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P. Andrew Jones & Tom Cech, Colorado Water Law for Non-Lawyers

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Powell details the upside and downside of these alternatives, especially comparing costs and efficiency.

The sixteenth chapter, *Let People in the Future Worry about It*, amplifies Powell's belief that change needs to happen now. Powell discusses the problems of silt and salt, compromising reservoirs, dams, and the water quality of the Colorado River. He discusses the burden of repairing dams and keeping them functional. Powell also writes of dams being a short-term solution that eventually must fail. Powell bases his assertions of failure on the problem of silt, which is the most prevalent culprit to the downfall of dams. Powell notes that few solutions exist to combat silt. According to Powell, flushing muddy water through openings in a dam may be a solution, but this would not affect any silt below the level of the hydraulic generators. Thus, the most obvious strategy is to dredge the sediment. However, with a lake the size of Lake Powell, the author estimates that 120,000 tons of silt would need dredging each day, and there is no place to hold this dredge even if the actual feasibility of a project of this magnitude were not an issue in itself.

In the seventeenth chapter, *A Hundred Green Lagoons*, Powell further depicts gloom, especially for wildlife, as the Colorado River Compact becomes unworkable and Lake Powell dries up. Changes are necessary, but past failures in rebuilding and sustaining dams leaves Powell with little hope that the West can sustain itself by staying on the path it carved out years ago.

The fifth part of the book, *River of Tomorrow*, contains the last two chapters, *River of Law*, and *The West Against Itself*. These chapters further discuss the breakdown of the Colorado River Compact. Powell provides a detailed vision of the West if it continues on its current path. Powell ends by discussing the changes in society over the last several decades, and how water adaptation to a new, man-made climatology is the only hope for the future of the West.

Dead Pool vividly portrays the history in developing the West and the water needed to sustain it. It gives a glimpse into the future of water law in the Southwest, and focuses on how past decisions of the government may have grave, unintended consequences in the future.

Chris McNicholas

P. Andrew Jones & Tom Cech, *Colorado Water Law for Non-Lawyers*, University Press of Colorado (2009); 276 pp; \$26.95; ISBN 9780870819506; soft cover.

In *Colorado Water Law for Non-Lawyers*, P. Andrew Jones and Tom Cech direct their discussion of Colorado water law towards non-lawyers, effectively explaining the state's complex water allocation scheme. The book is more thorough than most materials now available to the general public, but less detailed than a traditional textbook. Each chapter describes a specific aspect of Colorado water law, providing the reader with a basic understanding of all elements of Colorado's

allocation system. To accomplish this goal, the book describes Colorado's history with water, ranging from the Anasazis, the first residents to irrigate using Colorado water, to the current population's multiple uses. The book also discusses why Colorado water law exists in its current state, directing the reader toward understanding the overall water process.

Chapter One, *Colorado Climate, Geology, and Hydrology*, introduces the reader to the climate, topography, hydrology, and geology of the state. These natural attributes determine the water patterns in the state and are partially responsible for the development of Colorado's water law. Because of the varying topography, rain and snowfall amounts are extremely variable. Additionally, the state's sunny climate and high elevation create significant evaporation rates, presenting many challenges to water users. These challenges compelled the creation of a unique water law system.

Chapter Two, *Early Water Use and Development*, presents Colorado's historic cultures and their water uses. The first known inhabitants of Colorado were nomadic, but centered many activities, such as religious ceremonies and trading, next to streams. Eventually, groups gave up nomadic life and began to farm, settling near water sources. The Anasazis first built ditches, diverted water, and constructed a reservoir, now known as "Mummy Lake." Subsequent settlers failed to complete irrigation projects. Irrigation success finally came during the Colorado gold rush in 1859. As a result of the growing mining industry, the population grew and agriculture became inevitable. Necessity drove settlers to divert water and build irrigation ditches.

Chapter Three, *Water Law Basics*, describes the fundamental principles of the riparian system of water allocation and explains why Colorado departed from this system to one of prior appropriation. The riparian system dates back to the Roman Empire and allocates water rights to the land adjoining the stream. The landowner has a usufructuary right to use a reasonable amount of water, as long as the user does not injure other landowners. However, because water is scarce in the West and miners required large quantities of running water, the principles of the Riparian Doctrine could not support Colorado's water needs. Thus, frontier justice developed the Prior Appropriation Doctrine—"first in time, first in right." Under this doctrine, the law viewed a water right separately from a mining claim, and judges established a priority list for each stream in their jurisdiction. Thus, miners gained economic certainty and had an incentive to develop large-scale mining projects.

