

TAKINGS, WATER RIGHTS, AND CLIMATE CHANGE

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INTRODUCTION: CLIMATE CHANGE, RISK, MORAL HAZARD, AND TAKINGS LAW

This Article examines the possible consequences of climate change on the Supreme Court's takings jurisprudence as it applies to the non-recognition and regulation of water rights and land rights at the land-water interface. Climate change poses unprecedented challenges for both our existing political and legal systems and will require a reexamination of many fundamental property and constitutional doctrines. The United States has faced major climate-related disasters in the past, but the lessons from earlier responses have limited applicability to climate change. For example, in the 1930s, the combination of falling crop prices, severe drought, and the dust storms caused by converting grasslands to wheat depopulated the High Plains from Nebraska to Texas.¹ As with climate change, Hugh Bennett, the New Deal's Dust Bowl strategist, believed that the problem "seemed like something caused by man, a byproduct of hubris and ignorance on a grand scale."² The Depression did produce important legislative changes such as mortgage moratoria, the elimination of deficiency judgments for residential mortgages, and the federal purchase of farms to create national grasslands in the Dust Bowl states.³ But, in the end, more permanent adaptation steps, such as moving people out of harm's way, were rejected because the impacts were seen as temporary and preventable by more modest but

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1. For the standard history of the disaster, see DONALD WORSTER, *DUST BOWL: THE SOUTHERN PLAINS IN THE 1930S* (1979).

2. TIMOTHY EGAN, *THE WORST HARD TIME: THE UNTOLD STORY OF THOSE WHO SURVIVED THE GREAT AMERICAN DUST BOWL* 225 (2006).

3. R. Douglas Hurt, *The National Grasslands: Origin and Development in the Dust Bowl*, in *THE HISTORY OF SOIL AND WATER CONSERVATION* 144, 144–47 (Douglas Helms & Susan L. Flader eds., 1985).

unsuccessful steps, such as tree barriers.⁴ In contrast, climate change will have significant, although not fully understood,⁵ permanent impacts on the earth's surface, water supplies, and the way we live and use this stressed resource base.

To adapt to the stresses of climate change, there is likely to be more regulation of, and judicial limitations on, the use and enjoyment of water and water-related land that is impacted, or likely to be impacted, by climate change. Some losses cannot be avoided. Most of the steep losses of value resulting from climate change will likely be classified as "Acts of God."⁶ But, when legislatures, administrative agencies, and courts shift titles and reduce existing rights to share these scarce resources more equitably among competing demands, there will be takings challenges.⁷

The Supreme Court's takings jurisprudence provides almost no guidance for legislators or administrators trying to adapt to climate change. This Article argues that climate change will require courts and legislatures to focus on the risks of changed use and enjoyment inherent in property rights and on the ability of victims to avoid the harm instead of engaging in moral-hazard behavior. Water rights and rights to submerged lands are the most amenable to adaptation because these property rights have long carried inherent risks of diminished use, enjoyment, and title loss due to changed natural conditions. The law has encouraged right holders to engage in moral-hazard behavior by ignoring the risks of the unrestrained exercise of these rights. Too often, the law encourages property owners to develop or overuse resources in the face of known natural hazards because property owners know that either the state cannot force them to avoid the hazard or that they will be compensated if the hazard occurs. Thus, to adapt to climate change, risk and moral hazard must be factored into takings jurisprudence.

The difficulty of this task cannot be underestimated. Current Supreme Court precedent offers limited precedential support for the consideration of risk and moral hazard, but climate change is an opportunity to introduce them into takings jurisprudence. Fifth Amendment law currently assumes that property rights are and should be stable. Therefore, it focuses on the impact of regulation on the victim rather than on the nature of the property

4. See A. Dan Tarlock, *Rediscovering the New Deal's Environmental Legacy*, in *FDR AND THE ENVIRONMENT* 155, 165–66 (Henry L. Henderson & David B. Woolner eds., 2005).

5. See CLIMATE CHANGE SCIENCE PROGRAM, STRATEGIC PLAN FOR THE U.S. CLIMATE CHANGE SCIENCE PROGRAM 23 (2003), available at <http://www.climatescience.gov/Library/stratplan2003/final/>.

6. See *infra* notes 96–98 and accompanying text.

7. Takings challenges could be triggered by laws that (1) restructure existing allocation regimes, (2) prefer aquatic ecosystem conservation to consumptive uses, or (3) mandate the adoption of water conservation measures.

right and on the ability of the victim to minimize the adverse impacts for which compensation is sought.⁸ Nonetheless, the seeds of my argument can be found in *Lucas v. South Carolina Coastal Council*⁹ and Justice O'Connor's concurring opinion in *Palazzolo v. Rhode Island*.¹⁰ As the impacts of climate change on water and related land rights become clearer, efforts to adapt to the impacts could provide a new, more legitimate and powerful justification for regulations that compel landowners to avoid activities that put their water and land rights at the risk of diminished enjoyment.

Part I of the Article examines the potential impact of climate change on the use and value of land and water rights and the possible changes to the attributes of property ownership that climate change may produce. Part II poses six pro-type cases where legislative, administrative, or judicial action may produce takings challenges and examines existing precedents and possible resolutions of the cases. The Article concludes by sketching the principles of a climate-change takings jurisprudence for water rights and for land at the water-land interface.

I. CLIMATE CHANGE: STRATEGIES, IMPACTS, AND PROPERTY RIGHTS

A. *The Imperative of Adaptation*

There are two strategies to address the projected adverse impacts of climate change: mitigation and adaptation. Most domestic and international efforts have focused on the theory of mitigation—the reduction of greenhouse-gas emissions—through either a cap-and-trade system or a carbon tax. However imperative it may be to roll back greenhouse-gas emission levels, mitigation is largely an illusion in an era of constrained

8. See, e.g., *Lingle v. Chevron U.S.A. Inc.*, 544 U.S. 528, 539 (2005) (noting that the Court's regulatory takings jurisprudence "aims to identify regulatory actions that are functionally equivalent to the classic taking . . . [and] focuses directly upon the severity of the burden that government imposes upon private property rights"); *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1019 (1992) ("[W]hen the owner of real property has been called upon to sacrifice *all* economically beneficial uses in the name of the common good, that is, to leave his property economically idle, he has suffered a taking."); *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 435 (1982) (holding that the government's "permanent physical occupation" of private property constitutes a taking, for "[s]uch an appropriation is perhaps the most serious form of invasion of an owner's property interests . . . [because] the owner has no right to possess the occupied space himself, and also has no power to exclude the occupier from possession and use of the space"); *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978) (noting that, when resolving regulatory takings claims, courts should consider both the economic impact of a regulation and the extent to which it interferes with the owner's distinct investment-backed expectations).

9. *Lucas*, 505 U.S. at 1003.

10. *Palazzolo v. Rhode Island*, 533 U.S. 606, 632–36 (2001) (O'Connor, J., concurring).

budgets, an increasingly dysfunctional American political system, the weakness of international environmental law, and the resistance of large segments of the energy industry to switching to a non-carbon-based future. The United States may try a few token gestures, such as carbon sequestration, and throw money at alternative energy research, but the status quo of continued reliance on hydrocarbon energy with the resulting greenhouse-gas emissions seems the norm for the foreseeable future.¹¹ Furthermore, even if there were to be an effective international mitigation regime, the benefits will not manifest themselves for centuries.¹² The result is that adaptation—taking projected adverse impacts as a given—has emerged as a second-best imperative. Due to the current congressional gridlock, responsibility for adaptation is being de facto devolved to the states, which have the primary responsibility for defining and allocating water and the use of water-related lands.

B. Impacts on Land and Water

The bottom line on the impact of climate change for water is that there may be too little or too much, but we do not know when and where the adverse impacts¹³ will manifest themselves or their exact magnitude.¹⁴ We

11. Clifford Krauss, *The Energy Picture, Redrawn*, N.Y. TIMES, Oct. 26, 2011, at F1. The global energy picture has changed dramatically in the past few years with the discovery of new oil and gas reserves outside the Middle East. *Id.* The net result “is a devil’s bargain, probably making solutions to climate change, and the development of renewable energy, even more difficult.” *Id.*

12. Richard Monastersky, *A Burden Beyond Bearing*, 458 NATURE 1091, 1092 (2009). The current thinking is that it will be at least 1,000 years before any serious mitigation, which is not now in place, will begin to produce benefits. NAT’L RESEARCH COUNCIL, CLIMATE STABILIZATION TARGETS: EMISSIONS, CONCENTRATIONS, AND IMPACTS OVER DECADES TO MILLENNIA 1 (2010). The latest research suggests that we are reaching dangerous CO₂ concentrations more quickly than previous estimates and that the recovery time from reductions, should they actually occur, may be as much as 1,000 years. See generally GARY BRAASCH, EARTH UNDER FIRE: HOW GLOBAL WARMING IS CHANGING THE WORLD 160–63 (2007) (providing information on global-warming recovery times).

13. Of course, there will also be winners among land-holders. Land in the northern latitudes may be more valuable for agriculture as the growing season lengthens or population migration increases. John Reilly, *Climate Change, Global Agriculture and Regional Vulnerability*, in GLOBAL CLIMATE CHANGE AND AGRICULTURAL PRODUCTION: DIRECT AND INDIRECT EFFECTS OF CHANGING HYDROLOGICAL, PEDOLOGICAL AND PLANT PHYSIOLOGICAL PROCESSES 237 (Fakhri Bazzaz & Wim Sombroek eds., 1996). For example, in places as diverse as California and Namibia, prime irrigated agricultural land may become even more valuable as scarce water resources force the retirement of marginal lands. If climate change wipes out much of California’s premium wine industry, Oregon may be the beneficiary. M.A. White et al., *Extreme Heat Reduces and Shifts United States Premium Wine Production in the 21st Century*, 103 PROC. NAT’L ACAD. SCI. 11,217, 11,219 (2006).

