

## WATER AND PROPERTY RIGHTS IN AN ERA OF HYDROCLIMATE INSTABILITY

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*Stationarity—the idea that natural systems fluctuate within an unchanging envelope of variability—is a foundational concept that permeates training and practice in water-resource engineering.*<sup>1</sup>

*Changes in extreme weather events are the primary way that most people experience climate change. Human-induced climate change has already increased the number and strength of some of these extreme events. Over the last 50 years, much of the United States has seen an increase in prolonged periods of excessively high temperatures, more heavy downpours, and in some regions, more severe droughts.*<sup>2</sup>

Playing off a famous and provocative 1966 cover story from *Time Magazine* that asked “Is God Dead?” a group of scientists proclaimed in 2008 in *Science Magazine* that “Stationarity is Dead.”<sup>3</sup> They uttered that phrase as it pertains to water infrastructure planning and management. Their point was that anthropogenic changes in climate had already rendered invalid the assumptions regarding the extremes in water shortage and abundance on which America’s

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1. P.C.D. Milly, Julio Betancourt, Malin Falkenmark, Robert M. Hirsch, Zbigniew W. Kundzewicz, Dennis P. Lettenmaier & Ronald J. Stouffer, *Stationarity is Dead: Whither Water Management?*, 319 *SCIENCE* 573 (2008).

2. JERRY M. MELILLO ET AL., U.S. GLOB. CHANGE RES. PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 15 (2014) [hereinafter NATIONAL CLIMATE ASSESSMENT], [http://s3.amazonaws.com/nca2014/high/NCA3\\_Climate\\_Change\\_Impacts\\_in\\_the\\_United%20States\\_HighRes.pdf?download=1](http://s3.amazonaws.com/nca2014/high/NCA3_Climate_Change_Impacts_in_the_United%20States_HighRes.pdf?download=1).

3. Milly et al., *supra* note 1. For the 1966 cover, see “Time Magazine Cover: Is God Dead?” *TIME*, Apr. 8, 1966.

water projects had been based. The events of the last decade have proved their thesis. Climate extremes are now far greater than those that generations of water experts had planned for—more frequent and extended droughts, more intense rainfall events and floods—with the consequence that a new paradigm of water planning and management is needed.

Events in the physical world are playing out in many ways, creating new occasions for the interplay of governmental action and property rights. This Article will identify two such situations, both related to the operation of major water control facilities, where current and potential alterations to past operational regimes are giving rise to protestations that the governmental responses to changed climatic conditions are takings of private property rights.

### I. THE NEW “NORMAL”

As a technical, definitional matter, it may be fair to quibble about whether stationarity is really dead<sup>4</sup> and, similarly, there likely will continue to be some people who remain climate change skeptics. What is not open to dispute is the empirical reality that the expected operating parameters of the large water supply and flood control projects in the United States, almost all of which were planned and built forty or more years ago, have not accounted either for the more extreme weather patterns—the intensity of droughts and storms—experienced in the most recent forty-year period, or for the frequency with which the extremes are being felt in many different regions of the nation. These changes in the norms are concisely depicted using maps rather than words. One of the maps depicts changes in flood magnitude over time, and two sets of maps depict predicted mid-twenty-first century water shortage and water consumption patterns,

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4. See Harry F. Lins, *A Note on Stationarity and Nonstationarity*, WORLD METEOROLOGICAL ORG. (2012), [http://www.wmo.int/pages/prog/hwrrp/chy/chy14/documents/ms/Stationarity\\_and\\_Nonstationarity.pdf](http://www.wmo.int/pages/prog/hwrrp/chy/chy14/documents/ms/Stationarity_and_Nonstationarity.pdf). Dr. Lins is the president of the World Meteorological Organization Commission for Hydrology and a hydrologist at the U.S. Geological Survey. After making a strong argument that the frame of reference affects the characterization of a system, as stationary or not, one of Dr. Lins's major conclusions is that even stationary systems are not static. *Id.* at 5.

with and without climate change. All of the graphics are selected from the 2014 *National Climate Assessment*.<sup>5</sup>

### Trends in Flood Magnitude

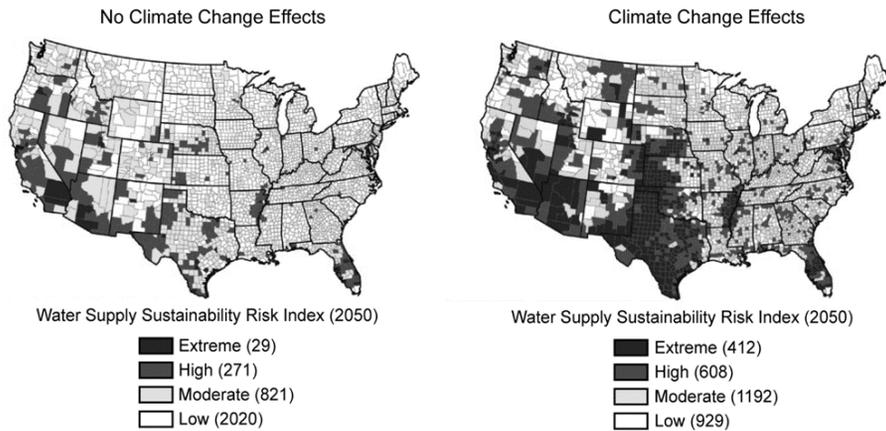


**Figure 1.** Trend magnitude (triangle size) and direction (upward pointing arrow = increasing trend, downward pointing arrow = decreasing trend) of annual flood magnitude from the 1920s through 2008. Local areas can be affected by land-use change (such as dams). Most significant are the increasing trend for floods in the Midwest and Northeast and the decreasing trend in the Southwest.<sup>6</sup>

5. NATIONAL CLIMATE ASSESSMENT, *supra* note 2.

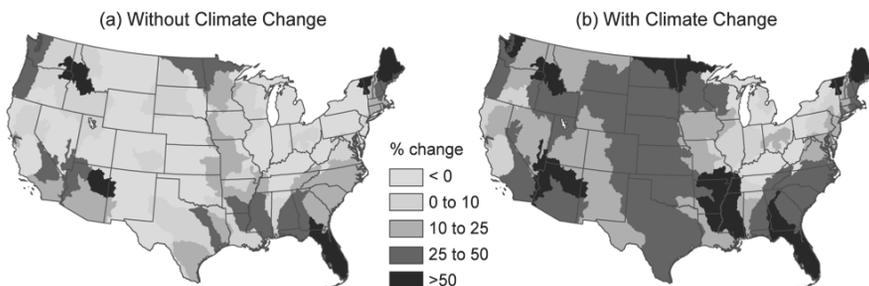
6. NATIONAL CLIMATE ASSESSMENT, *supra* note 2, at 40 fig.2.21 (“Trends in Flood Magnitude”), <https://nca2014.globalchange.gov/report/our-changing-climate/extreme-weather#tab1-images>.

