



Summer 2025

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Recommended Citation

Eric Kuhn, Katherine H. Tara & John Fleck, *Unfinished Business: Twenty-First Century Questions Posed by Ambiguities in the Upper Colorado River Basin Compact and the Law of the River*, 55 N.M. L. Rev. 417 (2025).

Available at: <https://digitalrepository.unm.edu/nmlr/vol55/iss2/5>

UNFINISHED BUSINESS: TWENTY-FIRST CENTURY QUESTIONS POSED BY AMBIGUITIES IN THE UPPER COLORADO RIVER BASIN COMPACT AND THE LAW OF THE RIVER

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ABSTRACT

The Law of the River, particularly those components relating to Upper Colorado River water allocation, usage, and measurement, is rife with ambiguities and uncertainties. In the twenty-first century, facing a future with less water, these ambiguities pose serious problems. The ongoing process for the development of the Post-2026 Colorado River Operating Guidelines presents an ideal opportunity to address these issues. This Article gives a brief history of the Law of the River, with an eye toward the origins of the stream depletion theory, beneficial consumptive use, and tribal water allocations. The authors then explore potential approaches to addressing the challenges posed by these three areas. The Article concludes by urging water leaders in the Upper Colorado River Basin to consider these solutions in their development of Post-2026 Guidelines.

INTRODUCTION

Today, the Colorado River Basin is a river in crisis. Since 2000, consumptive uses have exceeded the available supply by about 1.5 million acre-feet (maf) per year.¹ Water storage in the nation's two largest reservoirs, Lake Mead and Lake Powell, has plummeted to dangerously low levels.² The basic solution is

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1. The authors estimate this figure based on the reduction of total storage in Lakes Mead and Powell from October 1, 1999, to October 1, 2023. See Eric Kuhn, Katherine H. Tara & John Fleck, *A Horse Named "Stream Depletion Theory": The History and Negotiation of the Upper Colorado River Basin Compact*, 65 NAT. RES. J. 69, 121 n.513 (2025).

2. See *Reservoir Data*, U.S. BUREAU OF RECLAMATION, https://www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html [<https://perma.cc/23J2-RSLL>] (the specific data for Lake Powell and Lake

obvious. Water consumption in the Basin must be reduced to match the available supply. Yet as of the writing of this Article, negotiations among the Basins' stakeholders to solve this core problem are at a stalemate.

The "Law of the River" is the corpus of legislation, regulation, litigation, and administration that governs the use of Colorado River water, beginning with the 1922 Colorado River Compact.³ The Law of the River attempts to allocate the use of Colorado River water among the seven states of the Colorado River Basin—Arizona, California, Colorado, New Mexico, Nevada, Utah, and Wyoming—as well as the country of Mexico. In addition to the 1922 Compact, this body of law includes the 1908 *Winters* Doctrine (the legal foundation for tribal water allocation policies),⁴ the 1928 Boulder Canyon Project Act,⁵ the 1944 treaty with Mexico,⁶ the 1948 Upper Colorado River Basin Compact (Upper Basin Compact),⁷ the 1956 Colorado River Storage Project Act,⁸ *Arizona v. California*,⁹ and the 1968 Colorado River Basin Project Act.¹⁰ Additionally, the seven Basin states, the federal government, and Mexico have developed a modern host of policies on governing the river system now stressed by overuse and drought, such as the 2019 Drought Contingency Plans¹¹ and Minutes to the 1944 Treaty with Mexico.¹²

In creating the 1922 Colorado River Compact, its negotiators were attempting something novel—the creation of an institutional arrangement for the management of a river at the scale of a hydrologic river basin spanning a large

Mead can be found by clicking on each in the interactive map). From Oct. 1, 1999, through Sep. 30, 2022 (23 water years), the combined active storage of Lake Mead and Lake Powell dropped from 47.6 maf to 12.8 maf. *Id.* (click each lake; click "Storage"; select 2000 and 2022; and add the storage levels on the appropriate dates).

3. Colorado River Compact, Nov. 24, 1922, 42 Stat. 171; *see also* 43 U.S.C. § 617l (establishing the Colorado River Compact as controlling law). The Colorado River Compact is also commonly referred to as the "1922 Colorado River Compact" or the "1922 Compact."

4. *See generally* *Winters v. United States*, 207 U.S. 564 (1908).

5. Boulder Canyon Project Act, Pub. L. No. 70-642, 45 Stat. 1057 (codified as amended and supplemented at 43 U.S.C. §§ 617–617v).

6. Treaty Between the United States of America and Mexico Respecting Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, Mex.-U.S., Feb. 3, 1944, 59 Stat. 1219 [hereinafter Treaty Respecting Utilization of Waters].

7. Upper Colorado River Basin Compact, Oct. 11, 1948, 63 Stat. 31 [hereinafter Upper Basin Compact].

8. Colorado River Storage Project Act, Pub. L. No. 84-485, 70 Stat. 105 (1956) (codified as amended at 43 U.S.C. § 620).

9. 373 U.S. 546 (1963).

10. Colorado River Basin Project Act, Pub. L. No. 90-537, 82 Stat. 885 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556).

11. *See* Colorado River Drought Contingency Plan Authorization Act, Pub. L. No. 116-14, 133 Stat. 850 (2019). The Drought Contingency Plans (DCPs) were designed to reduce consumptive uses and thus arrest the decline of reservoir storage. *See Drought Contingency Plans*, U.S. BUREAU OF RECLAMATION, <https://www.usbr.gov/ColoradoRiverBasin/dcp/index.html> [https://perma.cc/74KT-N3NR] (describing Upper and Lower Basin DCPs).

12. "Minutes" are used to interpret and implement the 1944 U.S. and Mexico Treaty. *See* Treaty Respecting Utilization of Waters, *supra* note 6 (requiring Treaty Commission to record its decisions regarding rules, regulations, and procedures in "Minutes"). For a full list of minutes, see INT'L BOUNDARY & WATER COMM., *Minutes Between the United States and Mexican Sections of the IBWC*, <https://www.ibwc.gov/minutes/> [https://perma.cc/J8RJ-X3KG].

portion of the continent.¹³ To understand what follows, one of their most important innovations, for better or worse, was the division of the Colorado River Basin into two sub-basins, based on geography and communities of interest.¹⁴ The more mountainous and rural states of the “Upper Basin”—Wyoming, Colorado, New Mexico, and Utah—were separated by the canyon country of the Colorado Plateau from the more arid, faster-growing “Lower Basin” states of Arizona, Nevada, and California.¹⁵ The negotiators chose a dividing point called Lee Ferry near a remote Mormon crossing.¹⁶

For much of the twentieth century, the Law of the River has mostly operated as it was intended by its many authors. As we contemplate the future management of the Colorado River in the twenty-first century, however, beasts like overuse of the available supply, over-appropriation, and the multitude of climate change-caused flow reductions make the hundred-year-old Law of the River look, well, *old*.

The 1922 Compact only apportions the beneficial consumptive use of the river’s waters between two geographic sub-basins: an Upper Basin above Lee Ferry and a Lower Basin below Lee Ferry.¹⁷ The negotiators left the difficult task of allocating water to the individual states that have land in the two sub-basins. The five states with lands in the Upper Basin completed this task in 1949 with the approval of the Upper Basin Compact.¹⁸ In *A Horse Named “Stream Depletion Theory,”*¹⁹ we chronicle the negotiations of the Upper Basin Compact through its approval in 1949. Like its parent 1922 Compact, the Upper Basin Compact set the stage for the development of the upper river, primarily with federal resources.²⁰ The three states with land in the Lower Basin never completed the equivalent for the Lower Basin. Instead, they turned to the Supreme Court. The Court’s 1963 decision in *Arizona v. California* allocated water on the mainstem of the river below Lee Ferry,²¹ but in our view, fell far short of what the 1922 Compact negotiators intended for a Lower Basin Compact.

The Upper Basin Compact was followed by congressional approval of the Colorado River Storage Project Act in 1956²² and the Colorado River Basin Project Act in 1968.²³ The passage of these two federal laws, and the Supreme Court’s 1963 decision, kickstarted the Basin’s uncertain and turbulent future.²⁴ During the last two

13. See Colorado River Compact, *supra* note 3, art. I.

14. *Id.*

15. See *id.* art. II(f)–(g).

16. See *id.* art. II(e)–(g). Although they are often used interchangeably, there is a subtle difference between Lee’s (or Lees) Ferry, the historic settlement located just upstream of the confluence of the Paria and Colorado Rivers, and Lee Ferry, the compact point, located one mile downstream of said confluence. See generally W. L. RUSHO, *LEE’S FERRY DESERT RIVER CROSSING* (2016).

17. See Colorado River Compact, *supra* note 3, art. I; *id.* art. II(e)–(g).

18. Kuhn et al., *supra* note 1, at 73.

19. *Id.*

20. See *id.*

21. 373 U.S. 546, 567–90 (1963).

22. Pub. L. No. 84-485, 70 Stat. 105 (1956) (codified as amended at 43 U.S.C. § 620).

23. Pub. L. No. 90-537, 82 Stat. 885 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556).

24. See ERIC KUHN & JOHN FLECK, *SCIENCE BE DAMMED: HOW IGNORING INCONVENIENT SCIENCE DRAINED THE COLORADO RIVER* 193–201 (2019).

decades of the twentieth century, the slow pace of building the Central Arizona Project and abundant river flows masked the Basin's problems, but this ended abruptly in 2000 with the advent of what is referred to as the "Millennium Drought."²⁵

Since 2000, the natural flow at Lee Ferry, the Colorado River's most used "vital sign," has averaged about 12.4 maf per year,²⁶ far less than what the authors of the Law of the River believed available when most of the law was put in place. In this Article, we follow the development of the river, post–Upper Basin Compact, through the lens of the Upper Basin.

This Article aims to review the Law of the River with a focus on the ambiguities within the body of law as it currently functions today. The goal is to draw attention to the uncertainties that plague our modern-day conversations on Colorado River management. We begin with a review of the Law of the River, starting in 1922 with the Colorado River Compact²⁷ and moving on to the Upper Colorado River Basin Compact,²⁸ the Colorado River Storage Project Act,²⁹ *Arizona v. California*,³⁰ the Colorado River Basin Project Act,³¹ and the drought mitigation measures implemented during the Millennium Drought.³² In explaining the history of this governing law, we seek to highlight the creation and perpetuation of ambiguities and systemic injustices. This Article examines how these uncertainties—and, in some cases, regressive policy choices—influence Colorado River governance today.

After reviewing the extant Law of the River, this Article explores three basic foundational problems with the Law of the River, focusing on water development in the Upper Colorado River Basin. First, the 1922 Compact does not include a basin-wide definition for "beneficial consumptive use" (the "commodity" that the 1922 Compact apportions). This lack of a definition means that there is no accepted method for measuring how much compact apportionment each basin is using. Thus, there is no shared understanding of many of the 1922 Compact's key provisions. Second, the 1922 Compact has no shortage provision. Collectively, the 1922 Compact and the 1944 treaty with Mexico apportion a total of 17.5 maf per year on a river system that is producing far less, probably in the range of 13.0–13.5 maf per year.³³ Further, the 1922 Compact requires that the four primary Upper Basin states (the states of the Upper Division) deliver (that is, not deplete) fixed flows at

25. See *id.* at 196–97. The term "Millennium Drought" is commonly used within the Colorado River water community to label the dry period that began around 2000.

26. See *Colorado River Basin Natural Flow and Salt Data*, U.S. BUREAU OF RECLAMATION, <https://www.usbr.gov/lc/region/g4000/NaturalFlow/provisional.html> [<https://perma.cc/2QGJ-75BE>].

27. Colorado River Compact, *supra* note 3.

28. Upper Basin Compact, *supra* note 7.

29. Colorado River Storage Act, Pub. L. No. 84-485, 70 Stat. 105 (1956) (codified as amended at 43 U.S.C. § 620).

30. 373 U.S. 546 (1963).

31. Colorado River Basin Project Act, Pub. L. No. 90-537, 82 Stat. 885 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556).

32. Colorado River Drought Contingency Plan Authorization Act, Pub. L. No. 116-14, 133 Stat. 850 (2019).

33. See *infra* note 71.

Lee Ferry.³⁴ The combination of no shortage provision and fixed flow obligations puts the drying impacts of climate change on the backs of the Upper Division states. And third, Native Americans whose water uses and needs date back to time immemorial were an afterthought for the early development of the Law of the River, receiving a single line in the 1922 Compact.³⁵ The Upper Basin Compact negotiations discussed tribal water needs (with no tribal representatives beyond the Bureau of Indian Affairs present) and ultimately chose to include tribal water rights within the apportionments made to each state.³⁶ The result has been a history of efforts by the Upper Division states to limit tribal water rights and prevent full use of tribal entitlements by inserting provisions in project-authorizing legislation.³⁷ As tribes settle their Colorado River water rights in a basin with decreasing water availability, they continue to contend with this legacy of racism.

The ongoing negotiations to replace the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (2007 Interim Guidelines) present an opportunity to address the foundational problems with the Law of the River. There is little debate that change in how the river is managed is essential to the Basin's future, but the efforts to date have resulted in a stalemate. The outstanding question is how this change will occur. There are two basic options: a negotiated process that involves the Basin's stakeholders, including the tribes, or a conflict process involving litigation. We propose alternative considerations for river management with the goal of resolving the longstanding questions built into the Law of the River. It is our hope that these solutions, or others like them, will guide water leaders as they consider the next era of the Colorado River. Finally, we propose solutions for the identified issues with the goal of encouraging conversation about these critical pieces of law in the development of the Post-2026 Colorado River Operating Guidelines.

I. BACKGROUND

Political wailing and gnashing of teeth following a poor spring runoff has become an annual tradition in the Colorado River Basin. The classic remedy to these increasingly serious concerns is to point to existing law as a defense for whatever position a particular group is arguing. Presently, these conversations are occurring amid a larger process for developing an update to the 2007 Interim Guidelines.³⁸ This

34. See Colorado River Compact, *supra* note 3, art. III(c)–(d). Although the terms Upper Basin states and States of the Upper Division (or Upper Division states) are often used interchangeably, there is a 1922 Compact difference. The term “Upper Basin states” is not found in the compact. See Colorado River Compact, *supra* note 3. The Colorado River Compact defines the Upper Basin as a geographic area which includes a small amount of land in Arizona. See *id.* art. II(f). The States of the Upper Division, by contrast, include only Colorado, New Mexico, Utah and Wyoming. *Id.* art II(c).

35. See Colorado River Compact, *supra* note 3, art. VII (“Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.”).

36. See Kuhn et al., *supra* note 1, at 92–94, 111.

37. The Indian issues associated with the Upper Basin Compact surfaced during the congressional debate over the authorization of the San Juan–Chama and Navajo Indian Irrigation Projects. See Navajo Indian Irrigation Project, Pub. L. No. 87-483, 76 Stat. 96 (1962). For more information see *infra* note 61.

38. For a history and description of the 2007 Interim Guidelines, see *Operating Under the 2007 Interim Guidelines*, U.S. BUREAU OF RECLAMATION [hereinafter 2007 *Interim Guidelines*],

process involves all seven states in the Colorado River Basin, as well as the Bureau of Reclamation, plus a National Environmental Procedure Act (NEPA)³⁹ analysis. Furthermore, in pursuing the new set of Post-2026 Colorado River Operating rules, major water agencies and state leaders have insisted that the Law of the River—the suite of legal and administrative rules dating to the 1922 Colorado River Compact and including the Upper Basin Compact—should be a fundamental guiding principle of future river management.⁴⁰ “The Post-2026 Operations should reside in a framework consistent with a reasonable interpretation of the Law of the River,” one water manager wrote, to cite one example among many.⁴¹ But a careful review of the history of the Upper Basin Compact shows how tenuous a foundation the Law of the River provides, and how uncertain any attempt at “reasonable interpretation” might be, because of fundamental uncertainties about what the Law actually says.⁴²

When the Upper Basin Compact was signed, it allocated to each of the four Upper Division states a percentage of the Upper Basin’s total water supply: 51.75% to Colorado, 11.25% to New Mexico, 23% to Utah, and 14% to Wyoming.⁴³ But the Upper Basin Compact is silent on the central question: Percentage of what? What is the baseline of total supply against which percentages are to be calculated? At the time the Compact was negotiated, the negotiators were clear: Water use in the Upper Basin was limited by what remained after meeting what they clearly saw as the Colorado River Compact’s delivery requirement that the Upper Basin “not . . . deplete” the flow below a rolling ten-year total of 75 maf at Lee Ferry.⁴⁴ The negotiators intended to apply the percentages only to this remaining, usable water.⁴⁵ Today, because of the impacts of climate change on flows, there is no such agreement and there are claims that the intent of the compact was to provide an equal amount of water for use to each basin. Modern policy discussions are thus unsettled on the *percentage of what?* issue. The percentages allocated to each Upper Basin state are

<https://www.usbr.gov/ColoradoRiverBasin/interimguidelines/index.html>

[<https://perma.cc/8Z3L-BTGB>].

39. For a discussion of the Environmental Impact Statement process for post-2026 operations, see *Colorado River Post 2026 Operations*, U.S. BUREAU OF RECLAMATION, <https://www.usbr.gov/ColoradoRiverBasin/post2026/index.html> [<https://perma.cc/69ZG-P6YA>].

40. Letter from John J. Entsminger, Gen. Manager, S. Nev. Water Auth., Adel Hagekhalil, Gen. Manager, Metro. Water Dist. of S. Cal., & Brenda Burman, Gen. Manager, Cent. Ariz. Water Conservation Dist., to Camille Touton, Comm’r, U.S. Bureau of Reclamation (Aug. 15, 2023), [https://www.azwater.gov/sites/default/files/2023-11/08_15-2023-SNWA-CAP-Metropolitan-Post-2026 ScopingCommentLetter_FINAL.pdf](https://www.azwater.gov/sites/default/files/2023-11/08_15-2023-SNWA-CAP-Metropolitan-Post-2026%20ScopingCommentLetter_FINAL.pdf) [<https://perma.cc/DNX8-UGLT>].

