

ADAPTING WATER LAW TO PUBLIC NECESSITY: REFRAMING CLIMATE CHANGE ADAPTATION AS EMERGENCY RESPONSE AND PREPAREDNESS

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“Sudden and disruptive changes are always painful, and every effort needs to be made to ensure that transition periods proceed as smoothly as possible The new era is one of reallocation. . . . No private property claims are going to halt this transformation Those who adapt well will survive.”¹

“We should be thinking less about rights altogether, and more about ways to get things done”²

“The needs of the many outweigh the needs of the few, or the one.”³

Abstract

As a result of both climate change and non-climate-change forces, fresh water supplies in many parts of the United States are approaching a state of crisis. This article suggests that both the law and public policy should embrace that reality.

Specifically, this article argues that viewing climate change impacts on water supply as an ongoing emergency could provide a more productive

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1. Joseph L. Sax, *The Limits of Private Rights in Public Waters*, 19 ENVTL. L. 473, 482–83 (1989). While Sax was discussing emerging concerns in water law regarding ecological protection, his views on the necessarily adaptable and public nature of water law are equally apt in the climate change context.

2. Carol M. Rose, *Property as the Keystone Right?*, 71 NOTRE DAME L. REV. 329, 351 (1996).

3. STAR TREK: THE WRATH OF KHAN (Paramount Pictures 1982) (quoting Mr. Spock and Captain Kirk).

framework for initiating and implementing adaptation strategies. Classifying climate change's impacts on water supply as a real crisis allows adaptation planning to become a form of emergency preparedness—concrete measures designed to deal with existing problems—underscoring the fact that the impacts are only likely to become worse in many parts of the country. Moreover, reframing climate change adaptation in the water context as emergency preparedness could productively shift the focus of adaptation strategies to the survival of communities as functional communities—that is, as something more than the mere physical survival of individual humans. Such reframing would also allow recognition that communities are coupled socio-ecological systems, dependent on the surrounding natural resources—like water—and the ecosystem services that they provide.

Reframing climate change impacts on water as an emergency, moreover, could provide needed flexibility both legally and politically. Legally, emergencies allow for the operation of the doctrine of public necessity, a common-law doctrine that may prove very useful in reallocating water rights, especially in times of significant drought. This article argues that public necessity invokes a broader public policy regarding the relationship of individual rights and community well-being that should produce a politically powerful synergy in the context of adapting water law to climate change, given that water is already considered a semi-public natural resource.

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INTRODUCTION

As a result of both climate change and non-climate-change forces, fresh water supplies in many parts of the United States are approaching a state of emergency. This article posits that the law should embrace that reality as an aid to climate change adaptation efforts.

As early as July 2003, the U.S. Government Accountability Office's (GAO's) survey of the states revealed that "[e]ven under normal water conditions, water managers in 36 states anticipate water shortages in localities, regions, or statewide within the next 10 years. Under drought conditions, 46 managers expect shortages in the next 10 years. Such shortages may be accompanied by severe economic, environmental, and social impacts."⁴ Notably, drought-plagued California and New Mexico did not respond to the survey,⁵ suggesting that the totals should actually be thirty-eight and forty-eight states, respectively: California is already facing water shortages⁶ and New Mexico is vulnerable to water stress.⁷

The end of the GAO's ten-year predictive window—2012—is quickly approaching, and drought conditions have persisted in many regions of the country.⁸ Thus, even without the complication of climate change, the United States is facing an impending water supply crisis.

However, as the GAO also recognized, climate change⁹ adds another level of urgency to the national water supply problem.¹⁰ Climate change

4. U.S. GEN. ACCOUNTABILITY OFFICE, GAO-03-514, FRESHWATER SUPPLY: STATES' VIEWS OF HOW FEDERAL AGENCIES COULD HELP THEM MEET THE CHALLENGES OF EXPECTED SHORTAGES 5 (2003), available at <http://www.gao.gov/new.items/d03514.pdf#70> [hereinafter 2003 GAO STATE WATER SURVEY REPORT].

5. *Id.* at 3.

6. Cal. Drought Preparedness, Water Shortages, <http://www.cadroughtprep.net/watshort.htm> (last visited Feb. 22, 2010).

7. Scott Streater, *Climate Change, Water Shortages Conspire to Create 21st Century Dust Bowl*, THE NEW YORK TIMES GREENWIRE, May 14, 2009, <http://www.nytimes.com/gwire/2009/05/14/14greenwire-climate-change-water-shortages-conspire-to-cre-12208.html>.

8. See U.S. Drought Monitor, National Drought Summary—January 26, 2010, <http://drought.unl.edu/DM/MONITOR.html> (showing much of the West, part of the Great Lakes region, and part of Florida in drought in December 2009).

9. "'Climate change' is the shift in the average weather, or weather trends that are experienced over decades or longer. Climate change is not demonstrated by a single event, but by a series of events,

resulting from the accumulation of greenhouse gases in the atmosphere is already affecting water resources in the United States and is likely to continue to do so for several decades, perhaps centuries.¹¹ These impacts threaten not only the availability of water to satisfy human needs for drinking water, agricultural irrigation, and industrial uses, but also the integrity of aquatic ecosystems and the ecosystem services that they supply to humans living in coupled socio-ecological systems.¹²

In general, climate change inspires observers and scholars to reframe our standard conceptions of “environmental problems.”¹³ In the climate change mitigation¹⁴ context, for example, several commentators have questioned the wisdom of viewing climate change as a standard “pollution” problem, despite the fact that identifiable emissions of greenhouse gases cause climate change. Most dramatically, in 2007 Ted Nordhaus and Michael Shellenberger argued that “the quantitative accumulation of carbon dioxide in the atmosphere has created something qualitatively different from pollution: changing temperatures worldwide and melting ice caps, which may lead to a collapse of the North Atlantic Gulf Stream, water shortages, new disease epidemics, and resource wars.”¹⁵ In their assessment:

To describe these challenges as problems of pollution is to stretch the meaning of the word beyond recognition. Global warming is as different from smog in Los Angeles as nuclear war is from gang violence. The ecological crises we face are more global, complex, and tied to the basic

like floods or warm years that change the average precipitation or temperature over time.” NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES, CONFRONTING CLIMATE CHANGE: AN EARLY ANALYSIS OF WATER AND WASTEWATER ADAPTATION COSTS 1-1 (2009), available at <http://www.amwa.net/galleries/climate-change/ConfrontingClimateChangeOct09.pdf> [hereinafter 2009 NACWA WATER ADAPTATION COST ANALYSIS].