## Water Supplies Projected to Decline



**Figure 2.** Climate change is projected to reduce the ability of ecosystems to supply water in some parts of the country. This is true in areas where precipitation is projected to decline, and even in some areas where precipitation is expected to increase. Compared to 10% of counties today, by 2050, 32% of counties will be at high or extreme risk of water shortages. Projections assume continued increases in greenhouse gas emissions through 2050 and a slow decline thereafter (A1B scenario). Numbers in parentheses indicate number of counties in each category.<sup>7</sup>

## Project Changes in Water Withdrawal



**Figure 3.** The effects of climate change, primarily associated with increasing temperatures and potential evapotranspiration, are projected to significantly

7. NATIONAL CLIMATE ASSESSMENT, *supra* note 2, at 198 fig. 8.1 ("Water Supplies Projected to Decline"), <https://nca2014.globalchange.gov/report/sectors/ecosystems>, reprinted with permission from Roy et al., *Projecting Water Withdrawal and Supply for Future Decades in the U.S. Under Climate Change Scenarios*, 46 ENVTL. SCI. & TECH. 2545, 2553 (2012). Copyright (2012) American Chemical Society.

increase water demand across most of the United States. Maps show percent change from 2005 to 2060 in projected demand for water assuming (a) change in population and socioeconomic conditions based on the underlying A1B emissions scenario, but with no change in climate, and (B) combined changes in population, socioeconomic conditions, and climate according to the A1B emissions scenario (gradual reductions from current emission trends beginning around mid-century).<sup>8</sup>

Hydroclimate instability threatens to throw into chaos the nation's water management system, particularly water supply for reclamation projects and lack of storage capacity for flood control.<sup>9</sup> Unless or until those recent extreme weather patterns go quiescent, operators of major water projects have to review and revamp their operating procedures to deal with more frequent extreme weather events.<sup>10</sup> With that awareness even inaction has to be considered a conscious choice among alternatives, as water managers chart the way in which the facilities under their control will respond to the threats and stresses of too little and too much water.

## II. HYDROCLIMATE FALLOUT FOR WATER MANAGEMENT AND WATER USERS

The ramifications of hydroclimate instability reach beyond the operation of water supply and control facilities to encompass regulatory choices and legal doctrines and decisions. One of the essential functions of government is to respond to natural disasters and, when possible, to prevent or minimize their effects. Floods and droughts are prime territory for both proactive and reactive governmental interventions.<sup>11</sup> The police power authority over health, safety, and welfare

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8. NATIONAL CLIMATE ASSESSMENT, *supra* note 2, at 85 fig 3.11 ("Projected Changes in Water Withdrawals"), <https://nca2014.globalchange.gov/report/sectors/water>.

9. There are also significant water quality effects that will not be considered in this Article attributable to hydroclimate instability. These include increased sedimentation, nitrogen, and other pollution loading. *See, e.g.*, NATIONAL CLIMATE ASSESSMENT, *supra* note 2, at 70.

10. To be sure, some reviews are underway, but it remains uncertain (and in many settings, doubtful) whether the authorities under which water managers operate are sufficiently broad to allow the managers to consider all of the ramifications of their choices. *See, e.g.*, Reed D. Benson, *Reviewing Reservoir Operations: Can Federal Water Projects Adapt to Change?*, 42 COLUM. J. ENVTL. L. 353 (2017). *See generally* KATHRYN FIRSCHING, *U. S. Army Corps of Engineers, in LAW OF WATER RESOURCE UTILIZATION: IMPACT OF FEDERAL ENVIRONMENTAL LAWS* (Am. Bar Ass'n, Robert Abrams & Latravia Smith, eds., forthcoming 2018).

11. Wildfire mitigation and response is likewise a threat of changed dimension in the most recent decade. Although not an intended topic in this Article, wildfire policies are another

provides the groundwork for laws and regulations addressing the subject. Similarly, numerous laws charge federal and state officials with responsibilities related to the protection of natural resources for the public benefit. A considerable number of those laws, such as the federal Clean Water Act (“CWA”) or state minimum levels and flows legislation, directly address governance of the water resource. Other laws, such as the federal Endangered Species Act (“ESA”)<sup>12</sup> and state counterparts, address water indirectly, as critical habitat that must be maintained to avoid jeopardy to listed species.

The reach of the myriad of laws promoting the public interest often overlaps the sphere of the project-specific authority granted to water managers, and the directives of the two sets of laws are not always unitary. Officials of the United States Bureau of Reclamation (“Bureau of Reclamation”) and the United States Army Corps of Engineers (“USACE” or “Corps”) are required to operate their projects in conformity with the congressional authorizations pursuant to which the projects were funded and built. Concurrently, those same officials are required to obey the CWA, ESA, and a host of other laws. State officials, such as those in departments of natural resources, are similarly constrained: many of the dictates of those federal laws circumscribe what state officials can do in pursuance of their organic state-law mandates. In addition, their state constitutions and legislation frequently will prescribe other general duties in relation to water resources and the public’s interest in those resources.

A second constituency affected by the ramifications of hydroclimate instability is water rights holders, both riparians and appropriators. Their interests are affected by the threats of water shortages or overabundance and, necessarily, by the water managers’ responses to those conditions. Changes in the water management status quo affects rights holders’ interests.

On the shortage end of the scale, the most obvious example of adverse impacts falls on those having rights to divert and use water whose diversions are curtailed or limited in times of water shortage. There is a considerable controversy regarding governmental responses

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area in which governmental choices are likely to have far-reaching impacts on affected property owners. Historically, that area has given rise to legal doctrines that offer comparisons to water facility operations that suggest a broad range of governmental activity, including the extreme action of destroying property to protect other property, should be shielded from takings liability. *See infra* text accompanying notes 46–48.

12. Endangered Species Act, 16 U.S.C.A., § 1531–44 (2018).

to climate instability that results in reductions in water availability to holders of water rights. Legally, this translates into claims that such actions constitute a taking of property, or whether they are permissible, noncompensable, regulations. On the superabundance end of the scale, the class of interested property holders extends far beyond water users to include those living in the flood plains of rivers who are protected by dams and levees. Still farther, it includes the class of people owning property in communities whose water supply is linked to storage in a reservoir, where dam operators' responses to particular hydroclimate threats can alter the reliability or force a reduction of that supply. Although less frequent, these more diffusely affected parties also have pursued takings claims.<sup>13</sup>

Before going forward, return for a moment to the initial point about the incorrect assumptions that undergird most of America's water impoundment and control facilities. The engineers were not the only ones who predicated their structures on incorrect assumptions: the legal community did as well. Water laws that allocate the use of water and the property rights spawned by those laws relied on similarly flawed assumptions regarding stationarity and water availability. The cause of the changed circumstance, whether anthropogenic<sup>14</sup> or not, is immaterial to the claim that the laws were established with flawed assumptions.<sup>15</sup> Present water laws have their

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13. A high visibility example of such a takings claim due to downstream inundation was presented in *Ark. Game & Fish Comm'n v. United States*, 568 U.S. 23 (2012). This Article will not consider issues of municipal and industrial water supply.

14. Consider, for now, two quick examples of anthropogenic changes that radically shift the historic patterns of use that were expected when the relevant legal doctrines developed. At the time U.S. water laws were formed and became the foundational doctrines of riparianism and prior appropriation, who could have foreseen the technological and economic advances, such as the centripetal pump, electrification of the countryside, and the rise of agribusiness serving international as well as local, domestic markets? In combination, those developments have created the basin-wide overdraft of the massive Ogallala Aquifer. Similarly, who would have expected that urbanization, by hardening and encroaching on flood plains, would double hundred-year flood peaks? See G. E. MOGLEN & D. E. SHIVER, METHODS FOR ADJUSTING RURAL PEAK DISCHARGES IN AN URBAN SETTING, U. S. GEOLOGICAL SURV. SCI. INVESTIGATIONS REP. 55 (2006), <https://pubs.usgs.gov/sir/2006/5270/>.