Chapter Four, *Introduction to Federal and Interstate Issues*, details water sharing between the states. The federal government gave each state control over all waters within the state, allowing each state the autonomy to implement a method of water administration that best suits the needs of the state. In Colorado, which has the strictest form of prior appropriation, even the federal government must have an adjudicated decree to divert water and cannot take water out of priority. However, two exceptions apply: (1) the federal government can reserve

water rights on federal land, and (2) federal agencies can control water uses under the Endangered Species Act and the Clean Water Act. When disputes between states arise, the states can bring the case to the United States Supreme Court to rule using equitable apportionment, a balancing doctrine. The United States Supreme Court, however, has resolved very few of these disputes, so there is little precedent, and a large degree of uncertainty in the outcomes. Thus, states typically resolve their disputes with negotiations and binding compacts.

Colorado law divides water into four distinct categories: (1) tributary water; (2) non-tributary and not non-tributary water; (3) designated groundwater; and (4) exempt wells. The law presumes all water to be tributary water, water connected to and contributing to a natural stream. The other three categories are exceptions to the general presumption. Chapter Five, *Tributary Water*, details this category of water, which includes flowing streams and alluvial aquifers. Gaps in the sedimentary material of alluvial aquifers allow water to eventually seep back into the stream, so all tributary water connects to a flowing stream.

The Water Rights Determination and Administration Act of 1969 ("1969 Act") governs tributary water allocation according to strict prior appropriation principles. The 1969 Act created seven water divisions, a court system devoted to solely to water issues, and a process to establish a water right. The process begins when a water right seeker applies for a permit and decree with the court. Next, the court publishes the application in a local newspaper and a water court résumé, giving interested parties the ability to object. A water court referee evaluates the claim and makes a non-binding recommendation to a water judge. A party can object to the recommendation and request a complete trial. Typically, a referee will review simple, noncontested cases, and the parties will request complicated matters be sent directly to a judge.

For a water right to have value, the permit-holder must have a decree because the decree gives the owner a priority date. To establish a tributary water right, a water right owner must divert the water and put that water to beneficial use. Recently, many issues have arisen surrounding perfection of a water right: (1) whether a water user must actually divert the water or if the user can use the water instream; (2) whether the government should allow the creation of instream flow water rights to sustain fish and wildlife population; and (3) whether an uncertain future use can sometimes be a beneficial use. Additionally, because water rights are property interests, owners can change the type of water use and the point of diversion, with a limitation that the new user cannot injure another water right. The new user must divert the same amount of water and return the same amount of non-consumptive water back into the stream.

A final tributary issue deals with pumping wells. Until the 1960s, Colorado did not regulate alluvial wells because geologists did not understand the connection between wells and flowing streams. The 1969 Act required that water courts adjudicate these wells according to tributary water principals. The 1969 Act also permitted an augmentation plan so well owners could continue to divert if they could

find ways to add water to the river. Owners can find extra water by engaging in leases, buying senior rights, or building storage vessels.

Chapter Six, *Non-Tributary and Not Non-Tributary Groundwater*, discusses the waters in confined aquifers. Water users must employ drills and wells to access this type of water. Non-tributary groundwater does not affect the flow of natural streams in any significant way. Not non-tributary groundwater does slightly affect stream flow because a thinner layer of sedimentary material allows for some water transfer. However, the Colorado General Assembly ("General Assembly") still required allocation of this water according to the principles of non-tributary groundwater, due to the economic importance of this type of water. The General Assembly first exerted its control over non-tributary waters in Senate Bill 5 in 1985, deciding that landowners above these confined aquifers could appropriate the water below. Even though this type of water is nonrenewable, the General Assembly decided that the owner could deplete the aquifer within 100 years. To receive a well permit, the owner must (1) apply to the Office of the State Engineer, (2) demonstrate that the groundwater meets the statutory definition of non-tributary groundwater, and (3) prove that he owns the land above the aquifer or has permission from the owner to pump the water. This process is relatively straightforward, but after multiple land transfers and possible splitting of water rights, questions may still arise over actual ownership.

Chapter Seven, *Designated Groundwater*, details the third type of water, designated groundwater. Colorado lawmakers introduced designated groundwater in the 1965 Ground Water Management Act (the "1965 Act"), following the discovery that well pumping affects tributary water. The 1965 Act required wells to conform to the principles of tributary water allocation, but exempted certain wells that only had a *de minimis* effect on flowing streams. The 1965 Act also established the Colorado Ground Water Commission, which officially assigns designated groundwater status. Initially, the Commission designated many basins, but designation has become increasingly difficult and controversial. The Commission allocates basins according to a modified prior appropriation system that calls for an additional reasonableness assessment. The General Assembly decided this approach was necessary to protect economic development so well pumping in certain areas did not completely end.

The final type of water in Colorado is exempt wells, described in Chapter Eight, *Exempt Wells*. Exempt wells do not follow prior appropriation rules because they only have a small capability, meant merely for domestic use, livestock watering, and certain low-intensity commercial uses. Because these wells directly oppose prior appropriation principles, statutes specifically define appropriate exempt wells, and the state engineer does not issue a permit unless the application clearly meets all the statutory standards. Additionally, the state engineer strictly enforces the terms of the permit and regularly investigates any claim of overuse. Even though an exempt well owner can only withdraw a small amount of water, these wells can

considerably affect other water users because there are a large number of these wells.