41. Letter from Brenda Burman, Gen. Manager, Cent. Ariz. Water Conservation Dist., to Camille Touton, Comm’r, U.S. Bureau of Reclamation 2 (Aug. 15, 2023), <https://www.riversimulator.org/2025Guidelines/Scoping/FedStateLocalAtoF.pdf> [<https://perma.cc/8CV5-SDB8>] (letter on pp.21–31 of the PDF).

42. See generally Kuhn et al., *supra* note 1.

43. Upper Basin Compact, *supra* note 7, art. III.

44. Colorado River Compact, *supra* note 3, art. III(d); see also CLIFFORD STONE, REPORT AND SUBMISSION BY THE COMMISSIONER FOR COLORADO OF THE UPPER COLORADO RIVER BASIN COMPACT 17 (1948).

45. STONE, *supra* note 44, at 17. The Upper Basin Compact is frequently praised for state-by-state allocations based on percentages (except Arizona), rather than absolute numbers, thus avoiding the mistake in the Colorado River Compact that over-allocated the river’s water. See generally Charles Meyers, *The Colorado River*, 19 STAN. L. REV. 367 (1967).

meaningless without reference to some sort of underlying total amount of water available to be shared among the states.⁴⁶ Not knowing the “what” creates deep uncertainty about the actual volumes of water available to each state.

There is still no consensus on how to measure consumptive use basin-wide. The Upper and Lower Basins use different methods, and Lower Basin tributary use is neither well understood nor easily quantified.⁴⁷ This makes managing the river system challenging. The Upper Division states claim overuse by the Lower Basin based on one measurement method, while using a different method to measure their own uses.⁴⁸ There is valid dispute over these theories and methodologies.

Moreover, the stream depletion theory—the water use measurement method applied in the Upper Basin Compact—is not consistently used in the Upper Basin today.⁴⁹ It is, for example, used to quantify reservoir evaporation on the Upper Basin’s joint-use storage reservoirs like Lake Powell, but not for quantifying irrigation use, which makes up over 60% of the Upper Basin’s total consumptive use.⁵⁰ On the Lower Basin mainstream, the “diversions minus return flows” method is used because it is mandated by Supreme Court decree in *Arizona v. California*.⁵¹ It is not clear how uses on the Lower Basin tributaries, which are included in the compact definition of “Colorado River System,”⁵² are measured.

Accordingly, while the stream depletion theory survives in the Upper Basin Compact, inconsistencies and lack of sufficient measurement mean there is still no consensus on how to quantify consumptive use basin-wide under the Law of the River.⁵³ This remains a source of conflict and uncertainty, and if not corrected or finessed could lead to interstate litigation among the compact states.

Importantly, climate change has altered the river’s hydrology, impacting the Upper Basin most heavily.⁵⁴ Since the 1922 Compact does not include a shortage provision, its leaders have been forced to respond by arguing that the compact’s negotiators’ intention was to equally divide the water available to each basin for use.⁵⁵ Since climate change is causing a decline in natural flows, they argue,⁵⁶ whatever Lee Ferry obligations the Upper Division states have must now be adjusted to reflect the new hydrologic reality. Resolving this issue will require either litigation, negotiated settlement, or collectively agreeing on a modified approach—one that appropriately factors in climate change and maintains the benefits of the 1948 flexible percentage allocations.

46. STONE, *supra* note 44, at 20.

47. Eric Kuhn, *On the Colorado River, There Are No Simple Disputes*, INKSTAIN (Feb. 22, 2024, 16:26 MT), <https://www.inkstain.net/2024/02/on-the-colorado-river-there-are-no-simple-disputes/> [https://perma.cc/42WK-UFXS].

48. *Id.*

49. *Id.*

50. *Id.*

51. 376 U.S. 340, 340 (1964) (decree).

52. Colorado River Compact, *supra* note 3, art. II(b).

53. Kuhn et al., *supra* note 1, at 115.

54. Upper Basin water officials make this case because approximately 90% of the natural flow of the Colorado River originates in the Upper Basin. *See infra* note 71.

55. Rebecca Mitchell, Colo. Comm’r to the Upper Colo. River Comm’n, Speech to the Colorado Water Congress (Aug. 23, 2023).

56. *Id.*

Crucially, while the federal government identified large Native American water needs and legal entitlements before the 1948 Upper Basin Compact was negotiated, tribal communities were excluded from the negotiations.⁵⁷ Instead, despite knowledge that tribal water allocations were legally perfected long before 1922, Indian water use was lumped into state allocations, with each state being responsible for meeting tribal needs from its share of the water.⁵⁸ This gamble set up a potential conflict between the apportionments made by the 1948 Upper Basin Compact⁵⁹ and the protections previously provided to Indian rights under the 1922 Colorado River Compact.⁶⁰

A decade after the Upper Basin Compact was signed, this conflict became real. In response, Upper Basin leaders took steps to limit tribal water rights and prevent full use of tribal entitlements by inserting provisions in project-authorizing legislation.⁶¹ Today, the United States' legacy of discrimination against tribes is evident in the tribal water rights are still being resolved more than 100 years after the *Winters* Doctrine was established.⁶² Furthermore, tribal water rights remain unresolved and limited in some cases by legal and administrative rules aimed at preventing tribes from using their full legal entitlements.⁶³

57. Representatives of the Bureau of Indian Affairs corresponded with the Commission and attended several negotiating meetings. The Official Record of the Upper Colorado River Commission (UCRC) lists all the attendees and their affiliations for all the meetings. As far as the authors can tell, no tribal member attended any of the meetings. See I–III UPPER COLO. RIVER BASIN COMPACT COMM'N, OFFICIAL RECORD (1948) [hereinafter OFFICIAL RECORD],

https://www.varuna.io/LOTR/1948/UCRC_Record_Vol_1.pdf [<https://perma.cc/286S-S56H>];

https://www.varuna.io/LOTR/1948/UCRC_Record_Vol_2.pdf [<https://perma.cc/5XUH-QQDX>];

https://www.varuna.io/LOTR/1948/UCRC_Record_Vol_3.pdf [<https://perma.cc/99A3-9PZZ>].

58. Kuhn et al., *supra* note 1, at 93–94.

59. See Upper Basin Compact, *supra* note 7, art. III (apportionments are made to states under the compact).

60. There are two articles in the Colorado River Compact that, in theory, protect tribal rights: Article VII and Article VIII. See Colorado River Compact, *supra* note 3, art. VII; *id.* art. VIII; see also *infra* Section II.B.

61. The Indian issues associated with the Upper Basin Compact surfaced during the congressional debate over the authorization of the San Juan–Chama and Navajo Indian Irrigation Projects. Navajo Indian Irrigation Project, Pub. L. No. 87-483, 76 Stat. 96 (1962); see also *Navajo Indian Irrigation Project and San Juan-Chama Project: Hearing Before the Subcomm. on Irrigation and Reclamation of the S. Comm. on Interior and Insular Affairs*, 87th Cong. 32 (1961) [hereinafter *Hearing on S. 107*] (statement of S.E. Reynolds, State Eng'r, State of N.M.) (“Section 8 of the draft [eventually becoming Sections 11 and 12] was inserted to give Colorado assurance that all uses from these projects in New Mexico or Arizona will be chargeable to the allocations given New Mexico and Arizona by the Upper Colorado River Basin compact, and that the right to use amounts in excess of those allocations will not be claimed under the Winters doctrine, the ‘reservation theory’ or some other theory of water law.”).

62. See *infra* Sections II.C, F.

63. Kuhn et al., *supra* note 1, at 72; see also Act of June

13, 1962, Pub. L. 87-483, 76 Stat. 96 (1963) (codified as amended at 43 U.S.C. § 620) (giving the Secretary of the Interior control over two component projects of the Colorado River storage project).

II. HISTORY

A. While the 1922 Compact Is the Fundamental Foundation of the Law of the River, It Also Created Many Ambiguities and Unresolved Disputes

The 1922 Colorado River Compact is the “cornerstone” of the foundation of the Law of the River. The remainder of the body of law stands atop that foundation; the other building blocks are all, in theory, subject to its provisions.⁶⁴

The 1922 Compact is a relatively simple and short document. In 1921, Congress authorized a compact commission to negotiate the pact.⁶⁵ It consisted of one commissioner from each state, appointed by its governor, and a representative of the United States appointed by the President.⁶⁶ The commissioners failed in their initial task of apportioning water among the seven basin states. As a compromise they apportioned the beneficial consumptive use of the river’s water between two geographic sub-basins, an Upper Basin and a Lower Basin, while leaving a third “surplus” pool for future apportionment.⁶⁷ The dividing point was defined as “Lee Ferry,” a point on the river one mile downstream of the confluence of the Paria and Colorado Rivers, just below the Utah–Arizona border, immediately adjacent to the Navajo Nation.⁶⁸

The 1922 Compact, while fundamental, has ambiguities and unresolved disputes that create challenges for the current and future management of water use in the Basin. We contend that due to climate change, the compact was negotiated for a river that no longer exists.

At the time the compact was signed, the negotiators clearly believed there was at least 20 million acre-feet (maf) per year of water available⁶⁹—enough that in addition to the 16 maf of beneficial consumptive use apportioned under article III(a) and (b), another five maf of “surplus” water was available for a future treaty with Mexico and for another round of apportionments that could commence after October 1, 1963.⁷⁰ Through the first quarter of the twenty-first century, the estimated natural flow of the river at the international boundary is about 13.5 maf per year.⁷¹ This

64. See, e.g., Boulder Canyon Project Act, 43 U.S.C. § 617(c) (“Also all patents, grants, contracts, concessions, leases, permits, licenses, rights-of-way, or other privileges from the United States or under its authority, necessary or convenient for the use of waters of the Colorado River or its tributaries, or for the generation or transmission of electrical energy generated by means of the waters of said river or its tributaries, whether under this [Act], the Federal Water Power Act, or otherwise, shall be upon the express condition and with the express covenant that the rights of the recipients or holders thereof to waters of the river or its tributaries, for the use of which the same are necessary, convenient, or incidental, and the use of the same shall likewise be subject to and controlled by said Colorado River compact.”).

65. Act of Aug. 19, 1921, ch. 72, 67 Stat. 171.

66. See NORRIS HUNDLEY, JR., *WATER AND THE WEST: THE COLORADO RIVER COMPACT AND THE POLITICS OF WATER IN THE AMERICAN WEST 197–202* (2d ed. 2009).

67. Colorado River Compact, *supra* note 3, arts. I–III; see also Kuhn et al., *supra* note 1.

68. Colorado River Compact, *supra* note 3, art. II(e).

69. KUHN & FLECK, *supra* note 24, ch. 3.

70. Colorado River Compact, *supra* note 3, art. III; see also RAY L. WILBUR & NORTHCUTT ELY, *THE HOOVER DAM DOCUMENTS*, H.R. DOC. NO. 717, at A36 (1948).

71. The estimated natural flow at Lee Ferry for 2000–2024 averaged 12.41 maf/year. *Colorado River Basin Natural Flow and Salt Data*, *supra* note 26 (navigate to dataset which lists maf at Lee Ferry per

belief that the river was a 20 maf per-year resource meant that the negotiators never seriously considered a compact shortage provision.

Thus, the 1922 Compact and climate change have led to a situation on the river where, including the water allocated to Mexico under the 1944 treaty, 17.5 maf of water have been legally allocated on a river with a natural flow of 13.5 maf per year.⁷²

The first five paragraphs of article III contain the compact's hydrologic provisions. Article III(a) states: "There is hereby apportioned from the Colorado River System in perpetuity to the Upper Basin and to the Lower Basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist."⁷³ During the 1922 Compact negotiations, Arizona Commissioner Winfield Norviel did not believe the 7.5 maf apportioned to the Lower Basin was sufficient to meet its future needs, including full use of the Gila River system.⁷⁴ As a last-minute compromise, article III(b) was added.⁷⁵ It reads: "In addition to the apportionment in paragraph (a), the Lower Basin is hereby given the right to increase its beneficial consumptive use of such waters by one million acre-feet per annum."⁷⁶

The commission's decision to handle article III(b) in this manner has resulted in confusion and disputes over its meaning that have not been resolved over a century after the compact was signed.⁷⁷ On today's river, these III(b) uncertainties and disputes loom very large. Using the language of III(a) only, Upper Basin water officials argue that the intent of the 1922 Compact negotiators was that each basin was given an equal amount of water to use.⁷⁸ To make this argument, these officials must either ignore article III(b) or assume the additional one maf applies only to the Lower Basin tributaries.⁷⁹

year). Assuming that the natural flow at Lee Ferry is approximately 92% of the flow at the international boundary, the natural flow at the international boundary would be ~13.5 maf/year.

72. Article III(a) and (b) of the Colorado River Compact apportions a total of 16 maf/year (8.5 maf for the Lower Basin and 7.5 maf for the Upper Basin) plus 1.5 maf/year for Mexico under the 1944 treaty. Colorado River Compact, *supra* note 3, art. III(a)–(b); Treaty Respecting Utilization of Waters, *supra* note 6. If the additional 962,000 acre-feet/year of Hoover Dam "surplus water" contracts the Secretary of the Interior signed with California agencies in the 1930s are included, the total is nearly 18.5 maf/year. See generally RAY L. WILBUR & NORTHCUTT ELY, THE HOOVER DAM DOCUMENTS, H.R. DOC. NO. 717 (1948) (detailing the quantities from the various Hoover Dam contracts of the 1930s).

73. Colorado River Compact, *supra* note 3, art. III(a).

74. KUHN & FLECK, *supra* note 24, at 51.

75. HUNDLEY, *supra* note 66, at 197–202; see also KUHN & FLECK, *supra* note 24, at 51–53.

76. Colorado River Compact, *supra* note 3, art. III(b).

77. Lawrence MacDonnell, *Sources of Controversy in the Law of the Colorado River: An Upper Basin View* 12–15 (June 25, 2021) (working paper) (on file with authors); see also Meyers, *supra* note 45. Numerous other articles have been written about the disputes over the interpretation of article III(b) of the Colorado River Compact. For abridged versions, see HUNDLEY, *supra* note 66, at 291–94; KUHN & FLECK, *supra* note 24, at 158–60.

78. Mitchell, *supra* note 55 ("The Upper and Lower Basins have equal apportionments to the river in perpetuity, established by the 1922 Colorado River Compact. We are not re-negotiating the Compact, and any guidelines for post-2026 operations at Lake Powell and Lake Mead must be rooted in the Compacts and the Treaty with Mexico.").

79. If the article III(b) water is to cover consumptive uses on the Lower Basin tributaries only, then the argument could be that the intent of the 1922 Compact negotiators was to apportion equal amounts of

Article III(c) addresses the obligation of each basin for the delivery of water to Mexico.⁸⁰ In 1922, there was no treaty with Mexico, but the compact commissioners wanted to include a prospective provision to address the potential for a future treaty.⁸¹ When the negotiators were attempting to apportion the use of the entire river, they easily agreed that each basin would be responsible for 50% of a future obligation.⁸² When they changed direction and decided to give each basin a fixed apportionment, leaving a third surplus pool for future apportionment, they agreed that Mexico's water would be met from the surplus pool.⁸³ If the surplus was not sufficient, then the deficiency would be shared equally between the sub-basins.⁸⁴ With five maf of surplus water, it is likely that the compact negotiators believed that a treaty would not affect the water allocated to each basin.⁸⁵ That belief—that there was enough surplus water to meet United States' obligations to Mexico—may already have been in doubt by the 1940s, when the two nations negotiated a treaty allocating 1.5 maf per year of water to Mexico.⁸⁶ But overly optimistic official estimates of the river's flow were sufficient to paper over any formal doubts, and in 1945 the U.S. Senate ratified the treaty.⁸⁷

Written for a 20 maf per year river, article III(c) made sense, but on a 13.5 maf per year river, it creates obvious problems. The Basin states have never agreed on how the article should be interpreted. The Lower Division states argue that there is no surplus, so the states of the Upper Division must deliver 50% of the annual delivery to Mexico annually (normally 1.5 maf per year but possibly less under Treaty Minutes).⁸⁸ The Upper Division states counter that because the Lower Basin is currently overusing its compact apportionment, this overuse must be delivered to Mexico before the Upper Division states have any obligation to Mexico.⁸⁹ A dispute over the interpretation of article III(c) clearly has the potential to be the spark for interstate litigation.

Article III(d) requires the states of the Upper Division to deliver (or “not deplete”) water for the Lower Basin.⁹⁰ It was intended to “equalize” the water available to each basin.⁹¹ The article's specific language is important: “The States of

the waters available on the mainstem exclusive of the Lower Basin tributaries (7.5 maf/year to each). See Colorado River Compact, *supra* note 3, art. III(b).

80. See *id.* art. III(c).

81. HUNDLEY, *supra* note 66, at 203–06.

82. KUHN & FLECK, *supra* note 24, at 49.

83. *Id.* at 119, 122.

84. *Id.* at 62.

85. Of note, it appears from the minutes that there was no discussion of the location of the surplus water. Had they had this discussion, they probably would have recognized that most of the surplus water originated above Lee Ferry. See Kuhn et al., *supra* note 1, at 101 n.293.

86. Treaty Respecting Utilization of Waters, *supra* note 6.

87. KUHN & FLECK, *supra* note 24, at 116–25.

88. W. Patrick Schiffer, Herbert R. Guenther & Thomas G. Carr, *From a Colorado River Compact Challenge to the Next Era of Cooperation among the Seven Basin States*, 49 ARIZ. L. REV. 217, 220–21 (2007).

89. James S. Lochhead, *An Upper Basin Perspective on California's Claims to Water from the Colorado River Part I: The Law of the River*, 4 U. DENV. WATER L. REV. 290, 320 (2001).