15. The human role in the changed conditions has relevance in assessing the relative strength of claimed entitlements based on property rights. For example, in some instances the changes being considered are not those having to do with climate. They are instead human exacerbations that cause flooding through development and channel sedimentation and cause dewatering of riverine environments through diversions and consumptive water use on a scale that was unimaginable at the time when key elements of American water laws were established. The law of property has always recognized, in numerous forms, the doctrine of changed

genesis in the distant past. Riparian doctrine predates the founding of the nation, having been carried to the New World with the colonists as a doctrine having a long English history. Prior appropriation is often thought to have its roots in the pragmatic, customary rules of the mid-nineteenth-century gold rush mining camps, but it also has deeper roots in the Spanish settlement of the American Southwest, which can be traced back from there to the time when the Moors ruled in Spain.<sup>16</sup> Today's far more volatile hydroclimate is not the one they considered when they developed legal rules for the allocation and use of the water resource.

Both riparianism and prior appropriation have demonstrated a considerable ability to adapt to changing conditions and modes of water use. This is most pronounced in regard to integrating groundwater and surface water law doctrines as the science of hydrogeology provided an ever more nuanced understanding of the physical interconnection of the two types of water sources.<sup>17</sup> However, like the engineers, the legal community, which created the laws governing the use and allocation of water, can hardly be expected to have a more foresighted view of water availability than climatologists, hydrologists, and other physical science and engineering experts. The law will adapt to these changes as well, and with that in mind, this Article will consider whether some of the currently claimed property rights should continue to receive unchanged recognition, given the changed state of the system in which the doctrines operate. To the extent that legal norms incorporate moral norms, the water resource entitlements and expectations that the law condoned and promoted in an earlier era and under a more stable hydroclimate may have lost the footing on which their continued validity stands.

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conditions. *See generally* RESTATEMENT (THIRD) OF PROPERTY (SERVITUDES) § 7.10 (AM. LAW INST. 2000).

16. *See* MICHAEL C. MEYER, *WATER IN THE HISPANIC SOUTHWEST: A SOCIAL AND LEGAL HISTORY*, 1550–1850, 20–21 (1984).

17. *See, e.g.*, *Mich. Citizens for Water Conservation v. Nestle Waters N. Am.*, 269 Mich. App. 25, 709 N. W.2d 174 (2005), *aff'd in relevant part*, 479 Mich. 280, 737 N.W.2d 447 (2010) (riparian doctrine applied to treat the interference with surface water use by groundwater extraction under unified surface water principles); BARTON THOMPSON, JR., JOHN LESHY & ROBERT ABRAMS, *LEGAL CONTROL OF WATER RESOURCES* 513–34 (5th ed. 2013) (describing groundwater-surface water integration in several prior appropriation jurisdictions). More generally, the author is a proponent of the view that water law is a prime example of a legal doctrine that adapts over time to meet the needs of the society. *See, e.g.*, Robert H. Abrams, *Charting the Course of Riparianism: An Instrumentalist Theory of Change*, 35 WAYNE L. REV. 1381 (1989).

### III. A CAPSULE REVIEW OF TAKINGS OF PROPERTY DOCTRINE, AND HOW WATER-RELATED TAKINGS CLAIMS ARISE

Cases raising claims that private property has been taken without just compensation fall into three major categories: regulatory takings, physical invasion takings, and exactions. After an initial inquiry to ascertain that the claimant has a “cognizable property interest” affected by a governmental action,<sup>18</sup> the issue turns to whether a compensable taking has occurred. At that point, the legal analysis applied in each of these instances is distinctive, and the result in terms of likelihood of success for the claimant vary greatly. When the facts of a case demonstrate either a permanent physical invasion or a regulatory “wipeout,” the claimants have a high probability of success, assuming ripeness<sup>19</sup> and the absence of other defenses. The analysis of non-wipeout regulatory takings and exactions both proceed under multifactor rubrics that make a claimant’s position more difficult to sustain. Exactions have a largely distinctive doctrine and, although mentioned and summarized, that analysis has yet to find its way into the scenarios being considered here.

#### *A. Physical Invasion Takings: Permanent and Temporary*

These claims arise when the government has physically taken possession of the property of a claimant either by invasion of the parcel or by taking away or depriving the claimant of a tangible interest. In the various water contexts, the invasion could be by flooding, and the deprivation of the tangible interest could be denying the claimant a water use to which the claimant has a protected property right.<sup>20</sup>

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18. See, e.g., *Klamath Irrigation v. United States*, 129 Fed. Cl. 722, 729 (2016). In a later phase of that litigation, the irrigator claimants were found to lack water rights that would entitle them to receive water, due to the presence of a senior right that required the water to support tribal fishery. *Baley v. United States*, 2017 WL 4342771 (Fed. Cl. Sept. 29, 2017).

19. ROBERT MELTZ, CONG. RESEARCH SERV., RL31796, THE ENDANGERED SPECIES ACT (ESA) AND CLAIMS OF PROPERTY RIGHTS “TAKINGS” 5–6, (2013), <https://fas.org/sgp/crs/misc/RL31796.pdf>. In ESA takings-of-property challenges, Meltz makes a seldom-observed point that many of those cases fail due to a lack of ripeness because there are additional steps that can be taken in agency proceedings before the loss of the property interest is attributable to governmental action. *Id.*

20. Most water rights are usufructuary in nature, and ownership of the corpus of the water remains in the state, although the use, such as bottling spring water, may convert the

The doctrine here is pretty simple—if the owner is permanently deprived of the property, it is a taking; if the owner is temporarily deprived of the property, the case is analyzed using the test applied in cases of claimed regulatory takings. The Supreme Court in *Arkansas Game & Fish Commission* (“AG&FC”) stated:

True, we have drawn some bright lines, notably, the rule that a permanent physical occupation of property authorized by government is a taking. So, too, is a regulation that permanently requires a property owner to sacrifice all economically beneficial uses of his or her land. But aside from the cases attended by rules of this order, most takings claims turn on situation-specific factual inquiries.<sup>21</sup>

The Court further notes that “temporary limitations are subject to a more complex balancing process to determine whether they are a taking.”<sup>22</sup>

In the water rights area, cases involving takings of property based on a reduction in water rights are, up to this time, very few. In the only such case that has produced an opinion at the circuit court level, *Casitas Municipal Water District v. United States*,<sup>23</sup> the United States Court of Appeals for the Federal Circuit treated a reduction in allowable use of water as a physical invasion case, and treated any deprivation of water as a permanent taking of that quantum of water,<sup>24</sup> a position that the dissenting judge found untenable.<sup>25</sup> In most instances

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contained water to private property. As a fairly recent development, Texas appears to recognize the right of the overlying owners to groundwater. See *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012).

21. *Ark. Game & Fish Comm’n v. United States*, 568 U.S. 23, 31–32 (2012) (citations omitted). See also *Tahoe-Sierra Pres. Council v. Tahoe Reg’l Planning Agency*, 535 U.S. 302, 322–23 (2002) (indicating that regulatory takings generally require balancing and “complex factual assessments,” utilizing the so-called *Penn Central Transportation Co. v. City of New York* test).

22. *Ark. Game & Fish Comm’n v. United States*, 568 U.S. 23, 36 (2012) (quoting *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 435 (1982)).

