and did not directly address water issues or problems. Compacts between two or more States now address such diverse subjects as child custody, bridge tolls, nuclear waste, taxes and water. The Council of State Governments in Lexington, State of Kentucky, maintains a repository of these agreements.⁴⁵

The first compact that apportioned interstate waters was signed in 1925. It divided the waters of a small river, the La Plata River between the States of Colorado and New Mexico. The most recent interstate water apportionment compact was executed in 1980. In total, Congress has consented to 22 interstate compacts that apportion water on interstate rivers.⁴⁶

In general, States are not free to sign interstate water apportionment contracts without seeking Congressional consent.⁴⁷ When Congress consents, it passes a statute. The

⁴⁵ See the compilation of interstate compacts at the Council of State Governments website, www.csg.org/knowledgecenter/Old%20Pages/ncic/database/search.aspx. The website of the International Water Law Project also contains a list of the U.S. interstate water compacts and the text of the agreements, http://internationalwaterlaw.org/documents/interstate_us.html.

⁴⁶ Congress has also consented to a number of interstate compacts that address water quality and related natural resource issues. See, for example, the Great Lakes-St. Lawrence River Basin Water Resources Compact, which Congress approved in 2008. Those compacts do not allocate or apportion water.

⁴⁷ The Supreme Court has held that not all interstate compacts require Congressional consent. *Virginia v. Tennessee*, 148 U.S. 503 (1893). The Court's reasoning was that if the subject of the compact was within the sole jurisdiction of the States, requiring Congressional approval would improperly diminish State control and independence. But in the case of water allocation contracts, the subject is rarely (if ever) within the sole power of the States to decide. There are inevitably federal interests at stake. Thus, as a general rule, an interstate water apportionment compact requires consent from

compact therefore becomes a binding legal agreement between the States *and* a federal statute at the same time. As a result, the States cannot amend their compact without returning to Congress and asking it to pass an amended statute.⁴⁸

Some compacts create an interstate commission to interpret or implement its terms and conditions. Other compacts do not. Some compacts have been the subject of prolonged litigation before the Supreme Court. Others have proceeded smoothly. There is no uniform experience.

A violation of the terms and conditions of an interstate compact gives rise to a contract claim for breach. These claims are filed with the U.S. Supreme Court, which is the only forum to resolve the disputes (if they are between States, as opposed to private parties and a State).

Over the years, the Supreme Court has interpreted a number of interstate compacts but its role is different than when it apportions a river without a compact. In the latter circumstance, there is no agreement between the States and the Supreme Court equitably divides the river as best it can. If, however, the Supreme Court is interpreting an interstate compact, it looks to the terms and conditions that the States themselves have accepted. The Court's role is more limited: it is reluctant to disturb the compact terms, even if they result in an impasse, as they did on the Pecos River

Congress.

⁴⁸ The same principle applies if the States were to undo the compact entirely: Congress would have to repeal its prior consent, unless the compact itself spelled out the conditions for termination. .g., if the Compact itself expires automatically on a date certain, Congress need take no action.

Compact between the States of New Mexico and Texas.⁴⁹

In that case, the State of New Mexico asked the Supreme Court to “reform” the compact by allowing a non-voting federal member of the Pecos River Commission to end years of deadlock between the two States (who had one vote each). The Supreme Court declined to do so. The solution, the Supreme Court said, was for the States of New Mexico and Texas to amend their compact. Once Congress consented to a compact, as it had done here, the agreement was transformed into the law of the United States, and “no court may order relief inconsistent with its express terms.”⁵⁰

The Supreme Court can, however, order money or water remedies if it finds a violation of the compact terms. It can direct an upstream State to supply water, for example, to a downstream State, or it can impose money penalties for failure to abide by the terms of the compact.

Finally, the Supreme Court can appoint a special “river master” to account for water diversions and provide technical information *after* its decision. The Supreme Court has taken that step only twice: once in a dispute involving the Delaware River between the States of New Jersey and New York⁵¹; the other in the litigation between

⁴⁹ *Texas v. New Mexico*, 482 U.S. 124, 128 (1987). “[A] compact when approved by Congress becomes a law of the United States....It remains a legal document that must be construed and applied in accordance with its terms.” See, also, *Montana v. Wyoming*, No. 137, Orig. (slip opinion, May 2, 2011), available at www.supremecourt.gov/opinions/slipopinions.aspx.

⁵⁰ *Texas v. New Mexico*, 482 U.S. at 564.

⁵¹ *New Jersey v. New York*, 347 U.S. 995 (1954)(amended decree).

the States of New Mexico and Texas over the Pecos River.⁵²

VI. INTERSTATE WATER DISPUTES IN INDIA

More than 80% of India lies within an interstate river basin.⁵³ Thus, the resolution of interstate conflicts affects virtually every area of the country and virtually every part of the economy, from irrigation to industrial uses.

Even before independence from Great Britain in 1947, the boundaries of India's States (then called "Princely States" or kingdoms) changed regularly. At the time of independence in 1947, India consisted of 11 provinces and 562 Princely States, of which 147 were vested with some degree of autonomous legal authority. The Constitution of India, which came into force in 1950, consolidated these units into several dozen States.

Six years later, India redrew its State boundaries when Parliament approved the States Reorganization Act of 1956. The legislation re-configured most State borders based on language -- "linguistic boundaries" that reflected the diverse ethnic background and

⁵² *Texas v. New Mexico*, 485 U.S. 388 (1988).

⁵³ The Central Water Commission ("CWC") defines a "major river basin" as those greater than 20,000 square kilometers (7,722 square miles). See 2009-10 Annual Report (inset), "India – Land and Water Resources: Facts." The CWC identifies 12 major basins: the Indus; Ganga-Brahmaputra-Barak (a tributary to the Meghna); Sabarmati; Mahi; Narmada; Tapi; Brahmani; Mahanadi; Godavari; Krishna; Pennar; and Cauvery. See Table 1.4 Catchment Area of Major River Basins in the CWC's Handbook of Water Resource Statistics, available at www.cwc.nic.in/main/webpages/publications.html.

languages of the Indian population.⁵⁴ In 2000, three new States -- Uttarakhand, Jharkhand and Chhattisgarh -- joined the Union. India is currently considering the creation of more States. A proposal to create a new State, Telangana in central India, is now under discussion.