14. For example, between 2005 and 2007 the Southeast United States experienced a severe drought that stressed Atlanta’s water supply and destroyed billions of dollars worth of crops in Alabama and Georgia. However, Columbia University scientists have concluded that the stresses were the product of regional population growth and bad planning, not global climate change. Richard Seager et al.,

are still reading tea leaves.¹⁵ Both the consumptive and non-consumptive uses of water—for irrigation, municipal supply, energy production, and fish—will be impacted. There is a relatively firm consensus that arid and semiarid regions risk the net loss of stream runoff as winter snow packs diminish and spring and summer evaporation rates increase due to warmer temperatures.¹⁶ Federal and state carry-over storage projects might not be able to meet their municipal & industrial (M & I) or contractual irrigation delivery obligations in growing, water-stressed areas.¹⁷ Reduced flows will equally impact energy production; decreased flows create the risk of decreased production from thermal and hydroelectric power plants.¹⁸ Finally, there have been many efforts to restore fish populations and aquatic ecosystems by providing minimum flows on many rivers. These experiments could be jeopardized as there will be counter-pressures to abandon them.

Predictions are cloudier for more humid areas, but there is little doubt that runoff patterns will be altered. Many areas in the East may experience intense bursts of increased runoff that will cause severe flood events, as occurred in 2011 due to Hurricane Irene. At the same time, these areas may experience lower summer water flows due to deeper, more prolonged droughts on major, heavily used rivers. A 2011 Report claims that in 1950,

Drought in the Southeastern United States: Causes, Variability over the Last Millennium and the Potential Future Hydroclimatic Change, 22 J. CLIMATE 5021, 5022 (2009). In 2008, the National Research Council convened a workshop on the future of water use in the Apalachicola-Chattahoochee-Flint and Alabama-Coosa-Tallapoosa River Basins, and participants divided on the issue of whether all uses could be supplied in the future, although “[a]ttendees generally acknowledged that additional population growth would add further stresses to the water supply system.” JEFFREY JACOBS, NAT’L RESEARCH COUNCIL, SUMMARY OF A WORKSHOP ON WATER ISSUES IN THE APALACHICOLA-CHATTAHOOCHEE-FLINT AND ALABAMA-COOSA-TALLAPOOSA (ACF-ACT) RIVER BASINS 5 (2009).

15. In 2009, much of the United States experienced wild temperature swings. For instance, the Ohio Valley experienced record average lows in July, while California and Nevada experienced their warmest month on record in September. M.P. Hoerling, Nat’l Oceanic & Atmospheric Admin., *Strong Seasonality in 2009 U.S. Temperatures*, in STATE OF THE CLIMATE IN 2009: SPECIAL SUPPLEMENT TO THE BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY 140 (D.S. Arndt et al. eds., 2010), available at <http://www.aoml.noaa.gov/hrd/Landsea/bams-91-7-stateoftheclimate.pdf>. However, the latest assessment of the world’s climate in 2009 concludes that “[s]uch seasonal extremes most certainly were not the result of human-induced climate change.” *Id.*

16. See, e.g., Robert W. Adler, *Climate Change and Hegemony of State Water Law*, 29 STAN. ENVTL. L.J. 1, 10–17 (2010); STEPHEN SAUNDERS ET AL., ROCKY MOUNTAIN CLIMATE ORG., HOTTER AND DRIER: THE WEST’S CHANGED CLIMATE 10 (2008), available at <http://www.nrde.org/globalwarming/west/west.pdf>; NAT’L ACADEMY OF SCIENCES, COLORADO RIVER BASIN WATER MANAGEMENT: EVALUATING AND ADJUSTING TO HYDROCLIMATIC VARIABILITY 89 (2007).

17. For additional discussion of drought vulnerability in the region, see OXFAM AMERICA, EXPOSED: SOCIAL VULNERABILITY AND CLIMATE CHANGE IN THE US SOUTHEAST 6–8 (2009), available at http://adapt.oxfamamerica.org/resources/Exposed_Report.pdf.

18. Benjamin K. Sovacool, *Running on Empty: The Electric-Water Nexus and the U.S. Electric Sector*, 30 ENERGY L.J. 11, 11 (2009).

the chances of a record-breaking cold day or record-breaking hot day were even; now the chance of a record-breaking hot day is two times greater than a record-breaking cold day.¹⁹ Rainfall in the United States increased 7% in the twentieth century, and rain falling from the heaviest cloudbursts has increased by 20%.²⁰ The Great Lakes are an example of a region that may face new stresses. A 2008 synthesis of the climate-change literature for the Great Lakes concludes that:

Mean annual lake surface evaporation could increase by as much as 39% due to an increase in lake surface temperatures. This will present particular concern during summer and autumn, which are already characterized by low stream flow. Moreover, with increased evapotranspiration and decreased snowpack, less moisture will enter the soil and groundwater zones, and runoff will be even further decreased. Consequently, under future warmer and drier conditions, Great Lakes residents could become more vulnerable to water supply and demand mismatches.²¹

The greatest consumptive use of water is to grow crops or to irrigate grass. Thus, the climate-change impacts on land will affect the use of water. Therefore, some lands may become less valuable for irrigation farming or even dry-land farming. For example, a 2008 report estimating the yearly damage range to California real estate illustrates the range of landscape impacts of climate change common to vulnerable areas.²² Excluding agriculture and forests, the report estimates that climate-change damages will be between \$0.2 and \$1.4 billion for water and \$0.1 to \$2.5 billion from fire.²³ The potential damage includes the risk of increased wildfires, sea-level rise and the resulting coastal erosion, and increased winter-storm

19. Hunter Cutting, Sandra Chung & Susan Hassol, *Overview: Current Extreme Weather & Climate Change*, CLIMATE COMM'N, <http://climatecommunication.org/new/articles/extreme-weather/overview/> (last visited Feb. 7, 2012).

20. *Precipitation, Floods, & Drought*, CLIMATE COMM'N, <http://climatecommunication.org/new/articles/extreme-weather/precipitation-floods-drought/#refmark-15> (last visited Feb. 24, 2012).

21. Noah D. Hall & Bret B. Stuntz, *Climate Change and Great Lakes Water Resources: Avoiding Future Conflicts with Conservation*, 31 *HAMLIN L. REV.* 641, 645 (2008). Subsequent studies confirm dropping water levels, in part attributed to climate change. INT'L JOINT COMM'N, *IMPACTS ON UPPER GREAT LAKES WATER LEVELS: ST. CLAIR RIVER*, at v–vii (2009), available at http://pub.iugls.org/en/Other_Publications/IUGLS_Final_Report.pdf. However, a new study by the same scientists now predicts no major impact on Great Lakes water levels from climate change. *NOAA Study Points to Less Water Loss in Future Great Lakes Levels*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Oct. 19, 2011), http://www.noaa.gov/stories2011/20111019_glerlwaterlevels.html.

22. DAVID ROLAND-HOLST & FREDRICH KAHRL, UNIV. OF CAL. BERKELEY, CALIFORNIA CLIMATE RISK & RESPONSE: EXECUTIVE SUMMARY (2008), available at http://are.berkeley.edu/~dwrh/CERES_Web/Docs/ClimateRiskandResponse_ES.pdf.

23. *Id.* at 3.

flood and wind damage.²⁴ When damage to forests and agricultural land is factored in, the yearly range is between \$0.3 and \$4.3 billion.²⁵

Aquatic ecosystems will also be directly impacted. The anticipated flow patterns, characterized by higher highs and lower lows, may directly impair ecosystem functions and species composition and survival. Climate change will produce warmer water temperatures that will increase the risks of species dispersal, and more algae blooms will result in poorer water quality.²⁶ For example,

[a]ssuming no change in food resources, invertebrate production of streams and rivers may increase, potentially yielding more food for fish. However, higher water temperatures will also increase the rate of microbial activity and thus the rate of decomposition of organic material, which may result in less food being available for invertebrates and ultimately fish. In either case, warmer water holds less dissolved oxygen, so water quality will be reduced for organisms such as invertebrates and fish that have a high oxygen demand.²⁷

The bottom line is that “[e]xpected rates of climate change are probably too great to allow adaptation through natural genetic selection. . . . [A]quatic species differ greatly in their dispersal abilities, so not all species will be able to move to hospitable habitat.”²⁸

C. Consequences for Water and Related Land Rights

There has been little effort to examine the consequences of potential climate-change impacts on the private law of property entitlements including water rights. Historically, property and water law in civil, common, and mixed systems have been thought of as a set of abstract, universal principles that are relatively impervious to external changes in economic values relating to the use, enjoyment, and transfer of resources. Both the common and civil law protect the owner’s right to exclude (*jus prohibendi*) rather than the right to fixed value.²⁹ The law of property and to

24. *Id.* at 7.

25. *Id.* at 3.

26. N. LEROY POFF, MARK A. BRINSON & JOHN W. DAY, JR., PEW CENT. ON GLOBAL CLIMATE CHANGE, AQUATIC ECOSYSTEMS AND GLOBAL CLIMATE CHANGE: POTENTIAL IMPACTS ON INLAND FRESHWATER AND COASTAL WETLAND ECOSYSTEMS IN THE UNITED STATES, at iii (2002).

27. *Id.* at 7 (citation omitted).

28. *Id.* at 32.

29. Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 747 (1998).

some extent water rights is still built on the foundation of Roman law. The abstract nature of property allows it to function to stimulate commerce by promoting title security and by decreasing the risk that other private parties or the state can disturb an owner's title.³⁰ Change does occur, but it is incremental and often consists of discarding doctrines that have become dysfunctional. Climate change increases the risk of title and enjoyment disturbance, and thus three possible climate-change impact scenarios are possible. First, the existing property doctrines can adapt to climate change. Second, climate change will produce new doctrines that limit the exclusive enjoyment of rights and mandate greater resource sharing. Third, the change will come from legislatures and the role of courts will be to assess the constitutionality of the legislation.

The starting point to incorporate climate change into the law of property is to recognize that ownership always entails some risk despite the emphasis on exclusion and title security. Competing claims can displace title due to the lack of title registration in the United States and title can be lost through adverse possession. Owners have always faced disasters and severe declines in the market value of land and water, but in general, disasters and value declines are assumed not to impact the legal ownership of property; ownership is an abstract interest in a thing and that interest remains as long as the thing remains.³¹ And, many disasters are Acts of God for which no one is legally responsible; compensation is an act of grace not duty.³² Climate change may introduce new risks to property holders, such as boundary shifts between private and public ownership that cause title shifts from private to public ownership. In other situations, the full, expected use and enjoyment of an entitlement will not be recognized or will be curtailed.³³

30. Richard Epstein, *Property and Necessity*, 13 HARV. J. L. & PUB. POL'Y 2, 7 (1990).

31. Early Supreme Court jurisprudence extended this risk analysis to social legislation that wiped out investment values that were perfectly legal when made. *E.g.*, *Mugler v. Kansas*, 123 U.S. 623, 623 (1887) (passage of prohibition legislation that destroyed the value of a brewery was not a taking because there was no interference with the brewery's title).

32. *See infra* notes 97–100 and accompanying text.

33. Carbon sequestration may be an example where the right to exclude is not fully recognized. Some have suggested that precedents such as *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982), may not be applied to subsurface trespass claims. Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change, Carbon Sequestration, and Property Rights*, 2010 U. ILL. L. REV. 363, 389–91 (2010). Cases such as *BP Chemicals v. Chance*, 670 N.E.2d 985, 992 (Ohio 1996), and *FLP Framing, Ltd. v. Texas Natural Resources Commission*, No. 03-02-00477-CV, 2003 WL 247183, at *4–5 (Tex. Ct. App. Feb. 6, 2003), suggest that a surface owner will not be able to invoke the normal rule that any entry is a violation of the right to exclude even if no damage occurs. The surface owner must establish damages to a current or foreseeable surface or subsurface use. The rationale is that surface owners do not have (and never had) a reasonable expectation to own upwards to the heavens. The expectation of the use of the deep subsurface may be stronger, at least for surface and mineral interest owners “already

Owners in vulnerable coastal and other water-related areas face increased risks that pre-climate-change patterns of entitlements will no longer hold. A dramatic example of this is occurring in the Panhandle of Alaska. When the area was covered with glaciers, there was a navigable channel between the capital, Juneau, and a port ten miles away on the Inland Passage.³⁴ Area glaciers are melting, and the channel and associated wetlands are silting in as the land rises due to the release of the pressure placed on it by the ice.³⁵ The land that “is emerging from the water to replace the lost wetlands [is] shifting property boundaries and causing people to argue about who owns the acreage and how it should be used.”³⁶

The risk level for water-right holders and land owners at the water-land edge has always been relatively greater than those faced by “dry-land” owners because the scope of a water right is defined in the context of other users and the state.³⁷ Risk is inherent in the law of water rights. Water rights are property rights, but they are relatively incomplete compared to land rights.³⁸ Their usufructuary nature subjects users to greater risks of curtailed enjoyment compared to land owners.³⁹ There is a dissenting view that

making economic use of the subsurface at the same depths as proposed CO₂ sequestration, or such uses are subject to reasonable, investment-backed expectations.” Klass & Wilson, *supra*, at 411. However, surface owners face a more difficult burden to establish a regulatory taking for state programs that limit subsurface drilling or other uses to protect the integrity of a CO₂ reservoir. The “pore” estate might be severed from the rest of the mineral estate and no regulatory taking found on the logic of *Keystone Bituminous Coal Ass’n v. DeBenedictis*, 480 U.S. 470, 495–502 (1986). On balance, Klass and Wilson conclude that unless there is a total deprivation of all economic use, “it is unlikely a court would find that regulations restricting some portion of the surface or subsurface would constitute a taking.” Klass & Wilson, *supra*, at 417.

34. Cornelia Dean, *As Alaska Glaciers Melt, It’s Land That’s Rising*, N.Y. TIMES, May 18, 2009, at A1.

35. *Id.*

36. *Id.*

37. See Shelly Ross Saxer, *The Fluid Nature of Property Rights in Water*, 21 DUKE ENVTL. L. & POL’Y F. 49, 61 (2010); Sandra B. Zellmer & Jessica Harder, *Unbundling Property in Water*, 59 ALA. L. REV. 679, 707 (2008).

38. See *In re Water Use Permit Applications*, 9 P.3d 409, 492–93 (Haw. 2000).

It is generally recognized that a simple private ownership model of property is conceptually incompatible with the actualities of natural watercourses. Rather, the variable and transient nature of the resource, as well as the necessity of preserving its purity and flow for others who are entitled to its use and enjoyment have led to water rights being uniformly regarded as usufruct[ua]ry and correlative in nature.

Id. (alteration in original) (emphasis omitted) (quoting *Robinson v. Ariyoshi*, 658 P.2d 287, 305–06 (Haw. 1982)).

39. See Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. REV. 257, 260 (1990) (noting that water rights enjoy less constitutional protection than other rights because (1) they are subject to “original public prior claims, such as the navigation servitude and the public trust,” as well as laws protecting the commons (e.g., water pollution laws); (2) they are often limited to beneficial or non-wasteful uses, unlike other species of property rights; and (3) to the extent

denies the “water-is-different” theory and argues that water rights are just another form of property right.⁴⁰ However, the consensus (and more accurate characterization of water rights) is that they are a different form of property right, and thus the Constitution affords water-right holders *comparatively less* protection compared to land owners.⁴¹ The basic reason is that the range of those with a legitimate interest in one person’s use of water is greater compared to those with a legitimate interest in one person’s use of land. It includes the user community, the state, and others affected by water use. In short, the law of water rights is another example of a property rights system that expressly incorporates the risk of non-enjoyment of the resource as well as of physical alteration into the legal right.⁴² Both the right to use water and the delineation of water boundaries carry the risk that the physical nature of the right, and thus its use and enjoyment, will not remain constant over time. All water-right holders face the risk that the entitlement might be curtailed due to the vagaries of climate or the demands of competing users and uses⁴³ and that use rights might be—within the bounds of the Constitution—redefined.⁴⁴ This is reflected in the general assertion that the public owns the waters of a territory. State ownership is a fiction for the assertion of the power to regulate all aspects of use and enjoyment rather than an assertion of full ownership.⁴⁵ It means that private rights to

that the government grants water rights through a permit, they are subject to permit constraints). Of course, the destruction of an easement may be an occasion for compensation. *See, e.g., United States v. Va. Elec. & Power Co.*, 365 U.S. 624, 627–31 (1961) (holding that acquisition of land subject to a flowage easement entitles an easement holder to compensation for the value of land apart from riparian uses).

40. Scott Andrew Shepard, *The Unbearable Cost of Skipping the Check: Property Rights, Takings Compensation & Ecological Protection in the Western Water Context*, 17 N.Y.U. ENVTL. L.J. 1063, 1066 (2009).

41. *See Sax, supra* note 39, at 260.

42. Joseph L. Sax, *The Property Rights Sweepstakes: Has Anyone Held the Winning Ticket?*, 34 VT. L. REV. 157, 166 (2009). “Water law is the rare property regime where our legal system has explicitly confronted the time/space distinction in regard to the use of ambient resources. It illustrates that . . . a landowner may, or may not, have a property right to some share of those resources.” *Id.*

43. A. Dan Tarlock, *How Well Can Water Law Adapt to the Potential Stresses of Global Climate Change?*, 14 DENVER WATER L. REV. 1, 7–8. “[W]ater rights are of necessity correlative, because water is not always available in the desired quantities due to climate variation and is uniquely necessary for human and ecosystem survival. . . . Of necessity, each user’s right is subject to the rights of other similarly situated users on a stream or over an aquifer.” *Id.* at 7.

44. *See* A. Dan Tarlock, *The Legacy of Schodde v. Twin Falls Land and Water Co.: The Evolving Reasonable Appropriation Principle*, 42 ENVTL. L. 37 (2012); Reed D. Benson, *Alive but Irrelevant: The Prior Appropriation Doctrine in Today’s Western Water Law*, 84 U. COLO. L. REV. (forthcoming 2012).