23. *Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276 (Fed. Cir. 2008).

24. *Id.* at 1295–96.

25. The dissent stated:

For this to be a physical taking requires expanding the definition to the point of erasing the line between physical and regulatory takings. Indeed, any property use restriction—whether on land, air, or water, and whether temporary or permanent—deprives the owner of a pre-existing right to develop at least a portion of his property for certain economic uses. Yet in *Tahoe-Sierra*, the Supreme

thereafter, the Court of Federal Claims would be erroneous to contend that the position is well-established,<sup>26</sup> especially in light of the Supreme Court's decision in *AG&FC* to remand and have the lower court analyze the non-permanent invasions by flooding using the regulatory takings test.<sup>27</sup>

### *B. Regulatory Takings: "Wipeouts" and Lesser Restrictions*

These claims arise when governmental action limits the uses that an owner may make of his or her burdened property. As noted above, a similar analysis is used when physical invasions are temporary. This type of takings claim is similarly bifurcated between so called "wipeouts," in which the regulation is so burdensome that the regulated parcel as a whole has no remaining value,<sup>28</sup> and impositions which may still be found to be takings, but are evaluated using a multifactor balancing test. The balancing test that is the contemporary standard is drawn from the *Penn Central* case, which involved development restrictions placed on Grand Central Station under New York City's historic preservation laws.<sup>29</sup> The Court found:

In engaging in these essentially ad hoc, factual inquiries, the Court's decisions have identified several factors that have particular significance. The economic impact of the regulation on the

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Court nevertheless reaffirmed the constitutional distinction between physical acquisitions and regulatory restrictions. 535 U.S. at 321–22, 122 S. Ct. 1465. Here, compliance with Section 9 of the ESA ultimately requires Casitas to leave more water in the river, thus augmenting the downstream river flow essential for protection of the endangered steelhead trout.

*Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276, 1300 (Fed. Cir. 2008) (Mayer, J., dissenting).

26. *Casitas* demonstrates the lack of a consistent judicial approach. It was not a unanimous opinion. Also, the *Casitas* case was decided in the Court of Federal Claims by Judge Wiese. Wiese had earlier adopted the physical invasion approach in *Tulare Lake Basin Water Storage District v. United States*, 49 Fed. Cl. 313 (Fed. Cl. 2001). Due to the Supreme Court's decision in *Tahoe-Sierra Preservation Council v. Tahoe Regional Planning Agency*, 535 U.S. 302 (2002), Judge Wiese changed position and rejected the physical invasion analysis to find no taking. See *Casitas Mun. Water Dist. v. United States*, 76 Fed. Cl. 100 (2007).

27. *Casitas* itself did not result in a recovery for the water user because, on remand, Judge Wiese found no interference with the state law property right and dismissed the case without prejudice. See *Casitas Mun. Water Dist. v. United States*, 102 Fed. Cl. 443 (2011).

28. The seminal case on this issue is *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992).

29. The balancing test that is considered to be the standard is drawn from *Penn Central Transportation Co. v. City of New York*, 438 U.S. 104 (1978).

claimant and, particularly, the extent to which the regulation has interfered with distinct investment-backed expectations are, of course, relevant considerations. So, too, is the character of the governmental action. A “taking” may more readily be found when the interference with property can be characterized as a physical invasion by government, than when interference arises from some public program adjusting the benefits and burdens of economic life to promote the common good.<sup>30</sup>

In both the flood control context and the water shortage context, it is easy to imagine governmental actions that could trigger regulatory takings claims. For example, in an effort to increase the flood storage in anticipation of more frequent, extreme storm events, a federal dam operator could, depending on reservoir conditions, release water in larger quantities than the historic norm, resulting in some marginal inundation of downstream areas that had remained dry in the past.<sup>31</sup> Similarly, in an effort to protect fisheries, prevent excessive sedimentation, and enhance other riparian values and uses, a state might set and enforce a minimum flow requirement; the effect of which is to prevent water users from withdrawing as much water as they would otherwise be allowed to withdraw in the absence of the minimum flow protection.<sup>32</sup>

### C. Exactions

These claims arise when the government requires a property owner to pay a fee, or dedicate a portion of the property to public use, as a condition for receiving governmental permission to engage in regulated land development activity. In exactions cases, the courts make a two-pronged inquiry that measures, first, the “essential nexus”

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30. *Id.* at 124 (citations omitted).

31. This scenario reflects several features of the *AG&FC* case, *Ark. Game & Fish Comm’n v. United States*, 568 U.S. 23 (2012). The purpose of the changed flow regime in *AG&FC*, however, was a response to a request from a group suffering water inundation losses that could be avoided by altering the release pattern, while the changed flow regime raised in the scenario being presented in the text is a part of an overarching regional flood control strategy.

32. There are no cases directly on point, but there are some cases where minimum flow requirements have triggered more indirect impacts that have been challenged as takings by property owners. See *Whatcom Cty. v. Hirst*, 186 Wash. 2d 648 (2016) (regarding the prevention of residential development due to the inability to pump a quantity of groundwater that was otherwise exempt from regulation due to the hydrologic link to a stream having a minimum flow requirement that was not being met).

between the condition and the underlying purpose of the regulatory regime giving rise to the exaction,<sup>33</sup> and second, whether the burden on the parcel is roughly proportionate to the projected impacts of the proposed development.<sup>34</sup> To date, there are no governmental responses to hydroclimate stresses that have resulted in takings claims based on an excessive exaction theory.<sup>35</sup>

#### IV. THE VIEW FROM THE FEDERAL DAM OPERATOR'S PERSPECTIVE

For the moment, do not consider legislated purposes and policies that may act as a constraint on how dams are operated.<sup>36</sup> Instead, set as the object of the dam operator the maximization of the total net social benefit of the dam as an asset of the nation. In charting an operations plan, the focus would be on events that have the potential to have the greatest impact financially and socially on the citizenry. Droughts and floods, because of the broad regionally disruptive impacts they cause, are the two starting points in building an initial, somewhat simplistic operating plan.

Operators of the dam would (1) seek to maximize the amount of water retained behind the dam in anticipation of drought conditions, to be able to release the water to ameliorate shortfalls in municipal, industrial, irrigation, and environmental supplies. Contrastingly, those same dam operators would (2) seek to reduce the amount of

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33. *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825 (1987).

34. *Dolan v. City of Tigard*, 512 U.S. 374 (1994).

35. Hypotheticals raising such a claim can be constructed. For example, if a state sought to increase instream flows by conditioning approval of a water user's change request based on a dedication of a portion of the water right to instream flow, an exactions taking claim might be lodged. Such an exaction would seem to easily satisfy the nexus prong and, depending on the proportion of water dedicated to instream flow, likely to withstand the proportionality test as well. In the wake of Hurricane Harvey, it seems plausible, if not likely, that exactions for flood control may be levied due to the exacerbation of flooding attributable to hardening of the flood plain caused by the developmental activity. See, e.g., C. P. Conrad, *Effects of Urban Development on Floods*, USGS: U.S. GEOLOGICAL SURVEY, FACT SHEET 076-03 (Nov. 29, 2016), <https://pubs.usgs.gov/fs/fs07603/> (study of the effects of flood plain hardening by development).