90. Colorado River Compact, *supra* note 3, art. III(d).

91. HUNDLEY, *supra* note 66, at 197–99.

the Upper Division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact.”⁹² Today, the focus of the Upper Division states is on the word “cause.”⁹³ If climate change, not man-made depletions, is the primary cause that future ten-year flows might fall below 75 maf every ten years, is that a compact violation?⁹⁴

In addition to the article III paragraphs, three other 1922 Compact provisions are at issue today. The first is the fundamental question of whether the compact covers consumptive uses on the Lower Basin tributaries. Article II(b) appears straightforward—“[t]he term ‘Colorado River System’ means that portion of the Colorado River and its tributaries within the United States of America”—but that did not prevent Arizona from arguing in *Arizona v. California* that the compact does not cover the Lower Basin tributaries.⁹⁵

The other two disputed provisions are related: Article VIII was a compromise provision and the last of the difficult issues the compact negotiators resolved.⁹⁶ It reads: “Present perfected rights to the beneficial use of waters of the Colorado River System are unimpaired by this compact.”⁹⁷

In 1963, the Supreme Court draped operational skin around the bones of that provision. Arizona had sued California in 1952, effectively asking the Supreme Court to sort out conflicting interpretations of the Law of the River.⁹⁸ The Court’s 1963 ruling in the case,⁹⁹ and a series of decrees that followed,¹⁰⁰ created a framework that, while sidestepping the thorniest 1922 Compact interpretation questions by focusing its ruling on a statutory interpretation of the 1928 Boulder Canyon Project Act¹⁰¹ rather than broad Compact interpretations, provided guidance for water managers on the quantification and operational priority of present perfected rights.¹⁰²

92. Colorado River Compact, *supra* note 3, art. III(d).

93. Mitchell, *supra* note 55 (“If flows at Lees Ferry fall below 75 million acre feet over a 10-year period, it would prompt an inquiry into the cause. If the *cause* is something other than our depletions, we have not violated the Compact.” (emphasis added)).

94. See *id.*

95. See Colorado River Compact, *supra* note 3, art. II(b); Opening Brief for Arizona, app. A at 2, *Arizona v. California*, 373 U.S. 546 (1963) (No. 9, Original).

96. KUHN & FLECK, *supra* note 24, at 54–55.

97. Colorado River Compact, *supra* note 3, art. VIII.

98. KUHN & FLECK, *supra* note 24, at 160–68.

99. *Arizona*, 373 U.S. at 551–52 (“As we see this case, the question of each State’s share of the waters of the Colorado and its tributaries turns on the meaning and the scope of the Boulder Canyon Project Act passed by Congress in 1928.”).

100. See, e.g., *Arizona v. California*, 376 U.S. 340 (1964) (decree) (referencing interpretation of the 1928 Boulder Canyon Act throughout).

101. Mitchell, *supra* note 55.

102. Eric Kuhn, *The Risks and Potential Impacts of a Colorado River Compact Curtailment on Colorado River In-Basin and Transmountain Water Rights Within Colorado*, 35 COLO. ENV’T L.J. 275, 289–90 (2024).

Although the 1922 Compact has no shortage provision, the 1964 Supreme Court decree implementing the 1963 *Arizona* decision does.¹⁰³ It directs the Secretary of the Interior to first satisfy the water needs of present perfected rights holders in the Lower Basin states, in order of their priority without regard to state lines.¹⁰⁴ The consumptive use associated with these rights is approximately 3.5 maf per year.¹⁰⁵ Using the priority system in times of significant water shortages, applied strictly as contemplated by the 1964 decree, it is possible that senior present perfected rights could squeeze out all major municipal providers, such as the Southern Nevada Water Authority, the Central Arizona Project, and the Metropolitan Water District of Southern California.¹⁰⁶ The lack of a reliable Colorado River water supply for these agencies that serve almost 30 million people is one of the major destabilizing forces on the river today.

Article VIII is one of two compact provisions that, in theory, protect tribal water when taken in the context of *Winters v. United States*, which retroactively established water rights for tribal reservations.¹⁰⁷ Under the *Winters* Doctrine, the priority dates of tribal rights relate back to the date that presidential directive or treaty created each reservation.¹⁰⁸ It means that almost all tribal rights are present perfected rights that are unimpaired by the compact.¹⁰⁹

Article VII directly addresses tribes. It states: “Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian Tribes.”¹¹⁰ Hoover requested an article protecting tribal rights believing was a core federal interest.¹¹¹ As a practical matter, since the funding of any United States “obligation” to the tribes must be approved by Congress, and this approval typically requires the support of non-Indian state politicians, article VII has shown to be of limited benefit in regard to protecting tribes.¹¹²

103. *Arizona*, 376 U.S. at 341–42.

104. *Id.*

105. This is the authors’ estimate. See also U.S. BUREAU OF RECLAMATION, NEAR-TERM COLORADO RIVER OPERATIONS: REVISED DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT 3-59–3-60 (2023).

106. For example, a 3.6 maf Lower Basin shortage would only leave .4 maf for Lower Basin post-Compact uses ($7.5 - 3.6 = 3.9$).

107. See Colorado River Compact, *supra* note 3, art. VIII; *Winters v. United States*, 207 U.S. 564 (1908); *Arizona v. California*, 373 U.S. 546, 597 (1963) (confirming that the priority of tribal rights relates back to when the reservations were created); see also *infra* note 112.

108. Report of Simon H. Rifkind, Special Master at 257–62, *Arizona*, 373 U.S. 546 (No. 8, Orig.) [hereinafter Rifkind Report].

109. The authors use the words “almost all” because it is possible that under the terms of individual settlements, some tribes may have chosen to give up their claims for *Winters* rights in return for water from projects that are not present perfected rights.

110. Colorado River Compact, *supra* note 3, art. VII.

111. HUNDLEY, *supra* note 66, at 211–12.

112. See Kuhn et al., *supra* note 1, at 98. It was not until the negotiations of the Upper Basin Compact that representatives of the states and federal government even engaged in serious conversations about tribal water rights, spurred mostly by what would become the Bureau of Indian Affairs. *Id.* at 93–94. Note that these conversations were devoid of representatives from any of the tribes or nations whose water rights were at stake. *Id.* at 86. It was even later, during *Arizona v. California*, that the logistics for determining tribal water rights were hammered out. See 373 U.S. 546 (1963). In 1978, the first federal

Today, it is also important to consider what is not included in the 1922 Compact. The compact does not include a definition of “beneficial consumptive use,” the “commodity” that the compact apportions, nor does the compact provide a method of measuring the consumptive use that it apportions. This gave Arizona and the states of the Upper Division an opening to use the Upper Basin Compact negotiations to design a method of measuring compact apportionments that would benefit their interests.¹¹³ To this day, the problems caused by the lack of a compact definition for “beneficial consumptive use” remain unresolved.

The 1922 Compact was written without a shortage provision. Given that the commissioners believed that the river had a water supply of at least 20 maf, which left a surplus for future division, it is likely that such a provision was never seriously considered.¹¹⁴ Conceivably, had the compact negotiators taken a longer view of the system hydrology, a shortage provision might have been applied to article III(d), the obligation of the Upper Division states to not deplete the flow by 75 maf every ten years.¹¹⁵ During the ratification process, Hoover addressed shortages with an answer that may soon become problematic for the Upper Basin.¹¹⁶ In a written response to questions by Arizona Congressman Carl Hayden, he stated, “[I]n the improbable event of a deficiency, the lower basin has the first call on the water up to a total use of 75,000,000 acre-feet each 10 years.”¹¹⁷ Because of climate change, a deficiency can no longer be considered an “improbable” event.

B. The Upper Colorado River Basin Compact Completed the Job of Apportioning Water to the Upper Basin States but Also Amplified the Basin’s Uncertainties and Disputes

The Upper Basin Compact was signed on October 11, 1948.¹¹⁸ After ratification by the states and approval by Congress, it became effective on April 6, 1949.¹¹⁹ The purposes of the compact are identified in article I(a)¹²⁰ and highlighted in the foreword to the *Official Record* of the Upper Basin Compact Commission: to apportion “among the States of Arizona, Colorado, New Mexico, Utah, and Wyoming the beneficial consumptive use of the water apportioned to the Upper Basin by Article III(a) of the 1922 Compact” and to make provision “as to the

settlement for tribal water rights in the Colorado River Basin was completed. *See* Ak-Chin Indian Water Rights Settlement Act of 1978, Pub. L. No. 95-328, 92 Stat. 409.

113. *See* Kuhn et al., *supra* note 1, at 82 (describing the formation of the “stream depletion theory” formed as a collaboration between Arizona and Colorado).

114. KUHN & FLECK, *supra* note 24, at 64.

115. *Id.* at 69–71 (pointing out that at the time of the negotiations, there were Colorado River hydrology experts that were concerned with the adequacy of the water supply).

116. *Id.* at 61–62.

117. RAY L. WILBUR & NORTHCUTT ELY, THE HOOVER DAM DOCUMENTS, H.R. DOC. NO. 717, at A34 (1948).

118. OFFICIAL RECORD, *supra* note 57, vol. I, at i.

119. *Id.*

120. Article I(a) of the Upper Basin Compact also includes a list of more general purposes similar to Article I of the Colorado River Compact, such as “to promote interstate comity [and] to remove causes of present and future controversies.” Upper Basin Compact, *supra* note 7, art. I(a); *see* Colorado River Compact, *supra* note 3, art. I.

responsibility of the States of Colorado, New Mexico, Utah, and Wyoming in regard to their joint obligation to deliver water at Lee Ferry for use in the Lower Basin.”¹²¹

The Upper Basin Compact is subject to the terms of the 1922 Compact.¹²² The apportionments to the individual states are made in article III. Arizona was given a fixed amount of water for use: 50,000 acre-feet per year.¹²³ The four Upper Division states were given a percentage of “the total quantity of consumptive use per annum apportioned in perpetuity to and available for use each year by the Upper Basin under the Colorado River Compact after [deducting] . . . (Arizona’s 50,000 acre-feet).”¹²⁴ The use of percentages apportionments is one of several key areas where the Upper Basin Compact is different from the Colorado River Compact. In his report to the Colorado Governor and General Assembly, Colorado Commissioner Clifford Stone explained why the decision to use percentages was made and how to determine the underlying amount (the “what”) to which the percentages are applied:

While the 1922 Compact, by its paragraph III (a), apportions to the Upper Basin the beneficial consumptive use of 7,500,000 acre-feet of water annually, such use is subject to the availability of water. The States of the Upper Division are required by the 1922 Compact to maintain certain flows at Lee Ferry. *The water available for use in the Upper Basin is that remaining after the Lee Ferry delivery requirements are satisfied.* In view of the uncertainty as to the total amount of water which might be available for the Upper Basin the Compact Commission determined that so far as the States of the Upper Division are concerned the apportionment must be in terms of percents of the total amount of water apportioned to, and available for use in, the Upper Basin.¹²⁵

Utah’s Commissioner Edward Watson used identical language in his report to the Utah Governor and Legislature.¹²⁶ The apportionments made by article III included all existing uses,¹²⁷ and under article VII, all consumptive uses by agencies, instrumentalities, and wards of the United States are charged to the state in which the use is made.¹²⁸

Article IV addresses the second primary purpose identified in the foreword to the *Official Record* the responsibility of each of the four Upper Division states to meet their joint Lee Ferry obligations under article III of the 1922 Compact.¹²⁹ The article provides the principles under which the Upper Colorado River Commission

121. OFFICIAL RECORD, *supra* note 57, vol. I, at ii.

122. Upper Basin Compact, *supra* note 7, art. I(b).

123. *Id.* art. III(a)(1).

124. *Id.* art. III(a)(2).

125. STONE, *supra* note 44, at 17 (emphasis added).

126. EDWARD H. WATSON, REPORT AND SUBMISSION BY THE STATE ENGINEER OF THE STATE OF UTAH AND COMMISSIONER FOR UTAH OF THE UPPER COLORADO RIVER BASIN COMPACT, *microformed on* Series 13912, Box 15, Folder 22 (Utah Div. of Archives & Recs. Serv.).

127. Upper Basin Compact, *supra* note 7, art. III(b)(4).

128. *Id.* art. VII (note the use of the term “wards” which probably refers to the tribes).

129. *Id.* art. IV.

(UCRC), established under Article VIII, determines the amount and timing of a curtailment and divides the burden of it among the four states.¹³⁰

Article V addresses how reservoir evaporation should be charged to the Upper Division states. Evaporation from reservoirs built before the compact was signed are charged to the state in which they are located.¹³¹ Evaporation from post-compact “joint-use” reservoirs (meaning those reservoirs that are used to meet the Lee Ferry flow requirements like Lake Powell), are charged to each of the Upper Division states in the same proportion as their consumptive uses.¹³² Post-compact reservoirs used in whole or in part to support uses within a state or multiple states, are charged to the state, or proportionally to the states, in which the water is used.¹³³

Commissioner Stone noted that this article was important to the negotiators because they wanted to avoid the kind of dispute over reservoir evaporation that was then occurring in the Lower Basin.¹³⁴ Seventy-six years later, the assessment of reservoir evaporation from Lakes Mead, Mojave, and Havasu remains a disputed and unresolved issue.¹³⁵

Article VI addresses the marquee issue of how to define and measure “beneficial consumptive use.”¹³⁶ The Upper Basin Compact negotiators understood that the 1922 Colorado River Compact did not include a definition of beneficial consumptive use, nor did it include a method for measuring the use of apportionments. During the negotiations, Colorado legal advisor Jean Breitenstein asked, “if you cannot measure it, what good is to you to divide it?”¹³⁷ The Upper Division State negotiators were also keenly aware that how to measure the Lower Basin’s 1922 Compact apportionment was at the epicenter of the ongoing dispute between Arizona and California over the authorization of the Central Arizona Project (CAP), Arizona’s proposed canal to pump water up from the Colorado River to Phoenix, Tucson, and surrounding communities.¹³⁸ In his commissioner’s report, Stone summarized the two competing methods: the “stream depletion theory” favored by Arizona and the four Upper Division states and the “diversions less return

130. *Id.* (“The extent and times of curtailment shall be such as to assure full compliance with Article III of the Colorado River Compact.”).

131. *Id.* art. V(a).

132. *Id.* art. V(b).

133. *Id.* art. V(c). This complicated article was included in the compact because the negotiators believed that it was probable that reservoirs would be built in one state, or the inundation area would be in multiple states, to support uses in another state. Kuhn et al., *supra* note 1, at 116.

134. STONE, *supra* note 44, at 19.

135. See, e.g., Ian James, *As Colorado River Shrinks, Water Evaporation Becomes Critical to California’s Future Supplies*, L.A. TIMES (Feb. 9, 2023, 04:00 PT), <https://www.latimes.com/environment/story/2023-02-09/evaporation-takes-center-stage-in-colorado-river-crisis> [<https://perma.cc/QCE3-B9S7>].

136. See Upper Basin Compact, *supra* note 7, art. VI.

137. OFFICIAL RECORD, *supra* note 57, vol. II, Sixth Meeting, at 51.

138. See, e.g., *Colorado River Water Rights: Hearing on S.J. Res. 145 Before the Subcomm. of the S. Comm. on Int. & Insular Affs.*, 80th Cong. 300–03 (1948) (statement of W.J. Wehrli, Special Couns. for the State of Wyo.) (“The conflict that appears to exist is one between Arizona and California. . . . At this time Wyoming is not in conflict with any other State to the extent that requires any litigation.”).

flows theory” favored by California and Nevada and why the negotiators chose to use the stream depletion theory.¹³⁹ Article VI states:

[T]he Commission shall determine the quantity of the consumptive use of water, which use is apportioned by Article III hereof, for the Upper Basin and for each State of the Upper Basin by the inflow outflow method in terms of man-made depletions of the virgin flow at Lee Ferry, unless the Commission, by unanimous action, shall adopt a different method of determination.¹⁴⁰

The UCRC, established under article VIII, is a different body than the Compact Commission, whose job was to negotiate the compact. The primary legal purpose of the UCRC may have been to gather the data and administer article IV, the curtailment provision, but from the language in the foreword to the *Official Record*,¹⁴¹ it is clear that the negotiators also intended that the UCRC be far more than just an agency that administers the compact. They wrote, “As an official body, it occupies a unique position of being able to expedite Upper Colorado River Basin development, to aid in shaping such development, and to integrate Federal and State activities and interests.”¹⁴² The UCRC has five members, one from each Upper Division state and one representing the United States.¹⁴³ Arizona does not have a member on the UCRC.¹⁴⁴ Its first official meeting began five minutes after the Upper Basin Compact Commission adjourned sine die on August 5, 1949.¹⁴⁵

C. The Upper Basin Compact Addressed Tribal Water but Failed to Meaningfully Include Tribal Representatives or Resolve the Issue of Settling Tribal Water Rights

Unlike the negotiations of the 1922 Colorado River Compact, where the existence of the Colorado River Basin’s Native Americans was barely recognized and their water needs considered negligible,¹⁴⁶ the 1948 Upper Basin Compact negotiators had no choice but to consider and address the water needs of the six federally recognized Upper Basin tribes in more careful and deliberate manner, largely owing to the presence of what would eventually become the Bureau of Indian Affairs. The six Upper Basin tribes are the Jicarilla Apache Nation, Navajo Nation, Ute Mountain Ute Tribe, Southern Ute Indian Tribe, Ute Indian Tribe, and the Paiute Indian Tribe of Utah.¹⁴⁷ No tribal members were invited to or participated in the

139. STONE, *supra* note 44, at 20.

140. Upper Basin Compact, *supra* note 7, art. VI.

141. See generally OFFICIAL RECORD, *supra* note 57, vol. I, Foreword.

142. *Id.* vol. I, at ii.

143. *Id.*

144. *Id.*

145. OFFICIAL RECORD, *supra* note 57, vol. II, Eleventh Meeting, at 19.

146. HUNDLEY, *supra* note 66, at 211–12.

147. See, e.g., UPPER COLO. RIVER COMM’N, MEMORANDUM OF UNDERSTANDING AMONG THE UPPER COLORADO RIVER BASIN TRIBES AND THE UPPER COLORADO RIVER COMMISSION (2024) [hereinafter MEMORANDUM OF UNDERSTANDING], <https://newspack-coloradosun.s3.amazonaws.com/wp-content/uploads/2024/03/UCRC-UB-Tribes-MOU-1.pdf> [https://perma.cc/53K8-XPKR] (six signatory tribes).

actual negotiations, but the commission, through its chairman, U.S. Representative Harry Bashore, sought input from all federal agencies, including the Office of Indian Affairs.¹⁴⁸ The “Indian Bureau” (as it referred to itself) responded with a November 25, 1946, letter signed by Assistant Commissioner William Zimmerman.¹⁴⁹ The letter was discussed by the negotiators during the Fifth Meeting and is included in the *Official Record*.¹⁵⁰

The Zimmerman letter likely surprised and shocked the state negotiators. An attachment included a list of existing and potential Indian irrigation projects that totaled 1.43 maf of diversions and 585,000 acre-feet of depletions, about two thirds of which were in New Mexico.¹⁵¹ The 585,000 acre-feet for Indian uses is only about 8% of the 7.5 maf apportioned to the Upper Basin by the Colorado River Compact; however, these depletions would have to be added to about 8.4 maf of depletions from existing and potential projects identified by the Bureau of Reclamation in the 1947 study.¹⁵² Thus, the states likely believed they needed to negotiate for every acre-foot available.