45. The definitive treatment of this issue remains Frank J. Trelease, *Government Ownership and Trusteeship of Water*, 45 CALIF. L. REV. 638, 640–49 (1957) (examining the “state ownership” and “state trusteeship” theories of water rights and water use and how these concepts have shaped the law of water rights in various Western states); *see also* Reed D. Benson, *Deflating the Deference Myth:*

use water are not excluded, but they are limited, usufructuary rights rather than full, exclusive ownership.⁴⁶

II. SIX CASE STUDIES

A. Case One: Sea-Level Rise Inundates Private Property and the State Asserts That the Land Is Now Public Land Subject to the Public Trust

If large-scale sea-level rise occurs, large amounts of coastal property might become permanently submerged. Thus, states could assert public-trust ownership of these newly submerged lands. This case is the easiest in which to deny compensation. The complete title shift from private to public ownership is a total “wipeout” and physical occupation; it does not fit the traditional takings cases for two primary reasons. First, the losses are not borne by an individual or small class of landowners, but by large numbers of coastal owners.⁴⁷ Second, the public trust is a background common-law principle that property owners must expect to come into play.⁴⁸ In all states, private-property boundaries end at the mean high or low water mark. The beds of lakes, rivers, and oceans are owned by the state subject to the public trust, and the line between public and private ownership has always been a shifting one. Owners take the risk that their projects will encroach on trust land or that private land may become inundated and subject to the trust.⁴⁹

The doctrine that inherent limitations on title are a defense to a categorical taking was formally articulated in *Lucas v. South Carolina Coastal Council*.⁵⁰ The issue in *Lucas* was whether a state beachfront setback statute could be applied to limit development on a barrier island.⁵¹

National Interests vs. State Authority Under Federal Laws Affecting Water Use, 2006 UTAH L. REV. 241, 255 (noting that the Equal Footing Doctrine provides that all states admitted into the Union subsequent to the original thirteen are admitted with the same rights as the original thirteen, which includes title to the beds and banks underlying tidal and navigable waters).

46. Dante A. Caponera, *Ownership and Administration of Water Resources*, in NATIONAL AND INTERNATIONAL WATER LAW AND ADMINISTRATION 83, 83–84 (2003).

47. Michael A. Hiatt, *Come Hell or High Water: Reexamining the Takings Clause in a Climate Change Future*, 18 DUKE ENVTL. L. & POL’Y F. 371, 391–92 (2008).

48. See e.g., *Nat’l Ass’n of Homebuilders v. N.J. Dep’t of Env’tl. Prot.*, 64 F. Supp. 2d 354, 356–58 (D.N.J. 1999) (no taking occurred when state regulations required a developer to maintain a thirty-foot walkway along the Hudson River over state trust land conveyed to private property owners but never severed from the trust). *But cf.* Robin Kundis Craig, *Adapting to Climate Change: The Potential Role of State Common-Law Public Trust Doctrines*, 34 VT. L. REV. 781, 801–02, 806–09 (2010) (describing the public trust doctrine and noting that, as a doctrine that courts can easily adapt to changing circumstances and time periods, it is well-suited as a vehicle to promote climate-change adaptation through the law).

49. *McQueen v. S.C. Coastal Council*, 580 S.E.2d 116 (S.C. 2003).

50. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003 (1992).

51. *Id.* at 1007.

Lucas was an easy case for compensation because it was a simple equal-protection case; the island was almost fully developed with unstable beach-front stilt houses before the state decided to limit coastal development.⁵² Instead of applying this rationale, the Court recognized a new category of categorical taking and held that the statute was unconstitutional because it resulted in the complete elimination of the value of property for any development.⁵³ In the course of a rather rambling opinion, Justice Scalia allowed that there are a limited class of common-law background title limitations⁵⁴ that can be raised as defenses to compensation.

B. Case Two: The State Fixes Littoral Boundaries

Water boundaries can never be permanently fixed for two reasons. First, rivers, lakes, and the sea are constantly changing adjoining land, and second, in all countries, the state owns the submerged lands of the sea, large rivers, and lakes up to some boundary standard, such as the mean high tide line or the high water mark.⁵⁵ Thus, water boundaries on lakes, rivers, and oceans are dynamic rather than static. Property owners may lose and gain soil due to rapid erosion or accumulation of the deposit of soil. The common and civil law classify these processes as avulsion and accretion.⁵⁶ A riparian land owner is entitled to the gradual deposit of soil that extends his original boundary.⁵⁷ If water retreats, the land owner gains the newly

52. *Id.* at 1008.

53. *Id.* at 1007, 1028 n.14. Prior to *Lucas*, only physical occupations were categorical takings. *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 422 (1982) (finding a taking for an unconsented cable television cable on the exterior of a building).

54. Michael C. Blumm and Lucus Ritchie surveyed the post-*Lucas* cases and found that the background limitation defense is growing. Michael C. Blumm & Lucus Ritchie, *Lucas's Unlikely Legacy: The Rise of Background Principles As Categorical Takings Defenses*, 29 HARV. ENVTL. L. REV. 321 (2005). Many of the instances where courts invoke the defense involve resources such as water, *id.* at 342–43, 350–51, fishing quotas, *id.* at 357, 363, and public land, *id.* at 363. Professor James Huffman has sharply criticized an expansive reading of the background limitation doctrine. James L. Huffman, *Background Principles and the Rule of Law: Fifteen Years After Lucas*, 35 ECOLOGY L.Q. 1, 12 (2008) (arguing that courts must maintain the defined limits of the common law to give property rights meaning, for if courts were to apply the “background limitations” principle expansively and issue “ex post declarations that the [common] law is . . . what it was not,” they would effectively “read the [T]akings [C]ause out of the [C]onstitution”). For a counter-critique, see Michael C. Blumm & J.B. Ruhl, *Background Principles, Takings, and Libertarian Property: A Reply to Professor Huffman*, 37 ECOLOGY Q. 805 (2010).

55. *See, e.g.*, *Brickell v. Trammel*, 82 So. 221, 226 (Fla. 1919).

56. The Roman, civil, and common law origins of the doctrine are briefly traced in JOSEPH K. ANGELL, A TREATISE ON THE RIGHT OF PROPERTY IN TIDE WATERS AND THE SOILS AND SHORES THEREOF 249–89 (1847).

57. The rationales are (1) *de minimis non curat lex*, (2) fairness dictates the right to accretion as compensation for erosion, (3) all property should have an owner and for convenience the riparian is the

exposed soil under the doctrine of reliction.⁵⁸ Conversely, the owner may lose a portion of his original land if the stream course migrates landward. However, in rapid shifts, known as avulsion, boundaries do not shift.⁵⁹

Efforts to deal with climate change might require the state to create stable water boundaries that push private-property boundaries landward. Florida's legislation to do this and the subsequent takings challenge is instructive. The state enacted legislation that allows the state to freeze the public-private water boundary—the mean high tide line—to establish an erosion-control boundary (ECL), and declared that all artificial beach nourishment seaward of the ECL remains the property of the state.⁶⁰ Littoral owners have a right of access along with the general public but no right to future accretions.⁶¹

In *Walton County v. Stop the Beach Renourishment*, property owners challenged the ECL as an unconstitutional taking of private property.⁶² Although Florida had previously held that littoral rights, such as view, cannot be taken without compensation,⁶³ the Florida Supreme Court classified view as a present right and the right to receive accretion as a contingent future one, which was ancillary to the right of access.⁶⁴ This made it easier to conclude that the state had struck a reasonable balance between the public interest in preventing beach loss, the reduction of storm damage and the conservation of the shoreline, and the property owner's interest in beach access.⁶⁵ The Florida Supreme Court also noted that hurricanes are avulsive events, so the property boundary remains in place, but the property owner has a reasonable period of time to reclaim the lost land.⁶⁶ Thus, the legislation simply allowed the state, as public-trust owners of land seaward of the mean high tide line, to do what the common law allows them to do.

owner of accretion, and (4) the necessity to preserve water access. Bd. of Trs. of the Internal Improvement Trust Fund v. Medeira Beach Nominee, Inc., 272 So. 2d 209, 211–13 (Fla. Dist. Ct. App. 1973).

58. A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 3.44 (2011); Joseph L. Sax, *The Accretion/Avulsion Puzzle: Its Past Revealed, Its Future Proposed*, 23 TUL. ENVTL. L.J. 305, 308 (2010).

59. Sax, *supra* note 58, at 308. After an exhaustive examination of the origins of the avulsion-accretion distinction, Professor Joseph Sax concludes that it should be abolished, except in limited cases, and land titles should follow moving water boundaries to retain a riparian's "water adjacency." *Id.* at 353.

60. Beach and Shore Preservation Act, FLA. STAT. §§ 161.161(3)–(5) (2007); *Walton County v. Stop the Beach Renourishment, Inc.*, 998 So. 2d 1102, 1108 (Fla. 2008) (citing FLA. STAT. §§ 161.161(3), 161.191(1)–(2) (2005)).

61. FLA. STAT. § 61.201; *Stop the Beach Renourishment*, 998 So. 2d at 1108 (citing FLA. STAT. §§ 161.191(2), 161.201).

62. *Stop the Beach Renourishment*, 998 So. 2d at 1105.

63. *See Lee County v. Kiesel*, 705 So. 2d 1013, 1016 (Fl. Dist. Ct. App. 1998).

64. *Stop the Beach Renourishment*, 998 So. 2d at 1112, 1119.

65. *Id.* at 1119–20.

66. *Id.* at 1116.

The U.S. Supreme Court affirmed because the Florida Supreme Court decision was consistent with “background principles of state property law. It did not abolish the Members’ right to future accretions, but merely held that the right was not implicated by the beach-restoration project, because the doctrine of avulsion applied.”⁶⁷ Unfortunately, four Justices needlessly opened up the specter of judicial takings.⁶⁸

Texas’s approach to avulsive changes caused by a hurricane illustrates that the modern notion of property remains rooted in the notion of exclusive dominion subject only to the duty not to cause a nuisance. Public beach access over private dry-sand areas has been a major issue in the United States, and states have developed different legal strategies to expand public access of the dry-sand area. Texas law recognizes public prescriptive rights to use private beaches up to the vegetation lines.⁶⁹ A state court interpreted the law to mean that public prescriptive easements move with changes in the vegetation line.⁷⁰

But, a recent case allowed a constitutional challenge to the rolling easement doctrine by a property owner whose property migrated seaward of the vegetation line after Hurricane Rita.⁷¹ In *Severance v. Patterson*, erosion prompted by Hurricane Rita caused two homes on Severance’s beachfront property to encroach upon the public “dry beach” after the vegetation line shifted.⁷² Texas courts have acknowledged a “rolling easement doctrine,” such that “once an easement is established, its boundaries shift with the vegetation line and the line of mean low tide.”⁷³ Severance argued that “enforcement of the rolling easement pursuant to [Texas law] would effect . . . an impermissible taking without just compensation under the Fifth Amendment.”⁷⁴ Over a strong dissent, the federal court of appeals judge characterized Texas law as ambiguous and uncertain, but held that a landowner could not bring a Fifth Amendment takings claim because the issue was not ripe.⁷⁵ However, the majority suggested that the state’s attempted enforcement of the easement was arguably a Fourth Amendment

67. *Stop the Beach Renourishment, Inc. v. Fla. Dep’t of Env’tl. Prot.*, 130 S. Ct. 2592, 2612 (2010) (internal citations omitted).