36. Federally funded dams built by the U.S. Army Corps of Engineers are congressionally authorized to serve particular purposes that often include flood control. A dam authorized for flood control also may include additional authorized purposes, such as navigation or municipal supply. Disputes over the authorized purposes can have immensely important consequences, such as in resolving whether municipal supply was an authorized purpose of the Buford Dam and its reservoir, Lake Lanier, which had become the mainstay of Atlanta's water supply. See *In re MDL-1824 Tri-State Water Rights Litigation*, 644 F.3d 1160 (11th Cir. 2011).

water retained behind the dam in anticipation of potential flood events, thereby providing storage capacity to be able to capture water that otherwise risks flood damage. Seasonally and historically, many locales follow a general strategy of lowering storage in winter to prepare for snow melt and spring rains and then, once the risk of flooding lessens, of retaining as much of the spring runoff as possible for release in late summer if supplies are short. Treat that pattern as the historic status quo that those owning parcels downstream of the dam have come to expect. Recalling the stationarity discussion set out at the very beginning of this Article, when the dam was built the assumption was that rainfall patterns would be variable from year to year, but the variations would be within predictable limits of storage capacity and ability to release water that the dam was engineered to handle.

In the current period of hydroclimate instability, a period that includes more severe storms and more protracted droughts, the old pattern of storage and release very likely is no longer appropriate. The winter and early spring releases might need to be greater to ensure that space is available to store more water, to be prepared in case a spring storm is more extreme than historic highs. At the same time, however, there will be a countervailing pressure of wanting to increase the amount of water held in storage to hedge against more intense droughts than have occurred in past years. Due to the difficulty of accurately predicting the weather as climate variability increases, the dam operator is going to respond in more extreme ways to short-term weather phenomena—knowing that a storm system might be more severe than in the past, for example, the dam operator would release water faster than under the old pattern of releases. When that water is released, it has to go somewhere and that somewhere is downstream in greater quantities than the historic norm. That alteration in releases may mean that the greater volume of water inundates downstream areas that had not flooded at that time of year in the past, giving rise to claims that the dam operator is taking the property of the downstream landowners whose parcels flood as a result.<sup>37</sup> At the opposite end of the spectrum, refusing to deliver

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37. Although the reasons for the change in the release pattern were not associated with the loss of stationarity, the timing and duration of downstream flooding in the wake of a changed release pattern was what precipitated the takings claim in *Ark. Game & Fish Comm'n v. United States*, 568 U.S. 23 (2012).

water to irrigators in a time of anticipated (or actual) extreme drought interferes with the activities of those who had benefitted from the releases of that water in the past.<sup>38</sup>

Now factor in additional benefits that can be obtained from the dam. These include maintaining navigation channels, hydropower generation, recreation, and support of the environment. Only a moment's reflection will reveal that a release pattern optimizing flood- and drought-amelioration operations differs from a release pattern optimizing other forms of benefits. Navigation tends to require releases to supplement low flows in the natural hydrograph to maintain water levels downstream. Navigation may also require water retention to ensure navigability of areas above the dam.<sup>39</sup> That flow pattern competes with upstream flatwater recreation and maximizing or minimizing storage as a hedge against high- and low-water extremes. Hydropower tends to be maximized by keeping the water level behind the dam high, to increase head, and timing the releases to align with power peaking, which is the time the price obtainable on the market is highest.<sup>40</sup>

The most obvious conflicts are between environmental protection and all other purposes, with the possible exception of recreation. Environmental values, especially when endangered species are present, often are enhanced by trying to maintain the river's historic hydrograph (the disruption of which may have been caused by the dam's presence). This will mean reducing large volume human diversions from already low water in droughts and having high spring pulse flows that clear sediment and flood some riparian lands to ensure

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38. See, e.g., *Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276 (Fed. Cir. 2008).

39. The USACE operation of the Missouri River dams to support navigation was a major point of controversy raised by the upstream states' desire to operate the system for recreational benefits and the environmentalists' desire to protect endangered species. This resulted in extensive litigation. The most recent judicial opinion reviewing the USACE's *Master Manual for the Missouri River* and the choices made by the operating plan gives great deference to the USACE. See *In re Operation of the Missouri River System Litigation*, 421 F.3d 618 (8th Cir. 2005), cert. denied, 547 U.S. 1097 (2006).

40. This aspect of dam operations was an important element in the Apalachicola-Chattahoochee-Flint ("ACF") controversy. In the dam's planning process and throughout virtually all of the project's existence, a small minimum off-peak flow from the Buford Dam was set at a mere six hundred cubic feet per second to retain as much water as possible in storage, to be released when power generation would be most advantageous. See *In re MDL-1824 Tri-State Water Rights Litig.*, 644 F.3d 1160, 1168 (2011). One of Florida's key litigation objectives was to increase the volume of the continuous release as a means to increase flows in the Apalachicola River.

appropriate breeding and sheltering habitats that the native species have adapted to over the millennia.<sup>41</sup> Those very same actions, however, reduce the water still in storage just as the traditionally higher water demand summer months are approaching. These conflicts are the ones seen in highest relief both in the ESA-irrigation conflict situations and in the return to more natural conditions pursued by the USACE on the Missouri River.<sup>42</sup>

When more extreme highs and lows are added by the changed weather patterns, the difficulty of designing an operating plan that strikes the proper balance among all of the competing interests increases. This is seen in *AF&GC*, where a change in the release pattern caused extended seasonal inundation 115 miles downriver, making any change in the release pattern run the risk of adversely affecting some downstream interests. Recognizing that dam operations inevitably involve trade-offs among the many purposes that might be served, every decision by a dam operator regarding release patterns will likely advantage some users of the resource complex and disadvantage others. It would seem odd, however, for takings law to transform the dam operator into a guarantor of all reliance interests that might be disrupted by a failure to maintain a particular release pattern. This realization affects the reasonableness of property owners' expectations, particularly when they insist on maintaining the status quo that provides them with an advantage but reduces the benefits to others that could have been realized by changes in dam operations.

It is time to add another consideration to the calculus facing the federal dam operator—the choices regarding the policies to be pursued are constrained significantly by the statutory directives issued by Congress to the dam operator and by the statutes that authorized

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41. See, e.g., Bettina Boxall, *Lake Powell Dam Releases Increased to Spread Sediment in Grand Canyon*, L.A. TIMES, Nov. 11, 2013, <http://www.latimes.com/science/sciencenow/la-sci-sn-grand-canyon-high-flow-experiment-20131111-story.html>.