Beyond the potential projects, the Zimmerman letter laid out the legal case that the federal government would make on behalf of the Basin’s tribes. The letter states:

[I]t is our position that the water rights for these Indian reservation lands were perfected rights to the beneficial use of waters of the Colorado River system long prior to 1922, and that, by the provision of Article VIII of the Colorado River Compact, “they are not impaired” by that compact. It is also our position that these Indians’ rights were specifically recognized by Article VII of the Colorado River Compact.¹⁵³

Since the Upper Basin Compact would be subject to and could not violate the Colorado River Compact, the negotiators would have to carefully consider how to address tribal rights.

New Mexico Commissioner Fred Wilson suggested two basic approaches the commission could use: either the Upper Basin Compact could treat the tribal rights as a “sixth” state and apportion the remaining water to the five states, or the needs of the tribes could be included within the apportionments made to each individual state.¹⁵⁴ After assigning the issue to its legal advisory committee for a

148. OFFICIAL RECORD, *supra* note 57, vol. I, Fifth Meeting, at 49–52.

149. *Id.* at 51.

150. *Id.*

151. *Id.* at 52. The tribal uses for the individual state uses were New Mexico 367,000; Utah 157,000; Colorado 36,000; and Arizona 25,000. *Id.* There are no tribal lands in the Colorado River Basin in Wyoming. *See id.* Existing projects were consuming 157,000 acre-feet (27%), 115,000 from irrigation on the Uintah Reservation. *Id.*

152. Authors did this math using information from the *Official Record*. OFFICIAL RECORD, *supra* note 57, vol. II, Seventh Meeting.

153. *Id.* vol. I, Fifth Meeting, at 49.

154. *Id.* vol. II, Seventh Meeting, at 99.

recommendation, the commission decided to include Indian uses within each state's apportionment.¹⁵⁵

This decision was a potential gamble on the part of the commission. Unless each state's apportionment was large enough to satisfy the collective consumptive uses of its tribes, a court might decide that the Upper Basin Compact was violating the 1922 Colorado River Compact by impairing the use of tribal present perfected rights. The Zimmerman letter may be primary reason that New Mexico ended up with 11.25% apportionment, over 700% of its flow contribution.¹⁵⁶ In his report, Commissioner Stone highlighted New Mexico's 11.25% apportionment by stating, "[T]he Commission wisely determined the water allocation should be such as to satisfy fully the needs of the Indians . . . sufficiently large to take care of every water use currently planned for the Indians," adding that Indian uses are to be charged against the state in which they occur.¹⁵⁷

D. Upper Basin Comprehensive Development Under the Colorado River Storage Project Act Was the Reward for Completing the Upper Basin Compact

After ratification of the Upper Basin Compact, which the Secretary of the Interior had made a prerequisite to federal support for further water development, the Upper Division states turned their focus to what they had wanted for decades: a comprehensive plan for the development of the water resources of the Upper Colorado River Basin.¹⁵⁸ The plan needed two basic components: approximately 30 maf of storage that would be used to meet the Lee Ferry flow obligations of the Upper Division states under the 1922 Colorado River Compact during a future drought like that of the 1930s, and a method to use hydroelectric power revenues generated by dams in the Upper Basin to subsidize the irrigation projects that could never be built without such a subsidy.¹⁵⁹ On April 11, 1956, Congress delivered by passing the Colorado River Storage Project Act (CRSPA), sometimes referred to as the Colorado River Storage and Participating Projects Act.¹⁶⁰

During the negotiations of the Upper Basin Compact, its Engineering Advisory Committee, one of the committees involved in planning the future of Upper Colorado River development, concluded that to meet the Upper Basin's compact obligations during a repeat of the 1930s drought, approximately 30 maf of active storage upstream of Lee Ferry was needed.¹⁶¹ CRSPA authorized four initial storage units, and one of the authorized purposes of these initial units was to help the Upper

155. *Id.* at 115–16.

156. *See id.* vol. I, Fifth Meeting, at 49–51. According to the Engineering Advisory Committee Report, New Mexico's contribution to the natural flow at Lee Ferry is 1.58%. *Id.*, vol. III, at 3. New Mexico's 11.25% apportionment of the Upper Colorado River Compact divided by their 1.58% contribution to the Colorado River equals 7.12 or 712%.

157. STONE, *supra* note 44, at 18.

158. Kuhn et al., *supra* note 1, at 7; KUHN & FLECK, *supra* note 24, at 151.

159. *See* KUHN & FLECK, *supra* note 24, at 151–52.

160. Colorado River Storage Act, Pub. L. No. 84-485, 70 Stat. 105 (1956). For more reading, see KUHN & FLECK, *supra* note 24, ch. 14.

161. OFFICIAL RECORD, *supra* note 57, vol. III at 62–65. Including sediment storage and dead pools, the recommended total storage required was 34.5 maf. *Id.* at 65.

Basin meet its compact obligations.¹⁶² Construction of the largest project, Glen Canyon Dam (which created Lake Powell), began a few months later.¹⁶³

Consistent with the aspirations of Utah's Upper Basin Compact Commissioner Ed Watson,¹⁶⁴ a portion of the revenues from power generation on the CRSPA dams are used to subsidize the repayment of Upper Basin irrigation projects.¹⁶⁵ The projects that are eligible for power revenue subsidies are referred to as participating projects.¹⁶⁶ Today, power revenues are also used to support environmental and salinity control programs.¹⁶⁷ As anticipated by the Upper Basin Compact negotiators, the UCRC likely played a pivotal role in getting the legislation through Congress. One of the major issues that the four Upper Division states had to negotiate was how to divide the power revenues that would be used to subsidize irrigation project costs that the local irrigators could not afford. Under CRSPA, 46% of the subsidy revenues are allocated to Colorado, 21.5% to Utah, 15.5% to Wyoming, and 17% to New Mexico.¹⁶⁸ Again, New Mexico appears to have been the major winner. It provides 1.58% of the natural flow at Lee Ferry, has a water apportionment of 11.25%, and a 17% share of the "subsidy" revenue.¹⁶⁹

The congressional battle to pass CRSPA was not easy. California and its nominal ally, Nevada, opposed the legislation.¹⁷⁰ Their congressional delegations strongly opposed using power revenues to subsidize irrigation projects.¹⁷¹ The legislative effort lasted seven years.¹⁷² The congressional debates likely broke new ground on three major precedents. First, tribal members, not just their Department of the Interior overseers, participated in the legislative hearings.¹⁷³ During the 1954

162. Colorado River Storage Project Act § 1. The four "initial unit" reservoir projects were Glen Canyon Dam, Flaming Gorge, the Aspinall Unit (formally referred to as the Curecanti Unit and consisting of three dams: Blue Mesa, Morrow Point, and Crystal), and Navajo Reservoir (which is primarily used to deliver water to users in New Mexico). *Id.* The total active storage capacity is approximately 30.6 maf. *Colorado River Storage Project*, U.S. BUREAU OF RECLAMATION: INTERIOR REGION 7, <https://www.usbr.gov/uc/rm/crsp/index.html> [<https://perma.cc/MHX7-XYU9>].

163. See *Colorado River Storage Project*, U.S. BUREAU OF RECLAMATION: PROJECTS & FACILITIES, <https://www.usbr.gov/projects/index.php?id=440> [<https://perma.cc/H2EM-XJXA>] (navigate to "Construction" tab).

164. See Kuhn et al., *supra* note 1, at 92.

165. Colorado River Storage Project Act, § 4.

166. See *Colorado River Storage Project*, *supra* note 163; see also *Colorado River Storage Project*, *supra* note 162.

167. *Colorado River Storage Project*, *supra* note 162.

168. Colorado River Storage Project Act § 5(e).

169. In a conversation author Kuhn had with former UCRC Executive Director Ival Goslin, Goslin attributed New Mexico's "bonus" to the political power of its Senator, Clinton Anderson. Conversation with Ivan Goslin, Exec. Dir., Upper Colo. River Compact. Goslin died in 1991; this conversation likely occurred in the late 1970s in Denver, Colorado.

170. See JOHN UPTON TERRELL, 2 WAR FOR THE COLORADO RIVER 28, 73-74 (1965) (chronicling California's efforts to oppose the CRSPA).

171. KUHN & FLECK, *supra* note 24, at 150-54.

172. The Upper Basin Compact was approved by Congress on April 6, 1949. See Upper Basin Compact, *supra* note 7.

173. *Colorado River Storage Project: Hearings on H.R. 4449, H.R. 4443, and H.R. 4463 Before the Subcomm. on Irrigation and Reclamation of the H. Comm. on Interior and Insular Affs.*, 83rd Cong., 580-92 (1954) (statements of Sam Ahkeah, Chairman, Navajo Tribal Council; Maxwell Yazzie, Chairman of

House of Representatives committee hearings, Navajo Nation Tribal Chairman Sam Ahkeah testified in favor of the legislation.¹⁷⁴ Second, the proposed legislation became a national environmental cause, specifically the proposed construction of Echo Park Dam located in the Yampa River canyon within Dinosaur National Monument.¹⁷⁵ And third, the authorization of Bureau of Reclamation irrigation projects was beginning to lose its post–World War II “luster,” especially among the congressional fiscal conservatives.¹⁷⁶

E. Arizona Filed *Arizona v. California* in 1952, Seeking to Resolve 1922 Compact Disputes, but the Court Avoided Interpreting the Compact

In the early 1950s, Arizona’s efforts to obtain authorization of its Central Arizona Project (CAP) reached a congressional stalemate. California’s powerful delegation in the House of Representatives successfully blocked its approval based on the argument that under the 1922 Compact, Arizona did not have a sufficient water supply to justify its construction.¹⁷⁷ To show Congress that it had a water supply for the CAP, in 1952 Arizona filed suit in the Supreme Court.¹⁷⁸ This was the fourth effort by Arizona to sue California over its rights to the Colorado River,¹⁷⁹ and the fifth time it had been to the Supreme Court over the river.¹⁸⁰ Among Arizona’s eight claims for relief were two that could directly affect the Upper Basin Compact:

5. A decree be entered herein recognizing, confirming and establishing that the beneficial consumptive use of water apportioned by the Colorado River Compact be measured in terms of stream depletion.¹⁸¹

Eng’g Comm., Navajo Tribal Council; and Howard Gorman, Chairman, Res. Comm., Navajo Tribal Council).

174. *Id.* at 580–89 (statement of Sam Ahkeah, Chairman, Navajo Tribal Council).

175. *Id.* at 18, 578 (statements of Honorable Ralph A. Tudor, Undersecretary, Dep’t of the Interior, and Reporter William Henry Harrison, Chairman, Subcomm. on Irrigation & Reclamation). In 1954, Reclamation was proposing two large storage projects: Glen Canyon Dam with a capacity of 26 maf and Echo Park Dam with a capacity of 6.5 maf. *See* H.R. 4449, 83d Cong. (1954). In the 1956 Act, Echo Park was replaced with three reservoir projects: Flaming Gorge, the Curecanti Unit (now Aspinall), and Navajo Reservoir. *See* H.R. 4443, 83d Cong. (1956). The authors calculate that the three projects would collectively have a similar storage capacity as Echo Park.

176. KUHN & FLECK, *supra* note 24, at 151–53.

177. *Id.* at 157.

178. *Id.* at 160; *Arizona v. California*, 373 U.S. 546, 550 (1963).

179. The first three cases were all in the 1930s, and all were unsuccessful. For a summary of each case, see RAY L. WILBUR & NORTHCUTT ELY, *THE HOOVER DAM DOCUMENTS*, H.R. DOC. NO. 717, 146–51 (1948).

180. *Id.* at 149. In 1935, the United States sued Arizona to prevent it from interfering with the construction of Parker Dam. *Id.* Arizona won that round when the Court ruled that the project needed to be authorized by Congress. *Id.* Congress authorized the project a few months later. *Id.*

181. Motion for Leave to File Bill of Complaint and Bill of Complaint at 30–31, *Arizona v. California*, 350 U.S. 114 (1955) (No. 10, Original).

6. Losses of water in and from reservoirs located in the Lower Basin on the main stream of the Colorado River shall be charged against the apportionment to Arizona and California respectively in the same proportion as the consumptive use of water in the State against which the charge is made currently bears to the total consumptive use of water in the Lower Basin.¹⁸²

Note that, in plain language, the sixth claim for relief asked the Court to determine how much evaporation from Lake Mead should be charged to each Lower Division state.

California and its Colorado River water agencies, the defendants in the case, opposed Arizona's claims. In 1954, they filed a motion to join the Upper Division states in the case as indispensable parties.¹⁸³ Arizona and its Upper Basin allies opposed the joinder motion and successfully took the position that the case was a Lower Basin matter only.¹⁸⁴

In 1957, as the case dragged on, Arizona hired a new chief counsel, Mark Wilmer.¹⁸⁵ Arizona then changed its strategy. Under the original approach, Arizona's case relied on an interpretation of article III(b) that the additional one maf was for Arizona's use (less a small amount for use in New Mexico and Utah), and a ruling that the stream depletion theory was the proper method of measuring compact apportionments.¹⁸⁶ In 1957, Arizona made an amended filing under its new counsel.¹⁸⁷ Arizona's position was that the 1922 Colorado River Compact apportioned only the mainstem waters of the Colorado River below Lee Ferry.¹⁸⁸ Water uses on the Lower Basin tributaries were not covered by the compact.¹⁸⁹ Since

182. *Id.* at 31.

183. Motion to Join, as Parties, the States of Colorado, New Mexico, Utah and Wyoming at 2; *Arizona*, 350 U.S. 114 (No. 10, Original); see also KUHN & FLECK, *supra* note 24, at 163.

184. The decision on the California motion was made by the first Special Master, George Haight. He died shortly after his critical ruling and was replaced by Simon Rifkind. Utah and New Mexico were included parties to the case for their Lower Basin interests only. There is a longstanding myth in Colorado water community that the Supreme Court did not allow Colorado to be a party to the case, but nothing could be further from the truth. In a joint filing by Wyoming and Colorado opposing the California motion, both states make it very clear that they feared that if they were drawn into the case, Congress would delay authorization of CRSPA. Kuhn and Fleck speculate that had Colorado and Wyoming had chosen to participate in the case, Glen Canyon Dam may never have been built. KUHN & FLECK, *supra* note 24, at 163.

185. *Id.* at 164.

186. *Id.* at 165.

187. See JACK L. AUGUST JR., *DIVIDING WESTERN WATERS: MARK WILMER AND ARIZONA V. CALIFORNIA* 78 (2007).

188. Amended Bill of Complaint at 21, *Arizona v. California*, 373 U.S. 546 (1963) (No. 8, Original) (framing Arizona's claim "that tributary waters which naturally drain into the Colorado River below Lee Ferry are waters of the Colorado River System not covered by the Compact.").

189. Wilmer's position ignores the plain language of article II(a) which defines the Colorado River System as "that portion of the Colorado River and its tributaries within the United States of America." See *Colorado River Compact*, *supra* note 3, art. II(a). We speculate that, like Wyoming's W. J. Wehrli, Wilmer saw the inherent weaknesses with the stream depletion theory, forcing him to concoct his theory that the Colorado River Compact did not cover diversions on the Lower Basin tributaries. The Supreme Court in its 1963 landmark decision acknowledged Arizona's position but remarked, "we need not reach that question" *Arizona*, 373 U.S. at 568.

the Lower Basin's 8.5 maf apportionment was only for uses on the mainstem, the stream depletion theory to reduce the depletions on the Gila River that count against the Lower Basin's compact apportionment was unnecessary.¹⁹⁰ Further, in 1928 Wilmer argued that, under the Boulder Canyon Project Act, Congress had given Arizona the right to use a minimum of 2.8 maf per year of mainstem water.¹⁹¹ This was more than enough to meet its needs on the mainstem and build the CAP.¹⁹²

In his 1960 report, Special Master Simon Rifkind concluded that Arizona's amended filing was superfluous,¹⁹³ but he still ruled in favor of Arizona by concluding that the 1922 Compact need not be interpreted to dispose of the case,¹⁹⁴ and that under the Boulder Canyon Project Act, Congress had given Arizona the right to use 2.8 maf per year of mainstem water—but subject to water availability under the 1922 Compact.¹⁹⁵ Rifkind's report included a section where, for background, he interpreted key provisions of the compact.¹⁹⁶ Notably, the ambiguities in the compact were never resolved.

The issues remain disputed over seventy years after Arizona asked the Supreme Court to interpret the 1922 Compact to determine how apportionments are measured and how the Lower Basin mainstem reservoir evaporation is attributed to individual states.¹⁹⁷

Today, as the Basin struggles to develop its Post-2026 Operating Guidelines, the lack of a basin-wide agreement on how to define "beneficial consumptive use" and measure compact apportionments has left significant differences of opinion over the meaning of the 1922 Compact's most critical provisions, including article III(c) and (d), the two provisions that define the obligations of the Upper Division states at Lee Ferry.¹⁹⁸

For purposes of measuring consumptive use in the Upper Basin, article VI of the 1948 Upper Basin Compact provides for the use of the stream depletion

190. *Arizona*, 373 U.S. at 586. In the amended filing, there is no mention of the stream depletion theory. Amended Bill of Complaint, *supra* note 188, at 21. Under the "Wilmer" theory, because uses of the Gila River were not covered by the 1922 Compact, Arizona's 2.8 maf apportionment under the Boulder Canyon Project Act provided enough water from the mainstem (at least 2.8 maf) to make the CAP feasible. *See id.*

191. Boulder Canyon Project Act, Pub. L. No. 70-642, 45 Stat. 1059 (1928) (codified as amended at 43 U.S.C. § 617).

192. *Id.*

193. Special Master Rifkind issued his Report on December 5, 1960. It was received and filed by the Supreme Court on January 16, 1961. Rifkind Report, *supra* note 108, at 137.

