THE PUBLIC TRUST DOCTRINE & GROUNDWATER: PROTECTING GROUNDWATER RESERVES FOR FUTURE GENERATIONS

BY

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The United States' groundwater resources are in crisis. As climate change creates surface water shortages, cities, farms, and industry are becoming increasingly reliant on groundwater. At current usage rates, this reliance is unsustainable, causing unintended harms like decreased water quantity and quality. In some areas, because groundwater resources can take millennia to replenish, the harms are irreversible, creating a unique type of monopoly in which one generation uses a resource to the exclusion of future generations. The public trust doctrine—a sovereign responsibility to protect public access to certain resources for both present and future generations—could help remedy this intergenerational inequity. This Note explores how courts might apply the public trust doctrine to groundwater. Despite the public trust doctrine's historic tether to navigable waters, the public trust is flexible enough to protect groundwater resources. This Note begins by exploring the groundwater crisis. It then details the five regimes under which states allocate groundwater and how the public trust might supplement these regimes. By describing the history of the public trust doctrine and its tether to navigable waters, this Note argues that throughout the doctrine's history navigability has served as a surrogate for a waterbody's social and economic importance. Considering groundwater's current importance, groundwater meets this conceptualization of "navigable." Finally, this Note looks to three representative states that have already applied the public trust doctrine to groundwater, providing three models for other states. This Note concludes that the public trust doctrine could supplement state regulation of groundwater to protect the resource for future generations.

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I. INTRODUCTION

Groundwater provides drinking water for nearly half of the country's population,[1] and irrigates some of the country's most agriculturally productive areas in the Great Plains, California's Central Valley, and the Upper Midwest.[2] Yet, groundwater resources across the country are in a climate trap.[3] As warming temperatures and drought cause surface waters to dwindle, water users turn to groundwater to make up the deficit.[4] Many of these groundwater resources have

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[1] JOSEPH W. DELLAPENNA, WATERS AND WATER RIGHTS § 18.01 (Amy K. Kelly & Jesse J. Richardson, Jr. eds., 3d ed. 2023) [hereinafter DELLAPENNA, WATERS AND WATER RIGHTS]; *see also* ROBERT GLENNON, WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS 28–29 (2002) [hereinafter GLENNON, WATER FOLLIES] (noting that groundwater is often of superior drinking quality to surface water because surface water accumulates salts as it flows downhill).

[2] Jack Tuholske, *Trusting the Public Trust: Application of the Public Trust Doctrine to Groundwater Resources*, 9 VT. J. ENV'T L. 189, 193 (2008); GLENNON, WATER FOLLIES, *supra* note 1, at 28 (noting that groundwater is an enticing source of water for farmers because it is available year-round and exists almost everywhere in the country).

[3] Claire O'Neill et al., *America is Using Up Its Groundwater Like There's No Tomorrow*, N.Y. TIMES (Aug. 28, 2023), https://perma.cc/PFV6-AQZ8; *see also* U.S. GOV'T ACCOUNTABILITY OFF., GAO-20-24, WATER INFRASTRUCTURE: TECHNICAL ASSISTANCE AND CLIMATE RESILIENCE PLANNING COULD HELP UTILITIES PREPARE FOR POTENTIAL CLIMATE CHANGE IMPACTS 57–61 tbl.4 (2020) (explaining that diminished groundwater recharge rates could cause the Southeast, Midwest, Great Plains, Southwest, and Northwest to experience water shortages and drinking water service disruptions).

[4] O'Neill et al., *supra* note 3.

accumulated over thousands of years and are unlikely to recharge on human timescales.[5] As a result, continued overuse will eventually leave some communities without water.[6] A recent New York Times investigation spotlighted the dire condition of the United States' groundwater resources;[7] however, government agencies have warned about the harms of groundwater overuse for decades to little response.[8]

Governmental failure to respond can be partly attributed to the temporal separation between current groundwater overuse and the negative externalities that overuse causes.[9] Externalities are the unaccounted-for effects one party's actions have on the wellbeing of another.[10] Any action can have both positive and negative externalities.[11] Temporal externalities occur when a party is separated from their action's externalities by an amount of time.[12] Thus, a negative temporal externality occurs when a contemporary resource user reaps the benefits of their use but is temporally disconnected from the harms that use creates.

The temporal separation identified above disincentivizes contemporary government actors from intervening, creating what some scholars have referred to as the temporal tragedy of the commons.[13] Conventionally, the tragedy of the commons describes the incentive that individual users of a common resource have to exploit the resource to

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[5] *Id.*; *see* Marc F.P. Bierkens & Yoshihide Wada, *Non-renewable Groundwater Use and Groundwater Depletion: A Review*, ENV'T RSCH. LETTERS, May 2019, No. 063002, at 1–2 (explaining that the expansion of irrigated agriculture and the increasing number of people that live in large cities has resulted in water users increasingly relying on non-renewable groundwater, defined as "groundwater that is taken out of aquifers that will likely not be replenished on human time scales").

[6] O'Neill et al., *supra* note 3.

[7] *Id.*

[8] *See* U.S. GEOLOGICAL SURV., USGS FACT SHEET-165-00, LAND SUBSISTENCE IN THE UNITED STATES 1 (2000), https://perma.cc/W5FE-FST8 ("The increasing development of [the U.S.'s] land and [ground]water resources threatens to exacerbate existing land-subsidence problems and initiate new ones."); *see also* Bierkens & Wada, *supra* note 5, at 2 (noting that the scientific community has been aware of the harms of groundwater overuse for almost two decades).

[9] Yael R. Lifshitz et al., *The Future of Property*, 44 CARDOZO L. REV. 1443, 1450–56, (2023) (describing temporal externalities and the temporal tragedy of the commons).

[10] STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW 77 (2004) ("One party's action will be said to have an *external effect*—or to create an *externality*—if it influences, or may influence . . . the well-being of another person . . . ." (footnote omitted)).

[11] *See id.* at 79 (explaining that whether one perceives an externality as harmful or beneficial is a result of one's standard of reference).

[12] Lifshitz et al., *supra* note 9, at 1450–51; *see also* SHAVELL, *supra* note 10, at 78 (explaining that use of a common resource can have contemporaneous or non-contemporaneous effects on others).

[13] Lifshitz et al., *supra* note 9, at 1450–56; *see also* Susan Emily Ness, Note, *Water We Cannot See: Codifying a Progressive Public Trust to Protect Groundwater Resources from Depletion*, 76 VAND. L. REV. 953, 955–56 (2023) ("[T]he current legal landscape fails to adequately protect groundwater resources.").

the detriment of other users.[14] Individual users have this incentive because the user who exploits the resource receives all the proceeds from this overuse while the harms are shared by every common user.[15] The temporal tragedy of the commons describes the incentive current users of a resource have to exploit a resource to the detriment of future users.[16] Because groundwater is often a resource shared by many users, a user who chooses to pump more water receives all the proceeds from the additional pumping, whereas the harms are shared by present and future users. Thus, benefits are privatized by contemporary actors, while losses are socialized to future users.

In conjunction with legislative action,[17] the public trust doctrine could help remedy groundwater's temporal tragedy of the commons. The public trust doctrine creates government duties, private responsibilities, and public rights as to certain common natural resources.[18] The doctrine has an anti-monopolistic purpose, protecting trust resources against privatizations that would jeopardize fundamental public uses such as commerce, navigation, and fishing.[19] In the last century, courts have recognized in the trust a sovereign responsibility to protect certain resources for both present and future generations, imposing a duty on

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[14] *See generally* Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244–45 (1968) (describing the tragedy of the commons). *But see* SARAH K. MOCK, FARM (AND OTHER F WORDS) 178–79 (2021) ("[T]he assumption that people who hold land in common can't or don't create rules and systems to protect the resource's integrity is a false one."). *See also generally* ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 88–102 (1990) (discussing similarities between several enduring, self-governing common pool-resource institutions including: clearly defined boundaries, congruence between appropriation rules and local conditions, collective-choice arrangements, monitoring, gradual sanctions, conflict-resolution mechanisms, and minimal challenges to established systems from external governmental authorities).

[15] Hardin, *supra* note 14, at 1244–45.

[16] Lifshitz et al., *supra* note 9, at 1454–56.

[17] For examples of legislative attempts to protect groundwater resources, see Eric Garner et al., *The Sustainable Groundwater Management Act and the Common Law of Groundwater Rights—Finding a Consistent Path Forward for Groundwater Allocation*, 38 UCLA J. ENV'T L. & POL'Y, 165–66 (2020) (discussing California's Sustainable Groundwater Management Act of 2014); NEB REV. STAT. § 46-702 (2021) ("The Legislature recognizes its duty to define broad policy goals concerning the utilization and management of ground water and to ensure local implementation of those goals."); MINN. STAT. § 103A.204 (2024) (delegating the responsibility to protect groundwater resources to multiple state agencies).

[18] *See* Erin Ryan, *A Short History of the Public Trust Doctrine and Its Intersection with Private Water Law*, 38 VA. ENV'T L.J. 135, 137 (2020) (describing how the doctrine prevents private expropriation or monopolization of "critical public commons" containing valuable natural resources).

[19] *See* Michael C. Blumm & Aurora Paulsen Moses, *The Public Trust as an Antimonopoly Doctrine*, 44 B.C. ENV'T AFFS. L. REV. 1, 5–7, 52 (2017) (describing how the doctrine has protected the public against state attempts to create private monopolies over natural resources).

state governments to sustainably manage trust resources for the benefit of present and future generations.[20]

There are, however, several obstacles that advocates must confront in persuading courts to recognize that the doctrine protects subsurface bodies of water. The primary obstacle is the historical judicial recognition of only navigable waters as trust resources.[21] But, if the public trust doctrine is conceptualized as a flexible doctrine that protects inalienable public resources,[22] this historic limitation may be overcome.[23] This Note analyzes how some states have used the public trust doctrine to protect against temporal monopolies in groundwater and explains how these states could be models for other states. Part II begins by briefly describing the harms of groundwater overuse. Part III describes the prevailing ownership doctrines for groundwater to explain how states currently allocate groundwater use. Part IV details the evolution of the public trust doctrine in the United States, with a particular focus on the evolving navigability requirement, explaining that the navigability requirement should not pose an obstacle to judicial recognition of groundwater as a trust resource because courts have regularly expanded the navigability requirement to protect waterbodies of public importance. In light of this evolution, Part V looks at states that have extended the public trust doctrine to protect groundwater resources, discussing the courts' reasoning in enacting this expansion. The Note concludes that the public trust doctrine can serve as a tool to directly protect groundwater resources by requiring state and local agencies to consider the effects on public trust resources before approving any groundwater related actions, such as new well permits.

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[20] *See* Erin Ryan, *From* Mono Lake *to the Atmospheric Trust: Navigating the Public and Private Interests in Public Trust Resource Commons*, 10 GEO. WASH. J. ENERGY & ENV'T L. 39, 60 (2019) ("There have been important new applications in the context of water resources, including California's extension of the *Mono Lake* doctrine to groundwater tributaries in the *Scott River* case, the protection of public beach access in New Jersey, public walking rights along Great Lakes shores, and the protection of public drinking water from hydraulic fracturing under Pennsylvania's constitutionalized version of the doctrine." (footnotes omitted)).

[21] *See* discussion *infra* Section IV.A (tracing the public trust doctrine's lineage from Roman law through English common law to early American cases, showing that courts consistently tethered the State's fiduciary duty to waters deemed navigable, first by tidal influence, then by actual use for trade and travel).

[22] Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 452–53 (1892) ("The state can no more abdicate its trust over property in which the whole people are interested . . . than it can abdicate its police powers . . . ."); Borough of Neptune City v. Borough of Avon-By-The-Sea, 294 A.2d 47, 54 (N.J. 1972) ("The public trust doctrine, like all common law principles, should not be considered fixed or static, but should be molded and extended to meet changing conditions and needs of the public it was created to benefit."); *see also* OLIVER WENDELL HOLMES, THE COMMON LAW, at xxiv (Harvard Univ. Press 2009) (1881) (noting that "[t]he life of the law has not been logic: it has been experience," as the law responds to the "felt necessities of the time").

[23] *See* Lifshitz et al., *supra* note 9, at 1484–85 (advocating an expansion of temporal boundaries of the public trust doctrine to protect future people and generations).

Under the public trust doctrine, states could even reallocate previously issued rights for conservation purposes.[24]

II. THE EXTERNALITIES OF GROUNDWATER MINING

When a resource is scarce, as groundwater is at current usage rates,[25] overuse of the resource creates a negative temporal externality that this Note refers to as a temporal monopoly. That is, a monopoly in which contemporary users monopolize a limited resource to the exclusion of future users.[26] Temporal monopolies have negative externalities of their own. In the groundwater context such externalities include land subsidence,[27] deteriorated water quality,[28] declining agricultural productivity,[29] and increased societal conflict over access to groundwater resources.[30]

Although temporal externalities can manifest over varying periods of time,[31] in the groundwater context, long-term negative externalities are especially pernicious, as groundwater depletion is often slow but permanent.[32] When faced with overuse's negative externalities, state and federal actors may be incentivized to regulate. However, because of the pronounced temporal separation between contemporary overuse and its associated harms, governmental actors have not often had to

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[24] Nat'l Audubon Soc'y v. Superior Ct. of Alpine Cnty. (*Mono Lake*), 658 P.2d 709, 727 (Cal. 1983).

[25] *See* Bierkens & Wada, *supra* note 5, at 1–2.

[26] Conventional conceptualizations of monopoly are also at play. Capitalized interests make use of groundwater resources to the exclusion of others, jeopardizing fundamental public uses. *See, e.g.*, Tom Perkins, *The Fight to Stop Nestlé from Taking America's Water to Sell In Plastic Bottles*, GUARDIAN (Oct. 29, 2019), https://perma.cc/9V32-6Q8C (describing the harms, including dried wells and depleted aquifers, of privatized groundwater pumping for bottling water); *see also* Alexandra Shimo, *While Nestlé Extracts Millions of Litres from Their Land, Residents Have No Drinking Water*, GUARDIAN (Oct. 4, 2018), https://perma.cc/9CWP-SE54 (explaining the dynamics causing indigenous Canadians to do without water, while the beverage company, Nestlé, extracts millions of liters of water a day from their land without compensation).