42. See *Ideker Farms v. United States*, 2018 WL 1282417 (Fed. Cl.) (takings challenge to changes in Missouri River flood-management operations). In the *Ideker Farms* example, some of the changes in USACE operations were ESA-mandated changes that sought to mimic the natural hydrograph for the benefit of the endangered pallid sturgeon and restore portions of the floodplain to more natural conditions that would improve sturgeon breeding and create endangered bird-species habitat. To a degree, those purposes compete with obtaining absolutely maximal flood protection. The USACE contends that the extraordinary precipitation pattern in the time period covered by the lawsuit would have resulted in the flooding of the claimants' lands even in the absence of the changes in operations.

the construction of the dam. The federal dam operator has only the authority Congress has given and must follow congressional directives. Using the Missouri River basin as an example, for several decades the congressional mandate was largely monochromatic, making flood control the first priority and navigation the second. Beginning in 1973, the USACE, together with the rest of the federal government, was required to fulfill its duties in conformity with the Endangered Species Act (“ESA”). Even if the USACE did not have to go back and revisit its pre-1973 dam building and flood protection actions under that law, all actions taken after passage of the ESA are subject to its strictures. This would include any revisions to the *Master Manual for the Missouri River*, controlling dam operations and any construction projects undertaken, even projects that had been approved prior to the passage of the Act.<sup>43</sup>

Section 7 of the ESA requires all federal agencies to ensure that any action authorized, funded, or carried out “is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species.”<sup>44</sup> In the 1980s, the United States Fish and Wildlife Service (“FWS”) listed three species in portions of the Missouri River basin as threatened or endangered. The listings had the effect of requiring<sup>45</sup> compliance with the ESA, which resulted in consultation under Section 7 of the ESA and eventually took the form of providing suitable habitat for those species, set out as the Reasonable and

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43. *See, e.g.*, *TVA v. Hill*, 437 U.S. 153 (1978) (finding that the dam that had been authorized and started prior to the passage of the ESA was subject to ESA for remaining stages of construction). Even before ESA jeopardy opinions imposed habitat-supportive requirements on the USACE, Section 601 of the Water Resource Development Act of 1986 had launched the Corps on the path of habitat restoration for the damage caused by the Bank Stabilization and Navigation Project, which had been an ongoing aspect of the federal flood control program for seven decades.

44. 16 U.S.C. § 1536(a)(2) (2018).

45. *In re Operation of Missouri River Sys. Litig.*, 421 F.3d 618, 631 (8th Cir. 2005) (finding Section 7 of the ESA applies where USACE is able to exercise its discretion in determining how best to fulfill the statutory purposes of the Flood Control Act of 1944, 16 U.S.C.A. § 460d (2018)). Case law involving the Bureau of Reclamation dams has ruled that whenever the action being taken by the agency is an action to which the agency has no discretion, the agency need not comply with the ESA. *Compare* *Nat. Res. Def. Council v. Houston*, 146 F.3d 1118, 1125–26 (9th Cir. 1998) (finding no discretion and no ESA obligation), *with* *Nat. Res. Def. Council v. Jewell*, 749 F.3d 776, 785 (9th Cir. 2014) (finding that Section 7 of the ESA applies where the Bureau of Reclamation has some discretion in negotiating renewal of contracts with water rights holders).

Prudent Alternatives (“RPAs”) in FWS biological opinions. This additional legal requirement that supplemented the authority granted by the Flood Control Act put the agency in a potentially awkward position. Despite its flood control mandate, some of the steps required by the ESA could reduce the flood control protection previously provided.

As would be expected, the role of Congress in shaping flood control, navigation, and environmental protection in the Missouri River basin is central: the USACE is empowered to do only what Congress authorizes. Congress, the legislative branch, sets the policy to be followed by the agency. Of particular concern in this setting are American constitutional norms, which subject the implementation of those policy decisions to judicial review to ensure compliance with the congressional command, and to ensure that private property is not taken for public use without just compensation. Policy choices that rationally prefer one activity over another are given a wide berth by the Supreme Court. The leading case is *Miller v. Schoene*.<sup>46</sup> In that case, cedar trees were carriers for cedar-apple rust, a fungal disease that was harmless to cedar trees but fatal to apple trees. The Virginia legislature opted to protect the apple trees, literally at the expense of the owners of cedar trees. The legislation required the owners of cedar trees to cut and dispose of cedar trees on their own property at their own expense to protect the state’s apple growers. The Court perceived this as a triage nuisance decision and ruled unequivocally that a reasonable policy choice in a triage situation is not a taking of property:

When forced to such a choice the state does not exceed its constitutional powers by deciding upon the destruction of one class of property to save another which, in the judgment of the legislature, is of greater value to the public. It will not do to say that the case is merely one of a conflict of two private interests and that the misfortune of apple growers may not be shifted to cedar owners by ordering the destruction of their property; for it is obvious that there may be, and that here there is, a preponderant public concern in the preservation of the one interest over the other. And where the public interest is involved preferment of that interest over the property interest of the individual, to the extent even of its destruction, is one of the distinguishing characteristics of every exercise of the police power which affects property.

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46. *Miller v. Schoene*, 276 U.S. 272 (1928).

We need not weigh with nicety the question whether the infected cedars constitute a nuisance according to the common law; or whether they may be so declared by statute. For where, as here, the choice is unavoidable, we cannot say that its exercise, controlled by considerations of social policy which are not unreasonable, involves any denial of due process.<sup>47</sup>

*Miller v. Schoene*, though not widely cited, is not an outlier in Supreme Court takings jurisprudence. Cases where a building and its contents are sacrificed to prevent further spreading of a fire have long been acknowledged as not giving rise to governmental liability.<sup>48</sup> The logic of these cases militates strongly for a finding that governmental responses to climate extremes are unlikely to be easily categorized as takings of property. This especially is the case when the claimed property damage comes about as a result of the changed operations of a water control facility responding to climate extremes that were not anticipated when the projects were being built.

The deference given to governmental triage decisions by the Supreme Court has not blunted the efforts to seek takings redress for flooding events occurring in the Missouri River basin after the ESA impelled changes in USACE flood control operations. A recent, pending case presents precisely those issues. In *Ideker Farms v. United States*,<sup>49</sup> claimants' lands had not previously suffered major flood damage in the decades when the USACE had single-mindedly pursued flood control and navigation. Those lands, however, experienced major flooding and, in some cases, sand deposition during and after extreme weather events in the years after the USACE began to pursue Missouri River habitat restoration. *Ideker Farms* is an outgrowth of *AG&FC* in two regards. First, and correctly, the *Ideker Farms* claimants rely on the holding of the *AG&FC* case that removes the barrier to takings recovery for flooding that is not permanent. Second, and less certainly correct, the *Ideker Farms* court relied on the theory that takings liability can be based on a foreseeability standard rather than an intentionality standard.<sup>50</sup> That approach grows principally out of overbroad language in the decision of the Federal

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47. *Id.* at 279–80 (citations omitted).

48. See *Bowditch v. Boston*, 101 U.S. 16, 18–19 (1880).

49. *Ideker Farms v. United States*, 2018 WL 1282417.

50. *Id.* at \*16.

Circuit opinion in *AG&FC* on remand.<sup>51</sup> The standard applied by the Federal Circuit is essentially that of negligence; that is to say, the government is liable for inundation damage when that damage is a foreseeable consequence of the government's action.<sup>52</sup> Were that the standard, the USACE would become a de facto guarantor of all such losses, even though the actions were taken for a public purpose.<sup>53</sup> Congress has clearly proscribed tort recovery for flood control operations by granting broad immunity for those operations.<sup>54</sup> The intentionality standard that has been applied in takings cases requires what Professor Sandra B. Zellmer has termed, "substantial certainty."<sup>55</sup> There is absolutely no indication that *AG&FC* intended to change that. Justice Ginsburg's unanimous opinion flatly states:

We rule today, simply and only, that government-induced flooding temporary in duration gains no automatic exemption from Takings Clause inspection. When regulation or temporary physical

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51. In an earlier article, this author has described the overbroad language of the Federal Circuit in *AG&FC* following the remand from the Supreme Court (Ark. Game & Fish Comm'n v. United States, 736 F.3d 1364 (Fed. Cir. 2013)) as follows:

The Federal Circuit finding of a taking on remand adopted broad language that tended to obscure the absence of issues not preserved due to the Corps' litigation strategy that might have averted a successful takings claim. As written, the Federal Circuit opinion suggests that an inundation claimant can recover for a taking of property by proving only an objective and foreseeable harm due to increased flooding linked to a pattern of releases that confers a benefit of lesser flooding on others situated below a dam. The Federal Circuit's use of foreseeability badly misstates the rules laid down by the precedents upon which it relied.