68. The literature on this aspect of the opinion is already substantial. See, e.g., Laura S. Underkuffler, *Judicial Takings: A Medley of Misconceptions*, 61 SYRACUSE L. REV. 203 (2011).

69. TEX. NAT. RES. CODE ANN. § 61.011 (West 2009).

70. *Arrington v. Tex. Gen. Land Office*, 38 S.W.3d 764, 766 (Tex. App. 2001).

71. *Severance v. Patterson*, 566 F.3d 490 (5th Cir. 2009).

72. *Id.* at 494.

73. *Id.* at 493 (quoting *Feinman v. State*, 717 S.W.2d 106, 110–11 (Tex. App. 1986)).

74. *Id.* at 494.

75. *Id.* at 498–500.

seizure,⁷⁶ and certified the question to the Texas Supreme Court.⁷⁷ The Texas Supreme Court held that the easement did not roll with avulsion, and thus the state could only impose the easement by compensating the owner.⁷⁸ The common-law distinction between accretion/erosion and avulsion did not subject the owner to the risk of losing title.⁷⁹ The distinction is often hard to discern. For example, Professor Sax has persuasively argued that the distinction be abolished,⁸⁰ and climate change provides an additional justification for his argument. As coastal boundaries become more unstable, property owners must assume the greater risk of boundary change.

*C. Case Three: FERC Denies a Hydro License Renewal
Because of Climate Change*

Increasing water temperature and decreasing flows will put fish populations such as trout and salmon at risk.⁸¹ FERC has considerable discretion to address this issue. The Federal Power Act allows FERC to license hydroelectric projects on navigable streams for fifty-year terms. The original Act gave FERC (formerly the FPC) great discretion to license or not,⁸² and FERC granted most applications.⁸³ FERC's discretion was trimmed in 1986 when Congress amended the Federal Power Act to require that FERC give equal weight to the protection of fish and wildlife.⁸⁴ Most of FERC's hydro business involves license renewals, as many of the original licenses are up for renewal.⁸⁵

Renewal proceedings reflect the changes in our perception of rivers, but new conditions and dam removal have been achieved primarily through voluntary agreements. However, FERC's power to deny a license in light of changed conditions has been confirmed by the District of Columbia Circuit Court of Appeals in a forward-looking opinion.⁸⁶ In *City of Tacoma v. FERC*, the municipal licensee argued that the fish restoration and mitigation conditions of a new license amounted to an illegal de facto decommissioning

76. *Id.* at 502. See generally Michael Hofrichter, *Texas's Open Beaches Act: Proposed Reforms Due to Coastal Erosion*, 4 ENVTL. & ENERGY L. & POL'Y J. 147 (2009).

77. *Severance*, 566 F.3d at 503–04.

78. *Severance v. Patterson*, No. 09–0387, 2012 WL 1059341, at *14 (Tex. 2012).

79. *Id.* at *13.

80. See Sax, *supra* note 58, at 353–54.

81. Jack R. Tuholske, *Hot Water Streams: A Tale of Two Trout*, 34 VT. L. REV. 927, 943–47 (2010).

82. Federal Power Act, 16 U.S.C. § 797 (2006).

83. *E.g.*, *Namekogan Hydro Co. v. Fed. Power Comm'n*, 216 F.2d 509, 513 (7th Cir. 1954).

84. 16 U.S.C. § 797(e).

85. FRED BOSSELMAN ET AL., *ENERGY, ECONOMICS AND THE ENVIRONMENT* 157 (2010).

86. *City of Tacoma v. FERC*, 460 F.3d 53 (D.C. Cir. 2006).

order.⁸⁷ After noting that federal hydro policy had changed “from a near-exclusive focus on development to an increasing focus on environmental protection,” the court found “persuasive FERC’s argument that Congress implicitly extended to FERC the power to shut down projects either directly, by denying a new license, or indirectly, by imposing reasonable and necessary conditions that cause the licensee to reject the new license.”⁸⁸

A FERC licensee has no takings objection to a decommissioning order or to the imposition of extensive fish restoration conditions.⁸⁹ First, even if the licensee has—as the Act requires—a state water right to operate the project, federal approval is a prerequisite to the enjoyment of the state right.⁹⁰ The grazing-right cases confirm that denial of a federal permit—which is a license, not a property right—that prohibits use of a water right is not a taking because there is no deprivation of the water right because it may be transferred to other users.⁹¹ Second, a FERC licensee has no property right in the value of the use of navigable waters.⁹²

87. *Id.* at 71.

88. *Id.* at 73–74.

89. *United States v. Chandler-Dunbar Co.*, 229 U.S. 53, 76 (1913) (no compensation when a license to improve a navigable waterway was revoked); *see* cases cited *infra* note 91; *see also* Katharine Costenbader, *Damming Dams: Bearing the Costs of Restoring America’s Rivers*, 6 GEO. MASON L. REV. 635, 657–59 (1998).

[H]ydropower project owners do not acquire a property interest in a site’s water power value or in the land’s value as a hydroelectric site. The cases do, however, suggest that when the government condemns private riparian land—the land alongside a riverbed—for public purposes, the Fifth Amendment takings clause requires compensation. But a decommissioning order . . . does not condemn any land for public use. By virtue of decommissioning, FERC is simply ordering the licensee to stop producing hydropower with the existing dam.

Id. at 658–59 (footnotes omitted).

90. *S.D. Warren Co. v. Me. Envtl. Prot. Bd.*, 547 U.S. 370, 374 (2006).

91. *Colvin Cattle Co. v. United States*, 468 F.3d 803, 807–08 (Fed. Cir. 2006); *Sacramento Grazing Ass’n v. United States*, 96 Fed. Cl. 175, 189 (2010); *Walker v. United States*, 79 Fed. Cl. 685, 706 (2008); *Walker v. United States*, 162 P.3d 882, 888–92, 895 (N.M. 2007). In *Sacramento Grazing*, the U.S. Forest Service issued a series of grazing permits to the plaintiff that gradually limited the plaintiff’s livestock grazing activities in certain riparian enclosures and reduced the number of livestock that the plaintiff could graze on federal lands. 96 Fed. Cl. at 180, 183. The plaintiff brought a claim alleging that the government had taken his water and grazing rights without providing just compensation. *Id.* at 184. The U.S. Court of Federal Claims ultimately granted the Forest Service’s motion for summary judgment. *Id.* at 189. However, the “ability to transfer” logic does allow the award of compensation if the government blocks all access to the right. *Estate of Hage v. United States*, 82 Fed. Cl. 202, 210–12 (2008) (holding that the U.S. Forest Service “took” the plaintiff’s property within the meaning of the Fifth Amendment when it constructed fences around streams in which the plaintiff had a vested water right, and when it failed to remove brush and beaver dams in stream beds flowing to the plaintiff’s property, thereby preventing the plaintiff from irrigating his land). For an extensive discussion of these cases, see Robin Kundis Craig, *Defining Riparian Rights As “Property” Through Takings Litigation: Is There a Property Right to Environmental Quality?*, 42 ENVTL. L. 115 (2012).

92. *See, e.g., Chandler-Dunbar*, 229 U.S. at 74, 76 (holding that a hydropower owner acquires

D. Case Four: A Water-Right Holder Receives Less Water During a Climate-Change “Enhanced” Drought

A drought is the easiest case for the denial of compensation. The reduced availability of water during droughts is a risk that all right holders face. In prior-appropriation states, priority schedules determine, in theory, how available supplies will be distributed.⁹³ In riparian jurisdictions, again in theory, shortages are shared pro rata.⁹⁴ Federal and state project contractees are likely to suffer a percentage curtailment of their entitlements. Reclamation contracts explicitly provide for this contingency.⁹⁵

A drought is a drought. Any drought, including a climate-change-intensified one, is an Act of God. An Act of God has been defined as a casualty that is the result of “the direct, immediate, and exclusive operation of the forces of nature, uncontrolled or uninfluenced by the power of man and without human intervention.”⁹⁶ In this case, there is no taking of any water right or entitlement when a pre-existing reduction scheme is lawfully administered. Human-induced events are not, of course, Acts of God.⁹⁷ Courts have consistently held that if there is human intervention, the fact that a natural event occurred does not immunize the actor from liability.⁹⁸

“no such vested property right in the water power inherent in the falls and rapids of the river,” and that when the government revoked the owner’s hydropower license, the government had to compensate the owner for the value of condemned riparian lands but not for the losses associated with diminished water power production); *United States v. Grand River Dam Auth.*, 363 U.S. 229, 231–32 (1961) (holding that the United States is not liable for a taking when it denies an entrepreneur use of flowing water to produce power because, under the Commerce Clause, “the United States has a superior navigation easement which precludes private ownership of the water or its flow” (citing *Chandler–Dunbar*, 229 U.S. at 53, 69; *United States v. Twin City Power Co.*, 350 U.S. 222, 224–25 (1956))).