[27] *Groundwater Decline and Depletion*, U.S. GEOLOGICAL SURV. (June 6, 2018), https://perma.cc/467D-38UN.

[28] *Id.*

[29] *See* Ness, *supra* note 13, at 963–64 (noting groundwater withdrawal will lead to declining agricultural productivity and "[d]ecreased food production and increased cost in irrigation technology may also result in 'skyrocketing food prices'").

[30] *Id.* at 964; *see also* NAT'L INTEL. COUNCIL, NIC-NIE-2021-10030-A, NATIONAL INTELLIGENCE ESTIMATE: CLIMATE CHANGE AND INTERNATIONAL RESPONSES INCREASING CHALLENGES TO US NATIONAL SECURITY THROUGH 2040 10 (n.d.), https://perma.cc/BX49-B33T (explaining that transboundary tensions over groundwater use are likely to increase as weather variability causes or exacerbates water insecurity).

[31] Lifshitz et al., *supra* note 9, at 1452.

[32] *See, e.g.*, U.S. GEOLOGICAL SURV., CIRCULAR 1323, GROUND-WATER AVAILABILITY IN THE UNITED STATES 6 (2008), https://perma.cc/PE3R-PFHV (explaining that the harms caused by contemporary overuse may not be fully realized for many years).

confront these harms.[33] This Part briefly explains the United States' reliance on groundwater and the negative externalities associated with that use, with a particular emphasis on the temporal externalities.

Roughly twenty percent of the water used in the United States comes from groundwater,[34] and the total amount of groundwater used in the United States is increasing.[35] Scientists once thought groundwater resources to be as inexhaustible as the air humans breathe.[36] They now understand, however, that groundwater is a renewable resource only when the rate of natural recharge is greater than the rate users pump from the resource.[37] Groundwater mining, or overdrafting, occurs when users deplete an aquifer at rates exceeding natural recharge.[38] Current usage rates in the United States are unsustainable.[39] Some scientists suggest that areas of the nation will soon run out of groundwater supplies.[40]

Climate change exacerbates the groundwater issue. In a changing climate, the availability of surface water resources becomes increasingly unpredictable.[41] Warming temperatures can cause decreases in the snowpacks that supply surface water resources and can increase the rate that surface waters evaporate.[42] At the same time, weather patterns have become more variable, causing drastic changes in surface

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[33] The social benefits, or positive externalities, of groundwater use encourage groundwater users, and society at large, to continue to overuse the resource. Some positive externalities include increased supply of agricultural goods and the continued "abundance" of domestic water supplies. *See, e.g.*, Christopher Flavelle & Mira Rojanasakul, *America Is Draining Its Precious Groundwater to Make More Chicken Wings and Pizza*, N.Y. TIMES (Dec. 24, 2023), https://perma.cc/MT4S-MK84 (explaining how groundwater use has facilitated the production of alfalfa and soy in Idaho and Arkansas respectively); Christopher Flavelle & Mira Rojanasakul, *As Groundwater Dwindles, Powerful Players Block Change*, N.Y. TIMES (Nov. 24, 2023), https://www.nytimes.com/interactive/2023/11/24/climate/groundwater-levels.html (explaining how groundwater use has facilitated the development of rural lands in Montana).

[34] Joseph W. Dellapenna, *A Primer on Groundwater Law,* 49 IDAHO L. REV. 265, 266 (2013) [hereinafter Dellapenna, *Primer*].

[35] U.S. GEOLOGICAL SURV., CIRCULAR 1441, ESTIMATED USE OF WATER IN THE UNITED STATES IN 2015 51 (2018) (noting that from 2010 to 2015 the total amount of fresh groundwater pumped in the United States increased 8%).

[36] ROBERT GLENNON, UNQUENCHABLE: AMERICA'S WATER CRISIS AND WHAT TO DO ABOUT IT 122 (2009) [hereinafter GLENNON, UNQUENCHABLE].

[37] *Id.* at 123; GLENNON, WATER FOLLIES, *supra* note 1, at 40 ("[Recharge is a process where] water percolates or infiltrates into the ground . . . where [it] remains for years, centuries, or even millennia.").

[38] Tuholske, *supra* note 2, at 193.

[39] *See id.* at 193–95.

[40] GLENNON, WATER FOLLIES, *supra* note 1, at 32 ("[In the High Plains,] as much as half of the remaining water [in the Ogallala Aquifer] is too deep . . . to justify the costs of recovery or is of poor quality.").

[41] William R. Wieder et al., *Pervasive Alterations to Snow-Dominated Ecosystem Functions Under Climate Change*, PNAS, July 2022, No. e2202393119, at 1 ("Shifts in the timing of winter snowmelt and declining runoff efficiency may reduce the predictability of streamflow and drought under climate change scenarios.").

[42] O'Neill et al., *supra* note 3.

water availability year over year.[43] Given this unpredictability, water users have increasing relied on groundwater resources.[44] Many of these resources are non-renewable fossil aquifers, with the last drop of water entering the groundwater reserve well before human history began.[45] The result is an unprecedented temporal monopoly on groundwater, in which today's generation risks depriving future generations of the resource.[46]

Groundwater mining causes externalities that risk further imperiling the resource. To begin, overuse causes the water table to decline, requiring users to dig new, deeper, and more expensive wells.[47] In coastal areas, once the water table is lowered, saltwater intrusion gradually increases the groundwater's salinity levels, eventually making the water unpotable.[48] Inland, when the water table is lowered, groundwater no longer fills the porous spaces in the Earth's sediment, and the weight of that sediment eventually causes compaction.[49] This compaction causes subsidence, the incremental settling or abrupt sinking of the Earth's surface, which results in a non-recoverable reduction in the aquifer system's total water storage capacity.[50] Thus, groundwater mining creates externalities that compound the issue of depletion—with less water in the system water quality gets worse, and the system's capacity to store water decreases.

Aquifer depletion also harms surface water resources. Historically, groundwater users poorly understood the relationship between groundwater and surface water. In 1861, the Ohio Supreme Court went so far as to assert that "the causes which govern and direct [groundwater's] movements, are so secret, occult and concealed, that an

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[43] *See* Raymond Zhong, *See What California's Record Snowpack Looks Like, Up Close*, N.Y. TIMES (Apr. 3, 2023), https://perma.cc/BED6-NXUL (describing the historic storms that "deluged" the then drought-stricken state of California in 2023).

[44] O'Neill, *supra* note 3; *see also* Ness, *supra* note 29, at 959 (noting that in recent years groundwater has increased from forty percent of California's total water usage to sixty percent).

[45] *See* Bierkens & Wada, *supra* note 5, at 3.

[46] *See, e.g.*, O'Neill et al., *supra* note 3 (noting that two major California and Arizona Aquifers, and parts of Ogallala Aquifer—beneath eastern Colorado, Kansas, and the Oklahoma and Texas panhandles—reached their lowest levels since NASA started recording data).

[47] GLENNON, WATER FOLLIES, *supra* note 1, at 32.

[48] GLENNON, UNQUENCHABLE, *supra* note 36, at 133 (describing the effects of saltwater intrusion in coastal areas across the United States); U.S. GEOLOGICAL SURV., USGS FACT SHEET 056-01, U.S. GEOLOGICAL SURVEY GROUND-WATER RESOURCES PROGRAM (2001), https://perma.cc/WUY7-VVJA (noting that saltwater intrusion occurs in the majority of coastal States, and also occurs in some inland areas).

[49] GLENNON, UNQUENCHABLE, *supra* note 36, at 131; U.S. GEOLOGICAL SURV., *supra* note 8, at 1 ("[I]n the United States, more than 17,000 square miles . . ., an area roughly the size of New Hampshire and Vermont combined, have been directly affected by subsidence.").

[50] *See* U.S. GEOLOGICAL SURV., *supra* note 8, at 1 (explaining that a reduction in porous space in compacted aquifers results in a reduction in the aquifer's storage capacity).

attempt to administer any set of legal rules in respect to them would be involved in hopeless uncertainty, and would be therefore practically impossible."[51] All water, it is now clear, is hydrologically connected, and groundwater discharges from the ground augment flows to nearby surface water resources.[52] In turn, groundwater mining can have pronounced negative effects on surface water resources and the riparian ecosystems they support.[53]

Groundwater mining also has economic and social externalities. For example, as groundwater resources dry up, agricultural yields decline.[54] Decreased production and the costs associated with digging deeper wells could ultimately result in increasing food prices.[55] Additionally, decreasing groundwater supplies are likely to heighten social and political disputes, especially when the groundwater resource is shared across political boundaries.[56] Current usage rates have consequently created a temporal monopoly in groundwater that will likely impose ecological, economic, and social externalities on future generations.

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[51] Frazier v. Brown, 12 Ohio St. 294, 311 (1861); *see also* Stillwater Water Co. v. Farmer, 93 N.W. 907, 908 (Minn. 1903) (quoting this description from *Frazier v. Brown*); Hous. & T.C. Ry. Co. v. East, 81 S.W. 279, 281 (Tex. 1904) (same); Barclay v. Abraham, 96 N.W. 1080, 1082 (Iowa 1903) (same).

[52] GLENNON, WATER FOLLIES, *supra* note 1, at 40; *see also* U.S. GEOLOGICAL SURV., *supra* note 48 ("It is now recognized that nearly all surface-water features (streams, lakes, reservoirs, wetlands, and estuaries) interact with ground water."); *Groundwater/Surface-Water Interaction*, U.S. GEOLOGICAL SURV. (Mar. 2, 2019), https://perma.cc/F9UH-8AWW ("Surface water supplies recharge to the underlying aquifer, where the groundwater can remain in storage for days, months, years, centuries, or even millennia. Eventually the groundwater discharges back into the stream."); CYNTHIA BARNETT, BLUE REVOLUTION: UNMAKING AMERICA'S WATER CRISIS 10 (2011) (explaining that because water is often moving between surface and subsurface resources, the labels "groundwater" and "surface water" simply refer the location of water at a fixed point in time).

[53] *See, e.g.*, GLENNON, UNQUENCHABLE, *supra* note 36, at 126 (noting that groundwater mining in Arizona has caused the Santa Cruz River to run dry and is having negative effects on the San Pedro River).

[54] O'Neill et al., *supra* note 3 (explaining that corn yields have declined as water tables have lowered).

[55] J.S. Famiglietti, *The Global Groundwater Crisis*, 4 NATURE CLIMATE CHANGE 945, 948 (2014). *But see* GLENNON, UNQUENCHABLE, *supra* note 36, at 278 (arguing that farms adjust to using less water by using more efficient agricultural practices, including fallowing fields that are less productive, changing the crops they grow, and updating their irrigation systems).

[56] Famiglietti, *supra* note 55, at 947–48. In one recent case, Mississippi claimed that Tennessee overpumped from an aquifer that underlies both states. Mississippi v. Tennessee, 595 U.S. 15, 18 (2021). The Court dismissed the claim, reasoning that the water underlying each state is not the absolute property of that state. *Id.* at 26, 29. Instead, interstate aquifers are subject to equitable apportionment. *Id.* at 25. *See also* Thomas V. Corrigan, Note, *Water Run Aground:* Mississippi v. Tennessee, *Interstate Groundwater Conflict, and the West*, 65 ARIZ. L. REV. 479, 501–03 (2023) (discussing potential interstate groundwater conflicts between Nevada and Utah over the Snake Valley Aquifer and between New Mexico and Texas over the Ogallala Aquifer).

III. GROUNDWATER ALLOCATION (*JUS PRIVATUM*)

One does not own water, one only holds a right to use water: a usufruct.[57] This is true whether the right is to groundwater or surface water.[58] Several states pronounce public ownership of all in-state waters by statute.[59] Because groundwater resources were poorly understood, however, and courts were predominantly concerned about unsettling property rights, groundwater law long remained underdeveloped and confusing.[60] In the nineteenth century, courts considered groundwater and its origins to be occult and mysterious.[61] When groundwater law did develop, it occurred on a state-by-state basis, often developing separately from the laws governing surface water usage rights.[62] Today, states recognize five different groundwater allocation doctrines.[63]

In applying the public trust doctrine, courts often bifurcate title to public trust resources.[64] The *jus privatum* is the proprietary title: the property right of private landholders.[65] The *jus publicum* is the

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[57] LEXISNEXIS, WATERS AND WATER RIGHTS § 4.01 (Amy K. Kelley ed., 3d ed. 2020).

[58] *Id.*

[59] *See, e.g.*, TENN. CODE ANN. §§ 69-3-102, 69-3-103 (West 2024) (providing that the waters of Tennessee are the property of the state and held in trust for its citizens, and defining waters to include subsurface waters); N.H. REV. STAT. ANN. § 481:1 (2024) ("The general court declares and determines that the water of New Hampshire whether located above or below ground constitutes a limited and, therefore, precious and invaluable public resource which should be protected, conserved and managed in the interest of present and future generations."); VT. STAT. ANN. tit. 10 § 1390 (West 2024) ("In recognition that the groundwater of Vermont is a precious, finite, and invaluable resource . . . the withdrawal of groundwater of the State should be regulated in a manner that benefits the people of the State; is compatible with long-range water resource planning, proper management, and use of the water resources of Vermont; and is consistent with Vermont's policy of managing groundwater as a public resource for the benefit of all Vermonters."); N.J. STAT. ANN. § 58:11A-2 (West 2024) ("The Legislature declares that the objective of this act is, wherever attainable, to restore and maintain the chemical, physical and biological integrity of the waters of the State, including groundwaters, and the public trust therein . . . ."); OR. REV. STAT. § 537.110 (2023) ("All water within the state from all sources of water supply belongs to the public."); *see also* Parks v. Cooper, 676 N.W.2d 823, 838–39 (S.D. 2004) (relying on legislative recognition that all state water is public to conclude "that all waters within South Dakota, not just those waters considered navigable under the federal test, are held in trust by the State for the public").

[60] Dellapenna, *Primer*, *supra* note 34, at 268.