Robert Haskell Abrams & Jacqueline Bertelsen, *Downstream Inundations Caused by Federal Flood Control Dam Operations in a Changing Climate: Getting the Proper Mix of Takings, Tort, and Compensation*, 19 U. DENV. WATER L. REV. 1, 11 (2015) (citations omitted).

52. On April 20, 2018, shortly after the *Ideker Farms* decision, the U.S. Court of Appeals for the Federal Circuit handed down its decision in *St. Bernard Parish v. United States*, 887 F.3d 1354, 2018 U.S. App. LEXIS 10023, in which claimants' standard of proof on the issue of causation was set out in a manner that may require reconsideration of that issue in the ongoing portions of *Ideker Farms*. That court, in the context of flooding attributed to the Mississippi River Gulf Outlet during Hurricane Katrina stated, "the correct legal standard [requires] that the causation analysis account for government flood control projects that reduced the risk of flooding." *Id.* at \*2. To properly apply that standard, the governmental actions must be viewed in their entirety, including consideration of the parcel's propensity to flood before any governmental action. *Id.* at \*16. In *Ideker Farms*, that will require proof of historic conditions that obtained before any federal activities were taken to prevent flooding on the Missouri.

53. See Sandra B. Zellmer, *Takings, Torts, and Background Principles*, 52 WAKE FOREST L. REV. 193, 211–12 and 217–18 (2017).

54. See 33 U.S.C. § 702(c) (2015) (originally enacted as Act of May 15, 1928, ch. 569, § 3, 45 Stat. 534, 535–36).

55. Zellmer, *supra* note 53, at 194–95 (2017). Professor Zellmer provides an extended justification of that standard and its roots in case law. *Id.* at 216–29.

invasion by government interferes with private property, our decisions recognize, time is indeed a factor in determining the existence *vel non* of a compensable taking.<sup>56</sup>

#### V. THE EVOLUTIONARY IMPETUS OF CHANGED PHYSICAL CONDITIONS ON PROPERTY LAW

Property law evolves to meet the needs of society. Water law is one of the best proving grounds for that proposition as its legal doctrines change instrumentally to meet the most pressing needs of society.<sup>57</sup> Take a traditional property right as fundamental as the right to exclude others from one's land. When protection of that sacrosanct principle in the water law arena became sufficiently antithetical to the public good, it was jettisoned with barely a second thought by the Supreme Court of the Colorado Territory in 1872. The state was in its early phases of settlement, and the settlers locating on the east slope of the Rockies in the region known on the maps as the "Great American Desert" were faced with arid conditions that made dry-land farming untenable. The region's streams and rivers were spaced far apart, meaning that water could not be diverted from rivers and brought to the non-riparian lands for irrigation without trespassing on the lands of riparians and others located closer to the watercourse. That meant vast tracts of land would be uninhabitable until the invention of the centripetal pump made large volume groundwater pumping technologically feasible roughly seventy-five years hence. The law recognized the conditions and changed. The court summed it up in a single sentence:

In a dry and thirsty land it is necessary to divert the waters of streams from their natural channels, in order to obtain the fruits of the soil, and this necessity is so universal and imperious that it claims recognition of the law.<sup>58</sup>

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56. Ark. Game & Fish Comm'n v. United States, 568 U.S. 23, 38 (2012).

57. See, e.g., Robert Abrams, *Charting the Course of Riparianism: An Instrumentalist Theory of Change*, 35 WAYNE L. REV. 1381 (1989). The Google online dictionary defines instrumentalism as "a pragmatic philosophical approach that regards an activity (such as science, law, or education) chiefly as an instrument or tool for some practical purpose, rather than in more absolute or ideal terms, in particular." *Instrumentalism*, GOOGLE ONLINE DICTIONARY, <https://www.google.com/search?q=google+online+dictionary&ie=utf-8&oe=utf-8&client=firefox-b#dobs=instrumentalism>.

58. *Yunker v. Nichols*, 1 Colo. 551, 553 (Colo. Terr. 1872). Also cf., *Clark v. Nash*, 198 U.S. 361, 369–70 (1905) (Under arid conditions prevailing in Utah, but not in the absence of those

The holding in that case allowed private condemnation of an easement over the objection of the landowner across whose land the canal would run. With equal aplomb, many of the states of the West that had initially recognized riparianism as their water law legislatively abolished riparianism in favor of prior appropriation. That radical revision of property rights was not found to be a taking of the rights of the riparians.<sup>59</sup>

What is today's reality? What are the pressing interests of the community at large? Are the extraordinarily strong property rights being claimed by prior appropriators suitably viewed as inviolable without being a taking of property, or can they be adjusted instrumentally as a response to new understandings of ecology and hydroclimate instability? Keep in mind, here, that changes in conditions and attitudes are not always one-way ratchets that expand public rights at the expense of private property. *AG&FC* added protection of private property by discarding an older Supreme Court precedent, *Sanguinetti v. United States*,<sup>60</sup> which had required that inundations be permanent to qualify as takings.<sup>61</sup> At the same time, however, *AG&FC* required non-permanent inundations to be analyzed using *Penn Central* principles, rather than *Loretto* principles. By a parity of logic, *AG&FC* extends to the water shortage situation and calls for using the *Penn Central* balancing tests and not the permanent physical invasion rubric that would treat them as per se takings. This is particularly appropriate in the case of analyzing temporary governmental reductions in water deliveries, which are far less physically invasive than the deposit of flood waters. Beyond that, the newly emergent exigencies of hydroclimate instability bring the *Miller v. Schoene* principles into play.

Looking at the water shortage aspects of this discussion, the property rights being claimed are quite extraordinary. Consider, first, the

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or similar circumstances, a private party's condemnation of land for water transport is a public use.).

59. See, e.g., *Hough v. Porter*, 95 P. 732 (Ore. 1908). On the topic of how the western states justified the renunciation of riparianism, see A. DAN TARLOCK, *LAW OF WATER RIGHTS AND RESOURCES* §§ 5.5–5.10 (2017). Only Oklahoma has found that the elimination of residual (unexercised) riparian rights, to make use of water, constitutionally problematic. See *Franco-American Charolaise Ltd. v. Okla. Water Res. Board*, 855 P.2d 568 (Okla. 1990). California and Nebraska have what are considered dual systems that address the issue in less than fully satisfying ways. See TARLOCK, *supra* § 5.13.

60. *Sanguinetti v. United States*, 264 U.S. 146 (1924).