A. The Role of the Central Government

The national government in India is commonly referred to as the “Central Government” or “the Centre.” It typically does not own large dams for irrigation. That responsibility falls to the States, which have taken the lead for the last 100 or more years to build and manage dams across India’s large rivers.

As early as the 1850s, the British developed elaborate plans for the Princely States to construct irrigation and navigation canals, and generate revenue. The goal was to tame the rivers of India and prevent the extremes of flooding and destruction, drought and famine.

Some of those ambitious plans remained on the books and were never implemented. Other plans became reality and transformed India’s rivers in virtually every part of the country, from the Ravi-Beas in the northwest to the Godavari, Krishna and Cauvery in

⁵⁴ According to the 2001 Census of India, 29 languages are spoken by more than one million native speakers. In addition to Hindi, which is the official language of India, the 10 major languages are: Bengali (83 million); Telugu (74 million); Marathi (72 million); Tamil (61 million); Urdu (52 million); Gujarati (46 million); Kannada (38 million); Malayalam (33 million); Oriya (33 million); and Punjabi (29 million). See http://en.wikipedia.org/wiki/Languages_of_India.

peninsular India (central and south).⁵⁵

Despite the historical role of the States, the Central Government has established several corporations that are in the dam-building business, albeit with limited missions:

- The National Hydro Power Corporation (“NHPC”) is a federal enterprise that constructs and manages hydroelectric dams. The NHPC does not build dams, canals or pumping stations for irrigation.
- The Central Government has created several joint ventures with States to build dams. The Nathpa Jhakri Power Corp. (between the Central Government and the State of Himachal Pradesh) and Tehri Hydro Development Corp., Ltd. (between the Central Government and the State of Uttar Pradesh), are examples.
- The Damodar Valley Corporation (“DVC”) is a public entity with a regional mission in northeast India. The DVC was created in 1948 and has built dams to control floods, generate electricity and supply water for irrigation and other uses in the Damodar River Basin.⁵⁶ The basin drains part of two States:

⁵⁵ See the accomplishments of Sir Arthur Cotton (1803-1899), a British general and irrigation engineer. http://en.wikipedia.org/wiki/Arthur_Cotton.

⁵⁶ The Damodar Valley Corporation was approved by Parliament two years before the Constitution of India went into force. See Act. No. XIV of 1948, enacted pursuant to the 1935 Government of India Act. For more information, see www.dvcindia.org. The DVC also owns thermal power (coal) plants. It is located in Kolkata (Calcutta).

Jharkhand, formerly called Bihar; and West Bengal. The DVC is modeled loosely on the Tennessee Valley Authority (“TVA”) in the United States.

The absence of federal infrastructure on most interstate rivers in India means that the Central Government has little leverage to assert itself – it does not own the dams, locks, canals and pumping stations.

Nonetheless, the Central Government’s Ministry of Water Resources in India plays an important role in India. It monitors water resource development and provides technical information and assistance to other parts of the Central Government and to State governments, as well. The Ministry’s Central Water Commission remains the best source for understanding legal issues involved in interstate and international water issues.⁵⁷

B. The Constitution

India is a Union of States governed by a Constitution, which, among other things, establishes Parliament as the legislative branch. India consists of 28 States and seven Union territories.⁵⁸ The Government has more authority over Union territories (former colonial territories) than it does over States, which maintain a semi-independent role in the federation.

The Constitution of India went into force in 1950, three years after India achieved

⁵⁷ The CWC publishes four volumes of legal instruments, available at its website, www.cwc.nic.in/main/webpages/publications.html.

⁵⁸ The Union Territories include the National Capital Territory of Delhi (“New Delhi”).

independence from Great Britain. The official language is Hindi. English is the secondary (subsidiary) official language. The Constitution lists additional languages which it refers to as “national languages” of India.⁵⁹

Article 246 of the Constitution of India creates three Lists (categories) of subject matter that fall within the authority of the Union (the Central Government), or the States, or that are subject to concurrent (dual) jurisdiction. The Lists identify the subjects on which the Union or the States can legislate:

- **List I** contains those “entries” (specific subjects) that are the exclusive jurisdiction of the Union. Entry 56 covers the regulation and development of *interstate rivers and river valleys* “to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest.”
- **List II** contains entries that are the exclusive jurisdiction of the States. Entry 17 makes clear that everything related to water, *except for* an interstate river, remains under the exclusive control of States. “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power, subject to the provisions of Entry 56 of List I [the Union]” remains within State authority.

⁵⁹ Section 345 of the Constitution allows States to designate their own official languages.

- **List III** contains entries that form the “Concurrent List” over which the Union and States have dual authority. There is no mention of water in this list.

Thus, interstate waters remain under Central Government control *if* Parliament enacts legislation pursuant to Entry 56. Every other aspect of water and river management remains under State control.

If there is a conflict between States over the meaning of those provisions, the States may take their dispute to the Supreme Court, which has original jurisdiction to hear cases between States (like the Supreme Court of the United States).⁶⁰

But there is one important difference between India and the United States. In India, the Constitution expressly authorizes Parliament to provide for a special adjudication process for interstate rivers and, if Parliament so chooses, to prohibit (divest) the Supreme Court from deciding those disputes.⁶¹ The Constitution creates no other exemption to the Supreme Court’s authority to decide cases. Only in the area of interstate water disputes may Parliament intervene and strip the Court of its ability to adjudicate disputes by creating an alternative tribunal. In 1956, only six years after the

⁶⁰ Article 131 of the Constitution.

⁶¹ Article 262 of the Constitution states:

Adjudication of disputes relating to waters of inter-state rivers or valleys.

- (1) Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-state river or river valley.
- (2) Notwithstanding anything in this Constitution, Parliament may by law provide that neither the Supreme Court nor any other court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1).