[61] Frazier, 12 Ohio St. 294, 311 (1861); Stillwater Water Co., 93 N.W. 907, 908 (Minn. 1903); Houston & T.C. Ry. Co., 81 S.W. 279, 281 (Tex. 1904); Barclay, 96 N.W. 1080, 1082 (Iowa 1903).

[62] Tuholske, *supra* note 2, at 204.

[63] *Id.* at 204–05.

[64] *See* DAVID C. SLADE ET AL., PUTTING THE PUBLIC TRUST DOCTRINE TO WORK 6 (2d ed. 1997) (describing the distinction between *jus privatum* and *jus publicum*); *see, e.g.*, Shively v. Bowlby, 152 U.S. 1, 48 (1894) ("[For tidal lands in the United States,] by the law of England, the title in fee, or *jus privatum*, . . . 'is clothed and superinduced with a *jus publicum*, wherein both natives and foreigners . . . are interested by reason of common commerce, trade, and intercourse.").

[65] SLADE ET AL., *supra* note 64; *see, e.g.*, Marks v. Whitney, 491 P.2d 374, 379 (Cal. 1971) ("[T]he buyer of [tidal land] receives the title to the soil, the *jus privatum*, subject to the public right of navigation, and in subordination to the right of the state to take

sovereign title: the trust right that the sovereign holds to protect the public's interest in trust resources.[66] The *jus privatum* is subservient to the *jus publicum*, and thus private title in public trust resources is encumbered by the sovereign public trust right.[67]

For groundwater, because most states do not recognize private ownership of the water itself, one's right to use groundwater is the *jus privatum*, and the state's sovereign ownership of that water is the *jus publicum*. Thus, users have a private use right that is subservient to state ownership of the resource. Reallocation of groundwater rights does not therefore constitute a compensable taking because the private right is subservient to the unextinguishable sovereign title.[68]

This Part discusses the private usufructuary right, focusing on the five groundwater usage doctrines that states across the country apply, analyzing the potential of each doctrine to protect against temporal monopolies in groundwater, and identifying limitations that the public trust doctrine could supplement. Understanding the groundwater allocation regimes is necessary to understanding how the public trust would operate in parallel to these regimes. For example, in the "capture regimes" discussed below,[69] whether a private right holder's pumping impairs the public trust would likely be established only after the state or a member of the public sues to enjoin that pumping, as there is no administrative process in which the trust could be considered before the state issues the right. On the other hand, in the "apportionment regimes" discussed below,[70] the state could consider the trust as a part of the administrative process before issuing a right to pump.

A. Absolute Ownership

The absolute dominion rule, or absolute ownership rule, is a rule of capture.[71] Throughout history, landowners considered groundwater to be a resource they owned and one that nature provided for free.[72] The absolute dominion rule reflected this perception, allowing overlying

possession and use and improve it for that purpose . . . ." (quoting People v. Cal. Fish Co., 138 P. 79, 87 (Cal. 1913)).

66 SLADE ET AL., *supra* note 64; *see, e.g.*, Ross v. Acadian Seaplants, Ltd., 206 A.3d 283, 287–88 (Me. 2019) (explaining that the upland owners of intertidal lands "obtained the fee title to the wet sand," the *jus privatum*, while "the public retained an easement interest in that intertidal zone" for navigation, fishing, and fowling, the *jus publicum*).

67 SLADE ET AL., *supra* note 64; *see, e.g.*, Gunderson v. State, 90 N.E.3d 1171, 1183 (Ind. 2018) (explaining that, although land owners can obtain fee title to land bordering Lake Michigan, the "land remains encumbered by the public trust").

68 *See, e.g.*, *In re* Water Use Permit Applications, 9 P.3d 409, 453 (Haw. 2000) ("[The sovereign public trust] authority empowers the state to revisit prior diversions and allocations, even those made with due consideration of their effect on the public trust.").

69 *See* discussion *infra* Sections III.A–B.

70 *See* discussion *infra* Sections III.C–E.

71 *See* Dellapenna, *Primer*, *supra* note 34, at 269–70 (explaining that although these terms are interchangeable, they carry slight connotational differences).

72 *Id.* at 271.

landowners to pump as much groundwater as they desired without consideration for, or liability to, adjacent landowners.[73] However, courts recognized several exceptions to the absolute dominion doctrine, prohibiting groundwater pumping when: 1) the user pumps with the intent of harming an adjacent landowner; 2) the user's pumping negligently harms an adjacent land owner; and 3) the user is withdrawing groundwater without putting it to a useful purpose, and the withdrawal is unreasonably interfering with surface water rights.[74] Under the absolute dominion rule, with those limited exceptions, one user can monopolize a groundwater resource to the deprivation of both neighboring landowners and future generations. Thus, "absolute ownership" is a misnomer, as ownership is only "absolute" so long as one's neighbor does not drain the resource.[75]

In upholding the absolute dominion rule, courts have relied on two tenets of the common law. The first is the maxim that property ownership extended up to the heavens and down to the center of the earth.[76] The second is the common law rule of capture, which recognized no private property interest in transient subsurface resources, such as oil, gas, and water, until users "capture" the resource by pumping it from a well.[77] In conjunction, these tenets enable landowners to use any groundwater underlying their property while having no property interest in that groundwater until they pump it.[78] Texas is an outlier to this general rule, as the Texas Supreme Court recently concluded that land owners have compensable property rights in groundwater in place.[79]

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[73] Tuholske, *supra* note 2, at 205–06 (explaining that, in the United States, the absolute dominion approach was not so absolute, as users can monopolize use of a groundwater resource to the detriment of their neighbors).

[74] Dellapenna, *Primer*, *supra* note 34, at 273–74.

[75] *Cf.* DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 23.02 ("Continued adherence to the absolute dominion rule . . . virtually guarantee[s] the 'tragedy of the commons' for groundwater.").

[76] Dellapenna, *Primer, supra* note 34, at 272. Indeed, some courts considered percolating water indistinguishable from the soil, to which a landowner had absolute right. *See, e.g.*, Pixley v. Clark, 35 N.Y. 520, 527 (1866) ("An owner of soil may divert percolating water, consume or cut it off, with impunity. It is the same as land, and cannot be distinguished in law from land. So, the owner of the land is the absolute owner of the soil and of percolating water, which is a part of, and not different from, the soil.").

[77] Dellapenna, *Primer, supra* note 34, at 272–73 (explaining that the rule of capture originally applied to wild animals, and courts eventually extended it to oil, gas, and water).

[78] DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 20.04 (noting that, in most courts, ownership of groundwater is established only after it is subjected to the control of the overlying landowner).

[79] Edwards Aquifer Auth. v. Day, 369 S.W.3d 814, 832 (Tex. 2012) (concluding that landowners have an ownership right to the water in place underlying their property); *id.* at 829 (under the body of law appliable to oil and gas, "[n]otwithstanding the rule of capture," a landowner has "an exclusive and private property right" to the oil and gas beneath its land); *id.* at 832 (applying this rule to groundwater, the court determined that groundwater beneath "the soil [is also] considered a part of the realty"); *id.* at 843 (thus,

Courts in most states have abandoned the absolute dominion rule.[80] In 46 states, courts have rejected the conclusion that there is a taking of property when the state abolishes the rule.[81] Courts have relied on the police power in determining that regulation of groundwater use does not constitute a taking.[82] However, because the police power *is* limited by the taking clause,[83] strict reliance on the police power is unpersuasive. The public trust doctrine, on the other hand, is not limited by the taking clause, [84] as it is a background principle of property law that places inherent limits on property rights.[85] Thus, judicial determinations that ground water regulation is not a taking could provide evidence of a public trust in groundwater.

Today, the absolute ownership rule applies with only minor limitations in at most three states—Indiana, Maine, and Texas.[86] Even

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the state's implementation of a regulatory scheme in the place of absolute ownership, if it "is too restrictive of [a user's] groundwater rights[,] and [that restriction is] without justification in the overall regulatory scheme," could constitute a taking requiring compensation).

[80] Dellapenna, *Primer*, *supra* note 34, at 275 n.74 (listing decisions in which the doctrine has been overruled).

[81] DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 20.07; *see also id.* § 20.06 (discussing the modern reluctance of courts to find a regulatory taking when legislatures statutorily abandon the absolute dominion rule); Dave Owen, *Taking Groundwater*, 91 WASH U. L. REV. 253, 284–92 (2013) (surveying the takings cases involving groundwater and concluding that courts often affirm the state's ability to "change state groundwater law, even where the changes effectively infringe rights that previously were unlimited").

[82] *See, e.g.*, Jacobs Ranch, L.L.C. v. Smith, 148 P.3d 842, 855 (Okla. 2006) ("The general rule is that that the Legislature may restrict the use and enjoyment of the State's water resources by exercise of its police power for the preservation of the public health, safety and welfare without compensating the property owner." (emphasis omitted)); Sw. Eng'g Co. v. Ernst, 291 P.2d 764, 768 (Ariz. 1955) ("Where the public interest it [sic] thus significantly involved, the preferment of that interest over the property interest of the individual even to the extent of its destruction is a distinguishing characteristic of the exercise of the police power. The principle which we recognize here as controlling rests upon historic precedent extending back into the common law, and has had continuous recognition almost to the present moment." (citation omitted)); *see also* Owen, *supra* note 81, at 286–87 (explaining that this reasoning is not anomalous).

[83] *See, e.g.*, Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1014 (1992) ("[W]hile property may be regulated to a certain extent [under the police power], if regulation goes too far it will be recognized as a taking." (quoting Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922)).

[84] *See, e.g.*, Esplanade Props., LLC v. City of Seattle, 307 F.3d 978, 984–87 (9th Cir. 2002) (holding that, because Washington's public trust doctrine was a background principle of state property law that reserved the public's interest in privatized tidelands, a regulation that limited private development of tidelands was not a taking); McQueen v. S.C. Coastal Council, 580 S.E.2d 116, 120 (S.C. 2003) ("[A land owner's] ownership rights do not include the right to backfill or place bulkheads on public trust land and the State need not compensate him for the denial of permits to do what he cannot otherwise do.").

[85] *Lucas*, 505 U.S. at 1029 ("[R]egulations that prohibit all economically beneficial use of land . . . cannot be newly legislated or decreed (without compensation), but must inhere in the title itself, in the restrictions that background principles of the State's law of property . . . already place upon land ownership.").

[86] Owen, *supra* note 81, at 273 nn.109–3.

in those states, the legislatures have limited the doctrines reach.[87] For, example in Indiana, a statute allows the state to declare a temporary groundwater emergency to curb withdrawals when there is reason to believe that continued extraction from a "significant ground water withdrawal facility"[88] will "exceed the recharge capability of the ground water resource."[89] Legislative limitations on the absolute dominion rule allow some protections for adjacent landowners in times of emergency. However, when these limitations are reactive in nature, states can only curb use after an emergency, and they offer little protection for future generations. Once there is a state of emergency, it is often too late for conservation efforts to protect the resource. If groundwater were a public trust resource, state regulatory agencies would instead have the authority to curb use when it would substantially impair the public's interest in the resource, allowing for more proactive management.[90]

B. The American Reasonable Use Rule

The shift from the absolute dominion doctrine accelerated in the middle of the twentieth century.[91] Most states adopted the reasonable use rule.[92] This rule, often called the American rule, is a capture rule like the absolute ownership rule. Under the American rule, groundwater pumping is permitted so long as the use is not wasteful and the water is applied to the overlying land.[93] Use of groundwater on non-overlying

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[87] *Id. See generally* Joseph W. Dellapenna, *The Rise and the Demise of the Absolute Dominion Doctrine for Groundwater*, 35 U. ARK. LITTLE ROCK L. REV. 291, 305–18 (2013) [Dellapenna, *Absolute Dominion Doctrine*] (describing the shift away from the absolute dominion rule).

[88] *See* IND. CODE § 14-25-4-6 (2023) (defining a "significant ground water withdrawal facility" as one that "in the aggregate from all sources and by all methods, has the capability of withdrawing at least one hundred thousand . . . gallons of ground water in one . . . day").

[89] *Id.* § 14-25-4-14.

[90] *See* discussion *infra* Section IV.C (explaining that some courts have determined that states have the authority to reallocate surface water rights to protect public trust resources from substantial impairment).

[91] Dellapenna, *Absolute Dominion Doctrine*, *supra* note 87, at 305–06.

[92] *See* DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 22.02 (explaining that New Hampshire was the first state to adopt the reasonable use rule in 1854, and in doing so the court adopted the same rule for groundwater as it already applied to surface water (citing Basett v. Salisbury Mfg. Co., 43 N.H. 569, 576 (1862) ("The law regulating water-courses has its origin or foundation in the benefits and injuries that may arise from water . . . . These benefits and injuries may often be quite similar in cases of underground and surface drainage, and of drainage by water-courses. . . . Therefore, so far as a similarity of benefits and injuries exists, there should be a similarity in the rules of law applied.")); *see also id.* § 22.03 (noting that in the twentieth century the reasonable use rule became the "normal law of choice regarding groundwater," earning it the moniker: the American Rule).

[93] *See id.* § 22.02 ("[The American Rule] departed from a rule of property that could be applied by a judge as a conclusion of law, and moved to a rule requiring a finding of fact . . . of what was 'reasonable . . . .'"); *see also* Kimberly Till Lisenby, Comment, *Rights to Groundwater in Alabama and the Reasonable Use Doctrine: An Assessment of* Martin v.

land, however, is not altogether prohibited, but users exporting the water may only do so if the export does not injure other common users of the groundwater resource.[94] Importantly, unlimited withdrawals to the detriment of present and future common users are reasonable so long as the use is not wasteful.[95] If jurisdictions that apply the American Rule were to protect groundwater under the public trust, the state or private citizens could sue to enjoin any use that substantially impairs the public interest in that resource.[96]

The reasonable use rule continues to be applied in about ten states, including Alabama, New York, and Pennsylvania,[97] with some uncertainty as to the proper classification of the rule courts apply in some jurisdictions.[98] Moreover, some states have adopted the approach of the *Restatement (Second) of Torts*,[99] which incorporates aspects of both the reasonable use rule and the correlative rights doctrine discussed in the next section.[100] Other states have moved to the permitting approach discussed below.[101] Most courts in states that have

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City of Linden, 48 ALA. L REV. 1045, 1052 ("Essentially a prohibition of groundwater use away from the withdrawal location, the reasonable use standard does not require a comparison of various landowners' use of groundwater."); Melissa K. Scanlan, *Droughts, Floods, and Scarcity on a Climate-Disrupted Planet: Understanding the Legal Challenges and Opportunities for Groundwater Sustainability*, 37 VA. ENV'T L.J. 52, 63 (2019) ("Courts have generally upheld any use on-tract as reasonable, even if it depletes the aquifer and interferes with a neighbor's reasonable on-tract use.").