61. That was the holding below, in *AG&FC*. See *Ark. Game & Fish Comm'n v. United States*, 637 F.3d 1366 (Fed. Cir. 2011), *rev'd*, 568 U.S. 23 (2012).

unusual nature of the rights claimed to have been taken in cases like *Tulare Lake*,<sup>62</sup> *Klamath*,<sup>63</sup> and *Casitas*.<sup>64</sup> The entire prior appropriation system operates as a perpetual grant of public resources for the benefit of holders of appropriative rights, the vast majority of whom are private parties profiting from the use, without paying anything for the right to use the water resource itself. Once established, there is no time limit on the right—it functions as a permanent alienation by the government of a portion of each year’s available water.<sup>65</sup> The effect of treating even a temporary interruption of the right to divert water, in order to protect important public interests, as a physical invasion is also quite extraordinary. The prior appropriation system awards rights to take that water in a priority order and on a perpetual basis with no concern for the potentially harmful impacts of that activity on the resource base and the interest of the general public. That absolute private control of the water is claimed even when its exercise results in significant public harms. Throughout the West, streams have been dewatered by the actions of prior appropriators, at times harming threatened and endangered species and other riparian ecosystem values. Moreover, the resource over which the private owners are claiming dominion is a publicly owned public resource, which the state administers as a trustee for the benefit of all of its citizens.

Recalling the background principles of property and nuisance law, these rights not only should be, but are subject to reasonable regulation without takings liability under either the public trust or nuisance prevention doctrines. Assume, momentarily, that *Tulare Lake* and *Klamath* properly state the law, that is to say, that interference with those appropriative rights are governed by the rule for physical invasion cases and are takings of property. In effect, under that rule, the usufructuary rights of appropriators are perpetual and immune to government regulation for the public interest. Due to the perpetual nature of the appropriative rights and their immunity to regulation in the public interest, there could scarcely be a more concrete example that contravenes the doctrine established by *Illinois Central*,<sup>66</sup> which

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62. *Tulare Lake Basin Water Storage Dist. v. United States*, 49 Fed. Cl. 313 (Fed. Cl. 2001).

63. *Klamath Irrigation v. United States*, 129 Fed. Cl. 722, 729 (2016).

64. *Casitas Mun. Water Dist. V. United States*, 543 F.3d 1276 (Fed. Cir. 2008).

65. The doctrines of abandonment and forfeiture place a minimal burden on the water user to ensure that the rights granted be exercised and not go unused for a period of time. See BARTON THOMPSON, JR., JOHN LESHY & ROBERT ABRAMS, *LEGAL CONTROL OF WATER RESOURCES* 356 (5th ed. 2013).

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

announced, as the core public trust principle, that government cannot abdicate its authority to govern public trust resources for the benefit of the public. That is not to say that the state cannot validly opt to honor appropriative rights due to their importance to the predictability and stability of the persons relying on the uses made of the water—that is one of the teachings of the famous *Mono Lake* decision.<sup>67</sup> What *Illinois Central* does say, however, is that the reasonable restriction of those rights in exigent circumstances remains in the power of the state, and operates as an inherent limitation on private rights in trust property and is not a taking if that restrictive power is exercised.

The next point to be made is the unrealistic idea that the water rights themselves are immutable. As already noted, the instrumental nature of water law has seen major changes in property rights accomplished without takings liability. The case can readily be made for establishing the importance of live streams to regional ecology, regional economy, and the public welfare. Like hydroclimate instability, changed understandings call for changes in the law. In fact, this is not a new and radical realization in the water community. More than forty years ago, in 1973, in an influential report suggesting numerous changes in water law, the National Water Commission stated, “The people of the United States give far greater weight to environmental and aesthetic values than they did when the nation was young and less settled.”<sup>68</sup> As Garrett Hardin said in his very famous article *The Tragedy of the Commons*, “The morality of an act is a function of the state of the system at the time it is performed.”<sup>69</sup> The state of the system, due to the stresses imposed by hydroclimate instability, has changed. The collective stresses of droughts and over-appropriation in many parts of the West is literally destroying riparian ecosystems to the detriment of all, including the water-user community. As was recognized by the Colorado Supreme Court, a court known for its commitment to the fundamental principles of the prior appropriation doctrine, it is no longer reasonable for appropriators to expect to utilize every last drop of water.<sup>70</sup>

Takings law itself has seen outcomes in cases change with the times and with the perceptions about the extent and importance

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67. *Nat'l Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419 (1983).

68. NAT'L WATER COMM'N, *NEW DIRECTIONS IN U. S. WATER POLICY* 5 (1973).

69. Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243, 1245 (1968).

70. *Pagosa Area Water & Sanitation Dist. v. Trout Unlimited*, 170 P.3d 307, 314 (Colo. 2007), *as modified* (Nov. 13, 2007).

of the injury to be avoided by the challenged regulation. Just as the bright-line test of *Sanguinetti* gave way to the possibility of a *Penn Central*-based analysis in *AG&FC*, the outcome in the famous regulatory takings case *Pennsylvania Coal Co. v. Mahon*<sup>71</sup> was disregarded on almost indistinguishable facts sixty-five years later in *Keystone Bituminous Coal Association v. DeBenedictis*,<sup>72</sup> where the nuisance prevention rationale was applied to coal mining-induced subsidence prevention laws. The change vindicated the words of Justice Brandeis, dissenting in *Mahon*:

[T]he right of the owner to use his land is not absolute. He may not so use it as to create a public nuisance, and uses, once harmless, may, owing to changed conditions, seriously threaten the public welfare. Whenever they do, the Legislature has power to prohibit such uses without paying compensation; and the power to prohibit extends alike to the manner, the character and the purpose of the use.<sup>73</sup>

Under current conditions of increased water scarcity and better knowledge of the consequences of dewatering ecosystems, states and the federal government have the power to regulate appropriators to protect minimum flows and levels (“MFLs”) and endangered species as incidents of nuisance prevention without takings liability. Applied in the takings arena, changed understandings about the ecological effects of dewatering streams and the need for the government to be able to address more frequent drought scenarios, not anticipated when the nation’s major water control structures were built, vitiates all possibility that it is reasonable for water rights holders to expect that their appropriative rights are, or should remain, unregulated and “unregulable” without takings liability.

It is equally doubtful that governmental dam operations can be expected to be immutable in the face of both the increased ecological understanding and the pressure of hydroclimate instability. Under a tort standard, governmental liability for unreasonable choices might otherwise be available, but Congress intentionally granted a broad tort immunity to be sure that its flood control projects would not be subject to review on that basis. What is left is takings law, but even

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71. *Pa. Coal Co. v. Mahon*, 260 U.S. 393 (1922).

72. *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470 (1987).

73. 260 U.S. 393, 417 (1922) (Brandeis, J., dissenting).

after the lowering of the barrier to inundations caused by the operation of flood control dams in *AG&FC*, there is still more required than mere tort foreseeability before a recovery for a taking can be obtained.

In sum, it is already apparent that hydroclimate instability is creating a new normal. In that universe, government operators of water control structures are ever more frequently being pressed to make decisions charting a course among competing perils. When reasonable choices are made, properly analyzed, those actions are neither torts nor takings. That has long been the case, and the Supreme Court's ruling in *AG&FC* is not to the contrary. Even as the Court removed the requirement that a flooding invasion must be permanent to support a takings claim, the Court did not find a temporary, physical invasion of property to be a per se taking. The Court called for the use of *Penn Central* balancing, one key element of which is the reasonable, investment-backed expectations of the landowner. In an era of hydroclimate instability, surely those expectations are shaped by the climate and the physical capabilities of dam and reservoir systems built with reference to assumptions that are no longer operative. Applying the principles of takings law, principles that expressly were left unchanged by *AG&FC*, when reasonably made in response to fraught choices, the actions of dam operators in controlling flood waters or responding to drought conditions will seldom, if ever, run afoul of the prohibition against takings of property.