194. *Id.* at 138.

195. *Id.* at 151.

196. *Id.* at 138–51. In this non-binding background section of his report, Special Master Rifkind provided his views on the Colorado River Compact. As Wilmer may have feared, he supported California's diversions minus return flows theory for measuring compact apportionments. While it may be the case that Rifkind's compact analysis is written in dicta, this particular dictum was written by an independent and highly respected Supreme Court Special Master that spent a great deal of time studying the compact, the commissioner's reports, and heard or read considerable testimony from people who were either in the negotiating room (Meeker) or were close associates of those that were (Tipton and many others). If they have views that differ from Rifkind, we hope they have a better reason than "it doesn't fit with our talking points."

197. *See* Kuhn, *supra* note 47.

198. *See* further discussion *infra* Section III.B.

theory.¹⁹⁹ The Upper Basin Compact does not bind the Lower Basin to this method, and except for reporting reservoir evaporation from Lake Powell, it is largely ignored.²⁰⁰

F. Indian Water Rights Challenge the Basis of the Upper Basin Compact

Special Master Rifkind's December 1960 report in *Arizona*²⁰¹ raised concerns about the quantification of tribal rights under the *Winters* Doctrine.²⁰² The report set off major alarm bells in the Upper Basin, especially in Colorado.²⁰³ What bothered Colorado was Rifkind's decision to recognize and quantify the *Winters* rights of five tribes residing along the Lower Colorado River (Colorado River Indian Tribes, Quechan Tribe of the Fort Yuma Indian Reservation, Chemehuevi Indian Tribe, Cocopah Indian Tribe, and Fort Mojave Indian Tribe) based on a practicably irrigable acreage (PIA) standard with priorities dating back to the dates of the reservations.²⁰⁴ Felix Sparks, Colorado's UCRC commissioner and director of the Colorado Water Conservation Board, viewed the Rifkind decision as a direct and imminent threat to the apportionments made to each state under the Upper Basin Compact.²⁰⁵

The Upper Basin Compact Commission's 1948 strategy to include tribal uses within each state's individual apportionment was now in question. Since the Upper Basin Compact was subordinate to the Colorado River Compact, there was a

199. Kuhn et al., *supra* note 1.

200. The stream depletion theory is used by the Bureau of Reclamation for reporting net evaporation on Colorado River Storage Project (CRSP) reservoirs. *See generally* JIAN WANG & JACK C. SCHMIDT, *STREAM FLOW AND LOSSES OF THE COLORADO RIVER IN THE SOUTHERN COLORADO PLATEAU* (2020) (analyzing streamflow and water budget data for Colorado River inputs and outputs).

201. Rifkind Report, *supra* note 108.

202. The *Winters* Doctrine states that the federal government implicitly created a reservation of water rights for each Indian Reservation with a perfected priority date matching that of the establishment of each reservation. *Winters v. United States*, 207 U.S. 564, 576–78 (1908); *see also Arizona v. Navajo Nation*, 599 U.S. 555, 561 (2023) (noting the precedent developed in *Winters v. United States* is sometimes referred to as the *Winters* Doctrine). The Doctrine is silent, however, on the quantity of water in that perfected right. The first method for establishing quantity was determined in *Arizona v. California*. *See* 373 U.S. 546, 598–601 (1963).

203. Rifkind Report, *supra* note 108.

204. The PIA standard assesses the arable acreage in each reservation and asserts that the *Winters* reservation of water is sufficient to irrigate all arable land. *Arizona*, 373 U.S. at 601. This standard was set with the racist historical context of reservations in mind—colonizers historically viewed indigenous peoples as “savage” and reservations were intended to create agrarian cultures that resembled those in Europe. *See* Barbara A. Cosens, *The Measure of Indian Water Rights: The Arizona Homeland Standard, Gila River Adjudication*, 42 NAT. RES. J. 835, 838 (2002). The authors believe that this standard is significantly limited and is ill-suited for securing the water necessary for tribal self-determination and sovereignty. Arizona has suggested an alternate standard, the Homeland Standard, which considers all possible water uses a tribe may wish to engage in. *See In re General Adjudication of All Rights to Use Water in the Gila River System and Source (Gila V)*, 35 P.3d 68 (Ariz. 2001). Other courts, however, have declined to apply this standard.

205. Rifkind's report was subject to review and approval by the Supreme Court. *See* Rifkind Report, *supra* note 108. In its 1963 decision, the Court upheld Rifkind's rulings adjudicating the tribal rights on the lower mainstem based on the PIA standard and confirming the status of those rights as “present perfected rights” or pre-compact rights, thus giving them protection under article VIII of the Colorado River Compact. *Arizona*, 373 U.S. at 602; *see* Colorado River Compact, *supra* note 3, art. VIII.

real possibility that using the PIA standard could give the Navajo and Jicarilla Apache Tribes rights protected by article VIII's non-impairment provision—rights that might exceed New Mexico's or Arizona's individual apportionments.²⁰⁶ If that were to happen, to avoid impairment of these rights, the 11.25% apportionment for New Mexico or the 50,000 acre-feet apportionment for Arizona would have to be increased. Giving New Mexico and Arizona larger apportionments would mean less water for the other three states.²⁰⁷

The situation in New Mexico was very delicate. A federal court might award the tribes rights that would fit within New Mexico's 11.25% apportionment but large enough to squeeze out the junior non-tribal rights, creating a conflict between the tribes and their neighbors.²⁰⁸

Unfortunately, Indian water rights had few allies in Congress. At that time, as it happened, New Mexico was seeking congressional authorization of the San Juan–Chama Project and Navajo Indian Irrigation Project (NIIP).²⁰⁹ This authorizing act provided Sparks and his powerful congressional ally, Wayne Aspinall, the opportunity to use federal legislation to undermine the protections explicitly afforded to Indian rights under both compacts and effectively limit tribal water developments and uses in a manner that would have been considered outrageous and unacceptable for any non-Indian user.²¹⁰

Unless a solution could be found that protected Colorado's Upper Basin Compact share, Sparks argued, his state would have to oppose the legislation authorizing the two New Mexico projects.²¹¹ In 1961, Sparks told the House Subcommittee on Irrigation and Reclamation that Colorado and New Mexico had

206. The Hopi Tribe has also made claims for Upper Basin water. Felicia Fonseca, *Proposed Settlement Is First Step in Securing Colorado River Water for 3 Native American Tribes*, ASSOCIATED PRESS (May 14, 2024, 14:14 MT), <https://apnews.com/article/colorado-river-tribes-water-settlement-navajo-hopi-d8aaa65e7c5d04ef965763ea4bde5078> [<https://perma.cc/74Z8-GXJV>].

207. The situation was made more complicated by the hydrology. By 1960, it was obvious to the UCRC that the water available for use in the Upper Basin was now in the range of 6.0–6.2 maf/year. See LEEDS, HILL & JEWETT, REPORT ON DEPLETION OF SURFACE WATER SUPPLIES OF COLORADO WEST OF CONTINENTAL DIVIDE, S. DOC. NO. 23, at 29–30 (1st Sess. 1955).

208. The 2005 settlement between New Mexico and the Navajo Nation resulted in litigation with local non-tribal water entities challenging the settlement. See Donovan Quintero, *Federal Appeals Court Dismisses Settlement Litigation Against Federal, State, and Navajo Government*, NAVAJO TIMES (Dec. 5, 2024), <https://navajotimes.com/reznews/federal-appeals-court-dismisses-water-rights-lawsuit-against-federal-state-and-navajo-government> [<https://perma.cc/W883-K6AC>].

209. The first congressional hearings on the Navajo Indian Irrigation Project and the San Juan–Chama Project were held in May 1960, before Special Master Rifkind's final report was published in December 1960. See HUNDLEY, *supra* note 66.

210. Because NIIP and the San Juan–Chama Project were coupled together by an internal political agreement within New Mexico, some of the restrictions that apply to NIIP also impact San Juan–Chama. See generally Judith E. Jacobsen, *The Navajo Indian Irrigation Project and the Quantification of Navajo Winters Rights*, 32 NAT. RES. J. 825 (1992) (describing the legal landscape of tribal water law in the context of NIIP).

211. *San Juan-Chama Reclamation Project and Navajo Indian Irrigation Project: Hearings on H.R. 2552, H.R. 6541, and S. 107 Before the Subcomm. on Irrigation and Reclamation of the H. Comm. on Interior and Insular Affs.*, 87th Cong. 190–92 (1961) (statement of Felix L. Sparks, Dir., Colo. Water Conservation Bd.). Colorado had an important ally, House Natural Resources Committee Chair Wayne Aspinall from Grand Junction. New Mexico also had a powerful ally that Colorado did not want to upset, Senator Clinton Anderson.

reached an agreement on legislative language that would preclude the federal government from claiming waters (for tribes) allocated to Colorado for use in New Mexico or Arizona.²¹² The Sparks–Reynolds compromise language became a part of sections 11 and 12 of the federal authorizing legislation.²¹³

The “hydrologic determination” is the short name given to the hydrologic investigations required by section 11 of the act authorizing the San Juan–Chama Project and NIIP that must be conducted by the Secretary of the Interior before the Bureau of Reclamation can enter any long-term contracts for water from Navajo Reservoir (post-NIIP and -San Juan–Chama).²¹⁴ The language requires the Secretary to:

Determine[] by hydrologic investigations that sufficient water to fulfill said contract is reasonably likely to be available for use in the State of New Mexico during the term thereof under the allocations made in Articles III and XIV of the Upper Colorado River Basin compact and has submitted such determination to Congress . . . and Congress has approved such contracts . . .²¹⁵

These requirements are unique. In no other Upper Division state is there a requirement for the Secretary to make a hydrologic determination before issuing a contract for water from a federal facility and have both the determination and contract approved by Congress.²¹⁶

Sections 12(a) and (b) prohibit the use of project facilities authorized under the San Juan–Chama and Navajo Indian Irrigation projects to deliver water to project beneficiaries in order to satisfy a “preferential” right—a pre-1922 Compact right awarded to a tribe under the *Winters* Doctrine and *Arizona v. California*, and protected by article VIII of the compact—if doing so would cause New Mexico or Arizona to exceed their apportionments under the Upper Basin Compact.²¹⁷ In simple terms, a court might ultimately recognize tribes’ paper water rights that, together with the other uses in New Mexico or Arizona, could result in one of these states exceeding their compact apportionments, but the Secretary could not use project facilities to cause that outcome. These limitations only apply to water uses within New Mexico and Arizona and only exist because Colorado officials feared the consequences of the Navajo and Jicarilla Apache Tribes obtaining and using pre-compact Colorado River water rights that could not be impaired by the 1922 Colorado River Compact.²¹⁸

212. *Id.* at 192.

213. Navajo Indian Irrigation Project, Pub. L. No. 87-483, §§ 11–12, 76 Stat. 96, 99–100 (1962).

214. *Id.* § 11.

215. *Id.*

216. There is no need for the hydrologic determination to apply to Arizona because it has a fixed 50,000 acre-feet apportionment. The authors believe that while Colorado and Utah also have tribes with *Winters* Doctrine rights, in the early 1960s there was little concern that these rights might cause one of these states to exceed their Upper Basin Compact apportionments. Depending on how much water is available for use in the Upper Basin, the situation in Utah might be different today.

217. Navajo Indian Irrigation Project § 12.

218. The exact role of the UCRC and its staff in this legislation is not entirely clear. It is likely that the Utah and Wyoming UCRC representatives shared Colorado’s concerns, but they may have decided to take a back seat and let Sparks and Reynolds handle the matter.

The Sparks–Reynolds compromise was put in place for a single purpose: to limit the use of the pre-compact water rights benefiting Native Americans. The authors believe that it would have been inconceivable for any of the Upper Division states or the UCRC to even consider placing similar limitations on the pre-compact rights belonging to the descendants of the tribe’s Euro-American settler neighbors.

G. Amidst Basin Disputes, the UCRC Became the Entity Bridging the Gap Between State and Federal Interests

The Supreme Court issued its opinion in *Arizona v. California* on June 3, 1963.²¹⁹ One the next day, Arizona senators Carl Hayden and Barry Goldwater introduced Senate Bill 1658, which would authorize the construction of the CAP—a massive project that would move water from the river into Central Arizona.²²⁰ Like the other two major federal development acts, the 1928 Boulder Canyon Project Act²²¹ and the 1956 Colorado River Storage Project Act,²²² the process was lengthy. There were numerous iterations of the legislation and many twists and turns before Congress finally passed the Colorado River Basin Project Act (CRBPA) on September 30, 1968.²²³

The legislation authorized the CAP, the Dixie Project in Southern Utah²²⁴ and five more participating projects in the Upper Basin,²²⁵ and, under title 6, provided guidance to the Secretary of the Interior on how to operate the major federal reservoirs under the 1922 Colorado River Compact, the 1944 treaty with Mexico, and the Upper Basin Compact.²²⁶ The Upper Division states participated in the numerous meetings among the states and congressional meetings and hearings using the UCRC as a coordinator and clearinghouse.²²⁷

In 1965, the UCRC hired Colorado’s longtime interstate compact engineering advisor Royce Tipton to prepare a hydrology report on the water supply

219. 373 U.S. 546 (1963).

220. S. 1658, 88th Cong. (1963).

221. Boulder Canyon Project Act, Pub. L. No. 70-642, 45 Stat. 1057 (1928) (codified at 43 U.S.C. § 617).

222. Colorado River Storage Project Act, Pub. L. No. 84-485, 70 Stat. 105 (1956) (codified as amended at 43 U.S.C. § 620).

223. Colorado River Basin Project Act, Pub. L. No. 90-537, 82 Stat. 885 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556).

224. The project was never built as a federal project. See *The Dixie Project*, WASH. CNTY. HIST. SOC’Y, <https://wchsutah.org/water/dixie-project.php> [https://perma.cc/6BWQ-EGZG].

225. Title 5 authorized five new participating projects: Dallas Creek, Dolores, West Divide, and the San Miguel Projects—all in Colorado exclusively—and the Animas–La Plata Project in Colorado and New Mexico, including approval of the Animas–La Plata Compact between New Mexico and Colorado. Additionally, the Uintah Unit of the Central Utah Project was approved. Of the six projects (including the Uintah Unit), only the Dolores and Dallas Creek Projects were completed as irrigation projects. A modified version of the Animas La Plata Project (Lake Nighthorse) was built, but without the irrigation features. Colorado River Basin Project Act § 501(a).

226. Colorado River Basin Project Act § 602(a) (beginning with: “In order to comply with and carry out the provisions of the Colorado River Compact, the Upper Colorado River Basin Compact, and the Mexican Water Treaty, the Secretary shall propose criteria for the coordinated long-range operation of the reservoirs constructed and operated under the authority of the Colorado River Storage Project Act, the Boulder Canyon Project Act, and the Boulder Canyon Project Adjustment Act.”).

227. Discussions between Author Kuhn and Ival Goslin, Ed Currier, and Felix Sparks in 1984.

available in the Colorado River Basin.²²⁸ The purpose of the report was described by Tipton in the Foreword:

[The prospective authorization of the CAP] poses a problem to the States of the upper division of the Colorado River Basin. Uses in the Upper Basin may not have progressed to the point that all waters apportioned to it by the Colorado River Compact, or to the limit imposed by nature, are being used at the time the Central Arizona Project goes into operation if it is authorized and goes to construction. In other words, there might be some unused water destined for use in the Upper Basin passing Lee Ferry which, if used in the Lower Basin, would pose a problem when those waters subsequently were needed by projects in the Upper Basin.

Actually, at the present time some of the uses in the Lower Colorado River Basin on the main stem are being made only because of unused flows in the Upper Basin passing Lee Ferry. The present studies therefore appeared desirable to enable the Commission to take stock and see what problems might arise because of the situation, and in order that policies and procedures may be developed.²²⁹

In the report summary, Tipton concluded:

All studies disclose without exception that any increase in the use on the lower river must now be made from water apportioned to the Upper Basin, but now unused by it. Actually, at present the aggregate demand on Lake Mead is close to 9 maf per year. It is apparent that even present uses on the lower river are dependent upon significant amounts of water released from Lake Powell in excess of those required by the Colorado River Compact.

As the Upper Basin develops there will arrive a time when its water will no longer be available for further uses on the lower river. The question is, when will that time arrive.²³⁰

Tipton's prescient report determined that if the Upper Division states were delivering only 8.25 maf per year, which he referred to as an "arbitrary" amount, the deficit in the Lower Basin would be 1.195 maf per year.²³¹ If the delivery was 7.5 maf per year, the deficit was 1.945 maf per year.²³² These deficit numbers are what we refer to today as the "structural deficit."²³³ Tipton ended his report with a

228. TIPTON & KALMBACH, INC., WATER SUPPLIES OF THE COLORADO RIVER (1965), <https://www.varuna.io/LOTR/1965/TiptonReport1965ocr.pdf> [<https://perma.cc/4CEZ-FQ5W>].

229. *Id.* at 2.

230. *Id.* at 6.

231. *Id.* at 7.