94 *See* DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 22.04 ("This approach did not altogether prohibit the use of groundwater off the overlying land, but it did mean that in any dispute involving one using groundwater on overlying land and another using the groundwater off the overlying land, the one using the water on the overlying land would always win, virtually without regard to the equities as between the uses or the users."); *see also* Higday v. Nickolaus, 469 S.W.2d 859, 866 (Mo. Ct. App. 1971) ("[T]he modern decisions agree that under the rule of reasonable use an overlying owner, including a municipality, may not withdraw percolating water and transport it for sale or other use away from the land from which it was taken if the result is to impair the supply of an adjoining landowner to his injury." (emphasis omitted)).

95 Tuholske, *supra* note 2, at 207–08.

96 *See, e.g.*, *Mono Lake*, 658 P.2d 709, 735 n.11 (Cal. 1983) (upholding the public's standing to bring claims alleging harm to the public trust).

97 Dellapenna, *Primer*, *supra* note 34, at 290 n.192 (listing the states that currently apply the rule).

98 *Id.* (noting that some scholars argue that New York and Tennessee in fact apply correlative rights to groundwater).

99 RESTATEMENT (SECOND) OF TORTS § 858 (AM. L. INST. 1979).

100 DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 22.04 (noting that within seven years of the completion of the *Restatement (Second) of Torts* in 1977, four states—Alabama, Ohio, Nebraska, Michigan, and Pennsylvania—applied some version of the test it established). Under the *Restatement*'s rule, landowners may withdraw groundwater and put it to a beneficial use without liability to an adjacent landowner for interference, so long as the withdrawal: 1) does not cause "unreasonable" harm to a neighboring land owner, 2) does not exceed the landowner's reasonable share of the annual supply or total share of the resource, and 3) does not have a direct effect on surface water resource and causes harm to a person entitled to use that resource. RESTATEMENT (SECOND) OF TORTS § 858 (AM. L. INST. 1979).

101 *See* discussion *infra* Section III.E.

embraced this transition have determined that the adoption of regulations did not constitute a taking requiring compensation under the Fifth Amendment, reasoning that landowners had no ownership right to groundwater prior to capture.[102]

C. Correlative Rights

Correlative rights, distinct from the reasonable use rule, require allocation of groundwater resources according to a rule of proportionality—often in proportion to each user's ownership of the land overlying a particular aquifer.[103] Thus, although correlative rights allow for more equitable apportionment between present users,[104] the doctrine gives no express consideration to future users.

Administrative difficulties associated with apportionment of groundwater have militated against adoption of the correlative rights doctrine.[105] Moreover, it has been historically difficult for scientists, let alone courts, to quantify groundwater resources, making it difficult to determine a user's proportionate share of a groundwater resource.[106] Given these difficulties, California and Nebraska are the only correlative use states today.[107]

D. Prior Appropriation

Prior appropriation originated as a surface water doctrine in many western states, allowing frontier users to resolve disputes over water use.[108] Appropriative rights are established by putting water to beneficial use.[109] Between users, those who established their right earliest have priority.[110] In times of scarcity, the rights of junior users are curtailed to allow senior users their entire right: "first in time, first

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[102] *See, e.g.*, Town of Chino Valley v. City of Prescott, 638 P.2d 1324, 1328 (Ariz. 1981); *see* Owen, *supra* note 81, at 291 ("In early 2011, apparently for the first time in American groundwater/takings jurisprudence, a court ordered a government defendant to pay compensation for a taking of groundwater use rights." (citing Second Amended Final Judgment, Bragg v. Edwards Aquifer Auth., No. 06-11-18170 (Medina Cnty., Tex. Dist. Ct. Mar. 25, 2011)).

[103] DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 21.01; *see also* ANTHONY DAN TARLOCK & JASON ANTHONY ROBISON, LAW OF WATER RIGHTS AND RESOURCES § 4:14 & n.3 (2023) (describing the development of the correlative rights rule in California).

[104] Tuholske, *supra* note 2, at 209.

[105] *See, e.g.*, State v. Michels Pipeline Constr., Inc., 217 N.W.2d 339, 349 (Wis. 1974) ("[T]he administrative difficulties of a court trying to make such an apportionment would militate against its adoption.").

[106] *See* DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 18.01 (noting that until the 1920's lawyers and jurists lacked credible information on groundwater hydrogeology).

[107] *Id.* § 22.01.

[108] TARLOCK & ROBISON, *supra* note 103, § 5:20.

[109] Tuholske, *supra* note 2, at 209.

[110] *Id.*

in right."[111] Moreover, appropriative rights can be lost for non-use: "use it, or lose it."[112]

In 1915, the Idaho legislature became the first state to apply the doctrine to groundwater.[113] Today, most every western state applies the prior appropriation doctrine to at least some groundwater withdrawals.[114] Idaho and the states following its lead established an allocation system that intrinsically encourages overuse, as users risk losing their established right if their use is not maintained.[115] Moreover, state prioritization of senior groundwater uses, many dating from the early-twentieth century, devotes groundwater resources to uses and usage rates that are unlikely to provide socially and economically equitable outcomes in this century or the centuries to come.[116] The public trust could enable modernization of historically entrenched rights in light of current conservation needs.

E. Permitting

Many states that once applied absolute dominion, the reasonable use rule, or correlative rights to groundwater now apply a permitting approach.[117] Permitting is the only approach that allows states to balance public and private interests, while restraining private monopolization of groundwater resources.[118] This approach originated from the riparian approach to surface water allocation, where owners of lands that border or cross a stream have the right to make reasonable use of that water on their land and to be free from unreasonable interference with that use.[119] Because users often had difficulty determining whether a use was reasonable, riparian rights systems often produced uncertainty and confusion, inhibiting the judicial settlement of rights during times of shortage, leaving public interests

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111 *Id.*

112 TARLOCK & ROBISON, *supra* note 103, § 5:91.

113 1899 Idaho Sess. Laws 380, § 2; *see* Dellapenna, *Primer*, *supra* note 34, at 299 (briefly describing the history of Idaho's application of prior appropriation to groundwater).

114 PETER N. DAVIS, WATERS AND WATER RIGHTS § 57.08; *see* Dellapenna, *Primer*, *supra* note 34, at 329 n.344 (listing the 15 states that apply prior appropriation to groundwater, the statutes through which the states did so, and briefly describing the extent of that application).

115 Dellapenna, *Primer*, *supra* note 34, at 302 (explaining that ground water appropriations can be lost through non-use).

116 *Cf. id.* at 301–02 (noting that, in many jurisdictions, courts have subordinated groundwater uses to senior surface-water uses when the groundwater resource is a tributary to the surface-water resource and suggesting that this subordination does not always lead to equitable outcomes, since today's society may not ascribe the same value to senior surface-water uses established in the mid-nineteenth century).

117 *See generally id.* at 302–10 (describing the permitting approach to groundwater allocation); TARLOCK & ROBISON, *supra* note 103, § 4:29 (same).

118 Dellapenna, *Primer*, *supra* note 34, at 304–05.

119 DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 7.02.

unprotected, and discouraging investment in water infrastructure.[120] To provide more certainty, in the latter half of the twentieth century, legislatures in at least twenty-two states developed administrative permit systems to replace traditional common law usage rights.[121] These states grant water users a time-limited permit, in many states for ten to twenty years, based on an evaluation of the reasonableness of the proposed use.[122]

At least fourteen states that have deployed a permitting system to surface water apply the same legal system to groundwater.[123] Five states—Arkansas, Georgia, South Carolina, Virginia, and Wisconsin—have distinct permitting statutes for groundwater and surface waters.[124] Three states—Arizona, Illinois, and Nebraska—have a regulated permitting system for groundwater without having one for surface water.[125]

Arizona is a state with a permitting approach to groundwater management.[126] The state has separate laws for surface water and groundwater allocation.[127] The Arizona Department of Water Resources administers the state's groundwater code,[128] a product in large part of the landmark Groundwater Management Act of 1980.[129] The state legislature passed the law in response to its finding that, in many of the state's groundwater basins, "withdrawal of groundwater is greatly in excess of the safe annual yield."[130] Although the groundwater code governs groundwater use throughout the entire state, the code's main provisions focus on geographical areas dubbed Active Management

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120 *Id.* § 23.02.

121 Dellapenna, *Primer*, *supra* note 34, at 307 nn.332–33, 308 nn.334–36 (listing the states, the majority of which are east of the 100th Meridian); *see also* Kevin Krajick, *The 100th Meridian, Where the Great Plains Begin, May be Shifting*, COLUM. CLIMATE SCH.: STATE OF THE PLANET (Apr. 11, 2018), https://perma.cc/VNE9-UCHU (explaining that the 100th Meridian is the boundary between wet states to the east and dry states to the west).

122 DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, § 23.02; *see also id.* § 9.03 ("[I]n many states the permits are issued only for a period of time (10–20 years) so that when a permit expires the question of the continued reasonableness of the use can be reexamined.").

123 Dellapenna, *Primer*, *supra* note 34, at 307 & n.332 (listing states).

124 *Id.* at 307.

125 *Id.* at 307–08.

126 *See generally* Rhett Larson & Brian Payne, *Unclouding Arizona's Water Future*, 49 ARIZ. STATE L.J. 465, 483–88 (2017) (describing Arizona's groundwater management scheme).

127 *Id.* at 483.

128 *Id.*

129 1980 Ariz. Sess. Laws 4th Spec. Sess. 1339 (codified at ARIZ. REV. STAT. ANN. §§ 45-401 to -704 (2023)).

130 ARIZ. REV. STAT. ANN. § 45-401 (2023); *see also* Jon L. Kyl, *The 1980 Arizona Groundwater Management Act: From Inception to Current Constitutional Challenge*, 53 U. COLO. L. REV. 471, 473 & n.8, 480–81 (1982) (explaining that the Secretary of the Interior threatened to delay construction of the Central Arizona Project if Arizona did not pass a robust groundwater management law).

Areas (AMAs).[131] Each AMA has management goals.[132] For example, a goal in four of the AMAs is to establish "a long-term balance between the annual amount of groundwater withdrawn . . . and the annual amount of natural and artificial recharge."[133] The Department of Water Resources issues use permits based on statutorily established criteria, including consistency with the AMAs management plan.[134]

As the Arizona's permitting approach illustrates, where the other groundwater doctrines treat groundwater as either common property subject to capture or private property, the permitting approach treats groundwater as a public property, protecting against overuse through administrative regulation.[135] Of the groundwater doctrines, the permitting approach is best equipped to protect groundwater resources from temporal monopolies because it allows state regulation before recognizing private rights in groundwater. In states that apply the regulated approach to groundwater, state consideration of the public trust doctrine when issuing use permits—such as a balancing of public and private interests to ensure that the public's interest will not be substantially impaired—can reinforce the anti-monopolistic principles that the permitting approach advances.

IV. THE PUBLIC TRUST DOCTRINE (*JUS PUBLICUM*)

This Part surveys the history of the public trust doctrine from its ancient origins to its contemporary application, with particular attention to the doctrine's traditional geographic scope—the navigability requirement. The public trust doctrine originated as a vehicle to protect public access to waterways that were important to trade and travel.[136] The navigability requirement served to distinguish between waters with and without this social and economic importance.[137] However, as the

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131 ARIZ. REV. STAT. ANN. at § 45-402(2) (2023).

132 *Id.* § 45-562.

133 In three of the five AMAs, the only goal is "safe yield" by January 1, 2025, defined as "a long-term balance between the annual amount of groundwater withdrawn . . . and the annual amount of natural and artificial recharge . . . ." *Id.* § 45-562(A) (describing the management goal for the Tucson, Pheonix, and Prescott AMAs); *id.* § 45-561(12) (defining "safe yield"). The other two AMAs have individualized goals, and for one of these AMAs this also includes safe yield. *See ID.* § 45-562(B)–(C) (describing the management goals for the Pinal and Santa Cruz AMAs).

134 *See* ARIZ. REV. STAT. ANN. § 45-513(F) (2023) (establishing the criteria for issuing dewatering permits); *id.* § 45-514(D) (2023) (establishing the criteria for issuing mineral extraction permits); *id.* § 45-515(D) (establishing the criteria for issuing industrial use permits); *id.* § 45-516(A) (establishing the criteria for issuing poor quality use permits); *id.* § 45-517(A) (establishing the criteria for issuing temporary electrical generation permits); *id.* § 45-518(A) (establishing the criteria for issuing temporary dewatering permits permits); *id.* § 45-519(A) (establishing the criteria for issuing drainage permits); *ID.* § 45-519.01(A) (establishing the criteria for issuing hydrologic testing permits).

135 DELLAPENNA, WATERS AND WATER RIGHTS, *supra* note 1, 23.02.

136 *See* discussion *infra* Section IV.A.

137 *See id.*

needs and conditions of society developed, and as waterways that were not traditionally important to trade and travel grew in social and economic importance, courts have regularly adopted new tests for "navigability,"[138] so that the public trust doctrine protected public access to these newly important waterways.[139] From the public trust doctrine's origins, "navigability" has served as a surrogate for public importance—a means of distinguishing between public and private waters.[140]

The needs and conditions of the United States are continuously changing. Once occult and mysterious,[141] groundwater now makes up more than 20 percent of all the fresh water used in the United States.[142] Groundwater's public uses include domestic consumption, crop irrigation, and industrial purposes, all of which are contemporary signifiers of public importance.[143] Thus, although groundwater was not historically relied upon for trade and travel, given its contemporary importance, groundwater is "navigable," and therefore a protected public trust resource.