Constitution went into force, Parliament did just that.

C. The Legal Mechanisms for Resolving Disputes

The year 1956 was important in India's history. Parliament that year passed the States Reorganization Act, which redrew State boundaries to consolidate populations who spoke the same language. With these redrawn boundaries came a host of new problems on interstate rivers. Management of these waterways became more fragmented: new States now had a river in their territory and they had their own issues and solutions they wanted to implement. Consensus became more difficult.

In response, Parliament enacted two companion statutes. The first statute authorized creation of interstate "river boards" to advise and help develop interstate rivers.

The second statute created special tribunals to adjudicate interstate water rights (e.g., in circumstances when the cooperative approach of the river boards does not work or when the States do not want to create a river board in the first place).⁶²

1. The River Boards Act of 1956

The River Boards Act allows States to request that the Central Government create a

⁶² States do not need to try a cooperative approach before seeking to adjudicate water rights. Instead, Parliament created a two-track approach that gives States a choice: one option (the river board) facilitates river-basin planning and long-term collaboration; the other option (the interstate water disputes tribunal) adjudicates the rights of the parties in an adversarial legal process. Both options are voluntary. The States are not under any obligation to create a river board nor are they under an obligation to ask the Central Government to establish an interstate water disputes tribunal.

board to advise the governments on any matter concerning an interstate river and to help prepare “multi-purpose schemes” for regulating or developing these waterways. The list of potential activities is comprehensive: the conservation, control and optimum use of water resources, as well as the promotion and operation of schemes for irrigation, water supply, drainage, hydroelectric power, flood control, navigation, reforestation, soil erosion and pollution.⁶³

Nonetheless, the River Boards Act has remained dormant. No river boards have been created in the last 55 years, a reflection of the high degree of suspicion by States, who fear that the river boards will give the Central Government too much influence over State infrastructure, particularly irrigation canals.⁶⁴

2. The Inter-State Water Disputes Act of 1956

The Inter-State Water Disputes Act allows States to file complaints with the Central Government and request the creation of a special court -- a tribunal -- to adjudicate water disputes.⁶⁵ *If* the Central Government concludes the dispute cannot be settled by negotiations, it creates a Water Disputes Tribunal under the Act.⁶⁶

⁶³ Article 13 of the River Boards Act, 1956.

⁶⁴ In recent years, the Central Government has created a number of boards and commissions to address issues on rivers but those entities are far more limited in authority and scope than the independent basin-wide boards contemplated by the River Boards Act. [See discussion at pp. 29-31 of this paper]

⁶⁵ Section 2c of the Inter-State Water Disputes Act, 1956. The Act defines “water dispute” to mean any dispute or difference between two or more States with respect to “the use, distribution or control of the waters of, or in, any inter-State river or river valley, *or* the interpretation of the terms of any agreement relating to the use, distribution or control of such waters or the implementation of such agreement.”

⁶⁶ *Id.* at section 4(1).

On some rivers, the Central Government tried to broker a negotiated agreement, calling meeting after meeting of State officials to reach an accord. Several years lapsed after the initial State request for a Tribunal. When the Central Government finally concluded the negotiation effort was fruitless, it established an interstate Tribunal.

Under the Act, Tribunal members include a Chairman and two other members, nominated by the Chief Justice of the Supreme Court, who are current judges of the Supreme Court or a High Court.⁶⁷ The Tribunal hires two or more “assessors” who provide a range of scientific, engineering and other technical advice.⁶⁸ The Central Government plays no role in fact-finding. When the Tribunal is finished, it issues a written decision called an “award.”⁶⁹ The typical award is a lengthy document addressing each State’s complaint and the resolution.

⁶⁷ *Id.* at section 4(2).

⁶⁸ *Id.* at section 4(3).

⁶⁹ *Id.* at section 5(2).

Table 3
Interstate Water Disputes Tribunals in India
In Chronological Order

Name of Tribunal:	Start Date:	Final Award:	Time:
Krishna River I	1969	1976	7 years
Narmada River	1969	1979	10
Godavari River	1969	1980	11
Ravi-Beas Rivers	1986	None *	25
Cauvery River	1990	2007	17
Krishna River II	2004	2010	6
Vansadhara River	2010	None	—
Mahadayi River	2010	None	—

** The Ravi Beas Tribunal issued an award in 1987 but it was never implemented. The parties referred certain issues back to the Tribunal, which is where matters remain to this day.*

The Tribunals have typically relied on the principle of equitable apportionment to divide the rivers and settle conflicting State claims. But equitable apportionment -- whether in India or the United States -- is something of a vague concept. The Tribunal must balance the competing factors that go into apportioning the waters, such as population, existing and prior uses, hydrology, the State's contribution to river flow and other variables.

After the Tribunal's decision is released, the States or the Central Government may (after 90 days) request an explanation or clarification.⁷⁰ Until those follow-on issues are resolved, the Central Government will not certify the Tribunal decision and publish the final award. Delays of months or even years are common. When the clarification process is finished, the Central Government publishes the Tribunal's decision in the Official Gazette and its decision then becomes binding -- at least in

⁷⁰ *Id.* at section 5(3).

theory -- on the States.⁷¹

Under a strict reading of the Inter-States Water Disputes Act, a Tribunal's decision is final. The Act clearly seems to prohibit appeals from a Tribunal to the Supreme Court:

Bar of jurisdiction of Supreme Court and other courts.

Notwithstanding anything contained in any other law, neither the Supreme Court nor any other court shall have or exercise jurisdiction in respect of any water dispute which may be referred to a Tribunal under this Act.⁷²

But in practice the Supreme Court has allowed limited appeals to proceed. In 2007, for example, several States filed special petitions in the Supreme Court, seeking to review the 2007 award by an Inter-States Water Disputes Tribunal for the Cauvery River in peninsula India. Four years after receiving the appeal, the Supreme Court has not issued an opinion.