232. *Id.*

233. The term "structural deficit" is currently evolving. In the early 2000s, author Kuhn started using it to refer to the difference between the minimum Upper Basin delivery plus inflow between Lee Ferry and Lake Mead and the demand on the river at Lake Mead plus reservoir evaporation. *See, e.g.*, Madeline Tennant & Amy Carmellini, *Quantifying Structural Deficit in the Lower Colorado River Basin*,

recommendation in support of importing water into the Basin: “[P]rojects must be authorized and constructed to import major amounts of water into the Colorado River Basin from sources of surplus. Such importation is important to both the Upper and Lower Basins.”²³⁴

The Upper Division states wanted section 601 in the CRBPA to avoid a situation where the Lower Division states would continuously object to and interfere with the storage of water in Lake Powell using article III(e) of the 1922 Colorado River Compact.²³⁵ Section 601 went beyond reservoir operations issues. Section 601(b)(1) requires the Secretary of the Interior to prepare a report on the annual consumptive uses of the Colorado River system.²³⁶ The report must include consumptive uses and losses on the Colorado River tributaries, including the Lower Basin.²³⁷

By 1968, it was clear that the UCRC had become the agency that 1948 Upper Basin Compact negotiators had envisioned in the foreword to the *Official Record*, an agency that would “shap[e] such development, and . . . integrate Federal and State activities and interests.”²³⁸ On critical river management issues such as the determination of how much water can be carried over in Lake Powell and in preparing consumptive uses and losses reports, the CRBPA requires the Secretary of the Interior to consult with the UCRC.²³⁹

H. The Upper Colorado River Basin Compact and the Evolution of the Modern “Colorado River in Crisis”

With the passage of the CRBPA in 1968, the legal and infrastructure template for the Colorado River as we know it was set in place. There would be additional federal legislation dealing with salinity and the Grand Canyon²⁴⁰ and a

HYDROSHARE (Apr. 30, 2020, at 16:17 MT), <https://doi.org/10.4211/hs.044de7ea0e9c4196998c870fadd2b047> [<https://perma.cc/7Z5A-MTZD>]. More recently it is used to quantify the total water demand on Lake Mead including evaporation or to describe the total Lower Basin mainstem system losses. See, e.g., Jennifer Yachnin, *Colorado River States Face Off over Dwindling Supplies*, POLITICO (Mar. 6, 2024, at 16:34 ET), <https://www.eenews.net/articles/colorado-river-states-face-off-over-dwindling-supplies/> [<https://perma.cc/8Z58-7ZFU>].

234. TIPTON & KALMBACH, INC., *supra* note 228, at 8.

235. U.S. DEP’T OF THE INTERIOR, UPDATING THE HOOVER DAM DOCUMENTS 207 (Milton Nathanson ed., 1978).

236. Colorado River Basin Project Act, Pub. L. No. 90–537, § 601(b)(1), 82 Stat. 885, 899 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556) (“The Secretary is directed to . . . make reports as to the annual consumptive uses and losses of water from the Colorado River system after each successive five-year period, beginning with the five-year period starting on October 1, 1970. Such reports shall include a detailed breakdown of the beneficial consumptive use of water on a State-by-State basis. Specific figures on quantities consumptively used from the major tributary streams flowing into the Colorado River shall also be included on a State-by-State basis. Such reports shall be prepared in consultation with the States of the lower basin individually and with the Upper Colorado River Commission, and shall be transmitted to the President, the Congress, and to the Governors of each State signatory to the Colorado River Compact . . .”).

237. *Id.*

238. This is an opinion of the author Kuhn based on his personal communications with former UCRC Executive Director Ival Goslin circa 1982–1983.

239. Colorado River Basin Project Act § 602(a)(3).

240. See, e.g., Colorado River Basin Salinity Control Act, Pub. L. No. 93–320, 88 Stat. 244 (1974).

few smaller, and mainly non-federal, projects would be developed, but with the authorization of the Central Arizona Project, a future of overallocation—and thus, conflict—was inevitable.

The CRBPA triggered the first dispute. The Act, under section 602, required the Secretary of the Interior to promulgate Coordinated Long-Range Operating Criteria (LROC) that would govern the operation of the major federal reservoirs.²⁴¹ For the UCRC, the marquee issue was the annual release from Glen Canyon Dam. Under the 1970 LROC, the Secretary set a minimum objective annual release of 8.23 maf per year.²⁴² The UCRC strenuously objected to this number because it could be argued that it was based on an annual delivery of 7.5 maf per year pursuant to article III(d), plus 750,000 acre-feet per year for Mexico pursuant to article III(c) (less 20,000 acre-feet per year to account for the Paria River flow).²⁴³ The Upper Division states objected to any implication that they had a compact obligation to deliver 750,000 acre-feet per year to Mexico.²⁴⁴ In response to the UCRC's concerns the Secretary made it clear that the 8.23 maf per year release was an objective, not a requirement.²⁴⁵

In the summer of 1980, Lake Powell finished its long 16-year fill.²⁴⁶ Twenty years later, Lake Powell was still essentially full.²⁴⁷ In contrast to the first two and one half decades of the twenty-first century, the last two decades of the twentieth century were wet.²⁴⁸ The mean natural flow at Lee Ferry from 1980 through 1999 was 16.1 maf per year, 30% more than the 2000–2024 mean of 12.4 maf per year.²⁴⁹

The wet conditions coincided with the completion of the construction of the CAP. By the late 1990s, the CAP was diverting about 1.6 maf per year to its service area in Central Arizona, including about 400,000 acre-feet for recharging long-depleted groundwater basins.²⁵⁰

While the CAP was ramping up to full uses, water deliveries to California water agencies continued at a level that exceeded its basic 4.4 maf apportionment under the Boulder Canyon Project Act.²⁵¹ From 1996 to 2000, California's Colorado River water use averaged 5.1 maf per year.²⁵² In the early 1990s, despite relatively

241. *Id.* § 602.

242. Discussions between Author Kuhn and Ival Goslin et al., *supra* note 227.

243. *Id.*

244. *Id.*

245. U.S. DEPT. OF THE INTERIOR, *supra* note 235, at app. VII-6.

246. *Reservoir Data*, *supra* note 2 (evidencing increased storage over 16 years of fill data in the graphs beginning in 1964 and ending in 1980).

247. *Id.*

248. See *Colorado River Basin Natural Flow and Salt Data*, *supra* note 26 (note increased inflows into Lake Powell between 1980 and 2000, and reduced inflows after 2000).

249. *Id.*

250. ARIZ. WATER BANKING AUTHORITY, ANNUAL REPORT 2000 app. B (2001).

251. See generally KUHN & FLECK, *supra* note 24, at 193. This overuse was considered legal because in addition to 4.4 maf/year of III(a) water, California has a right to use up to one half of the “unapportioned surplus.” See Boulder Canyon Project Act, 43 U.S.C. § 617c(a) (1928).

252. U.S. BUREAU OF RECLAMATION, COLORADO RIVER BASIN CONSUMPTIVE USES AND LOSSES REPORT FOR 1996-2000, at iv (rev. 2012), <https://www.usbr.gov/uc/envdocs/reports/ColoradoRiverSystemConsumptiveUsesandLossesReports/ColoradoRiverBasinConsumptiveUsesandLossesReport-1996-2000.pdf> [https://perma.cc/U2VV-54U6].

full reservoirs, the UCRC called the Basin's attention to the reality that with the CAP now in full operation and California using over 5 maf per year, water use in the Lower Basin was on an unsustainable path.²⁵³ Led by Colorado Commissioner James Lochhead, the Upper Division states pushed for what would be labeled the "California 4.4 Plan," a basin-wide plan that would give California a reasonable time period to reduce its annual uses from over 5 maf per year down to 4.4 maf per year.²⁵⁴

The basic problem was that under California's Colorado River allocation system, the Metropolitan Water District of Southern California (MWD), which serves nearly 20 million people, only had a right to 550,000 acre-feet of California's basic apportionment of 4.4 maf, yet the capacity of its Colorado River Aqueduct was 1.2 maf per year.²⁵⁵ To fill the gap, MWD would have to enter into agreements with two agricultural districts, Palo Verde and Imperial Irrigation District, to finance and develop projects that would transfer water from these districts to MWD.²⁵⁶

The priorities and amounts of Colorado River water that California water agencies can use are set by the 1931 Seven-Party Agreement.²⁵⁷ Under this agreement, agricultural districts have rights to the first 3.85 maf of California's basic 4.4 maf, but how much each district could use is not quantified.²⁵⁸ To allow for the transfer of water from agriculture to MWD, the water agencies needed to negotiate a Quantification Settlement Agreement (QSA).²⁵⁹ On January 16, 2001, Interior Secretary Bruce Babbitt signed the *Record of Decision for the Interim Surplus Guidelines*.²⁶⁰ The surplus guidelines applied to all three Lower Division states, but as a practical matter, they only impacted California.²⁶¹ Finalizing the QSA took several more years. It was ultimately signed in 2003.²⁶²

The Interim Surplus Guidelines were signed in the second winter of what would become the driest five-year drought in the Colorado River Basin since at least 1906.²⁶³ From 2000 through 2004, the mean natural flow averaged 9.46 maf per year, less than 60% of the 1980–1999 mean.²⁶⁴ System storage in Lakes Mead and Powell plummeted.²⁶⁵ Interior Department officials and the states agreed that in addition to the surplus guidelines, the Basin needed formal "shortage criteria and a more

253. See Lochhead, *supra* note 89, at 291–92.

254. *Id.* at 309.

255. *Id.*

256. *Id.*

257. RAY L. WILBUR & NORTHCUTT ELY, THE HOOVER DAM DOCUMENTS, H.R. DOC. NO. 717, app. 1003 at A479–83 (1948).

258. *Id.* at 107.

259. Lochhead, *supra* note 89, at 370–84.

260. KATHERINE OTT VERBURG, BUREAU OF RECLAMATION, THE COLORADO RIVER DOCUMENTS 2–3 (2008).

261. *Id.*

262. *Id.* at 6–12. In 2002, Secretary Norton suspended deliveries under the Interim surplus Guidelines. *Id.* at 6–10. California's water use went from 5.276 maf in 2002 to 4.44 maf in 2003. *Id.*

263. See Colorado River Interim Surplus Guidelines, 65 Fed. Reg. 78511 (Jan. 25, 2001) (note 2001 date on the notice); see also *Colorado River Basin Natural Flow and Salt Data*, *supra* note 26 (demonstrating the year 2001 to be within the lowest five year inflow period on record).

264. *Colorado River Basin Natural Flow and Salt Data*, *supra* note 26.

265. *Id.*

coordinated operation of Lakes Mead and Powell.”²⁶⁶ In December 2007, Interior Secretary Dirk Kempthorne signed the *Interim Guidelines for Lower Basin Shortages and the Coordinated Operations of Lake Powell and Lake Mead* (2007 Interim Guidelines).²⁶⁷ These guidelines, which were made “interim” so that the Bureau of Reclamation and the seven Basin states would revise, created a framework for modest Lower Basin reductions in allocations in the event Lake Mead dropped below the elevation of 1,075 feet (approximately 35% of its active capacity).²⁶⁸ Issues related to water use in the Upper Basin and the 1948 Upper Basin Compact were not specifically addressed during the basin-wide discussions and negotiations that preceded approval of the 2007 Interim Guidelines. The focus was on water use in the Lower Basin.²⁶⁹

The dry conditions continued.²⁷⁰ By 2014, basin water managers recognized that the 2007 Interim Guidelines were an insufficient response to worsening hydrology,²⁷¹ and more actions were necessary to reduce basin-wide use. In 2019, both the Upper Basin and Lower Basin approved drought contingency plans, which were then approved by Congress.²⁷² The Upper Basin’s plan, coordinated through the UCRC, includes three basic components: snowpack augmentation, drought operations of the upstream reservoirs, and demand management.²⁷³ The concept of demand management seeks to avoid involuntary curtailment through paid reductions in consumption. To date, the effort has involved pilot projects and studies.²⁷⁴ If a large-scale program is approved, it would likely be jointly managed by the states and the UCRC.

Although there was a small recovery in storage from 2005 to 2011, the below average stream flow conditions continued through 2024 and have been attributed to anthropogenic climate change.²⁷⁵ Close to full on October 1, 1999, by October 1, 2022, the combined active storage in Lakes Powell and Mead had dropped

266. KUHN & FLECK, *supra* note 24, at 198.

267. VERBURG, *supra* note 260, at 2-6.

268. *Id.* at 2-5 to -8.

269. An observation of author Kuhn who was a participant in many of the 2007 Interim Guidelines negotiation discussions between 2005 and 2007. The 2007 Interim Guidelines include an equalization table to address the requirements of Section 602(a) of the CRBPA. 2007 *Interim Guidelines*, *supra* note 38, at 49–51. This was a significant issue of concern for the UCRC, it is related to article III(e) of the 1922 Compact. See Colorado River Compact, *supra* note 3, art. III(e).

270. KUHN & FLECK, *supra* note 24, at 198.

271. As a member of the UCRC Engineering Advisory, author Kuhn participated in the meetings where the decisions were made to develop basin drought plans.

272. See Colorado River Drought Contingency Plan Authorization Act, Pub. L. No. 116–14, § 2, 133 Stat. 850, 850 (2019).

273. See *Drought Contingency Plans*, *supra* note 11. The Bureau of Reclamation website has more information on the specifics of the DCPs. *Drought Contingency Plans - Final Documents*, U.S. BUREAU OF RECLAMATION: COLORADO RIVER BASIN, <https://www.usbr.gov/ColoradoRiverBasin/dcp/finaldocs.html> [<https://perma.cc/4KV6-UT87>].

274. See UPPER COLO. RIVER COMM’N, UPPER BASIN STATES APPROVE THE IMPLEMENTATION OF THE 2024 SYSTEM CONSERVATION PILOT PROGRAM (2024), <https://www.ucrccommission.com/wp-content/uploads/2024/03/SCPP-2024-Press-Release-1.pdf> [<https://perma.cc/54CF-ZK42>].

275. See Jonathan T. Overpeck & Bradley Udall, *Climate Change and the Aridification of North America*, 117 PROC. NAT’L ACAD. SCI. 11856, 11856–57 (2020).

to about 13.1 maf or 25% of active capacity.²⁷⁶ Storage recovered a little after the wet winter of 2022–2023,²⁷⁷ but the future remains very uncertain.

The 2007 Interim Guidelines,²⁷⁸ the 2019 DCPs,²⁷⁹ and the related minutes to the 1944 treaty with Mexico,²⁸⁰ under which Mexico shares shortages, all expire on or before December 31, 2025, but will control operations for Water Year 2026 (October 1, 2025–September 30, 2026).²⁸¹ The Bureau of Reclamation is currently preparing the Environmental Impact Statement (EIS) to evaluate post-2026 reservoir management options.²⁸² In November 2024, it identified four action alternatives and a no-action alternative that it will analyze in the EIS.²⁸³ The draft EIS is expected to be released in late spring 2025.²⁸⁴

III. CURRENT UNFINISHED BUSINESS ON THE RIVER

A. The “Stalemate” Between the Upper and Lower Division States

In March 2024, the Upper Division and Lower Division states submitted competing proposals for the post-2026 reservoir operating guidelines.²⁸⁵ These new operating guidelines will replace the 2007 Interim Guidelines.²⁸⁶ The Secretary of the Interior will formally approve the new guidelines in 2026 after receiving input through an extensive public engagement process that began in 2022.²⁸⁷ As with the 2007 Interim Guidelines, the seven Basin states held a series of meetings with the intent of negotiating a seven-state proposal.²⁸⁸ Unlike 2007, these negotiations have failed thus far.

276. *See supra* note 1.

277. *Reservoir Data*, *supra* note 1 (recognizing the increase in storage during 2022 and 2023).

278. VERBURG, *supra* note 260, at 2–6.

279. AGREEMENT CONCERNING COLORADO RIVER DROUGHT CONTINGENCY MANAGEMENT AND OPERATIONS 2–3 (2019).

280. INT’L BOUNDARY & WATER COMM’N, EXTENSION OF COOPERATIVE MEASURES AND ADOPTION OF A BINATIONAL WATER SCARCITY CONTINGENCY PLAN IN THE COLORADO RIVER BASIN (2017), <https://www.ibwc.gov/wp-content/uploads/2023/03/Min323.pdf> [<https://perma.cc/V9G9-93JN>].

281. *Colorado River Post 2026 Operations*, *supra* note 39; *see also* 2007 *Interim Guidelines*, *supra* note 38, at 31 (defining water year).

282. *Alternatives Development*, U.S. BUREAU OF RECLAMATION: COLORADO RIVER BASIN, <https://www.usbr.gov/ColoradoRiverBasin/post2026/alternatives/index.html> [<https://perma.cc/H82Q-G3YX>].

283. *Id.*

284. *Id.* The authors would like to point out that with the change of administration that occurred in January 2025, the release date for the draft of the EIS is probably not fixed.

285. *Alternatives Development*, *supra* note 282.

286. Alex Hager, *Colorado River States Offer Competing Proposals for Managing Water*, CRONKITE NEWS (Mar. 7, 2024), <https://cronkitenews.azpbs.org/2024/03/07/colorado-river-states-offer-competing-proposals-for-managing-water/> [<https://perma.cc/K6P5-QYKJ>].

287. Request for Input on Development of Post-2026 Colorado River Reservoir Operational Strategies for Lake Powell and Lake Mead Under Historically Low Reservoir Conditions, 87 Fed. Reg. 37884, 37884 (June 24, 2022).

288. *See* Shannon Mullane, *Seven Colorado River States Have Mere Weeks to Reach Water Agreement After Long Impasse*, WATER EDUC. COLO. (Apr. 2, 2025), <https://watereducationcolorado.org/fresh-water-news/seven-colorado-river-states-have-mere-weeks-to-reach-water-agreement-after-long-impasse/> [<https://perma.cc/4AV7-CW48>] (describing the nature and intent of these off-the-record meetings).

The Upper Division states' proposal focuses on annual releases from Lake Powell through the Glen Canyon Dam. The annual release amount would be determined by the amount of water in storage in Lake Powell.²⁸⁹ Annual releases would vary between 5.0 and 12.0 maf per year but could be more when the reservoir was at full capacity.²⁹⁰ Under the Upper Division proposal, shortages to Lower Basin mainstem in and below Lake Mead would be whatever amount necessary to live with the annual releases from Glen Canyon Dam, plus inflows between Lee Ferry and Lake Mead, without draining Lake Mead.²⁹¹ In contrast, the Lower Division proposal focused on shortages, setting shortages to Lower Basin mainstem based on total system storage.²⁹² System storage includes Lake Mojave, Lake Havasu, Flaming Gorge Reservoir, Navajo Reservoir and the Aspinall Unit as well as Lake Powell and Lake Mead.²⁹³ Based on a rule curve,²⁹⁴ annual shortages could be up to 3.9 maf per year.²⁹⁵ Under their proposal, the Lower Division would take the first 1.5 maf per year of shortages, with Mexico sharing a yet-to-be-negotiated amount of the 1.5 maf.²⁹⁶ For shortages greater than 1.5 maf per year, the Lower Division proposed that the two divisions share the additional shortages equally.²⁹⁷

The Upper Division states have rejected the Lower Division proposal. They base their rejection on several factors. First, their representatives have repeatedly pointed out that because their users do not have the benefit of large storage buckets upstream of them, they suffer hydrologic shortages, especially in the drier years. Second, they note that unlike the Lower Basin, the Upper Basin is not using its full compact apportionment. Likewise, the Lower Division states have rejected the Upper Division's proposal for obvious reasons; they believe the shortages required by the Upper Division are too severe and at some point, both sub-basins will need to share in the cuts necessary to balance consumptive uses with the available supply.²⁹⁸

For the ongoing NEPA process, the Bureau of Reclamation will not be analyzing either of the competing division proposals as one of the four action alternatives. Instead, it has indicated that the alternatives are broad enough in scope

289. UPPER COLO. RIVER COMM'N, UPPER DIVISION STATES ALTERNATIVE REFINEMENTS 2 (2024).

290. *Id.* at 3.