A. Navigability: A Brief History

The modern public trust doctrine recognizes that states have a sovereign responsibility to hold certain resources in trust for public use.[144] The principle behind the doctrine dates back to the sixth century, when the Institutes of Justinian, a codification of Roman Common Law,[145] announced one of the first articulations of the public trust doctrine: "By the law of nature these things are common property to mankind—the air, running water, the sea, and consequently the shores of the sea."[146] Aspects of the Institutes of Justinian influenced the Magna Carta,[147] the Forest Charter,[148] and the English common law.[149]

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[138] *See, e.g.*, Roberts v. Taylor, 181 N.W. 622, 626 (N.D. 1921) ("Purposes of pleasure, public convenience, and enjoyment may be public as well as purposes of trade. Navigation may as surely exist in the former as in the latter.").

[139] *See* discussion *infra* Sections IV.A–C.

[140] *See* Lamprey v. Metcalf, 53 N.W. 1139, 1143 (Minn. 1893) ("The division of waters into navigable and nonnavigable is but a way of dividing them into public and private waters,—a classification which, in some form, every civilized nation has recognized; the line of division being largely determined by its conditions and habits."); Hillebrand v. Knapp, 274 N.W. 821, 822 (S.D. 1937) ("This division of lakes and streams into navigable and nonnavigable is the equivalent to a classification of public and private waters.").

[141] *See* cases cited *supra* note 51.

[142] *Groundwater Use in the United States*, U.S. GEOLOGICAL SURV. (June 18, 2018), https://perma.cc/C5X5-LZNV.

[143] *Id.*

[144] Ryan, *supra* note 18, at 140.

[145] *Id.* at 142–43.

[146] J. INST., 2.1.1 (Thomas Collett Sandars trans., 4th ed. 1867).

[147] WILLIAM SHARP MCKECHNIE, MAGNA CARTA: A COMMENTARY ON THE GREAT CHARTER OF KING JOHN 343 (2d. ed. 1914) (translating Chapter 33 of Magna Carta, which required the removal of weirs in the Thames and Medwar Rivers that disrupted fishing and navigation).

And, through the original states' reception of the common law,[150] courts eventually adopted the public trust doctrine in the United States.[151]

Under English common law, the public trust doctrine established sovereign authority over navigable waters to ensure their use as highways of navigation and commerce and to protect the public's right to fish those waters.[152] The King's Bench first recognized the distinction between navigable and non-navigable waters in 1611 when it declared that, although non-navigable waters could be owned privately, the sovereign held title to navigable waters in order to protect public use.[153] Rather than define navigability with reference to a waterway's ability to facilitate transportation of a particular watercraft, the court defined navigable waters as those that were affected by the ebb and flow of the tide.[154] Through this definition, the court recognized the historical importance of tidally affected waters, which constituted all of England's commercially important waterways.[155] Thus, the distinction between navigable and non-navigable waters was not originally based on a waterway's capability to support watercraft. Instead, the distinction was drawn on a historic signifier of a waterway's public importance—whether that waterway could be used for trade and travel. Today, groundwater makes up 37% of the water that local water departments provide to homes and businesses, and it provides 42% of all water used for irrigation.[156] These are contemporary signifiers of public importance. Under a conceptualization of navigability that recognizes that

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148 *Id.* at 508–12 (printing the Forest Charter, which protected public access and use rights to natural resources on certain undeveloped royal lands).

149 Le Case Del Royall Piscarie de la Banne [The Case of the Royal Fishery of Banne] (1611) 80 Eng. Rep. 540, 541–42 (KB), *reprinted in* DALE D. GOBLE & ERIC T. FREYFOGLE, WILDLIFE LAW 272 (2002).

150 *See* Ford W. Hall, *The Common Law: An Account of Its Reception in the United States*, 4 VAND. L. REV. 791, 798–800 (1951) (describing the 13 original states' reception of the English common law after the Revolution, through either the state legislature or judiciary); *see also* N. J. CONST. of 1776, art. XXII ("That the Common Law of England, as well as so much of the Statute-Law, as have been heretofore practised in this Colony, shall still remain in Force, until they shall be altered by a future Law of the Legislature . . . .").

151 Ryan, *supra* note 18, at 150; *see* Arnold v. Mundy 6 N.J.L. 1, 71–72 (N.J. 1821) (A seminal case in which the New Jersey Supreme Court began to establish the definition and concept of public trust doctrine in the United States.).

152 *See Shively*, 152 U.S. 1, 11 (1894) (describing the English common law application of the doctrine).

153 GOBLE & FREYFOGLE, *supra* note 149, at 273.

154 *Id.* ("Every navigable river, so high as the sea flows and ebbs in it, is a royal river, and the fishery of it is a royal fishery, and belongs to the king by his prerogative . . . .").

155 *See* Ryan, *supra* note 18, at 144–45 ("British law primarily applied the sovereign ownership principle to submerged lands beneath coastal tidelands, the navigable waterways of primary value there.").

156 *How Important Is Groundwater?*, U.S. GEOLOGICAL SURV., https://perma.cc/8P5N-A9WN (last visited Nov. 20, 2024) ("Groundwater is the source of about 37 percent of the water that county and city water departments supply to households and businesses (public supply).").

"navigable" waters are simply important waters, groundwater is a public trust resource.

After the Revolution, American coastal states upheld sovereign ownership of tidally affected waters. In *Arnold v. Mundy*,[157] the New Jersey Supreme Court in 1821 concluded that tidal waters and the land underlying them are the common property of all citizens to be used "for the purpose of passing and repassing, navigation, fishing, fowling, sustenance, and all the other uses of the water."[158] The Supreme Court of the United States decided *Arnold* was a well-reasoned decision in *Martin v. Waddell*.[159] The Court determined that "when the Revolution took place, the people of each state became themselves sovereign; and in that character hold the absolute right to all their [tidally affected] navigable waters, and the soils under them, for their own common use."[160]

As the nation recognized the significance of its vast inland watercourses, to which there were no true English analogs, necessity mandated judicial recognition of previously unprotected waterways as "navigable" for purposes of the public trust.[161] This expansion first occurred in 1810 in Pennsylvania, in *Carson v. Blazer*,[162] where the Supreme Court of Pennsylvania rejected a landowner's claim that his ownership of the bank of the Susquehanna River entitled him to exclusive fishing rights in the river opposite his land.[163] The Susquehanna is not tidally affected, and thus the landowner argued that under the common law he had an exclusive right to fish to the middle of the river.[164] The court rejected that argument, concluding that "[t]he qualities of fresh or salt water cannot . . . determine whether a river shall be deemed navigable or not. Neither can the flux or reflux of the tides ascertain its character."[165] Thus, concluding that "only such parts of the [English] common law as were applicable to [the] local situation [had] been received in [Pennsylvania]," the court rejected the English test for navigability.[166]

The Pennsylvania high court's rejection of the English test demonstrates the navigability requirement's ability to expand as the needs and conditions of society change. Judicial rejection of the English test was warranted because the Susquehanna and other large inland

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157 Arnold v. Mundy, 6 N.J.L. 1 (N.J. 1821).

158 *Id.* at 77.

159 Martin v. Waddell, 41 U.S. 367, 391 (1842).

160 *Id.* at 410; *see also* Pollard v. Hagan, 44 U.S. 212, 228–29 (1845) (holding that newly admitted states entered the Union on "equal footing" with the original states, and therefore also possessed sovereign authority over tidally affected waters and the lands underlying them).

161 Ryan, *supra* note 18, at 145.

162 Carson v. Blazer, 2 Binn. 475 (Pa. 1810)

163 *Id.* at 494.

164 *Id.* at 479.

165 *Id.* at 484 (emphasis omitted).

166 *Id.* at 483–84.

rivers were of immense public value, particularly to trade and travel.[167] As the court noted, the "local situation" was determinative.[168] Nineteenth and twentieth century courts continued to expand the requirement in response to the "local situation," recognizing that waterways incapable of supporting commerce but capable of recreational use were also "navigable" and therefore protected by the public trust.[169] Thus, a waterway's "navigability" is a function of its social and economic value. With this understanding, and considering groundwater's social and economic value, contemporary courts can and have recognized groundwater as a public trust resource.[170]

In the United States' seminal public trust case,[171] *Illinois Central Railroad Co. v. Illinois*,[172] the Supreme Court rejected the rigid application of the English test for navigability.[173] The dispute involved a repealed grant of most of the Chicago Harbor shoreland from the state to the railroad.[174] The state attorney general eventually filed suit to establish ownership of the submerged lands.[175] The Supreme Court determined that the public trust doctrine applied to the non-tidal, navigable in-fact waters of the Great Lakes.[176] The Court observed that under English common law "tidal water" and "navigable water" were synonymous terms, as in England "no waters [were] navigable in fact, at least to any great extent, which [were] not subject to the tide."[177] The Court then noted that in the United States many waters "are navigable for great distances above the flow of the tide,"[178] leading it to conclude that in America "navigability" included all navigable in-fact waters as instruments of commerce.[179] Articulating the trust's anti-monopolistic protections, the Court concluded that "control of property in which the public has an interest, cannot be relinquished by a transfer of the property."[180] The Court established two exceptions to this prohibition,

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167 *See* Shrunk v. Schuylkill Navigation Co., 14 Serg. & Rawle 71, 79 (Pa. 1826), *aff'g Carson*, 2 Binn. at 475 ("Many of [the United States'] rivers, such as the Mississippi, Ohio, Allegheny and Susquehanna, are navigable, even in their natural state by vessels of considerable burden." (emphasis omitted)).

168 *Carson*, 2 Binn. at 484.

169 *See* discussion *infra* Sections IV.B–C (discussing the nineteenth and twentieth century development of the navigability requirement).

170 *See* discussion *infra* Sections V.A–C (discussing modern applications of the public trust to groundwater).

171 *See, e.g.*, Ryan, *supra* note 18, at 140 (referring to *Illinois Central* as seminal in establishing "public trust principles in modern U.S. law").

172 Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387 (1892).

173 *Id.* at 436–37.

174 *Id.* at 438.

175 *Id.* at 433.

176 *Id.* at 435–37.

177 *Id.* at 435–36.

178 *Id.* at 436.

179 *Id.*

180 *Id.* at 453 (explaining, however, that a state may transfer control of a trust resource when "such parcels as are used in promoting the interests of the public therein or can be

allowing state transfer of trust resources when: 1) the transfer of trust property promotes the public interest in that property, or 2) the transfer of trust property can be done without substantially impairing the public's interest in the remaining trust property.[181]

The Court's expansion of the navigability requirement in *Illinois Central* was a direct response to the public importance of the non-tidally affected, navigable-in-fact waters of Lake Michigan. This responsive expansion of the public trust demonstrates that navigability is a surrogate for public importance. With its significant contemporary domestic and agricultural uses, groundwater meets this public importance test.

Professor Maureen Brady has argued that these early cases misunderstood the English common law.[182] She argues that under the English common law, the public had the right to navigate in *all* waters conducive to commercial travel.[183] Indeed, in rejecting what they considered the test for public use under the English common law, American courts conflated two distinct tests. The first, used to determine ownership of fisheries and subaqueous soil, depended on whether the waterbody was tidally influenced.[184] The second, used to determine whether the public was entitled to use a water resource for navigation, depended on whether the waterbody could be used for public carriage.[185] Professor Brady noted under the English common law, the public even had some navigational rights to certain "ditches" that were floatable in the winter but not in the summer.[186]

In some respects, Professor Brady's articulation of the English common law foreshadowed American courts' nineteenth century extension of the navigability requirement to protect public access to waters whose underlying beds were held in private ownership.[187] The recognition at English common law of public rights in waters *overlying* private lands supports judicial recognition of public rights in waters *underlying* private lands (groundwater) because it reflects a historic understanding that where waterbodies are of local social and economic

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disposed of without any substantial impairment of the public interest in the lands and waters remaining").

181 *Id.* at 453.

182 Maureen E. Brady, *Defining "Navigability": Balancing State-Court Flexibility and Private Rights in Waterways*, 36 CARDOZO L. REV. 1415, 1421–24 (2015).

183 *Id.* at 1421.

184 *Id.* at 1423.

185 *Id.* at 1422 (quoting MATTHEW HALE, DE JURE MARIS (n.d.), *reprinted in* STUART A. MOORE, A HISTORY OF THE FORESHORE AND THE LAW RELATING THERETO 370, 374 (3d ed. 1888) (describing "'little streams and rivers that are not a common passage' as private waters, and those in 'common or publick use for carriage' as public waters")).

186 *Id.* at 1421–22 (citing THE READING OF THE FAMOUS AND LEARNED ROBERT CALLIS, ESQ. UPON THE STATUTE OF SEWERS, 23 HEN. VIII. C. 5. AS IT WAS DELIVERED TO HIM AT GRAY'S INN, IN AUGUST, 1622, at 81 (William John Broderip ed., 4th ed. 1824) (1622)).

187 *See* discussion *infra* Section IV.B (describing this nineteenth century expansion of the public trust).

significance, the public's interest in that water is protected regardless of underlying or overlying land ownership.

B. Expanding Navigability: The Pleasure Boat Test

By the turn of the twentieth century, some state courts began to recognize additional water resources as protected by the sovereign public trust. They did so by again extending the meaning of "navigability," so that the trust protected public access to waters whose underlying beds were held in private ownership.[188] This expansion began with the Minnesota Supreme Court's 1893 decision in *Lamprey v. Metcalf*.[189] After determining that a dry lake bed was non-navigable, and thus not owned by the state, Justice William Mitchell elaborated on the public's usufructuary rights in navigable waters.[190] Recognizing that the trust's navigability requirement is simply a measurement of public importance, Justice Mitchell first explained that "the division of waters into navigable and nonnavigable is but a way of dividing them into public and private waters,—a classification which, in some form, every civilized nation has recognized; the line of division being largely determined by its conditions and habits."[191] Mitchell concluded that most of the definitions of navigability "convey[ed] the idea that the water must be capable of some commerce of pecuniary value, as distinguished from boating for mere pleasure."[192] Mitchell, however, rejected such a definition, as the privatization of all waters that failed to meet that commercial value dependent test "would be a great wrong upon the public for all time."[193] Instead, to sufficiently protect and preserve all beneficial public uses, including those "which [could not then] be enumerated or even anticipated," Justice Mitchell described a new test for navigability, concluding that "so long as [waters] are capable of use for boating, even for pleasure, they are navigable."[194] By announcing this test, Mitchell unmoored public rights from public land ownership.