93. TARLOCK, *LAW OF WATER RIGHTS AND RESOURCES*, *supra* note 58, § 5.30.

94. *Id.* § 3.61.

95. *Id.* § 5.83.

96. *Butts v. City of South Fulton*, 565 S.W.2d 879, 882 (Tenn. Ct. App. 1978); *see also Beaton v. Conn. Light & Power Co.*, 3 A.2d 315, 318 (Conn. 1938).

97. For a critique of the conventional application of the “Act of God” defense, see Jill M. Farley, *Re-Examining Acts of God*, 27 PACE ENVTL. L. REV. 669, 683–90 (2010) (arguing that climate change requires that the human–nature dichotomy be replaced by a doctrine that recognizes the interaction between human and “natural” phenomena); *see also* Joel Eagle, *Divine Intervention: Re-examining the “Act of God” Defense in a Post-Katrina World*, 82 CHI.-KENT L. REV. 459, 460–62 (2007) (describing the oil and chemical spills that Hurricane Katrina caused in the Gulf Region and arguing that the potentially responsible parties (PRPs) should not be permitted to assert an Act of God defense under various federal environmental statutes—such as the Clean Water Act and the Oil Pollution Act—because while Hurricane Katrina was a monumental disaster, it was not the type of unforeseeable disaster against which Congress intended PRPs to be able to assert the “Act of God” defense).

98. *See, e.g., Broyles v. Standifer*, No. E2005-02791-COA-R3-CV, 2006 WL 3497918, at *5, *8–10 (Tenn. Ct. App. Dec. 4, 2006) (holding that the defendant created a nuisance when he erected an

*E. Case Five: The Diversion of Water from Entitlement Holders
to Mitigate Adverse Climate-Change Impacts*

This is the hardest takings case. The diversion of water from property and contract holders to other uses, such as fish conservation, to maintain aquatic ecosystem restoration flows, or to adapt to climate change is not an “Act of God.” It is a government act that will trigger takings challenges. Climate change is increasingly a factor in water-rights litigation,⁹⁹ but it has only been invoked in one published takings opinion.¹⁰⁰ Based on takings cases where water has been diverted from agriculture to fish protection, the positive prediction is that takings challenges have a high probability of success in the Federal Circuit, but less in the other circuits.¹⁰¹ For example, there is a great divergence between the Federal Circuit and the Ninth Circuit.¹⁰² On one level, the diversion of water to address climate change adds nothing to the existing law. If the government has unconstitutionally taken a property right, the need for the water is irrelevant. However, the flawed logic in the Federal Circuit’s cases is a useful template to offer an alternative, risk-assumption analysis of takings jurisprudence.¹⁰³

The first case to challenge a cut-back in deliveries was *O’Neill v. United States*.¹⁰⁴ Westlands Irrigation District, the last reclamation project

earthen dam that blocked natural drainage patterns, causing flood damage from heavy rains produced by Hurricane Ivan); *City of Portsmouth v. Culpepper*, 64 S.E.2d 799, 802 (Va. 1951) (holding the City liable for damages to the plaintiff’s crops when it permitted a partially built earthen dam to remain in a flood canal and collect debris, thereby obstructing the flow of water and ultimately causing a flood in the plaintiff’s fields during a night of heavy rainfall).

99. See, e.g., *In re Delta Smelt Consolidated Cases*, No. 1:09-CV-1053 OWW DLB, 2010 WL 2520946 (E.D. Cal. June 21, 2010); *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F. Supp. 2d 1195 (E.D. Cal. 2008); *Natural Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 322 (E.D. Cal. 2007).

100. See *supra* note 97 and accompanying text.

101. See *infra* notes 104–15 and accompanying text.

102. See, e.g., *Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276 (Fed. Cir. 2008); *O’Neill v. United States*, 50 F.3d 677 (9th Cir. 1995).

103. See generally John Echeverria, *Is Regulation of Water a Constitutional Taking?*, 11 VT. J. ENVTL. L. 579, 580–82 (2010) (arguing that the Supreme Court should repudiate *Casitas* and apply the *Nollan–Dolan* exactions test, that the plaintiffs’ claim in that case should be barred under the public trust doctrine, and that the California statutory requirement that dam operators provide water flows via fish ladders to protect fisheries represents a background principle); *In re Polar Bear Endangered Species Act Listing and § 4(d) Rule Litigation*, 794 F. Supp. 2d 65, 90 (D.D.C. 2011) (agreeing that climate change threatens polar bear survival, but finding the federal government’s conservation measures adequate even if climate change was neglected because agencies are entitled to deference when they are on the frontiers of science). This deference should apply equally to agency efforts to adapt to climate change.

104. *O’Neill*, 50 F.3d at 677. *San Luis Food Producers v. United States*, 772 F. Supp. 2d 1210, 1231 (E.D. Cal. 2011), relied in part on *O’Neill* to hold that the federal government was under no obligation to operate the San Luis Unit of the CVP at full capacity because the Bureau of Reclamation must also operate the project to benefit fish and wildlife.

built in California as part of the Central Valley Project (CVP), had a 1963 contract for CVP water that exempted the government from liability for the failure to deliver water “arising from a shortage on account of errors in operation, drought, or any other causes.”¹⁰⁵ In 1993, the Bureau of Reclamation announced that Westlands would get 50% of its contract allocation because water was needed to protect the listed Delta Smelt upstream.¹⁰⁶ No taking or breach of contract was found. The court rejected Westlands’ argument that the clause was limited to a drought because the “liability limitation is unambiguous and that an unavailability of water resulting from the mandates of valid legislation constitutes a shortage by reason of ‘any other causes.’”¹⁰⁷

Irrigators have fared much better in the Court of Federal Claims and the Federal Circuit. The leading case, *Tulare Lake Basin Water Storage District v. United States*, held that California’s reduction of State Water Project deliveries to comply with the Endangered Species Act was a physical rather than a regulatory taking because “the denial of a right to the use of water accomplishes a complete extinction of all value,” and “the government has essentially substituted itself as the beneficiary of the contract rights with regard to that water and totally displaced the contract holder.”¹⁰⁸ This substitution constituted a “complete occupation of

105. *O’Neill*, 50 F.3d at 682 n.2.

106. *Id.* at 681. The Bureau acted pursuant to the 1992 Central Valley Project Improvement Act, which dedicated 800,000 acres annually to help California restore the Bay Delta and to comply with the Endangered Species Act. *Id.*

107. *Id.* at 684.

108. *Tulare Lake Basin Water Storage Dist. v. United States*, 49 Fed. Cl. 313, 319 (2001); see also David B. Anderson, *Water Rights As Property in Tulare v. United States*, 38 MCGEORGE L. REV. 461, 507 (2007) (arguing that the *Tulare* court erred in finding a taking because California law does not recognize a right to put diverted stream water to a property owner’s beneficial use); Brittany K.T. Kaufman, *What Remains of the Endangered Species Act and Western Water After Tulare Lake Basin Water Storage District v. United States*, 74 U. COLO. L. REV. 837, 839 (2003) (arguing that the Court should have analyzed the claim as a regulatory rather than a physical taking). *Tulare’s* influence is visible in the 2001 litigation between the Klamath Project irrigators and the United States over the curtailment of water deliveries to comply with the Endangered Species Act. The Court of Federal Claims dismissed the suit because the irrigators had no cognizable property interests in the water, but the Federal Circuit asked the Oregon Supreme to answer the question “whether beneficial use alone is sufficient to acquire a beneficial or equitable property interest in a water right to which another person holds legal title.” *Klamath Irrigation Dist. v. United States*, 227 P.3d 1145, 1160 (Or. 2010) (en banc) (citing *Klamath Irrigation Dist. v. United States*, 532 F.3d 1376 (Fed. Cir. 2008)). The Oregon Supreme Court answered this question “no” because “[b]eneficial use is a necessary but not a sufficient condition to acquire a beneficial or equitable property interest in a water right.” *Id.* Thus, the United States is free to define the trust relationship between it and water-right holders *within the bounds of law and the Constitution*. The Federal Circuit then vacated the reversal and asked the Court of Federal Claims to determine whether compliance with the ESA made performance of the irrigation deliveries impossible. *Klamath Irrigation Dist. v. United States*, 635 F.3d 505, 522 (Fed. Cir. 2011).

property” that “completely eviscerate[d] the right itself,” analogous to the imposition of an easement over the plaintiff’s property.¹⁰⁹

Purported differences in language can also control compensation. *Stockton East Water District v. United States* rejected the federal government’s argument that Bureau of Reclamation contracts for water from the New Melonies Dam were subject to subsequent federal and state environmental protection mandates.¹¹⁰ As a result, the government had no duty to compensate for losses suffered by contractees who did not receive their contractual amounts when water was diverted to fish protection during a drought year.¹¹¹ The contracts allowed the federal government to withhold or reduce deliveries during droughts and “other causes which, in the opinion of the Contracting Officer . . . , are beyond the control of the United States.”¹¹² Judge Jay Plager reasoned that the provisions were simply *force majeure* and did not apply to the subsequently enacted Central Valley Project Improvement Act.¹¹³ *O’Neill v. United States*¹¹⁴ had excused the Bureau of Reclamation in similar circumstances, but the court found the language in the *O’Neill* contract, “drought, or any other causes,” to be much broader.¹¹⁵

The primary barrier to the incorporation of risk and moral-hazard considerations is the characterization of reduced water deliveries as physical takings. The physical takings analysis ignores two crucial relevant factors. First, a delivery reduction is not a wipeout; the question is what loss of value the district’s users actually suffered. Second, water users have some capacity to adapt to reductions because this is always a risk and alternative supplies or conservation options may be available.¹¹⁶ Thus, the risk assumed by the users is a relevant factor. Takings jurisprudence gives insufficient attention to the risks that water-right holders assume. Climate change increases the risk level, and this increased risk ultimately should define the compensation to which a water-right holder is entitled. The closest that the Supreme Court has come to this analysis is the investment-backed expectations test.¹¹⁷ The Court has expressly stated that an important

109. *Tulare*, 49 Fed. Cl. at 319 (comparing the government’s invasion in *United States v. Causby*, 328 U.S. 256 (1946), to water-use restrictions). *Tulare* was decided before *Tahoe-Sierra Preservation Council v. Tahoe Regional Planning Agency*, 535 U.S. 302 (2002).