291. *Id.* at 6.

292. Letter from Governors' Representatives of Arizona, California, and Nevada to Camille Calimlim Touton, Comm'r, Bureau of Reclamation 2–3 (March 6, 2024) [hereinafter Lower Basin Alternative Letter], https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/alternatives/2024-03-06_Lower_Basin_Alternative_Letter_Submittal_508.pdf [<https://perma.cc/HC3S-T6WC>].

293. *See id.* at 3.

294. A "rule curve" is water speak for a graph that shows reservoir releases as a function of storage elevation (or other parameters).

295. Lower Basin Alternative Letter, *supra* note 292, at 4.

296. *Id.* at 2, 4.

297. *Id.* at 3.

298. These observations and conclusions are based on the public comments made by representatives of the seven Basin states at recent CRWUA conferences in Las Vegas, Nevada. Colorado River Water Users Association Conference, Dec. 13–15, 2023; Colorado River Water Users Association Conference, Dec. 4–6, 2024. Notes are on file with authors. For a more recent summary, see Mullane, *supra* note 288.

that if the states of the Upper and Lower Division can reach a compromise proposal, it would most likely be covered by the ongoing NEPA process.²⁹⁹

As of December 2024, the divisions were still in communication but had not reached an agreement. Whether these states can reach a compromise on a seven-state proposal as they did in 2006 is unclear.³⁰⁰ If they cannot, the next chapter of the history of the river could be a return to litigation, and if so, the foundational problems with the Law of the River in the 1922 Compact and Upper Basin Compact will loom large.

B. A Basin-Wide Definition of Beneficial Consumptive Use Is Urgently Needed

The 1922 Compact does not include a definition of “beneficial consumptive use,” the commodity the compact apportions. This means at the basin-wide scale, there is not a consistent method of measuring compact apportionments. The 1948 Upper Basin Compact, article VI, provides for the use of the stream depletion theory.³⁰¹ The 1964 decree in *Arizona v. California* requires the use of diversions less return flows to measure Lower Division mainstem uses under the 1928 Boulder Canyon Project Act,³⁰² and since there is no Lower Basin compact, there is no recognized method of measuring consumptive uses on the Lower Basin tributaries.

Because of the impacts of anthropogenic climate change and changes in societal values, including tribal, environmental, and recreation concerns, the river that the Upper Basin Compact negotiators dealt with in 1948 no longer exists. The average natural flow of the Colorado River at Lee Ferry is likely far lower than the “conservative” 15.7 maf per year assumption made by the Engineering Advisory Committee in 1948.³⁰³ The twenty-first century average natural flow average is about 12.4 maf per year.³⁰⁴ While there is considerable uncertainty, much of the published climate science is pointing to an even drier future.³⁰⁵ Based on the post-2000 hydrology, basin-wide uses have exceeded the available supply by about 1.5 maf per year, putting significant strain on dwindling reservoir storage.³⁰⁶

299. Carly Jerla, Post-2026 Program Manager, U.S. Bureau of Reclamation, Comments at the 2024 Colorado River Water Users Association Conference (Dec. 5, 2024). Authors Kuhn and Tara were in attendance.

300. Alex Hager, *A Turbulent Year on the Colorado River Comes to a Close*, KUNC (Dec. 26, 2024, 06:00 MT), <https://www.kunc.org/news/2024-12-26/a-turbulent-year-on-the-colorado-river-comes-to-a-close> [<https://perma.cc/79HN-B5TN>].

301. Kuhn et al., *supra* note 1, at 116–17.

302. 376 U.S. 340, 342 (1964) (decree).

303. OFFICIAL RECORD, *supra* note 57, vol. III, Synopsis at 3.

304. *See Reservoir Data*, *supra* note 2.

305. Martin P. Hoerling, Jon K. Eischeid, Henry F. Diaz, Balaji Rajagopalan & Eric Kuhn, *Critical Effects of Precipitation on Future Colorado River Flow*, 37 J. CLIMATE 4079, 4091 (2024). The biggest uncertainty facing river flows is the impact of climate change on future precipitation in the Upper Basin’s higher elevation watersheds. *Id.* at 4080. There is little dispute that watershed temperatures will continue to rise, and that for the same precipitation levels, rising temperatures will reduce stream flows. *Id.* What is not clear is if increasing precipitation will offset the loss of flow caused by rising temperatures. *Id.*

306. The drawdown of the total storage in Lakes Mead and Powell from October 1, 1999, to October 1, 2023, was approximately 1.5 maf. *See Colorado River Basin Natural Flow and Salt Data*, *supra* note 26.

A drier future has huge potential consequences for water use in the Upper Basin under the Upper Basin Compact and its parent Colorado River Compact. In their pre-scoping letter on the issues that should be covered during the 2007 Interim Guidelines renegotiations, the seven Basin states signed a joint letter declaring that the Colorado River Compact, the 1944 treaty with Mexico, and the Upper Basin Compact should be foundations of the Post-2026 Operational Guidelines.³⁰⁷ Given the unresolved and disputed issues inherent in both compacts, this is a risky strategy. Without some very delicate diplomacy on the parts of the states, it could easily lead to interstate litigation.

The primary purpose of the Colorado River Compact is to provide an equitable division of the beneficial consumptive use of the river system's water between the Upper and Lower Basin.³⁰⁸ Under article III, the Upper Basin's apportionment is 7.5 maf annually and the Lower Basin's apportionment is 8.5 maf annually.³⁰⁹ As we have repeatedly noted, the "Compact did not include a definition of 'beneficial consumptive use.'"³¹⁰ Defining beneficial consumptive use is a prerequisite to measuring compact apportionment use, although the latter has many additional technical details.³¹¹ Further, under Arizona's now seven-decades-old position taken in *Arizona v. California*, uses on the Lower Basin tributaries may not even be included within the Lower Basin's compact apportionment.³¹² Without a basin-wide definition of beneficial consumptive use and agreement on the status of Lower Basin tributaries, the foundation proposed by the states cannot provide effective guidance on fundamental management questions facing the Basin. It is impossible for states to reach consensus answers to how much of their compact apportionments each basin is using and to agree on how much water the Upper Division states must annually deliver at Lee Ferry for Mexico. In the Lower Basin, the dispute between Arizona and California over how to define and measure beneficial use prevented a Lower Basin compact.³¹³ Thus, nearly 90 years after Lake Mead began filling, reservoir evaporation is not assessed to the project's beneficiaries, and the Secretary of the Interior has no way to determine if water is available under the Upper Basin Compact for the Hoover Dam water contracts.³¹⁴

The Upper Basin Compact negotiators understood the problems caused by the lack of definition for beneficial consumptive use. Colorado legal advisor Jean Breitenstein called the lack of measurement methods a weakness, urging his fellow

307. Letter from representatives of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming to Carly Jerla, Senior Water Res. Program Manager, U.S. Bureau of Reclamation (Sept. 1, 2022), https://www.usbr.gov/ColoradoRiverBasin/documents/post2026/pre-scoping/PS_667_7States.pdf [<https://perma.cc/Z585-T3GY>].

308. Colorado River Compact, *supra* note 3, art. I.

309. *Id.* art. III (a)–(b).

310. Kuhn et al., *supra* note 1, at 71.

311. Upper Basin Compact, *supra* note 7, art. VI (providing that the UCRC should utilize the inflow-outflow method to determine the quantity of consumptive use).

312. Opening Brief for Arizona, *supra* note 95, at 23.

313. *Id.* at 11.

314. All the Hoover Dam water contracts have a provision making them subject to the Colorado River Compact. RAY L. WILBUR & NORTHCUTT ELY, THE HOOVER DAM DOCUMENTS, H.R. DOC. NO. 717, at 410 (1948). The authors note that the provision is meaningless for several reasons, including the fact that there is no Lower Basin compact that divides the 8.5 maf among the five Lower Basin states.

negotiators not to write another compact with the same weakness.³¹⁵ Led by Arizona and Colorado, the stream depletion theory became a fundamental plank in the Upper Basin Compact.³¹⁶ The compact negotiators did this for simple reasons: to maintain their alliance with Arizona and to game the system so that in some years the Upper Basin could consume more than 7.5 maf per year while only being charged for depleting 7.5 maf at Lee Ferry under the compact.³¹⁷ They made their decision at a time when their understanding of the river's hydrology suggested that it would be possible to consume more than 7.5 maf in many years and still meet the Lee Ferry obligations.³¹⁸ Today, our understanding of hydrology is very different. Even if river flows return to twentieth-century levels, it is unlikely that Upper Basin consumption could exceed 6 maf per year.³¹⁹ There may no longer be any hydrologic benefits to maintaining the stream depletion theory as a part of the Upper Basin Compact.³²⁰ As for the alliance with Arizona, that state walked away from the stream depletion theory 66 years ago.³²¹

The primary purposes of the Upper Basin Compact are to (1) apportion the use of the water made available by the Colorado River Compact among the four Upper Division states and Arizona and (2) to define the obligations of each of the Upper Division states for meeting their Lee Ferry obligations.³²² Without a basin-wide definition of beneficial consumptive use and a consensus method for measuring it, there are many differing interpretations of the Lee Ferry obligations. Thus, it is impossible to determine how much water is available for use in the Upper Basin, essentially defeating the primary purposes of the pact.

Seventy-five years ago, Jean Breitenstein said, "It does not do any good to divide between these states the beneficial consumptive use . . . unless and until you know how you are going to measure [it.]"³²³ Similarly, a common management adage is, "you can't manage what you don't measure."³²⁴ Basin water managers must

315. OFFICIAL RECORD, *supra* note 57, vol. II, Sixth Meeting, at 52.

316. Upper Basin Compact, *supra* note 7, art. VI.; *see supra* Section II.A.

317. *See supra* Section II.A; Kuhn et al., *supra* note 1, at 82–83.

318. KUHN & FLECK, *supra* note 24, at 145–48.

319. The last two hydrologic determinations in 1988 and 2007 concluded that the Upper Basin could consume about 6 maf/year. U.S. BUREAU OF RECLAMATION, HYDROLOGIC DETERMINATION 20 (1988) [hereinafter 1988 DETERMINATION]; U.S. BUREAU OF RECLAMATION, HYDROLOGIC DETERMINATION 7 (2007) [hereinafter 2007 DETERMINATION]. The 2007 edition only included the first few years of the twenty-first century drought. *See* 2007 DETERMINATION, *supra*. The critical drought period for both analyses was 1953–1977. 1988 DETERMINATION, *supra*, at 5; 2007 DETERMINATION, *supra*, at 5. It is author Kuhn's view that if the Hydrologic Determination was to be recalculated based on the twenty-first century hydrology using the same criteria as the previous two versions, the water available for use in the Upper Basin could be 4 maf/year or less.

320. The Upper Basin Compact negotiators believed that there were two primary benefits to the stream depletion theory. First, they could occasionally use more than 7.5 maf/year, and second, the diversions less return flows method was too data intensive and cumbersome. With today's technology, satellite-based IR sensing, that may longer be true. STONE, *supra* note 44, at 20–21.

321. *See supra* Section II.E.

322. OFFICIAL RECORD, *supra* note 57, vol. I, Governor's Meeting, at 4.

323. *Id.* vol. II, Sixth Meeting, at 50.

324. Dave Lavinsky, *The Two Most Important Quotes in Business*, GROWTHINK, <https://www.growthink.com/content/two-most-important-quotes-business> [https://perma.cc/G9PH-2MGQ] (attributing the popular quote to Peter Drucker).

not let the lack of a compact definition of beneficial consumptive use and a consensus approach for measuring compact apportionments become fatal flaws in the future management of the Colorado River. Since the 1948 Upper Basin Compact is subject to the 1922 Colorado River Compact, a fatal flaw or failure to follow the strictures in the Colorado River Compact could render both meaningless. Article VI of the Upper Basin Compact provides for the UCRC, by unanimous agreement, to change the method for measuring the apportionments made by the compact.³²⁵ The UCRC is already on this path.³²⁶ Before making a unilateral change, however, the UCRC should advocate for a basin-wide method of measuring and reporting consumptive uses that applies to the Upper Basin, the Lower Basin mainstem, and the Lower Basin tributaries. Negotiating a compact definition of consumptive use and a method for measuring apportionments will not be easy; it will require the resolution of disputed issues that have split the Basin for decades. The Upper Division states may want to consider if it is appropriate to formally trigger the Colorado River Compact's dispute resolution provision provided for under its article VI, which empowers any one of the seven Basin states' governors to call for a seven-state negotiation to resolve disputes.³²⁷ Any resulting agreement would require ratification by the legislatures of all seven Basin states, effectively giving each state blocking power over any agreement. The provision has never been used.³²⁸

If the Basin states cannot agree on a basin-wide definition of beneficial consumptive use, they could consider an "agreement to disagree" that puts off or finesses the disputed issues through the term of the next interim agreement. But, if they do so, they are only leaving the foundational problems with the 1922 Compact and the Law of the River to be solved by the next generation.

325. Upper Basin Compact, *supra* note 7, art. VI.

326. See GABRIEL SENAY ET AL., UPPER COLO. RIVER COMM'N, ASSESSING AGRICULTURAL CONSUMPTIVE USE IN THE UCRB PHASE III REPORT 6 (Brenna Mefford & Jim Prairie eds., 2022). In June 2022, the UCRC adopted a resolution implementing the "eeMETRIC" method for determining Upper Basin agricultural uses and instructing the staff to develop an alternative to the inflow-outflow model. Upper Colo. River Comm'n, Resolution of the Upper Colorado River Commission, Consumptive Use Measurement in the Upper Colorado River Basin (June 14, 2022), <https://www.ucrccommission.com/wp-content/uploads/2022/07/2022-06-14-Resolution-Consumptive-Use-Measurement.pdf> [<https://perma.cc/2TAD-QNUE>].

327. See Colorado River Compact, *supra* note 3, art. VI.

328. There are three basic approaches to reaching resolutions to the disputed compact issues: a negotiated settlement or settlements, which, under article VI of the Upper Basin Compact, requires unanimous agreement of the Basin states; congressional action, which, in today's political environment, requires near unanimous agreement (historically major actions like the 1928 Boulder Canyon Project Act and the ratification of the 1944 Treaty Respecting Utilization of Waters were accomplished despite serious opposition from one or more of the states); and finally, Supreme Court litigation. The potential for Supreme Court litigation to address the many unresolved compact issues has been under discussion in the Upper Basin for many decades. Attorney John Carlson and his associate Alan Bowles wrote about it in 1986. See JOHN CARLSON & ALAN BOWLES, CONTRARY VIEWS OF THE LAW OF THE COLORADO RIVER: AN EXAMINATION OF THE RIVALRIES BETWEEN THE UPPER AND LOWER BASIN 29–35 (1986).

C. With No 1922 Compact Shortage Provision, the States Must Formally Determine Whether Upper Basin Delivery Obligations Should Be Changed to Reflect Climate Change-Induced Reductions in Colorado River Runoff

Climate change is adding another unknown level of uncertainty to the “what.” If climate change, not Upper Basin depletions, is one of the causes that prevents the Upper Division states from meeting their obligation not to deplete the Lee Ferry flow below 75 maf every ten consecutive years, is that a violation of article III(d) of the Colorado River Compact? For reference, the average natural flow at Lee Ferry from 2000-2023 is about 12.4 maf per year, over three maf less than the 15.7 maf per year the Upper Basin Compact negotiators assumed in 1948.³²⁹ Upper Basin depletions over the same period are in the range of 3.5–4.5 maf per year, including actual CRSP reservoir evaporation.³³⁰ If the Upper Division states no longer have an obligation to not cause the flow to be depleted below 75 maf every ten years, what is their obligation (factoring in climate change) and how is it determined? Without knowing the value for the ten-year Lee Ferry obligation, there is no way to determine how much water is available for use in the Upper Basin.³³¹

Upper Basin state officials are publicly taking the position that the fundamental problem on the river is overuse by the Lower Basin.³³² They base this statement on the reasoning that if one adds the Lower Basin’s mainstem uses, Lower Basin mainstem reservoir evaporation, and Lower Basin tributary uses, the total exceeds the 8.5 maf apportioned to it by the Colorado River Compact.³³³ Data on Lower Basin mainstem uses and reservoir evaporation are readily available, but data for Lower Basin tributary use are not. The latest data available on Lower Basin tributary consumptive uses and losses are from 2015.³³⁴ Despite limited tributary use data, Upper Basin officials often state that Lower Basin uses exceed 10 maf per year,

329. OFFICIAL RECORD, *supra* note 57, vol. III, Report of the Engineering Advisory Committee, at 3.

330. We presented a large range (4–5 maf per year) to recognize that Reclamation and the UCRC staff are in the process of implementing and back-casting to 1991 a new methodology (eeMETRIC) to estimate Upper Basin agricultural depletions (which make up 60+% of the Upper Basin’s annual depletions). See U.S. BUREAU OF RECLAMATION, FINAL EIS – COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD, at app. C, tbl. C-1 (2007), <http://www.riversimulator.org/Resources/Graphs/UpperBasinDepletionSchedule.pdf> [<https://perma.cc/D7MW-7UXY>].

331. This climate change argument may be more of a “talking points” strategy than a legal strategy. If this argument were to be successful at the Supreme Court, the precedent could reopen many Western interstate water compacts that include flow provisions that were negotiated before the effects of climate change were understood.