Scholars have distinguished between the proprietary public trust and the sovereign public trust.[195] The propriety public trust, at issue in

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188 *See* Brady, *supra* note 182, at 1424 (articulating three categories of tests that states apply to determine navigability: historic tests, commercial tests, and flotation tests).

189 Lamprey v. Metcalf, 53 N.W. 1139 (Minn. 1893). *See generally* Michael C. Blumm & Courtney Engel, *Proprietary and Sovereign Public Trust Obligations: From Justinian and Hale to* Lamprey *and Oswego Lake*, 43 VT. L. REV. 1, 16–23 (2018) (discussing *Lamprey* and its legacy). *But see* Brady, *supra* note 182, at 1433–34 n.113 (explaining that subsequent Minnesota Supreme Court decisions have stated that Justice Mitchell's discussion of the public use right was not precedential).

190 *Lamprey*, 53 N.W. at 1143–44.

191 *Id.* at 1143.

192 *Id.*

193 *Id.*

194 *Id.* at 1144.

195 Blumm & Engel, *supra* note 189, at 16.

Illinois Central, concerns state ownership through the equal footing doctrine of waterways and the land underneath them.[196] Under the equal footing doctrine, the federal government conveyed title to the shores of navigable waters and the land underlying them to the states at statehood.[197] And, as *Illinois Central* established, states cannot relinquish control over these resources if doing so would "substantially impair" the public's interest.[198] On the other hand, the sovereign public trust—at issue in *Lamprey*—concerns public access and use of waterbodies whose beds are privately owned.[199] Although federal law determines which waterbodies the states hold in proprietary trust,[200] state law determines the scope of the sovereign public trust.[201]

This new "pleasure boat" test conceptualized a definition of "navigability" that recognized new public value. Many states have adopted this test.[202] A few, however, rejected the pleasure boat test, concluding that such an expansion of the public trust was a legislative, not a judicial, function.[203] These decisions notwithstanding, judicial adoption of the pleasure boat test in at least eleven jurisdictions across the country reflects the flexibility of the trust's navigability requirement, capable of modification in order to protect previously unprotected water resources in light of contemporary uses and values.[204] Because groundwater is now instrumental to the conditions and habits of the United States,[205] the division between public and private waters is ripe for judicial adjustment.

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196 *Id.*

197 Pollard's Lessee v. Hagan, 44 U.S. 212, 230 (1845).

198 146 U.S. 387, 453 (1982) ("The control of the state for the purposes of the trust can never be lost, except as to such parcels . . . [that] can be disposed of without any substantial impairment of the public interest in the lands and waters remaining.").

199 Blumm & Engel, *supra* note 189, at 4.

200 PPL Mont., LLC v. Montana, 565 U.S. 576, 590 (2012).

201 HARRISON C. DUNNING, WATERS AND WATER RIGHTS § 32.03 (Amy K. Kelly ed., 3d ed. 2023) (explaining that state law is used to determine which waterways are subject to the public right to use, also known as "The Pleasure Boat Test").

202 Brady, *supra* note 182, at 1433–34 nn.113–14 (listing Arkansas, California, Florida, Mississippi, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, and Wisconsin as states where courts have adopted the pleasure boat test, and describing several state courts' rationales for adopting the test).

203 *See, e.g.*, State *ex rel.* Meek v. Hays, 785 P.2d 1356, 1362 (Kan. 1990) (specifically referencing a Colorado court decision). One state court even opined that expansion of the Public Trust Doctrine to protect historically unprotected resources could require compensation for taking the private rights. Bott v. Comm'n of Nat. Res. 327 N.W.2d 838, 852–53 (Mich. 1982).

204 Brady, *supra* note 182, at 1433–34 nn.113–14 (listing Arkansas, California, Florida, Mississippi, North Carolina, North Dakota, Ohio, South Carolina, South Dakota, and Wisconsin as states where courts have adopted the pleasure boat test).

205 *Groundwater Use in the United States*, *supra* note 142; *How Important Is Groundwater?*, *supra* note 156.

C. Beyond Traditional Navigability: Water Rights & the Affectation Test

In the middle of the twentieth century, some state courts, in response to local habits and conditions, again broadened the scope of the sovereign public trust. This development is often traced to Professor Joseph Sax's seminal 1970 article *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*.[206] Sax advocated for a revival and expansion of the public trust to address gaps in natural resource management.[207] According to Sax, the public trust doctrine serves as a limit on governmental authority to alienate resources "that are so particularly the gifts of nature's bounty that they ought to be reserved for the whole of the populace," protecting these resources for every citizen.[208]

Several important developments to the sovereign trust came from the California Supreme Court's decision in *National Audubon Society v. Superior Court of Alpine County* (*Mono Lake*).[209] A permit granted by the state water board gave the Los Angeles Department of Water and Power (DWP) a right to divert nearly all of the flow of four of the five streams that fed Mono Lake.[210] As a result of DWP's diversions, Mono Lake receded considerably.[211] Mono Lake was navigable in-fact, thus the state held title to the lake and the land underlying it through the proprietary public trust, but the streams that fed Mono Lake were non-navigable.[212] The National Audubon Society sued DWP to enjoin its diversion from the tributaries under the theory that Mono Lake was protected by the public trust.[213]

Agreeing with the environmentalists, the Supreme Court of California established the "affectation test," recognizing that the trust protected navigable waters from harms caused by non-navigable

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[206] Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 473–74 (1970). *See generally* Michael C. Blumm & Zachary A. Schwartz, *The Public Trust Doctrine Fifty Years After Sax and Some Thoughts on Its Future*, 44 PUB. LAND & RES. L. REV. 1, 23–37 (2021) (describing the expansion of the public trust doctrine in the years after Sax's article).

[207] Sax, *supra* note 206, at 474.

[208] *Id.* at 484–85 ("[C]ertain interests are so intrinsically important to every citizen that their free availability tends to mark the society as one of citizens rather than of serfs.").

[209] Nat'l Audubon Soc'y v. Super. Ct. of Alpine Cnty. (*Mono Lake*), 658 P.2d 709 (Cal. 1983). *See generally* Erin Ryan, *From* Mono Lake *to the Atmospheric Trust: Navigating the Public and Private Interests in Public Trust Resource Commons*, 10 GEO. WASH. J. ENERGY & ENV'T L. 39, 48–56 (2019) (providing an in-depth discussion of the *Mono Lake* decision).

[210] *Mono Lake*, 658 P.2d at 711–12.

[211] *Id.* at 714–15.

[212] *Id.* at 720.

[213] *Id.* at 712; *see also id.* at 716–18 (detailing how the federal district court issued a stay in the proceedings to allow the California courts to resolve the scope of California's public trust in the first instance, and how National Audubon then sought declaratory relief in state court, but the state superior court entered summary judgement for DWP, concluding that the public trust doctrine did not operate independently of the California water rights system, and therefore any diversions made under a valid water right did not violate the public trust).

tributaries.[214] After noting that "[t]he objective of the public trust has evolved in tandem with the changing public perception of the values and uses of waterways,"[215] the court described the growing public interest in preserving trust resources in their natural state and announced that aesthetic, public health, and ecological values are all protected by the trust.[216] Because DWP's diversions at the non-navigable tributary level harmed the public's conservation interests in Mono Lake, California's high court decided that "the public trust doctrine . . . protects navigable waters from harm caused by diversion of non-navigable tributaries."[217]

The "affectation test" recognizes that diversions of waters on the private side of the public-private divide can harm the public's interests in public waters. Despite not modifying the state's test for navigability, *Mono Lake* demonstrates that when the local conditions and habits establish a new public interest in previously under-protected waters, courts have found the flexibility necessary to protect those interests. Subsequent courts have embraced this flexibility in determining that groundwater resources that affect navigable waters are also subject to the sovereign public trust.[218] Other courts have relied on the fact that all private waters affect public waters to declare all surface and subsurface waters public, eliminating the public and private dichotomy.[219]

After establishing the affectation test, the *Mono Lake* court concluded that California's statutory water rights system did not abrogate the state's public trust doctrine.[220] Instead, the public trust doctrine and the state's water rights statutes worked in tandem. Thus, before state agencies approve water diversions, they must consider the effect that diversion may have on the protected resource and attempt to minimize any harms.[221] The state also has the sovereign power to reallocate rights in light of current knowledge and needs,[222] and it may do so without the reallocation constituting a takings that requires compensation.[223] This sovereign authority is especially important in the

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214 *Id.* at 720–21.

215 *Id.* at 719.

216 *Id.*

217 *Id.* at 721 (footnote omitted).

218 *See* discussion *infra* Section V.B.

219 *See* discussion *infra* Sections V.A, C.

220 *Mono Lake*, 658 P.2d at 727–29.

221 *Id.* In considering these effects, under the standard established in *Illinois Central*, the state may not issue water rights that would "substantially impair" the public's interest in public trust water resources. *Ill. Cent. R.R. Co.*, 146 U.S. 387, 452–53 (1892). Because the state water board failed to consider the public trust implications when it initially permitted the diversions from Mono Lake's tributaries in 1940, the public trust doctrine required the state to consider the permits anew. *Mono Lake*, 658 P.2d at 729.

222 *Mono Lake*, 658 P.2d at 728. Indeed, the state may even reconsider decisions that properly considered the effect on trust resources. *Id.*

223 *Id.* at 723 ("[T]he state as administrator of the public trust [has] power which extends to the revocation of previously granted rights or to the enforcement of the trust against lands long thought free of the trust."); *see also In re* Water Use Permit

groundwater context, because any attempt at adequately protecting groundwater resources will require curbing usage,[224] which can be done by equitably reallocating usage rights.

Since its inception, the public trust's distinction between navigable and non-navigable waters has been the dividing line between public and private waters. Courts have drawn this line delineating which water resources are of sufficient public value to warrant public ownership by considering local habits and conditions.[225] As public needs and norms changed, courts have consistently redrawn the line, endowing previously unprotected waters with trust protections.[226] In the last century, society's scientific understanding of groundwater resources has dramatically expanded; homes, municipalities, and farms have become more reliant on groundwater; and the detrimental effects of groundwater mining have become more apparent. Given these changes, state courts should again adjust the line between public and private waters to establish groundwater as a public resource. As Justice Holmes explained, the law must respond to the "felt necessities" of the times.[227]

V. THE PUBLIC TRUST AND GROUNDWATER: THREE EXAMPLES

Few courts have directly addressed whether groundwater is a public trust resource. This Part examines three representative states that have judicially enacted such an expansion of the public trust. By identifying each states' rationales for expansion of the doctine, this Part shows how these three states' applications of the trust to groundwater can serve as models for the courts of other states. Although the public trust doctrine's historic tether to navigability could lead courts to reject the doctrine's application to groundwater, this Part explains how three states have embraced this development.

A. Hawai'i: Constitutional Protections

During the late twentieth century, several states, including Pennsylvania, Hawai'i, and Montana, passed constitutional provisions that provide broad protection for environmental resources.[228] Some

Applications, 9 P.3d 409, 453 (Haw. 2000) (concluding that, through the state's constitutional public trust, the state had the "authority *and duty* to preserve the rights of present and future generations in the waters of the state," and the state had the power to revisit and reallocate private rights (emphasis added)).

[224] *See* O'Neill et al., *supra* note 3 (explaining that overuse of groundwater is threatening irreversible harm).

[225] *See* discussion *supra* Sections IV.A–B.

[226] *Id.*

[227] HOLMES, *supra* note 22, at 3.

[228] *See* Quinn Yeargain, *Decarbonizing Constitutions*, YALE L. & POL'Y REV., Spring 2023, at 1, 33–42 (describing the modern environmental constitutionalism movement); *see, e.g.*, ILL. CONST. art. XI, § 2; MASS. CONST. amend. art. XCVII; MONT. CONST. art. II, § 3; N.Y. CONST. art. I, § 19; PA. CONST. art. I, § 27; R.I. CONST. art. I, § 17.

courts have read these constitutional provisions as creating public trusts that protect a wide array of environmental resources for use by future generations.[229] The Supreme Court of Hawai'i relied on the state's inherent public trust authority, as recognized in one such constitutional provision, to conclude that groundwater is a protected public trust resource.[230]

Hawai'i's Constitution codifies the state's inherent public trust doctrine, protecting trust resources for present and future generations:

> For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State. All public natural resources are held in trust by the State for the benefit of the people.[231]

In the so-called *Waiāhole Ditch* case,[232] the Hawai'i Supreme Court clarified that the public trust doctrine applied to "all water resources without exception or distinction," reasoning that the constitutional provisions made no distinction between groundwater and surface water.[233] Describing the public trust as "an inherent [and inalienable] attribute of sovereign authority," the court explained that current scientific knowledge discredited the surface water/groundwater dichotomy, and thus the reliance on common law distinctions between

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[229] *See, e.g.*, Pa. Env't Def. Found. v. Commonwealth, 161 A.3d 911, 931–32 (Pa. 2017) ("The third clause of Section 27 establishes a public trust, pursuant to which the natural resources are the corpus of the trust, the Commonwealth is the trustee, and the people are the named beneficiaries." (footnote omitted)). These constitutional trusts are self-executing, meaning that they do not require implementing legislation to be effective. *Id.* at 936–37 (re-affirming the court's prior pronouncement that Pennsylvania's Environmental Rights Amendment is self-executing); *see also In re* Water Use Permit Applications, 9 P.3d 409, 444 n.30 (Haw. 2000) ("Article XI, section 7 is thus self-executing to the extent that it adopts the public trust doctrine.").

[230] *In re* Water Use Permit Applications, 9 P.3d at 445. Hawaii's recognition of groundwater as a public trust resource is representative of the Alaska Supreme Court's recognition in *Williams Alaska Petroleum, Inc. v. State*, 529 P.3d 1160, 1186–88 (Alaska 2023), *cert. denied*, 144 S. Ct. 555, 217 L. Ed. 2d 296 (2024).

[231] HAW. CONST. art. XI, § 1.