110. *Stockton E. Water Dist. v. United States*, 583 F.3d 1344, 1369 (Fed. Cir. 2009).

111. *Id.*

112. *Id.* at 1360–61 (emphasis omitted).

113. *Id.* at 1361.

114. *O’Neill v. United States*, 50 F.3d 677, 677 (9th Cir. 1995).

115. *Id.* at 682 & n.2, 683–84.

116. *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 127 (1978) (citing *Pa. Coal Co. v. Mahon*, 260 U.S. 393, 414–15 (1922)).

117. *Id.* at 124.

element of fairness is whether the victim has legitimate investment-backed expectations that a compensable property will be recognized.¹¹⁸

The explicit incorporation of invested-backed expectations in 1978 indirectly introduced the idea of risk into takings law.¹¹⁹ The question then becomes: Can the state devalue property and avoid compensation because the property owner should have expected the regulation and not invested in the project or activity? The Court both limited and expanded the expectations analysis in *Palazzolo v. Rhode Island*.¹²⁰ The Court limited the principle by dismissing the argument that the purchaser of highly regulated property assumes the risk of development denial with the quip that “[t]he State may not put so potent a Hobbesian stick into the Lockean bundle.”¹²¹ Locke himself might be surprised that his labor theory now incorporates the Roman law right of *ius abutendi*, the right to destroy property.¹²² The Court may have expanded the principle in Justice O’Connor’s increasingly influential concurrence with this result. She argued that the amount of regulation was relevant to the determination of the property owner’s reasonable investment-backed expectations.¹²³

The power of the O’Connor analysis is illustrated by its application by the Federal Circuit in a variety of contexts to deny compensation. Two Surface Mining Control and Reclamation Act cases upheld the suspension and revocation of a mining permit¹²⁴ and the designation of land as

118. *Id.*; *Palazzolo v. Rhode Island*, 533 U.S. 606, 633 (2001) (O’Connor, J., concurring).

119. *Penn Central*, 438 U.S. at 124. The Supreme Court identified “[t]he economic impact of the regulation on the claimant and, particularly, the extent to which the regulation has interfered with distinct investment-backed expectations” as the major relevant factors in deciding whether compensation is due. *Id.*

120. *Palazzolo*, 533 U.S. at 606.

121. *Id.* at 627. In her concurrence, Justice O’Connor argued that the property owner’s knowledge of the extent of regulation was an element to be considered in determining the compensation, if any, to which he was entitled under the interference with investment-backed-expectations standard. *Id.* at 633. On remand, the Rhode Island trial court found that the proposed fill would be a public nuisance:

Plaintiff’s proposed residential development of the site would constitute a public nuisance under Rhode Island law. Plaintiff’s proposed use of the property was, accordingly, not a part of the “bundle of rights” acquired when he, and before him, SGI, obtained title to the subject parcel. Thus, the regulations complained of have not resulted in a taking under the Fifth Amendment.

Palazzolo v. State, No. WM 88-0297, 2005 WL 1645974, at *14 (R.I. Super. Ct. July 5, 2005) (citing *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1027 (1992)); see also J.B. Ruhl, *Making Nuisance Law Ecological*, 58 CASE W. L. REV. 753, 776 (2008) (noting that ecosystem-service nuisances seem ready-made for public nuisance liability).

122. See generally Lior Jacob Strahilevitz, *The Right to Destroy*, 114 YALE L.J. 781 (2005).

123. *Palazzolo*, 533 U.S. at 635 (O’Connor, J., concurring).

124. *Rith Energy, Inc. v. United States*, 270 F.3d 1347 (Fed. Cir. 2001). There, the Federal Circuit cited to Justice O’Connor’s statement that “the regulatory regime in place at the time the claimant acquires the property at issue helps to shape the reasonableness of those expectations.” *Id.* at 1350 (quoting *Palazzolo*, 533 U.S. at 633 (O’Connor, J., concurring)). The Federal Circuit went on to hold that the government’s revocation of the plaintiff’s mining permit under the Surface Mining Control

unsuitable for coal mining.¹²⁵ In another case, the federal government was allowed to designate tidal lands around the Palmyra Atoll as a National Wildlife Refuge closed to fishing.¹²⁶ Plaintiff claimed a prior contractual right to fish, but the court held that:

[T]he Interior Department's regulation does not prohibit commercial fishing operations on Palmyra—it merely prohibits commercial fishing activity in the surrounding waters. The fact that the government's regulation of activities in the waters surrounding Palmyra may have adversely affected the value of their contract rights to engage in activities on shore is not sufficient to constitute a compensable taking.¹²⁷

The court characterized the regulation as another matter altogether from the government regulating activities on its own property, or property over which it has full control, even if that regulatory action disappoints the expectations of nearby property owners.¹²⁸ *CRV Enterprises Inc. v. United States* found no physical invasion when the U.S. EPA erected a log boom across a slough as part of a Superfund cleanup¹²⁹:

Here, all of the water remains in the Slough, and plaintiffs are still able to use it, even if not for the particular use of navigation that they desired. Plaintiff's preferred use of its property, as a launch for navigation into the Slough, has not even been completely taken away. . . . [A]bout forty percent of its shoreline still touches the navigable portion of the Slough and provides access to the larger waterways beyond.¹³⁰

and Reclamation Act did not constitute a categorical taking because the plaintiff was “engaged in a highly regulated industry.” *Id.* at 1351. In such an industry, the plaintiff should have expected that its ability to mine coal might be constrained because “[t]he likelihood of regulatory restraint is especially high with regard to possible adverse environmental effects, such as potentially harmful runoff from the mining operations, which have long been regarded as proper subjects for the exercise of the state’s police power.” *Id.*

125. *Appolo Fuels, Inc. v. United States*, 381 F.3d 1338, 1352 (Fed. Cir. 2004).

126. *Palmyra Pac. Seafoods, Inc. v. United States*, 561 F.3d 1361, 1364 (Fed. Cir. 2009), *cert. denied*, 130 S. Ct. 2402 (2010).

127. *Id.* at 1366 (footnote omitted).

128. *Id.* at 1370.

129. *CRV Enters. Inc. v. United States*, 626 F.3d 1241, 1244 (Fed. Cir. 2010).

130. *Id.* at 1247.

F. Case Six: The State Requires a Climate-Change Adaptation Strategy

If the ability to make more accurate climate-change impact predictions improves, water users may be asked to take steps to adapt to the projected impacts. The basic purpose will be to share shrinking supplies to the maximum extent possible with minimal disruption of existing entitlements. The closest case to raise this issue is *Casitas Municipal Water District v. United States*.¹³¹ In *Casitas*, the District claimed a water right to apply 28,000 acre-feet per year to beneficial use.¹³² To comply with a National Marine Fisheries Service biological opinion (BiOp), the water district was required to construct a fish ladder at the intersection of a dam and canal and to divert between 1,349 and 3,200 acre-feet per year to supply the ladder.¹³³ Reversing a Court of Federal Claims decision denying compensation, the Federal Circuit Court of Appeals applied the two Supreme Court decisions holding that the filling of Friant Dam, part of the Central Valley Project, permanently appropriated downstream riparian rights.¹³⁴ The Federal Circuit also rejected the government's argument that there is a difference between a restriction and a direct appropriation of property.¹³⁵

Between *Tulare* and *Casitas*, the Court decided *Tahoe-Sierra Preservation Council v. Tahoe Regional Planning Agency*, which upheld a thirty-two month moratorium on land development while the bi-state agency developed a plan to control runoff into blue Lake Tahoe.¹³⁶

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

132. *Id.* at 1286.

133. *Id.* at 1282 n.4.

134. *Id.* at 1289–92. In *United States v. Gerlach Live Stock Co.*, 339 U.S. 725 (1950), the Court held that Congress authorized the CVP as a reclamation rather than a navigation project, *id.* at 731–38, and thus had to compensate for any state water rights permanently destroyed by the dam, *id.* at 752–54. The rights claimed were seasonable flood waters. *Id.* at 730. Justice Douglas concurred on the grounds that the government had a statutory rather than a constitutional obligation to compensate the property owners because there are no private property rights in navigable waters. *Id.* at 756–61 (Douglas, J., concurring). In *Dugan v. Rank*, 372 U.S. 609, 625 (1962), the Court analogized the construction of a dam as a partial taking of a servitude. *See, e.g., United States v. Causby*, 328 U.S. 256, 267 (1946) (agreeing with the Court of Federal Claims ruling below that, when the government conducted low-altitude flights over the plaintiff's property for four years, it had imposed a servitude on the plaintiff). However, the Court limited the riparians to the difference between the value of their property before and after the operation of the dam. *Dugan*, 372 U.S. at 624–25.

135. *Casitas*, 543 F.3d at 1290, 1292. It also rejected two “Hail Mary” government arguments: (1) that the Endangered Species Act did not divert water to a third party and (2) the Friant Dam cases involved the “undisputed exercise of the United States’ eminent domain powers.” *Id.* at 1293.

136. *Tahoe-Sierra Pres. Council v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 340–42 (2002).