332. Mitchell, *supra* note 55.

333. *Id.*; see also COLO. WATER CONSERVATION BD., WHERE IS THE WATER USED (2024), <https://dnrweblink.state.co.us/CWCB/0/edoc/223964/March2024UpdateWhereTheWaterFlowsInfographic.pdf> [<https://perma.cc/9KBY-KMDG>].

334. Under the 1968 CRBPA, the Secretary of the Interior is required to publish a comprehensive basin-wide consumptive every five years. Colorado River Basin Project Act, Pub. L. No. 90–537, § 601(b)(1), 82 Stat. 885, 899 (1968) (codified in scattered sections of 43 U.S.C. §§ 1501–1556); see *supra* note 236.

implying an overuse of at least 1.5 maf per year.³³⁵ So far, this has been a powerful public relations strategy, but it ignores the reality that this statement is based on a method of measuring compact apportionments that is not agreed on by the seven states.³³⁶ Further, if the Upper Basin Compact Article VI method—the stream depletion theory—is applied, it is likely that in most recent years the Lower Basin’s total consumptive use has not exceed 8.5 maf per year.³³⁷

The Upper Division states’ contention that the Lower Basin is using more than its Colorado River Compact entitlement is the basis of their additional argument that, in most years, the Upper Division states have no obligation to deliver 750,000 acre-feet per year to Mexico.³³⁸ The rationale is that the Lower Basin’s overuse of 1.5 maf per year should be delivered to Mexico before the Upper Division states have any obligation to Mexico.³³⁹

The Lower Basin states have historically taken the position that based on the plain language of article III(c), the surplus is the average amount of system water available when more than 16 maf per year are available on a rolling ten-year average.³⁴⁰ Arizona recently took this position in a joint letter signed by the director of the Arizona Department of Water Resources and the general manager of the Central Arizona Water Conservation District (operators of the Central Arizona Project).³⁴¹ Under this theory, the obligation of the Upper Division states would be at least 750,000 acre-feet per year.³⁴² Beyond doubt, the obligation of the Upper

335. Based on the diversions minus return flows theory, even in Water Year 2023 when the total use from Lake Mead by Arizona, California, and Nevada was only 6.2 maf, adding in another 800,000 acre-feet of mainstem reservoir evaporation and 1.8–2.2 maf of tributary use, collectively the Lower Basin still used 8.8–9.2 maf, more than 8.5 maf apportionment. Authors’ math, done using U.S. BUREAU OF RECLAMATION, COLORADO RIVER ACCOUNTING AND WATER USE REPORT: ARIZONA, CALIFORNIA, AND NEVADA 5 (2023).

336. Kuhn, *supra* note 47.

337. See Upper Basin Compact, *supra* note 7, art. IV. If the Lower Basin Hoover Dam contract depletions are 7 maf (less than their 7.5 maf apportionment but consistent with average use over the last ten years) and the stream depletion theory is used to calculate reservoir evaporation (as it is for Lake Powell) and tributary uses, then additional depletions would be about 400,000 acre-feet for reservoir evaporation (800,000 of actual evaporation minus 400,000 acre-feet that would have occurred had the reservoirs not been built) and 800,000 to 1.0 million acre-feet for LB tributary depletions. Under this approach, total Lower Basin depletions would fall in the range of 8.2–8.4 maf. Authors’ math, done using U.S. BUREAU OF RECLAMATION, *supra* note 335, at 5.

338. Lochhead, *supra* note 89, at 320. Lochhead was not the first to make this argument. Former Colorado UCRC representative Felix Sparks made the same argument at a 1984 UCRC meeting in Santa Fe (at which Kuhn was present). For additional reading on whether the Lower Basin’s use in excess of 8.5 maf/year is a compact problem or violation, see generally Jason Robison & Lawrence MacDonnell, *Arizona v. California & the Colorado River Compact: Fifty Years Ago, Fifty Years Ahead*, 4 ARIZ. J. ENV’T L. & POL’Y 130 (2014).

339. Lochhead, *supra* note 89, at 320.

340. Schiffer et al., *supra* note 88, at 220–22.

341. Letter from the Cent. Ariz. Project & Ariz. Dep’t of Water Res. to Genevieve Johnson, U.S. Bureau of Reclamation (Dec. 20, 2022) (on file with the Arizona Dep’t of Water Resources); see also Letter from Entsminger et al. to Touton, *supra* note 40.

342. We use the term “at least” because the Lower Basin might claim that in addition to the 750,000 acre-feet delivery, the Upper Division states owe transit losses from Lee Ferry to the border with Mexico. The authors also wish to note that Arizona is extremely vulnerable under some interpretations of the Law of the River.

Division states to Mexico has the potential to become a significant disputed issue in the next several years. If the states end up in litigation, interpreting article III(c) will be one of the most basic issues the court will have to address.

The unadjudicated and adjudicated, but underutilized, water rights of the Upper Basin's tribal communities add yet another source of uncertainty and management challenge for both the tribes and the Upper Division states. Assuming it is settled law that tribal rights are present perfected (pre-compact) rights and thus unimpaired by the Colorado River Compact, and not subject to a curtailment,³⁴³ the further development and use of these Indian rights puts additional compact risk on the basin's post-compact rights.³⁴⁴ The Upper Basin's post-compact uses include the large transmountain diversions that serve municipalities such as Albuquerque, New Mexico, the Colorado Front Range (from Pueblo to Denver to Ft. Collins), Cheyenne, Wyoming, and the Wasatch Front in Utah. This situation means that the Upper Basin's water agencies with the most political power, the cities, have an incentive to oppose the funding and utilization of tribal water rights.

The February 2025 24-month study projects an annual release from Glen Canyon Dam of 7.48 maf.³⁴⁵ This means that the chances of the cumulative ten-year Lee Ferry flow dropping below 82.5 maf in 2027 are very high.³⁴⁶ The potential for Lee Ferry ten-year flows dropping below 82.5 maf makes renegotiations of the 2007 Interim Guidelines more challenging and increases the likelihood of litigation. The 82.5 maf metric has been referred to as the first hydrologic "compact trip wire."³⁴⁷ Although a temporary settlement negotiated by Department of the Interior officials is the most likely outcome, there are two other possibilities. First, the UCRC could vote to implement a curtailment under article IV. This is possible, but based on

343. We used the phrase "assuming it is settled law" recognizing that, in the 1963 *Arizona v. California* decision, the Supreme Court did not interpret the 1922 Colorado River Compact. 373 U.S. 546 (1963). It did, however, interpret provisions of the 1928 Boulder Canyon Project (article VI) that directly reference present perfected rights protected by article VIII of the compact. *Id.* at 382; see Jonathan R. Schutz, *Present Perfected Rights: The Most Senior Undefined Water Rights on the Colorado River*, 16 U. DENV. WATER L. REV. 381, 382 (2013).

344. The authors believe that it is now well accepted in the Upper Basin that the risk of a curtailment is a function of both the water supply available and the level of (post-compact) consumptive use. See KEVIN WHEELER, ERIC KUHN, LINDSEY BRUCKERHOFF, BRAD UDALL, JIAN WANG, LAEL GILBERT, SARA GOEKING, ALAN KASPRAK, BRYCE MIHALEVICH, BETHANY NEILSON, HOMA SALEHABADI & JOHN C. SCHMIDT, CTR. FOR COLO. RIVER STUD., *ALTERNATIVE MANAGEMENT PARADIGMS FOR THE FUTURE OF THE COLORADO AND GREEN RIVERS* 18 (2021).

345. The 24-Month Study, which projects inflows and outflows from Lakes Powell and Mead based on available data, is readily available. See E-mail from Noe Santos, River Operations Manager, Boulder Canyon Operations Off., and Alex Pivarnik, Supervisor River Operations Group, Upper Colo. Operations Off., to All Annual Operating Plan Recipients (Feb. 2025), https://www.usbr.gov/uc/water/crsp/studies/24Month_02.pdf [<https://perma.cc/V2DG-WG5R>].

346. Eric Kuhn, John Fleck & Jack Schmidt, *January 2025 24-Month Study Is a Major Caution Sign for the Colorado River Basin*, INKSTAIN (Jan. 22, 2025, at 10:31 MT), <https://www.inkstain.net/2025/01/the-january-2025-24-month-study-is-a-major-caution-sign-for-the-colorado-river-basin/> [<https://perma.cc/52TT-U8BN>].

347. We believe this phrase should be attributed to James Lochhead, Colorado's UCRC representative from the mid-80s through 1998. Lochhead was also special counsel for a group of Colorado water users and was directly involved in the negotiations of the 2007 Interim Guidelines.

comments made by UCRC members, very unlikely.³⁴⁸ The second possibility is that the UCRC refuses to vote to implement a curtailment, causing one or more Lower Basin states to sue the UCRC and the Upper Division states.³⁴⁹ Under this scenario, it is possible that the Supreme Court or a Special Master appointed by the Court could then order the UCRC to implement a curtailment. But first, the Court or its Special Master would have to sort out and decide numerous disputed issues, including how beneficial consumptive use under the Colorado River Compact is defined and measured. Such litigation would be lengthy, expensive, unpredictable, and disruptive to the cooperative efforts necessary to manage today's river. The future of both the Colorado River Compact and the Upper Basin Compact could be in jeopardy.

If the dry hydrologic conditions experienced from 2000 to 2025 continue, or if the Basin's hydrology becomes drier, it is possible, if not probable, that Lee Ferry ten-year flows could fall below 82.5 maf,³⁵⁰ increasing the potential for litigation. Litigation, either through a court order or a negotiated settlement, could result in a curtailment of uses under article IV of the Upper Basin Compact. The UCRC and the Upper Division states need to ask a basic question: Are we ready for such a contingency? A curtailment would require the UCRC to make some very difficult decisions such as how to administer the ten-year penalty provision of article IV(b) and how to identify and quantify the uses of water under rights perfected before November 24, 1922, as required by article IV(c).³⁵¹ Understanding the intent and logic of the compact's negotiators, and being willing to actually curtail uses, will be important factors in such a decision-making process.

D. Stakeholders Should Formally Acknowledge Tribal Water Rights in Future Governing Documents and Consider Reliable Mechanisms for Tribal Involvement Moving Forward

As modeled by the Water and Tribes initiative, a tribal NGO, it is appropriate and beneficial to include tribal representatives in decision-making about the future of the Colorado River.³⁵² In the Post-2026 process, there is a federal-tribes-states process for increased tribal consultation.³⁵³ The parties in this group include representatives for the Bureau of Reclamation, the 30 Colorado River Tribes, and the

348. View the comments made by Colorado Commissioner Rebecca Mitchell to the Board of the Colorado River Water Conservation District at its July 2023 Board Meeting on YouTube, beginning at 60:18. Colorado River District, *Day 1, Third Quarterly Meeting, River District Board of Directors - July 18, 2023*, YOUTUBE (Jul. 27, 2023), <https://www.youtube.com/watch?app=desktop&v=4vIaHbIJwtg>.

349. Another possibility is that Lower Division states sue the Secretary of the Interior because the Bureau of Reclamation is responsible for the operation of Glen Canyon Dam and the other CRSP storage reservoirs.

350. Kuhn et al., *supra* note 346.

351. How to address water use under the *Winters* rights of the Upper Basin's tribes could be one contentious subject, among many others. See Upper Basin Compact, *supra* note 7, art. IV(c); see generally *Winters v. United States*, 207 U.S. 564 (1908).

352. See, e.g., Letter from Twenty Tribes to Camille Touton, Comm'r, U.S. Bureau of Reclamation 1 (May 16, 2024), https://www.waterandtribes.org/_files/ugd/1c5bb7_4b2fb1fb199e40a9a149d3de5006469d.pdf [<https://perma.cc/D5C2-RM3N>] (detailing tribal "views and expectations regarding how Basin tribes' water rights should be treated and protected" in the Post-2026 guidelines).

353. *Id.* at 2.

seven Basin states. In this process, tribes have proposed key principles for guiding Colorado River Basin management outcomes.³⁵⁴ These key principles are: the United States must (1) take actions to actively protect tribal water rights regardless of whether the rights have yet been quantified, to meet its trust responsibility to tribes; (2) encourage the development of flexible water management tools to allow tribes to determine how and when to use their water rights; and (3) create a permanent and formalized structure for tribal participation in future Colorado River governance.³⁵⁵ These principles are critical for rectifying the historic wrongs against tribes and Nations in the Colorado River Basin.

Taken by itself, it would be symbolically meaningful to urge Congress to repeal the provisions of the authorizing legislation for the San Juan–Chama and Navajo Indian Irrigation Projects³⁵⁶ that intentionally discriminate against tribal communities in Arizona and New Mexico.³⁵⁷ These provisions were specifically designed to limit the perfection and use of tribal water rights that are protected under articles VII and VIII of the Colorado River Compact.³⁵⁸ They are a relic of a time when overt discrimination against Native Americans was common and acceptable. However, as we detail above, the Law of the River is a complex web. Tugging at threads in the middle of the body of the law could lead to consequences no one can foresee, to say nothing of the difficulty of repealing legislation currently. We take an alternate view—the Law of the River is a polycentric system for water governance,³⁵⁹ and it is, by definition, iterative. Future legislation and rulemaking have the opportunity and, more importantly, the obligation to honor tribal sovereignty and tribal priority dates.

A recent Memorandum between the six tribes of the Upper Colorado River Basin (Jicarilla Apache Nation, Navajo Nation, Ute Mountain Ute Tribe, Southern Ute Indian Tribe, Ute Indian Tribe, and the Paiute Indian Tribe of Utah) and the Upper Colorado River Commission formalizes regular meetings between the tribes and the Upper Colorado River Commission.³⁶⁰ This open line of communication demonstrates significant progress since the days of the Zimmerman Letter. There is more work to do, especially as water managers contemplate a future with less Colorado River system water. In the remote event that tribal water rights cause consumptive uses in either Arizona or New Mexico to exceed their Upper Basin Compact apportionments,³⁶¹ the problem lies within the construct of the compact,

354. *Id.*

355. *Id.* at 2–5.

356. Navajo Indian Irrigation Project, Pub. L. No. 87-483, 76 Stat. 96 (1962).

357. *Id.* at §§ 11(a), 12(a)–(b).

358. *Hearing on S. 107*, *supra* note 61, at 32 (statement of S.E. Reynolds, State Eng’r, State of N.M.) (considering a bill to authorize the Secretary of the Interior to construct, operate, and maintain the Navajo Indian Irrigation Project and the initial stage of the San Juan–Chama project as participating projects of the Colorado River Storage Project, and for other purposes).

359. Mark Stephan, Graham Marshall & Michael McGinnis, *An Introduction to Polycentricity and Governance*, in *GOVERNING COMPLEXITY* 21–44 (Andreas Thiel et al. eds., 2019).

360. MEMORANDUM OF UNDERSTANDING, *supra* note 147.

361. We refer to this situation as unlikely, at least in the short term, because with the retirement of coal-fired power plants in Four Corners region, consumptive use in both states has been falling. The irony is that Colorado, the state that insisted on the restrictive provisions, has for at least the last two decades been consistently using about 55% of the Upper Basin’s total use, an amount over its 51.75%

not with the tribes, and the burden of the fix should be on the Upper Basin states in collaboration with the federal government, which owes tribes a trust responsibility.

CONCLUSION

The negotiation of the Colorado River's Post-2026 Operating Guidelines presents a timely opportunity to meaningfully evaluate future changes to the Law of the River to guide and inform Upper Basin water use and management during an increasingly uncertain and challenging future. The seven Basin states have repeatedly stated that they want to rely on the 1922 Colorado River Compact, the 1944 treaty with Mexico, and the 1948 Upper Basin Compact as the foundations for the future management of the river. These narrow criteria present significant obstacles—as of the writing of this Article, the Upper Division and Lower Division states are at a stalemate and may be closer to interstate litigation than to a consensus agreement.

Given the significant problems with these foundations, outlined in this Article, a stalemate leading to litigation should surprise no one. The Colorado River has a basic math problem; its foundations allocate 17.5 maf per year, but the water available is far less, about 13.5 maf per year, and will likely continue to shrink.³⁶² We have identified three basic needs, born of ambiguities in the current Law of the River, that will have to be addressed to fix the in the foundations:

- (1) A common basin-wide definition of beneficial consumptive use, without which the apportionments made in both the 1922 and Upper Basin Compacts are essentially meaningless.
- (2) A shortage sharing provision that equitably spreads the impacts of climate change on both sub-basins.
- (3) The recognition of Basin tribes' rights and water needs.

The authors see three basic paths that the Basin's states, tribes, and other stakeholders might take. Firstly, the seven Basin states could negotiate a short-term agreement that puts off or finesses the problems for the life of the next Interim Guidelines. This path creates a significant burden for the next generation of water managers in a future with entirely uncertain water supply. We hope the Basin does not take this path. The next Interim (Post-2026) Guidelines will expire; the foundational Law of the River will not.

Secondly, the seven Basin states could proceed with interstate litigation in the Supreme Court. This option would be lengthy and likely to freeze the cooperation among the parties and the development of innovative solutions that all agree are necessary to solve the Basin's problems. Furthermore, litigation on Colorado River

apportionment. It is not fair, however, to conclude that Colorado is overusing its Upper Basin Compact apportionment. Colorado's apportionment is 51.75% of the water available for use in the Upper Basin (less Arizona's 50 kaf), referred to as the "what" in *A Horse Named "Stream Depletion Theory*. Kuhn et al., *supra* note 1, at 114–15. Only once the "what" is defined can Colorado's 51.75% apportionment be quantified. *Id.*

362. See *supra* notes 71–72 and accompanying text.

allocation will not necessarily produce the most equitable or adaptive water management solution—it will simply reach the most well-argued conclusion.

The final option we have identified is for the seven Basin states to negotiate a long-term solution that modernizes the foundations of the Law of the River, enabling the next Interim Guidelines to manage the Colorado River that we actually have, rather than the Colorado River of myth. It is imperative for the UCRC and the Lower Basin states to work collaboratively in updating the Law of the River and eliminating the ambiguities we have identified in order to maintain a durable system for delivering water to all the Basin's constituents in perpetuity.