[232] *In re* Water Use Permit Applications, 9 P.3d at 409.

[233] *Id.* at 445. The dispute centered on an irrigation ditch system originally developed to divert both surface water and pumped groundwater to a sugar plantation on the leeward side of the island. *Id.* at 423. After the plantation ceased operations in 1995, the Hawaiian Water Rights Commission held a contested hearing over what would become of the plantation's portion of the diversion. *Id.* at 424–25. The Commission's 1997 decision recognized that the diverted water was a public trust resource and acknowledged its obligation to protect the resource under the trust. *Id.* at 430. The Commission approved an allocation of roughly half of the system's water to leeward agriculture with the rest dedicated to instream flow. *Id.* The Hawai'i Supreme Court affirmed the Commission's authority to regulate water use under the public trust but remanded to the Commission for additional findings regarding the instream flow standards. *Id.* at 501.

the two would ignore "present practical realities."[234] Concluding that "[t]he public trust, by its very nature, does not remain fixed for all time, but must conform to changing needs and circumstances," the court ruled that, "[b]ased on the plain language of our constitution and a reasoned modern view of the sovereign reservation, . . . the public trust doctrine applies to all water resources, unlimited by any surface-ground distinction."[235]

The court also applied the precautionary principle to trust resources. The precautionary principle states that "the absence of firm scientific proof should not tie the [state's] hands in adopting reasonable measures designed to further the public interest."[236] This proactive approach to resource management requires preventative action in the face of uncertainty to better ensure that government entities protect scarce or vulnerable resources for future generations.[237] If other states applied the precautionary principle to groundwater, it would mean adopting measures that would conserve groundwater resources, despite an absence of definitive scientific proof that such measures would be successful.

The Hawai'i Supreme Court's interpretation of the public trust doctrine envisions a robust trust that is capable of evolution to protect the needs of present and future generations. This conceptualization of an evolving trust is consistent with the historic application of the trust discussed in the previous Part.[238] Hawai'i's approach is a model for other jurisdictions with broad constitutional environmental protections—such as Montana,[239] Illinois,[240] and New York[241]—to protect groundwater under the trust.[242]

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234 *Id.* at 443.

235 *Id.* at 447.

236 *Id.* at 467.

237 Natasha Geiling, *Can the Precautionary Principle Save the Endangered Species Act from an Uncertain Climate Future?*, 47 ECOLOGY L.Q. 305, 329–35 (2020) (arguing that a new paradigm in which federal agencies charged with protecting endangered species adopt a precautionary approach could help agencies protect species despite the uncertainties climate change presents); *see also* Sax, *supra* note 206, at 564–65 ("[I]f the relevant facts are unknown, and yet legislatures and administrative agencies show eagerness to go forward, the courts are only reinforced in their over-all suspicion that they are dealing with governmental responsiveness to pressures imposed by powerful but excessively narrow interests."). *But see* Cass R. Sunstein, *Beyond the Precautionary Principle*, 151 U. PA. L. REV. 1003, 1021–29 (2003) (arguing that there are uncertain risks inherent in both state action and inaction, and therefore the precautionary principle is often unworkable and paralyzing, as agencies must overcome the uncertainties associated with any proposed regulations before acting).

238 *See* discussion *supra* Sections IV.A–C.

239 MONT. CONST. art. II, § 3 ("All persons are born free and have certain inalienable rights. They include the right to a clean and healthful environment and the rights of pursuing life's basic necessities, enjoying and defending their lives and liberties, acquiring, possessing and protecting property, and seeking their safety, health and happiness in all lawful ways. In enjoying these rights, all persons recognize corresponding responsibilities.").

B. California: The Affectation Test

With no express constitutional provision, a California court has also recognized that certain groundwater resources are subject to the state's public trust doctrine. The dispute revolved around the Scott River, a tributary of the Klamath River located in Siskiyou County.[243] The Scott River is a navigable river for purposes of the trust.[244] Importantly, there is strong surface-groundwater interconnection in the Scott River watershed, as groundwater pumping can both draw water from the river and reduce groundwater resources that would otherwise supplement the river's flows.[245]

In *Environmental Law Foundation v. State Water Resources Control Board,*[246] the California Court of Appeal affirmed the trial court's application of *Mono Lake*'s affectation test in determining that groundwater resources that affect a navigable surface water are subject to the trust.[247] Environmentalists sued, seeking a declaration that the public trust imposed a duty on the State Water Resources Control Board and Siskiyou County to consider the adverse effects of groundwater extraction on the Scott River when issuing new well permits.[248] Relying

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240 ILL. CONST. art. XI, § 2 ("Each person has the right to a healthful environment. Each person may enforce this right against any party, governmental or private, through appropriate legal proceedings subject to reasonable limitation and regulation as the General Assembly may provide by law.").

241 N.Y. CONST. art. I, § 19 ("Each person shall have a right to clean air and water, and a healthful environment.").

242 In *Williams Alaska Petroleum, Inc. v. State*, 529 P.3d 1160, 1187 (Alaska 2023), *cert. denied*, 144 S. Ct. 555 (2024), the Supreme Court of Alaska relied on the state's constitution, which provides that "[w]henever occurring in their natural state, . . . waters are reserved to the people for common use" to conclude that groundwater is a public trust resource (alteration in original) (citing ALASKA CONST., art. VIII, § 3). The court went on to conclude that as a trustee of public trust resources, the state can pursue legal actions for harms caused by private parties to public trust resources. *Id.* at 1186–88. Here, the state sued a private party for its alleged pollution of one of the state's groundwater resources. *Id.* at 1186–87.

243 Env't L. Found. v. State Water Res. Control Bd., 237 Cal. Rptr. 3d 393, 396 (Cal. Ct. App. 2018).

244 *Id.* The river and its tributaries provide important habitat for anadromous fish, including steelhead and coho salmon. PAUL STANTON KIBEL & JULIE GANTENBEIN, RIVERS THAT DEPEND ON AQUIFERS: DRAFTING SGMA GROUNDWATER PLANS WITH FISHERIES IN MIND 24 (2018), https://perma.cc/U6LD-QCWT. Land use in the Scott River Valley is primarily agricultural, and groundwater pumping to support agricultural uses has greatly increased since the surface water rights to the river were adjudicated in 1980. *Id.* at 23–24

245 KIBEL & GANTENBEIN, *supra* note 244, at 23–25. As a result of Scott River's surface-groundwater interconnection, there is an inherent conflict between groundwater pumping and protecting fish habitats. *Id.* at 24.

246 Env't L. Found. v. State Water Res. Control Bd., 237 Cal. Rptr. 3d at 393.

247 *Id.* at 397–98, 402. California's application of the "affectation test" to groundwater that affects a navigable water is representative of the Wisconsin Supreme Court's application in *Lake Beulah Management District v. State Department of Natural Resources*, 799 N.W.2d 73, 86–88 (2011).

248 *Env't L. Found.*, 237 Cal. Rptr. 3d 393, 396–97 (Cal. Ct. App. 2018). The trial court ruled for the environmentalists, and the appellate court affirmed. *Id.* at 399, 411.

on the "affectation test" established in *Mono Lake*, which held that non-navigable waters affecting navigable waters are subject to the public trust, the court determined that "the public trust doctrine applies if extraction of groundwater adversely impacts a navigable waterway to which the public trust doctrine does apply."[249] Thus, like *Mono Lake*'s holding that non-navigable surface waterways that affect navigable waters are subject to the public trust, *Environmental Law Foundation* recognized that groundwater resources that affect navigable surface waters are subject to the trust as well.

The court also decided that California's 2014 Sustainable Groundwater Management Act,[250] which allows local agencies to form groundwater sustainability agencies for the purpose of managing and regulating groundwater basins through the adoption of sustainability plans, did not subsume any trust obligations.[251] The court concluded that the Sustainable Groundwater Management Act and the public trust coexisted, acting in parallel with neither subsuming the other.[252] The court recognized that this determination was consistent with *Mono Lake*'s holding that California's statutory surface-water rights scheme did not subsume the public trust.[253] Rather than supplant the public trust, the Sustainable Groundwater Management Act supplements it.[254]

The court applied the "affectation test" to groundwater.[255] After a showing that a groundwater resource affects a navigable water, state and local entities have a duty to consider and evaluate the adverse effects groundwater pumping will have on that navigable water and its trust uses.[256] The primary limitation of this approach is evidentiary, as the court's retention of the navigability tether could allow unsustainable groundwater pumping where there is no evident effect on a substantial surface waterbody, which may fail to protect groundwater resources for future generations.[257] However, because the issue presented to the court was whether the county had a duty "to consider the potential adverse impacts of groundwater extraction on Scott River," the court had no reason to consider whether all groundwater is subject to the public

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249 *Id.* at 402.

250 CAL. WATER CODE §§ 10720–10732.2 (2023).

251 *Env't L. Found.*, 237 Cal. Rptr. 3d at 405.

252 *Id.* at 408.

253 *Id.* at 406–09.

254 *Id.* at 398.

255 *Id.* at 403.

256 *Id.* at 403–04.

257 This interpretation of the trust also puts the burden on plaintiffs to show that groundwater pumping has an adverse effect on a navigable surface water before government agencies are required to consider the effects of groundwater pumping. *See* Elena Bilheimer, *Public Trust Values in Peril: Friends of the Eel River File Lawsuit Against Humboldt County*, NORTHCOAST ENV'T CTR. (Nov. 30, 2022), https://perma.cc/ZW4X-98XY (explaining that a local environmental non-profit had to filed suit to establish that groundwater pumping had an effect on a navigable water because the county claimed to find no evidence that dry river conditions were directly caused by groundwater use).

trust. [258] This unresolved issue notwithstanding, California's application of the public trust doctrine could prove a model in jurisdictions with a strong navigability tether,[259] such as Georgia[260] and Kentucky.[261]

C. Nevada: Water as a Public Resource

In *Mineral County v. Lyon County*,[262] the Nevada Supreme Court relied on state sovereign authority and a legislative declaration that "[t]he water of all sources of water supply within the boundaries of the State whether above or beneath the surface of the ground, belongs to the public"[263] to conclude "that the public trust doctrine applies to all waters of the state, whether navigable or nonnavigable."[264] In 2011, in *Lawrence v. Clark County,*[265] the Nevada Supreme Court recognized the state's public trust in navigable waters for the first time.[266] Clark County and the Nevada State Land Registrar asked the court whether the state could freely alienate land that was once submerged under a waterway or whether the public trust prohibited such a transfer.[267] The

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[258] *Env't L. Found.*, 237 Cal. Rptr. 3d 393, 396 (Cal. Ct. App. 2018).

[259] *See also Lake Beulah Mgmt. Dist.*, 335 N.W.2d 73, 86–88 (Wis. 2011) (concluding that, "when presented with sufficient concrete, scientific evidence of potential harm to waters of the state," Wisconsin's Department of Natural Resources has a general duty under the public trust doctrine and state statutes to consider the effects of proposed high-capacity wells on navigable waters when deciding whether to issue a permit for those wells); Chernaik v. Brown, 475 P.3d 68, 81 n.7 (Or. 2020) (rejecting the plaintiff's argument that the atmosphere is a public trust resource but noting that the court was "not imply[ing] that a factual connection between a condition or activity affecting a natural resource and adverse effects on a recognized public trust resource is irrelevant," citing to *Mono Lake* & *Environmental Law Foundation*). For an example of a case applying California's application of the trust, see *Russian Riverkeeper v. County of Sonoma*, No. SCV-273415, 2024 WL 4241381, at *11–15 (Cal. Super. Ct. Aug. 21, 2024) (concluding that the County of Sonoma abused its discretion in adopting amendments to its well construction standards because the county did not properly consider the amendments impact on public trust resources).

[260] GA. CODE § 44-8-5(a) (2023) ("[T]he term 'navigable stream' means a stream which is capable of transporting boats loaded with freight in the regular course of trade either for the whole or a part of the year.").

[261] Natcher v. City of Bowling Green, 95 S.W.2d 255, 259 (Ky. 1936) ("The true criterion of navigability of a river is whether it is generally and commonly useful for some purpose of trade or commerce of a substantial and permanent character . . . .").

[262] Mineral Cnty. v. Lyon Cnty, 473 P.3d 418 (Nev. 2020).

[263] NEV. REV. STAT. § 533.025 (2023).

[264] *Mineral Cnty.*, 473 P.3d at 425. At the time of this writing, the author has not identified any other state courts that have also relied on public ownership of all in-state water to recognized groundwater as a public trust resource. However, the Nevada Supreme Court's reasoning could serve as a model in other states that recognize public ownership of all water. *See* statutes cited *supra* note 59 (listing states that recognize public ownership of all in-state water).

[265] Lawrence v. Clark Cnty., 254 P.3d 606 (Nev. 2011).

[266] *Id.* at 613. *See generally*, Michael C. Blumm & Michael Benjamin Smith, *Walker Lake and the Public Trust in Nevada's Waters*, 40 VA. ENV'T L.J. 1, 16–23 (2022) (putting *Lawrence* in its historical context and discussing the Walker Lake litigation).

[267] *Lawrence*, 254 P.3d at 607.

court identified three ways in which the state had recognized the sovereign public trust: the state constitution's gift clause,[268] state statutes announcing public ownership of state land and water,[269] and the intrinsic limitation the doctrine imposes on the state's sovereign power.[270] The court explained that the public trust doctrine is "not simply common law [and] easily abrogated by legislation" and concluded that "the doctrine constitutes an *inseverable restraint on the state's sovereign power*."[271] Thus, with inherent constitutional and statutory support, the court expressly adopted the doctrine in Nevada, recognizing the state as a sovereign trustee of public trust resources.[272]

Less than ten years later, in *Mineral County v. Lyon County*, the court clarified the scope of the trust and its relationship with state-granted water rights allocated under the doctrine of prior appropriation and settled by judicial decree.[273] Mineral County intervened in long-running litigation in federal court regarding the allocation of water from the Walker River arguing that the public trust doctrine required reallocation of water rights to preserve Walker Lake, located in the

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[268] The gift clause prohibits the gift or loan of public funds and credit. *Id.* at 612; NEV. CONST., art. VIII, § 9 ("The State shall not donate or loan money, or its credit . . . . to . . . any company, association, or corporation, except corporations formed for educational or charitable purposes."). Although not an explicit adoption of the public trust doctrine, the court noted that the gift clause expressly limits the legislature's ability to dispose of the public's resources without a public purpose, and it could decern no rationale for treating public trust waterways differently than public money and credit. *Lawrence*, 254 P.3d at 612.