Chapter Nine, *River Administration*, details the agencies and principal personnel that administer water law procedures. Colorado was the first state to have public administrators control water rights. The General Assembly divided the state into water divisions. A division engineer controls each water division, maintains a record of all water rights in his or her division, and is responsible for the division's water commissioners. Water commissioners closely watch the river conditions and all the diversions in his or her district. If a water right holder experiences an insufficient water supply, he or she alerts the water commissioner. The commissioner assesses the claim and can issue a call date, requiring junior users to cease diverting.

Chapter Ten, *Water Entities*, details seven different types of organizations that have been imperative in Colorado's history by managing and constructing large diversion projects. In fact, similar entities date back to the Anasazis' efforts to build a shared diversion and storage plan at Mummy Lake. In the 1800's, water users created mutual ditch companies, the first type of modern water entity to develop, preserve, and deliver irrigation water to users. Mutual ditch companies have a corporate structure, with bylaws, articles of incorporation, and a board of directors, where water permit-holders are the shareholders. Permit-holders remain the true owners of the water rights. The second type of entity, a lateral ditch company, is similar in organization and operation, but operates on a smaller scale. Typically, mutual ditch companies deliver water only to a headgate, and a lateral ditch company will pick up the diversion process with smaller ditches.

The government can form an irrigation district, following a petition by landowners for a district to plan and manage large irrigation projects. District courts can create a similar entity, a water conservancy district. Water conservancy districts can organize a wider body of water concerns, including the administration of water projects, water quality control, water education, and water distribution, and can also tax and issue bonds. The General Assembly can create a large-scale water conservation district to control water supply in a large geographic area. While many water conservancy districts exist, Colorado only operates four water conservation districts. A Title 32 Special District, typically a municipality, forms to perform a specific task, such the development of a reservoir or the creation of a water treatment facility. Finally, junior permit holders recently began to form augmentation plan groups to help each other when the group can no longer pump water.

Chapter Eleven, *Water Rights in the Marketplace*, summarizes basic economic principles that affect water rights and details the essential steps to purchase a water right. Because the prior appropriation system allows for the sale of water rights, water is a valuable commodity, subject to traditional economic principles of supply and demand. Thus, in over-appropriated streams, the value of a water right is extremely high. However, a market based only on supply and demand does not account for some beneficial activities, such as environmental quality.

Colorado law treats water right sales as it does land sales. However, while warranty deeds are the most common in real property sales, they are rare in the sale of water rights. Warranty deeds, the strongest guarantee, obligate the seller to defend title if any title issues arise. These are not popular in water right sales because water records can be difficult to trace. Special warranty deeds are more popular in water transactions: the seller promises that he has not done anything to the title, but makes no promises about his predecessors. A final deed is a deed without any promises, a quitclaim deed, which may be appropriate when both parties understand that the title is unclear or in the middle of a legal proceeding. Finally, the prospective buyer must perform the important step of due diligence to ensure delivery of water to the buyer's land both legally and physically.

In the final chapter, *Emerging Trends and Issues*, the book details three main issues likely to change future water law policy: (1) population growth, resulting in a decline in agriculture; (2) groundwater allocation; and (3) environmental concerns. The book cites studies projecting a sixty-five percent increase in population in Colorado by 2030. This population increase will demand more water diversions to Front Range municipalities. The authors argue that municipalities will need to convert irrigation water to municipal uses. Cessation of irrigation wells will have far reaching consequences beyond simply closing farms, including various social and environmental costs. Additionally, groundwater allocation will result in more wells shutting down as senior users with ineffective means of diversion put more calls on a river. Finally, the prior appropriation system does not take into account the environmental effect of water diversion. The authors argue that Colorado will have to change a strict reliance on prior appropriation to deal with these pressing issues.

Colorado Water Law for Non-Lawyers is a beneficial book for anyone seeking to obtain a general understanding of Colorado water law, whether non-lawyer, non-water lawyer, or law student. Additionally, water practitioners can recommend this book to their clients, who might have little knowledge of the water right they have or seek to have. The book succinctly lays out historic principles and explains current and future issues in Colorado water law.

Shannon Carson

Bonnie G. Colby, John E. Thorson, Sarah Britton, *Negotiating Tribal Water Rights: Fulfilling Promises in the Arid West*, The University of Arizona Press, Tucson, AZ (2005); 191 pp; \$35.00; ISBN 0-8165-2455-6; soft cover.

Negotiating Tribal Water Rights: Fulfilling Promises in the Arid West presents a thorough overview of Indian water issues in the Western United States. Water conflicts pose a problem in every river in the West, and these conflicts seem to worsen every year. At the heart of these troubles is the great uncertainty of ownership that pervades the water