Even more troubling is the attempt at nullification now before the Supreme Court concerning the award of a 1986 Tribunal in the long-standing dispute over water in the Ravi-Beas Rivers in northwest India. The Central Government has yet to publish the final award. In 2004, the State of Punjab passed a law expressly disavowing any responsibilities to the neighboring State of Haryana to supply surplus water from the Ravi-Beas system. Seven years after receiving a "Presidential Reference" for an opinion, the Supreme Court has not issued an opinion.⁷³

⁷¹ *Id.* at section 6(1).

⁷² *Id.* at section 11.

⁷³ The Supreme Court of India may issue advisory opinions when specific questions of law are referred to it by the President. The request is known as a "Presidential Reference."

Adding to this backlog are petitions filed in 2011 by the States of Karnataka and Andhra Pradesh challenging the 2010 *Krishna II* Tribunal decision. [See part VII of this paper for details.]

3. Voluntary Agreements Between the States

States in India may also settle water disputes by signing agreements among themselves. In India, unlike the United States, the Constitution is silent about interstate agreements. They are not expressly authorized or prohibited. But there are several statutes, including the Inter-State Water Disputes Act itself, which by implication assume that the States can -- and will -- sign agreements among themselves to address common problems.

Unfortunately, these agreements are rarely analyzed in academic research. According to the Central Water Commission, there are 125 separate interstate water agreements. Some agreements date back to the time when India was a British colony. Others were executed in the early 1990s. But the Central Water Commission itself has not published interstate water agreements since 1995.⁷⁴

Three examples illustrate the diversity in these interstate water contracts. In southwestern India, water from behind a dam built in 1886 on the Periyar River in the

⁷⁴ Central Water Commission, *Legal Instruments of Rivers in India*, Vol. III, available at www.cwc.nic.in/main/webpages/publications.html.

State of Kerala (formerly the Maharaja of Travancore) is diverted into canals and moved to the State of Tamil Nadu, pursuant to the terms of a 999-year lease agreement.⁷⁵ In northwest India, the Gang Canal, one of the oldest irrigation systems in the State of Rajasthan, diverts water from the Sutlej River in what is now the State of Punjab, pursuant to a contract signed in 1920.⁷⁶ An agreement in 1994 created the Upper Yamuna River Board to manage part of the Yamuna River north of Delhi.⁷⁷

4. The Central Government's Boards, Commissions and Authorities

A final way to resolve interstate disputes is for the Central Government to create its own board, commission or authority composed of Central Government and State officials to manage certain aspects of an interstate river. These entities are typically not created by contract but by special legislation or a memorandum of understanding.

⁷⁵ *Id.* at pp. 389-392.

⁷⁶ *Id.* at pp. 8-14.

⁷⁷ *Id.* at pp. 166-168.

Table 4
River Boards, Commissions and Authorities
Created by the Central Government (In Chronological Order)

Name of Board:	Date Created:
Tungabhadra Board	1953
Bhakra-Beas Management Board	1966
Ganga Flood Control Commission	1972
Betwa River Board	1976
Bansagar Control Board	1976
Brahmaputra Board	1980
Narmada Control Authority *	1980
Upper Yamuna River Board	1994
Krishna River Implementation Board *	2010

** Indicates a board created to implement an award of an interstate water dispute Tribunal.*

The boards, commissions and authorities rely on the Central Government to play a dominant role and are under its control. They are not the “river boards” contemplated by the River Boards Act of 1956, which anticipated that the States would form interstate boards with minimal oversight by the Central Government.

Some boards, like the Tungabhadra and Bansagar, manage a single hydroelectric and irrigation diversion project. Others, such as the Ganga Flood Control Commission, provide advice. The Brahmaputra Board covers seven States in northeast India that lie within the Brahmaputra River watershed (shared with Bangladesh) but it has no power to allocate water among the seven States in India. Rather, its duties include the preparation of a master plan for India’s share of Brahmaputra waters. The Upper Yamuna River Board allocates waters and provides coordinated management on the

Yamuna River between its source in the Himalayan Mountains and Okhala Barrage near Delhi, a distance of approximately 350 kilometers (213 miles).⁷⁸

VII. CASE STUDY IN INDIA: THE KRISHNA RIVER

The Krishna River begins in the Western Ghats, a mountain range that runs north-south along the western coast of India.⁷⁹ From its source the Krishna River flows east for 1,392 km (870 miles) before emptying into the Bay of Bengal. The river drains parts of three States: Maharashtra (where the river begins); Karnataka (the middle riparian) and Andhra Pradesh (the furthest downstream). The Krishna River basin is home to 74 million people. Parts of the basin are heavily industrialized with hundreds of factories.

Except for the upstream area in the Western Ghats, the Krishna basin is largely arid and receives approximately 90% of its annual rainfall during the six-month monsoon season (May to October). The first irrigation projects in the basin were built in 1855, when India was part of the British Empire.

As the basin population grew, the States signed water allocation agreements with each other, first in 1892 and again in 1933, 1944 and 1946.⁸⁰ In 1951, three of the States

⁷⁸ The Upper Yamuna River drains parts of five States (Himachal Pradesh, Uttar Pradesh, Uttarakhand, Haryana and Rajasthan) as well as Delhi. See the Board's website, <http://uyrb.gov.in>.

⁷⁹ The Western Ghats, also known as the Sahyadri Mountains, run 1,600 kilometers (976 miles) along the western coast of India.

⁸⁰ *Krishna II* Tribunal Report (2010) at p.16.

(then known as Bombay, Hyderabad and Madras) signed a new water allocation agreement. But the fourth State, Mysore (now Karnataka), refused to ratify the agreement, and the interstate disputes lingered.

Two pieces of legislation -- the 1953 statute creating a new State of Andhra Pradesh and the 1956 States Reorganization Act -- changed important boundaries in the Krishna River basin and consolidated a number of States. But disagreements over water continued.

Then, in 1969, in response to a petition from three States, the Central Government invoked the Inter-State Water Disputes Act and created the Krishna Water Disputes Tribunal, the first time the government had established a tribunal under the legislation.⁸¹ Four years later, the Krishna Tribunal issued its award. Additional requests from the States for clarification forced the Tribunal to reexamine certain assumptions and decisions.