However, the *Casitas* court held that *Tahoe-Sierra* applied only to regulatory takings, not physical takings claims.¹³⁷

The analogy is flawed. The Court's formalist physical invasion doctrine has been applied to the de facto or de jure imposition of a common-law servitude that interferes with the right to exclude. The curtailment of a reasonable delivery obligation does not disturb the underlying property or contract right, and thus the proper analysis is the Court's temporary takings doctrine. The better constitutional standard in this case would be the Supreme Court nexus test for exactions.¹³⁸ Exactions are usually imposed to offset the external costs of a specific proposed development, but the analysis can also apply to the duty to offset the costs of changed conditions. Climate change can, of course, also serve as a justification for finding a taking. The District invoked projected decreases in supply from climate change as a reason that the loss of water is a taking.¹³⁹

On remand, the Court of Federal Claims conducted a damages trial, found that no damages had occurred, and thus did not reach the District's climate-change argument.¹⁴⁰ The District argued that the BiOp caused a permanent loss of 1,915 acre-feet measured by the annual reduction of the project's safe yield.¹⁴¹ This damages measure was rejected because the measure of any water right is beneficial use.¹⁴² Applying this standard, the court essentially agreed that storage allowed the District to meet its delivery obligations and comply with the bypass requirements of the BiOp.¹⁴³ Thus, the takings claim was not ripe because the District had not suffered "an actual reduction in beneficial use."¹⁴⁴ The court's reaffirmation that a water right is limited to water actually applied to beneficial use is an important step in the incorporation of risk and moral hazard into takings law. In explaining why there had not been an interference with beneficial use, the

137. *Casitas*, 543 F.3d at 1297–98. Judge Mayer dissented because the District possessed only a usufructuary rather than an ownership right to the water and only imposed regulatory operating criteria on the District. *Id.* at 1297.

138. *Dolan v. City of Tigard*, 512 U.S. 374, 411–12 (1994) (Souter, J., dissenting); *Nollan v. Cal. Coastal Comm'n*, 483 U.S. 825, 836–37 (1987).

139. Plaintiff's Post-Trial Factual Findings and Conclusions of Law at 8–9, *Stockton E. Water Dist. v. United States*, 583 F.3d 1344 (Fed. Cir. 2009) (No. 1:05-CV-00168), ECF No. 213 (citing Expert Report of Edward Aguado at 12, *Stockton E. Water Dist. v. United States*, 583 F.3d 1344 (Fed. Cir. 2009) (No. 1:05-CV-00168), ECF No. 143 (asserting that the District has no surplus water and climate change will aggravate its thin margin of safety)).

140. *Casitas Mun. Water Dist. v. United States*, 102 Fed. Cl. 443, 472 (2011).

141. *Id.* at 465.

142. *Id.* at 470.

143. *Id.* at 446.

144. *Id.* at 474.

court observed that the District continued to add customers, “has not changed how it allocates water to its customers, has not purchased alternative water supplies, has not instituted any mandatory water conservation measures or changed its drought contingency measures, and has not increased the price of the water due to the biological opinion.”¹⁴⁵

Some might be upset with the court’s rejection of the public trust as a complete defense to a taking.¹⁴⁶ However, the Court squarely suggested that the beneficial-use doctrine might require a water-right holder to take affirmative steps to avoid a loss caused by the need to adapt to changed conditions.¹⁴⁷ The facts of *Casitas* do not present a classic moral-hazard problem. There was a forty-year lag between the time that the District signed a contract with the Bureau of Reclamation to obtain water from the Ventura River Project and the time that it was asked to construct a fish ladder to protect listed endangered species.¹⁴⁸ However, as we learn more about climate change, the ideas of risk and moral hazard will begin to merge as the opinion on remand illustrates.

Moral hazard is a concept first developed by the insurance industry to avoid excessive liability in situations where the insured has the capacity to take preventative action but has little or no incentive to do so.¹⁴⁹ For example, a home owner who obtains fire insurance has some incentive to engage in behavior that may increase the risk of a fire, and fewer incentives to refrain from activities that might cause a fire or to take preventative measures. To minimize the risks of this moral hazard, insurance companies have taken steps, such as deductibles, to incentivize property owners to be more careful.¹⁵⁰ Today, moral hazard applies to any risky behavior that could be avoided but is not because of the expectation that such behavior will not be penalized.¹⁵¹ In fact, the behavior is often encouraged by laws that immunize the actor from the full or partial responsibility for avoiding

145. *Id.* at 470.

146. The Court agreed that the public trust is a self-executing principle and that the trust applies to fish but rejected the government’s argument that the trust strips Fifth Amendment protection from water rights and that any harm to fish violates the public trust. *Id.* at 458–59. Instead, it set an impossible standard to prove a trust violation: “Defendant must . . . show that the balance between *Casitas*’s various uses and the uses identified in the biological opinion weighs in favor of the fish.” *Id.* at 461.

147. *Id.* at 470–74.

148. *Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276, 1283 (Fed. Cir. 2008).

149. RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 136 (8th ed. 2011); Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509, 537–38 (1986).

150. Kaplow, *supra* note 149, at 538.

151. *Id.* at 537. Professor Holly D. Doremus has identified four of the relevant factors that may play into the law of regulatory takings as it adapts to climate change. They include (1) the justification for the change, (2) the foreseeability and ability of property owners to adapt to change, (3) the abruptness of the change, and (4) the general nature of the new regulation. Holly D. Doremus, *Takings and Transitions*, 19 J. LAND USE & ENVTL. L. 1, 31 (2003).

the costs and which shift the costs to the public fisc.¹⁵² Thus, a moral hazard can be defined as socially undesirable or inefficient behavior that is encouraged either by the expectation that it will not be punished, or more perverse yet, that it will be rewarded.¹⁵³

The water-right holder engaged in moral-hazard behavior by failing to take action that would have avoided the loss. There is no explicit precedential basis for the incorporation of moral hazard into the Court's takings jurisprudence. But, Justice O'Connor's treatment in *Palazzolo v. Rhode Island* of the risk factor inherent in *Penn Central*'s investment-backed expectations standard provides the germ of a precedent.¹⁵⁴ Risk has at least two dimensions. Land owners who gamble on a regulatory approval knowing the odds are not necessarily treated unfairly when they are denied the opportunity to undertake an activity with significant external costs.¹⁵⁵ There can also be a mitigation element to Justice O'Connor's treatment of risk and investment-backed expectations. Water use is an ongoing activity in contrast to one-time activities such as a wetland fill. Risks are never constant. Thus, water users have always tried to anticipate possible risks to take precautionary steps to avoid them. As the remand opinion in *Casitas* instructs, climate change simply adds to existing risks, so it is unsurprising when users are denied full compensation for risks that could have been partially avoided. In some cases, it should be unreasonable for those who use water in ways that may adversely impact other uses to expect that they should be compensated for mandatory adaptation measures.

CONCLUSION: CONSTITUTION AND MORAL HAZARD

The need to incorporate climate change into the Supreme Court's takings jurisprudence illustrates how the Court has lost touch with the core norm of fairness. Fairness has two dimensions: discrimination and surprise. Discrimination occurs when a single property owner or a small group of problems is singled out to bear a disproportionate burden.¹⁵⁶ The easiest takings cases are usually equal-protection cases where the regulation comes too late to be effective. For all its questionable analysis, the Supreme

152. POSNER, *supra* note 149, at 136–37.

153. See Peter Byrne, *Property and the Environment: Thoughts on an Evolving Relationship*, 28 HARV. J. L. & POL'Y 679, 687 (2003).

154. *Palazzolo v. Rhode Island*, 533 U.S. 606, 635 (2001) (O'Connor, J., concurring); see *supra* notes 120–23.

155. Cf. *E. Enters. v. Apfel*, 524 U.S. 498, 522–37 (1998) (plurality opinion) (retroactive coal-miner health care liability inferred with investment-backed expectations of a company that went out of business in 1965).

156. *Armstrong v. United States*, 364 U.S. 40, 49 (1960).

Court's much parsed *Lucas* opinion is a simple equal-protection case. The state applied a set-back to a barrier island after development on all but plaintiff's lots had occurred.¹⁵⁷ U.S. takings jurisprudence is a classic study in the failure to incorporate moral hazard into the law. The incentives for property owners to assume risks starts with the Fifth Amendment to the Federal Constitution and continues through the well-justified expectation that the federal government will compensate a wide range of natural disasters. For example, the construction of flood-control projects and a federal flood-insurance program encourages over-building in high risk areas.¹⁵⁸ The problem is not with the basic idea of helping victims of natural disasters, but with our inability to distinguish between deserving victims and subsidized risk-takers. The surprise component of fairness is designed to compensate victims of regulation who have suffered substantial and *unanticipated* losses in the value of their property, which are disproportionate in comparison to those suffered by similarly situated right holders. These candidates for compensation are, on the whole, individual property owners who have been required to confer public benefits, or who are denied equal protection of the law by regulation that comes too late to address the problem that triggered the need for regulation.¹⁵⁹ Within this framework, there is room for the principle that climate change increases the risk level faced by water-right holders and provides a basis to curb moral-hazard behavior. This increased risk and the deterrence of moral hazard behavior should define the compensation to which a water-right holder is entitled. The Court has laid the foundation by making the victim's legitimate investment-backed expectations a major factor in determining whether a compensable property will be recognized as an important element of fairness.

157. *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1008 (1992).

158. Valdis Wish, *Can Insurers Cope with Climate Change?*, ALLIANZ (Oct. 16, 2009), http://knowledge.allianz.com/climate/mitigation_adaptation/?98/wwf-insurance.

159. See Joseph L. Sax, *Land Use Regulation: Time to Think About Fairness*, 50 NAT. RES. J. 455, 458–60 (2010).