[269] The court also recognized that two state statutes codified the public trust into statutory law. *Id.* at 612–13. The first, Nevada Revised Statutes Section 321.0005, provides in pertinent part: "The Legislature declares the policy of this State regarding the use of state lands to be that state lands *must be used in the best interest of the residents of this State*, and to that end the lands may be used for recreational activities, the production of revenue and other public purposes."
NEV. REV. STAT. § 321.0005 (2023) (emphasis added). And the second statute the court identified, Nevada Revised Statutes Section 533.025, provides that "[t]he water of all sources of water supply within the boundaries of the State whether above or beneath the surface of the ground belongs to the public." NEV. REV. STAT. § 533.025 (2023). The court reasoned that these provisions limit the state's authority to make use of state lands and waters, such that the state may only use these properties for purposes consistent with the public interest, which exemplifies the fiduciary principle at the core of the public trust doctrine. *Lawrence*, 254 P.3d at 613.

[270] Finally, as recognized in *Illinois Central*, the court recognized the public trust doctrine as an inherent limitation on sovereign powers, which "[t]he State can no more abdicate . . . than it can abdicate its police powers . . . ." *Lawrence*, 254 P.3d at 613 (quoting *Ill. Cent. R.R. v. Illinois*, 146 U.S. 387, 453 (1892) (alteration in *Lawrence*) (omission supplied)).

[271] *Id.* at 613 (emphasis added).

[272] *Id.* The court remanded the case to the lower court to determine on first impression whether the public trust doctrine applied to the land at issue. *Id.* at 617. In 2012, the parties settled the dispute, agreeing to split the parcels. Order Implementing Settlement Agreement at 3, Clark Cnty. v. Lawrence, No. 08A576003 (Nev. Dist. Ct. Jan. 26, 2012) (No. 31). The County received the land above a levee maintained by the Bureau of Reclamation, and the State retained the land below the levee. *Id.*

[273] 473 P.3d 418, 430 (Nev. 2020).

county.[274] The federal district court dismissed the county's claims.[275] On appeal, the Ninth Circuit certified two questions to the Supreme Court of Nevada: 1) does the public trust doctrine permit reallocation of adjudicated and settled water rights under the prior appropriation doctrine; and 2) if so, does reallocation constitute an unconstitutional takings of water rights holders' property?[276]

Answering the first question as it had reformulated it,[277] the court relied on the three sources of Nevada's public trust that it identified in *Lawrence*: the state constitution's gift clause, state statutes, and inherent sovereign authority.[278] The court gave attention to the statutory source of the trust, a statute that declares that "[t]he water of all sources of water supply within the boundaries of the State whether above or beneath the surface of the ground, belongs to the public."[279] This provision, according to the court, "recognize[s] that the public . . . water of [the] state [does] not belong to the state to use for any purpose, but only for the purposes that comport with the public's interest in [them], exemplifying the fiduciary principles at the heart of the public trust doctrine."[280]

Turning to whether the trust applied to all waters, whether navigable or not, the court expounded on the interconnected nature of all water, explaining that "navigable water's existence is wholly dependent on tributaries."[281] The court concluded that "[t]o permit the state, as owner of all water within its borders, to freely allocate nonnavigable waters to the detriment of navigable waters held for the public trust would permit the state to evade its fiduciary duties regarding public trust property."[282] Thus, the court determined that the public trust doctrine applied to all waters of the state.[283]

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274 *Mineral Cnty.*, 473 P.3d at 422–23.

275 *Id.* at 423.

276 *Id.* at 421–23 (answering the first question in the negative, the court did not reach the second question).

277 *Id.* at 421 (showing that the Supreme Court of Nevada rephrased the certified question as follows: "Does the public trust doctrine permit reallocating rights already adjudicated and settled under the doctrine of prior appropriation and, if so, to what extent?").

278 *Id.* at 424–25.

279 *Id.* at 425 (alteration in original) (quoting NEV. REV. STAT. § 533.025 (2023)).

280 *Id.* at 425 (quoting *Lawrence*, 254 P.3d 606, 613 (Nev. 2011)).

281 *Id.* at 426 (quoting Mineral Cnty. v. State, 20 P.3d 800, 807–08 (Nev. 2001)).

282 *Id.* at 426.

283 *Id.* at 425. The court also clarified that the public trust applied to water rights allocated both before and after the court's formal recognition of the public trust doctrine, as both the doctrine's inherent limitation on state sovereignty and Nevada's constitution have limited the state's ability to dispose of trust resources since the state's admission into the Union. *Id.* Additionally, the court concluded that Nevada's water rights statutes are consistent with the public trust because: 1) the State Engineer is required to consider the public interest in allocating water rights, and 2) the distribution of publicly owned water through the allocation of water rights is consistent with the standards that the court established for the dispersion of public trust resources. *Id.* at 426–29 (noting that the test to determine if the state's distribution of public trust property is consistent with the public

Here, the Nevada Supreme Court took the "affectation doctrine," originally recognized in *Mono Lake*, to its logical conclusion.[284] Rather than require a showing that a non-navigable water impacts a navigable water before subjecting that non-navigable water to the trust, the court, consistent with the current scientific understanding that all water is hydrologically connected,[285] simply asserted that *all* state waters are trust resources.[286] That is, all waters affect navigable waters, so all waters are trust resources.

Finally, the court determined that, although the public trust doctrine applies to water rights,[287] given the state's interest in finality as expressed in the state's statutory water law scheme,[288] the public trust doctrine does not permit reallocation of adjudicated and settled water rights.[289] The court did acknowledge that adjudicated and settled rights are still subject to regulation for the public welfare, leaving open the possibility of non-reallocation remedies, such as requiring a recovery plan for the lake that would include consumptive use reductions.[290] Determining that the statutory scheme prohibited state reallocation of judicially settled rights, the court did not reach whether such a reallocation would constitute a takings as requested by the Ninth Circuit.[291]

Where California's "affectation test" subjects non-navigable waters affecting navigable waters to the public trust, Nevada's Supreme Court concluded that all in-state waters are trust resources.[292] How effective these differing applications of the public trust doctrine will be at protecting groundwater for future generations remains to be seen. This is especially true in light of the Nevada court's rejection of the state's ability to reallocate judicially settled water rights in favor of finality, differing from *Mono Lake*'s recognition of the state's sovereign authority

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trust doctrine the distribution must meet three requirements: "(1) whether the dispensation was made for a public purpose, (2) whether the state received fair consideration in exchange for the dispensation, and (3) whether the dispensation satisfies the state's special obligation to maintain the trust for the use and enjoyment of present and future generations" (internal quotation marks omitted)).

284 *Mono Lake*, 658 P.2d 709, 721 (Cal. 1983).

285 *See* sources cited *supra* note 52.

286 *Mineral Cnty.*, 473 P.3d at 426.

287 *Id.* at 425.

288 NEV. REV. STAT. § 533.210(1) (2023) ("The decree entered by the court, as provided by [Nevada Revised Statute Section] 533.185, *shall be final and shall be conclusive* upon all persons and rights lawfully embraced within the adjudication . . . ." (emphasis added)).

289 *Mineral Cnty.*, 473 P.3d at 429–30. The court's decision was limited to judicially settled rights. *Id.* at 429 (citing NEV. REV. STAT. § 533.210(1)).

290 *Id.* at 430; *see also* Blumm & Smith, *supra* note 266, at 35 (discussing the remedies that Mineral County sought on remand, including, but not limited to, reducing the overall quantity of water available for diversion, requiring that excess water in wet years be delivered to the lake and not apportioned amongst users, and requiring the state to develop and fund an implementation plan for preserving the lake).

291 *Mineral Cnty.*, 473 P.3d at 431.

292 *Id.* at 426.

to reallocate water rights.[293] Nevada's interpretation of the trust could be problematic given that the state applies the prior appropriation doctrine to groundwater,[294] potentially limiting the state's ability to reallocate historically entrenched groundwater rights. However, because the *Mineral Lake* decision was specific to judicially adjudicated water rights, there is room to argue for the reallocation of groundwater rights that have not been settled by judicial decree or that the applicability of the public trust doctrine to water rights should affect the state's interpretation of beneficial use.

The Supreme Court of Nevada did away with the navigability requirement and recognized that all water resources are public trust resources. In doing so, the court relied in part on a state statute declaring that state waters belong to the public. This interpretation of the public trust could serve as a model in other states that recognize public ownership of all water.[295]

VI. CONCLUSION

The groundwater resources of the United States are in critical condition. Continued overuse of these resources risks complete deprivation of use for future generations. Indeed, overuse of groundwater is entrenched in our social and political system. From cattle farmers in Kansas to goldmines in Nevada and luxury home developments in Montana, entire communities and industries have been built around, and are entirely dependent on, pumping groundwater at rates that are unsustainable.[296] Moreover, the people engaged in these ventures are actively resisting changes that could conserve groundwater resources for future generations.[297]

Where applied to groundwater, the public trust may serve as a generational equalizer, as it would require states to consider future generations when allocating groundwater resources. The doctrine's historic tether to navigable waters presents an obstacle to such an

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293 *Mono Lake*, 658 P.2d 709, 728 (Cal. 1982). *See also generally* Roderick E. Walston, *The Public Trust Doctrine: The Nevada and California Supreme Courts' Divergent Views in* Mineral County *and* National Audubon Society, 58 IDAHO L. REV. 158, 184–201 (2022) (comparing the California Supreme Court's decision in *Mono Lake* with the Nevada Supreme Court's decision in *Mineral County*).

294 NEV. REV. STAT. § 534.020 ("All underground waters within the boundaries of the State belong to the public, and, subject to all existing rights to the use thereof, are subject to appropriation for beneficial use only under the laws of this State relating to the appropriation and use of water and not otherwise.")

295 *See* statutes cited *supra* note 59.

296 *See* Flavelle & Rojanasakul, *As Groundwater Dwindles, Powerful Players Block Change, supra* note 33.

297 *Id.* (providing examples in Kansas, Nevada, and Montana of entrenched interests actively resisting legislative and regulatory changes to those states current groundwater management schemes); *see also* Sax, *supra* note 206, at 560 (explaining that in public resource litigation the issues generally involve a "concerted minority" subjecting its will on a "diffuse majority").

application. However, throughout its history, the navigability requirement has served as a dividing line between public and private waters.[298] As public uses and values have changed, courts have modified the navigability requirement to protect waters of public significance.[299] As Justice Mitchell explained over a century ago in *Lamprey*, if the navigability requirement is incapable of protecting the public's use, then courts may use the common law "to discard" it.[300] Many states have regulated groundwater use to some degree through statute. This regulation should not be an obstacle to judicial recognition of groundwater as a trust resource, because the public trust doctrine is not nullified by statute or regulation.[301] The public trust is inherent in sovereignty and thus inextinguishable by legislative action.[302] The public trust doctrine coexists with states' various groundwater usage schemes, each serving their respective purposes.[303] Although the groundwater usage doctrines delineate private rights, the public trust preserves public rights.

Judicial recognition of a public trust in groundwater would allow citizens to sue to enforce the public's rights when a state fails to protect a groundwater resource from substantial impairment.[304] Courts applying the public trust could direct the state to use its sovereign authority to mandate reallocation of groundwater rights without threatening the balance of powers between the political branches. As Professor Sax explained in his half century old article, the public trust doctrine enables courts to "promote equality of political power for a disorganized and diffuse majority by remanding appropriate cases to the legislature [or state agencies] after public opinion has been aroused."[305] It is not the role of courts to overrule policy decisions that they perceive to be unwise.[306] Instead, the court's role in public trust cases is to reorient legislative and executive bodies, so as to level "the political

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298 *Hillebrand*, 274 N.W. 821, 822 (S.D. 1937) ("This division of lakes and streams into navigable and nonnavigable is the equivalent to a classification of public and private waters.").

299 *See* discussion *supra* Sections IV.A–C.

300 "If the term 'navigable' is not capable of a sufficiently extended meaning to preserve and protect the rights of the people to all beneficial public uses of [the inland lakes at issue], . . . we are not prepared to say that it would not be justifiable, within the principles of the common law, to discard the old nomenclature, and adopt the classification of public waters and private waters." *Lamprey*, 53 N.W. 1139, 1143–44 (Minn. 1893).

301 *See Mono Lake*, 658 P.2d 709, 727 (Cal. 1983); *In re* Water Use Permit Applications, 9 P.3d 409, 445 (Haw. 2000)

302 *See Lawrence*, 254 P.3d 606, 613 (Nev. 2011).

303 *See Mono Lake*, 658 P.2d at 727; *In re* Water Use Permit Applications, 9 P.3d at 445.

304 *See Mono Lake*, 658 P.2d at 716 n.11 (asserting that members of the public "[have] standing to raise a claim of harm to the public trust"); *see also Ctr. for Biological Diversity, Inc. v. FPL Grp, Inc.*, 83 Cal. Rptr. 3d 588, 605 (Cal. Ct. App. 2008) (holding that suits alleging that a government entity failed to discharge its public trust duties by permitting a private development project must name that government entity as a party to the suit).

305 Sax, *supra* note 206, at 560.

306 *Id.* at 558.

burdens . . . to aid underrepresented and politically weak interests," including the interests of future generations.[307] After leveling the burdens by requiring a balancing of interests,[308] a remand to the political sphere, "giv[ing] final authority . . . to a more adequately representative body," is the appropriate remedy.[309] If the state does not ultimately uphold its duty to prevent substantial impairment of trust resources, courts have a continuing obligation to reinform the political branches of their trust responsibilities.

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[307] *Id.*

[308] *See, e.g.*, *Mono Lake*, 658 P.2d at 712 (requiring the state water board to consider the effect that a water diversion may have on a public trust water and attempt to minimize any harms before approving the diversion).

[309] Sax, *supra* note 206, at 558.