As a result, it was not until 1976 that the Tribunal published its final award, which contained the following conclusions:⁸²

⁸¹ Two States, Madhya Pradesh and Orissa, were parties to the original 1969 dispute but withdrew their claims in 1971. The three remaining States -- Maharashtra, Karnataka and Andhra Pradesh -- continued their dispute.

⁸² The Tribunal is also known as the “Bachawat Tribunal” after retired Supreme Court Justice R.S. Bachawat, who served as its chairman.

- The Tribunal did not evaluate the adequacy of groundwater supplies. Each State was free to make use of underground water within its respective territory.⁸³
- The Tribunal found that the 1951 agreement, signed by three of the four basin States, was not valid. Furthermore, the Tribunal's order superseded previous agreements signed by the States (or their predecessors) in 1892, 1933, 1944 and 1946.⁸⁴
- The Tribunal evaluated two alternative solutions, which it called "Scheme A" and "Scheme B."
- Scheme A was based on an apportionment based on the annual availability of 2,060 TMC (thousand million cubic feet)(or 47.3 MAF) of water in the basin.⁸⁵
- The Tribunal allocated this water to the States of Andhra Pradesh, Karnataka and Maharashtra. The Tribunal used the principle of equitable apportionment to give Andhra Pradesh 39% of the annual flow; Karnataka, 34%; and Maharashtra, 27%.
- Those allocations were a fraction of what each State wanted. The Tribunal noted that the States' collective demands for water totaled 4,147 TMC (95.2 MAF), twice the available amount of water in the river.⁸⁶
- The Tribunal based Scheme A on what it called "75% dependability," meaning the river would provide the necessary flows 75% of the time, or three out of every four years. Thus, even the annual allocation of 2,060 TMC was not

⁸³ *Krishna I* Tribunal Order (1976), Clause II.

⁸⁴ *Id.*, Clause XI.

⁸⁵ *Id.*, Clause III.

⁸⁶ See discussion in *Krishna I* Tribunal Report (1973) at pp. 4-5.

assured in times of drought. What would happen during periods of shortage (one out of every four years)? The Tribunal did not explain.

- The Tribunal allocated the surplus (the amount of available water *above* 2,060 TMC) to the State of Andhra Pradesh but it did not acquire a permanent (vested) right to those waters.⁸⁷
- The Tribunal's second alternative, Scheme B, contemplated the creation of a Krishna Valley Authority, a basin-wide government entity, to allocate water and manage the river, including surplus flows. Two upstream States, Maharashtra and Karnataka, endorsed this alternative. The State of Andhra Pradesh did not. The Tribunal said the Authority could come into existence only if Andhra Pradesh changed its mind and supported the alternative *or* if Parliament created the Authority.
- Because the three States did not collectively agree to create a Krishna Valley Authority (and because Parliament had not acted), the Tribunal did not adopt Scheme B.⁸⁸ Instead, the Tribunal endorsed Scheme A and its allocations.
- The Tribunal allowed the States to re-open the water allocations after May 31, 2000.⁸⁹

⁸⁷ *Krishna I* Tribunal Order (1976), Clause V.

⁸⁸ The State of Karnataka sought to compel the Central Government to create the Authority and filed suit in the Supreme Court. It argued, among other things, that the State of Andhra Pradesh was not entitled to surplus waters if Scheme B was not implemented. The Supreme Court rejected those claims. *State of Andhra Pradesh v. State of Karnataka & ORS* (25 April 2000), available at www.indiankanoon.org/doc/953049.

⁸⁹ *Krishna I* Tribunal Order (1976), Clause XIV. Commentators found this provision to be self-defeating. "This single clause has made this [the Tribunal's] report incapable of giving lasting peace and harmony between the sharing States." S.K. Garg, *International and Interstate River Water Disputes & Interlinking of Rivers* (Khanna Publishers 1999) at p. 37.

After the final Tribunal award was published, the States began building new dams on their share of the river, all but guaranteeing that a new Tribunal would have to grapple with the next generation of water problems.⁹⁰

The next round of adjudication began in 2004 with the formation of a second Krishna River Tribunal. Its 800-page decision, announced six years later in 2010, concluded that the Krishna River held more water than previously thought.

As a result, the *Krishna II* Tribunal *increased* the amount of annual allocable water to 2,578 TMC (approximately 59 MAF).⁹¹ But the Tribunal made those additional allocations *less* dependable than the base allocations in 1976. The Tribunal calculated the amount of additional flows based on 65% dependability, not 75%, as it had done for the base allocations.

The additional flows are therefore likely to occur only two out of three years.⁹² The

⁹⁰ The State of Andhra Pradesh, for example, built Srisailem Dam in 1984. The State of Karnataka completed Almatti Dam in 1999.

⁹¹ See *Krishna II* Tribunal Order (2010) at pp. 802-804. The Tribunal did not allocate surplus waters only to the State of Andhra Pradesh, as the 1976 Tribunal had done. Instead, it divided the water evenly between the three States. Clauses VI and VII. In the case of Andhra Pradesh, for example, the Tribunal began with the 1976 award of 811 TMC and added Andhra Pradesh's pro rata share of additional water at 65% dependability *and* its share of surplus flows *and* its share of minimum flows for a total supplemental allocation. Andhra Pradesh's annual allocation of water therefore increased from 811 to 1,001 TMC (23 MAF). Clause VIII. The Tribunal used the same approach (methodology) for the two other States.

⁹² The Tribunal permitted the State of Karnataka to raise the height of Almatti Dam by 4.7 meters (approximately 15.4 feet), despite objections of Andhra Pradesh, the

Tribunal, like its predecessor, did not explain what happens when there is not enough water in the river to satisfy demands in drought (e.g., less than average water conditions). It did not adequately address shortages. The Tribunal called for the creation of a Krishna Water Decision Implementation Board to administer its findings.⁹³ The Tribunal said the States could re-open the Tribunal's order after May 31, 2050.⁹⁴ Meanwhile, two of the States, Karnataka and Andhra Pradesh, have filed petitions in the Supreme Court, challenging the award.⁹⁵

VIII. CASE STUDY IN THE UNITED STATES: THE POTOMAC RIVER

The Potomac River runs through Washington, D.C., and supplies most of the drinking water to six million people.⁹⁶ The river is only 628 kilometers (383 miles) long but it drains parts of four States -- Maryland, Pennsylvania, Virginia and West Virginia, along with the District of Columbia itself. Most of the basin is forested. The river empties into Chesapeake Bay on the Atlantic Ocean. There is little heavy industry in the basin.

Unlike many areas of the American West, which were first settled by Europeans only in the mid-1800s, the eastern coast of the United States was home to British

downstream State.

⁹³ *Krishna II* Tribunal Order (2010), Clauses XIV and XVIII. See, also, Appendix-I.

⁹⁴ *Id.*, Clause XVI.

⁹⁵ *The Hindu*, "A.P. moves Supreme Court against Krishna Tribunal award," March 29, 2011.

⁹⁶ The U.S. Constitution allows for the creation of a special district to serve as the national capital. Article 1, § 8, cl. 17. Washington in the District of Columbia ("D.C.") was created in 1790 and is not part of any U.S. State.

settlements dating back to the 1600s. King James I gave the first land charter in the Potomac River Basin to the London Company in 1609. The grant was followed by competing charters granted by kings.

As the population grew, Congress authorized the U.S. Army Corps of Engineers in 1859 to build an aqueduct for the city. Then, in 1940, faced with pollution (i.e., untreated sewage) problems, Congress consented to the creation of the Interstate Commission on the Potomac River Basin (“ICPRB”) to help the States and the federal government to protect and conserve water and land resources. The ICPRB consisted of a member from the four States, the District of Columbia and the federal government.⁹⁷

By the late 1960s, Congress and the basin States became concerned about a new problem: pending water shortages. In response, the parties to the 1940 compact agreed in 1970 to expand the ICPRB’s authority to collect data on water consumption and to establish a cooperative organization to coordinate water withdrawals during drought conditions.⁹⁸ The ICPRB, however, had no regulatory authority (nor does it have regulatory power now).

The impetus for these expanded duties came from demographic changes in the basin: the population growth occurred in the suburbs, outside of the District of Columbia itself. The responsibility for water supply therefore fell primarily to two water

⁹⁷ 54 Stat. 748, 33 U.S.C. §567(b). For the commission website, see www.potomacriver.org.

⁹⁸ 33 U.S.C. § 567(b)-1, Pub. L. No. 91-407, 84 Stat. 856 (Amended Compact).

agencies, the Washington Suburban Sanitary Commission in the State of Maryland, and the Fairfax County Water Authority in the State of Virginia.

In 1978, the entities in the basin (along with the Washington Aqueduct Division of the Army Corps of Engineer) agreed to a cooperative agreement that addressed over-use and drought. The agreement was followed by a 1982 water supply coordination agreement which, among other things, allows the water agencies to purchase storage rights at Jennings Randolph Dam, an Army Corps dam in West Virginia, and to coordinate the flow of water in times of drought from four other dams, as if they were all operated by a single entity.⁹⁹

Legal ownership remains in the hands of the entities that built the dams (e.g., Jennings Randolph Dam remains under Army Corps ownership). But a number of flexible contracts allow for a collaborative approach to river management. In some of the transactions, money changes hand: one government entity buys “watershed services” from another entity. The Army Corps and the two water agencies (Washington Sanitation and Fairfax County), for example, pay a certain part of the operation and maintenance costs at a State of Maryland dam in exchange for rights to demand the release of water in drought.

The ICPRB’s work is notable for two reasons. First, the ICPRB is one of three working interstate commissions (along with the Delaware and Susquehanna) that attempts to resolve conflicts on rivers that cross State boundaries. Second, the

⁹⁹ The vehicle for these contractual arrangements is a section of the ICPRB called the Cooperative Water Supply Operations on the Potomac (“CO-OP”).

ICPRB's ability to enforce or implement a decision is limited – it must rely on negotiation and facilitation.

The Delaware River Basin Commission, in contrast, has more legal authority. It was created in 1961 and consists of the States of New York, New Jersey, Pennsylvania and Delaware. The federal government is a signatory and has its own representatives on the Commission.¹⁰⁰ At the time of its creation, 43 State agencies, 14 interstate agencies and 19 federal agencies exercised fractured control over the river. Major cities in the basin include Philadelphia, Pennsylvania; Trenton and Camden, New Jersey; and Wilmington, Delaware. Eight million people live in the basin. There are many industries, port facilities and power plants along the river.

Prior to creation of the Delaware River Basin Commission, litigation over withdrawals in the basin had gone to the U.S. Supreme Court. In 1929, the State of New Jersey sought to prevent the State of New York from diverting water in the upstream basin to supply New York City. The Supreme Court's opinion in 1931 allowed for limited diversions but required the State of New York to maintain specified downstream flows. "A river is more than an amenity, it is a treasure," the Court said in words now quoted in other judicial decisions around the world (including by the Supreme Court in India). A river "offers a necessity of life that must be rationed among those who have power over it."¹⁰¹

¹⁰⁰ Pub. L. No 87-328, 75 Stat. 688. The website for the Delaware River Basin Commission is www.state.nj.us/drbc.

¹⁰¹ *New Jersey v. New York*, 283 U.S. 336, 342 (1931). In 1954, the U.S. Supreme Court issued an amended decree allowing greater diversions, *New Jersey v. New York*, 347 U.S. 995 (1954).

The Delaware River Basin Commission can plan for the basin, allocate water, build new reservoirs, prevent floods and control pollution. The Commission has not exercised all of its legal authority – for example, it has not allocated water – but it remains one of the best examples of regional river cooperation in the United States.

The same is true for the Susquehanna River Basin Commission, created in 1970 to primarily address diversions outside of the river basin.¹⁰² The States in the basin include New York, Pennsylvania and Maryland. The federal government is also a signatory to the compact and has a seat on the commission. Water from the Susquehanna River supplies approximately 5.5 million people.

IX. AN ALTERNATIVE TO LITIGATION: COOPERATIVE AGREEMENTS ON SHORTAGES

Adjudication -- the process of going to court -- offers only a limited solution to the complex problems of interstate river management in any country. Courts are generally not well-equipped to resolve convoluted problems of hydrology, economics, engineering and law. Litigation takes too long and is too expensive.

As a result, there is no easy “legal fix” in India or the United States that allows for the speedy and fair division of water from an interstate river, particularly a river that crosses multiple State boundaries and that is already used for multiple purposes (e.g.,

¹⁰² Pub. L. No. 91-575, 84 Stat. 1509. The website for the Susquehanna River Basin Commission is www.srb.com.

irrigation, power generation, navigation, etc.).¹⁰³

The better approach is to rely on a system of cooperative mechanisms that allows States to manage a river as if the infrastructure were owned by a single entity. Among the most promising of these tools are transactions called “payments for watershed services,” where one State pays another for enhanced flood control protection or where one utility leases upstream reservoir storage in case of drought, or where one State “banks” (stores) water with another State to use later.¹⁰⁴ Those types of transactions are in their infancy in the United States but are infrequently analyzed in India.

On the Colorado River, for example, the States in the Lower Basin have adopted innovative interstate water banking arrangements. These transactions allow States to store water in another State. The State (or local agency) that wants to “bank” the water pays the other State (or local agency) a fee. This is a financial as well as an operational arrangement. The transactions occur pursuant to federal regulations

¹⁰³ Some veteran lawyers and observers in India have proposed legal reforms to expedite the interstate water disputes process. See, for example, Fali S. Nariman’s essay, *Inter-State Water Disputes: A Nightmare!* in Ramaswamy R. Iyer (ed.), *Water and the Laws in India* (Sage Publications 2009) at pp. 32-57. Nariman concludes that interstate water disputes tribunals do not work efficiently and that Parliament should allow States to go directly to the Supreme Court. But the delays in obtaining decisions from the Supreme Court suggest this approach comes with its own problems and obstacles.

¹⁰⁴ “Payments for watershed services” are defined broadly to mean any voluntary transaction between two or more parties for a service or benefit in a river basin. Sometimes, they involve environmental benefits, such as payments by a downstream landowner to an upstream landowner to reduce logging by a river or to protect biodiversity. Other transactions involve agreements between water agencies or utilities to improve system efficiency or other benefits (e.g., sharing the cost of a reservoir, etc.).

allowing States to use store their “unused apportionment” of water.¹⁰⁵ Based on the adoption of those regulations in 1999, the Southern Nevada Water Authority signed water banking agreements with the Arizona Water Banking Authority and the Metropolitan Water District of Southern California.¹⁰⁶

The Lower Basin of the Colorado River is also home to one of the best examples of cooperative investments in infrastructure improvements. The All-American Canal, built pursuant to the Boulder Canyon Project Act of 1928, was unlined for years. It lost large amount of water from leaks and seepage. The canal, which runs east-west near the U.S.-Mexico border, delivers water from the Colorado River to irrigation districts in southern California.

In 2003, various parties (both federal and State) agreed to line the canal (or build new concrete-lined canals parallel to the old canal) and share the saved water. The San Diego County Water Authority helped pay for those efforts and, in return, received a portion of the water previously lost from leaks.¹⁰⁷

Those types of mechanisms are rarely used on interstate waters in India; there is little public discussion of the merits that these mechanisms might offer for India’s interstate water stalemate. The 2002 National Water Policy of India, for example, calls for improved water resources planning but makes no mention of payments for watershed services or flexible cooperative agreements. The 2011 National Water Mission

¹⁰⁵ 43 C.F.R. § 414.

¹⁰⁶ See the Arizona Water Banking Authority’s website, www.azwaterbank.gov.

¹⁰⁷ See the San Diego County Water Authority’s website, www.sdcwa.org/history.

endorsed basin-wide river planning but did not analyze the potential benefits of collaborative mechanisms to more efficiently manage interstate rivers.

Yet the cooperative transactions from the United States illustrate the potential for resolving interstate water disputes without litigation. The transactions above were not imposed by a court or by Congress, though they often occur in river basins, like the Colorado, that have seen decades of litigation. In some case, the transactions were authorized or encouraged by the federal government, but the arrangements themselves represented an imaginative and collaborative approach between the States and other entities, not an edict from Washington, D.C.

X. COMPARATIVE EVALUATION AND CONCLUSION

History provides painful reminders of how fragile the civil peace is during disputes over water and how easy it is for politicians (in India, the United States or elsewhere) to posture over perceived grievances.

In 1934, the State of Arizona was embroiled in a dispute with the federal government over the Colorado River. The federal government wanted to build Parker Dam across the river between the States of California and Arizona, and to allow the diversion of large amount water to Southern California for irrigation. Congress had not approved the project. In Arizona, opposition to Parker Dam was fierce. Arizona feared California would grab the available water and leave Arizona as a poor, desolate State. Arizona Governor B.B. Moeur ordered State troops to arm themselves and block construction of the dam on the Arizona side of the river. At the last minute, the State

troops (pejoratively called the “Arizona Navy”) were recalled when federal officials agreed to temporarily halt construction.

In the end, the battle over Parker Dam went to court, where Arizona prevailed. The U.S. Supreme Court held that the federal government could not build a dam across an interstate river without consent from Congress.¹⁰⁸ In response, Congress authorized Parker Dam but it also approved construction of the federal Gila River irrigation project in central Arizona. Both States got what they wanted. California obtained water from Parker Dam. Arizona obtained water from the Gila River.

Twenty years later, in the mid-1950s, the United States and Canada engaged in posturing over dams on the Columbia River. There was no Navy and no threatened use of force, but tensions between the two countries ran high.

The conflict was precipitated by U.S. attempts to build Libby Dam, a huge hydroelectric project, on the Kootenai River in the State of Montana.¹⁰⁹ The river begins in Canada, flows into the United States and then crosses the border back into Canada, where it feeds into the Columbia River. The problem was that Libby Dam would back up waters into part of British Columbia, Canada. The United States offered to compensate Canada for the area to be inundated but refused to sell electricity from the dam. In response, Canadian officials threatened to build their own dam that would divert a large part of the flow of the Columbia River before it entered

¹⁰⁸ *United States v. Arizona*, 295 U.S. 174 (1935). The Court held that the River and Harbor Act of 1899, 33 U.S.C. § 401, required specific Congressional approval before the federal government could build Parker Dam.

¹⁰⁹ The river is spelled “Kootenay” in Canada.

into the United States. The conflict threatened to generate into a “if you do this to us, we will do worse to you” dispute.

Canada’s threats proved idle, and two countries ultimately reached an agreement on joint uses of the Columbia River and its tributaries. The Columbia River is now managed for flood control and power generation as if it were under the control of a single entity, as if borders do not matter.

India has a good reason to pursue similar non-litigation alternatives. The jurisdictional conflicts between the Inter-States Water Disputes Tribunal and the Supreme Court add years of delay and make the process of equitable apportionment an opaque exercise. Several States in India have now attempted to have the Supreme Court rule on issues that are directly related to river management, despite the language in the Inter-State Water Disputes Act that appears to divest the Supreme Court of such jurisdiction. Furthermore, the Supreme Court has taken years to decide these cases.

Ironically, States in India can -- at least on paper -- reach agreement between themselves easier than States in the United States, where a water apportionment agreement requires Congressional consent. In India, no such consent is required. Furthermore, States in India can, if they wish, request that the Central Government constitute a river board to engage in comprehensive basin-wide planning. They have not done so. As a result, many of the interstate agreements in India are old or they address operations at a single dam or project. They lack the innovative terms, for example, found in interstate water banking agreements on the lower Colorado River or the drought management agreements on the Potomac River.

So perhaps it is time for India to reconsider other options, to survey the cooperative agreements elsewhere (including but not limited to the United States) and to assess whether similar agreements could facilitate the resolution of water disputes in India. Several rivers in India may offer good opportunities. The Central Government in India established two Tribunals in 2010, one for the Vansadhara River (in a dispute between the States of Orissa and Andhra Pradesh), the other for the Mahadayi River (in a dispute between the States of Goa, Karnataka and Maharashtra).¹¹⁰ Those States may not have staked out entrenched legal positions, as is the situation on other long-litigated rivers, and they may be more inclined to mediate their disagreements. Other interstate rivers, now the focus of basin-wide planning efforts, may offer additional opportunities for analyzing (and eventually enacting) collaborative management agreements.¹¹¹

Cooperative agreements elsewhere, like those adopted in the Potomac River in the United States, may hold promise for those rivers. Others may not. There is no “one-size fits all” arrangement. What is clear is that India needs to find an alternative mechanism for resolving interstate water disputes. Prolonged litigation before a Tribunal created under the Inter-State Water Disputes Act of 1956, or before the Supreme Court, is not likely to work. The experience in both India and the United States shows that litigating equitable apportionment is a long, contentious and unpredictable affair. Bilateral or multilateral negotiations between States are the

¹¹⁰ For a summary of the interstate river disputes, see the Ministry of Water Resources website, www.wrmin.nic.in.

¹¹¹ The Australian government, for example, is funding an integrated water resource planning effort on the Mahanadi River in India in cooperation with technical institutes in India and the Monash (Australia) Sustainability Institute. The Asian Development is funding similar planning efforts on other rivers in India.

preferred tool.

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ANNEX

Interstate Water Resources: A Checklist of Key Features of the Legal Systems in India and the United States

<u>Feature</u>	<u>India</u>	<u>U.S.</u>
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Federation of States	Yes	Yes
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Both India and the United States are federations with major interstate rivers that flow between the States and/or that serve as the borders of States. India has 28 States and 7 territories. The United States has 50 States but two (Alaska and Hawaii) are not contiguous with the rest of the country. The States have significant legal powers over water resource issues in both countries.

The Constitution	Yes	Yes
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The U.S. Constitution went into effect in 1789. The Indian Constitution went into effect in 1950. The U.S. Constitution does not address water resources, though it gives Congress the authority to legislate over interstate commerce, a field that includes navigation and, by implication, interstate river management. The Indian Constitution expressly states that interstate water issues are the exclusive concern of the central (federal) government, *if* Parliament chooses to legislate in this area. The remaining issues (e.g., irrigation) are vested with the States.

Supreme Court	Yes	Yes
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The U.S. Supreme Court has original jurisdiction to hear disputes between two or more States. The same general principle is true in India except that the Constitution expressly allows Parliament to divest the Supreme Court of hearing interstate water disputes by creating an alternative tribunal. Parliament did so in the 1956 Inter-state Water Disputes Act. Although the Act would seem to preclude States from suing each other in the Supreme Court over interstate water disputes, several petitions are now pending in the Court.

Common Law**Yes****Yes**

Courts in India and the United States rely on the common law, a tradition that reflects their British legal heritage. The common law consists of principles and rules developed by courts, as opposed to the statutes or rules enacted by legislatures. The U.S. Supreme Court and the water disputes tribunals in India both use the common law doctrine of “equitable apportionment” (i.e., a fair division of the waters) to settle interstate river disputes.

Contracts Between States**Yes****Yes**

States in both India and the United States can sign contracts (compacts) with each other to apportion (divide) waters or address common river management problems. Consent by Parliament is not required in India. Consent by Congress, however, is required in the United States.

Federal Statutes on Water Disputes**Yes****No**

In 1956, the Parliament of India enacted the Inter-state Water Disputes Act, which created an alternative tribunal system to resolve interstate water disputes. There is no such law in the United States. In 1956, the Parliament of India also enacted the River Boards Act, which authorized creation of interstate river boards to plan for and cooperatively address interstate water conflicts. No river boards have been established under the Act. There is no such law in the United States, though Congress has on occasion consented to compacts that create interstate river commissions (e.g., for the Delaware, Potomac and Susquehanna Rivers).

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