10. 2003 GAO STATE WATER SURVEY REPORT, *supra* note 4, at 62–63.

11. U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES 41 (2009), available at <http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf> [hereinafter 2009 U.S. CLIMATE CHANGE IMPACTS REPORT].

12. Robin Kundis Craig, “Stationarity Is Dead”—*Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34:1 HARV. ENVTL. L. REV. 9, 10–14 (Mar. 2010).

13. Of course, as J.B. Ruhl and Jim Salzman have recently pointed out, environmental problems themselves come in a variety of “flavors” and exhibit very different kinds and levels of complexity. See generally J.B. Ruhl & James Salzman, *Massive Problems in the Administrative State: Strategies for Whittling Away*, 98 CAL. L. REV. (forthcoming 2010) (manuscript at 42–43, on file with VJEL and the author), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1280896 (discussing the complexity of environmental issues).

14. Craig, *supra* note 12, at 18 n.49.

15. TED NORDHAUS & MICHAEL SHELLENBERGER, BREAKTHROUGH: FROM THE DEATH OF ENVIRONMENTALISM TO THE POLITICS OF POSSIBILITY 7 (2007) (emphasis omitted).

functioning of the economy than were the problems environmentalism was created to address forty years ago. Global warming threatens human civilization so fundamentally that it cannot be understood as a straightforward pollution problem, but instead as an existential one. Its impacts will be so enormous that it is better understood as a problem of evolution, not pollution.¹⁶

Notably, in the same year that Nordhaus and Shellenberger made these arguments, the U.S. Supreme Court decided *Massachusetts v. EPA*,¹⁷ which centered on the status of carbon dioxide and other greenhouse gases as “pollutants” under the federal Clean Air Act.¹⁸ The Environmental Protection Agency’s (EPA) refusal to regulate emissions of these gases and the resulting five-four split among the Justices gave powerful evidence of climate change’s contested status as a “pollution problem.”¹⁹

More recently, both Lisa Heinzerling²⁰ and John Nagle have discussed the phenomenon of “climate exceptionalism”—in Nagle’s terms, “the belief that the problem presented by climate change is different from the air pollution problems that we have addressed in the past.”²¹ While acknowledging that the traditional “pollution paradigm fits uneasily for a substance like CO₂,”²² Nagle argues instead that we should use a broader cultural construction of “pollution” when discussing climate change—one that includes conceptions of desecration and moral pollution.²³ This broader understanding of pollution, he argues, better promotes a pluralistic

16. *Id.* at 8 (emphasis omitted); see JAMES GUSTAVE SPETH, *THE BRIDGE AT THE EDGE OF THE WORLD: CAPITALISM, THE ENVIRONMENT, AND CROSSING FROM CRISIS TO SUSTAINABILITY* 9 (2008) (“Today’s mainstream environmentalism—aptly characterized as incremental and pragmatic ‘problem solving’—has proven insufficient to deal with current challenges and is not up to coping with the larger challenges ahead.”).

17. *Massachusetts v. EPA*, 549 U.S. 497 (2007).

18. See, e.g., *id.* at 558–59 (Scalia, J., dissenting) (arguing that greenhouse gases do *not* fit within the Act’s definition of “pollutant”).

19. For example, Chief Justice Roberts, writing in dissent, emphasized that “[g]lobal warming is a phenomenon ‘harmful to humanity at large[,] . . . and the redress petitioners seek is focused no more on them than on the public generally—it is literally to change the atmosphere around the world.’” *Id.* at 541 (Roberts, C.J., dissenting) (citation omitted). More directly on point, Justice Scalia (also writing in dissent) argued that climate change did not constitute “air pollution” for purposes of the Clean Air Act. *Id.* at 558–59 (Scalia, J., dissenting).

20. Lisa Heinzerling, *The Role of Science in Massachusetts v. EPA*, 58 EMORY L.J. 411, 416 (2008).

21. John Copeland Nagle, *Climate Exceptionalism*, 40 ENVTL. L. REV. (forthcoming Spring 2010) (manuscript at 1, on file with VJEL and the author), available at <http://ssrn.com/abstract=1459147>.

22. *Id.* at 2.

23. *Id.* at 3–4.

response to climate change, avoiding the either/or constrictions that the narrow environmental conception of “pollution” imposes on society’s responses to this phenomenon.²⁴ As Nagle points out, “[t]he traditional understanding of environmental pollution is doing much of the work to champion the regulation of CO₂ emissions instead of promoting adaptation to the effects of a changing climate. If the climate was changing naturally, then we would have to try to adapt to it.”²⁵ In contrast, “[a] broader understanding of pollution offers a justification for adaptation.”²⁶

This article takes the next step, arguing that we also should reframe (at least in specific contexts like water supply) how we categorize—legally, politically, and philosophically—climate change adaptation itself. In the United States in particular, climate change adaptation has generally been portrayed as a deliberative and generally unhurried process, framed as a choice whether to sacrifice current economic productivity in order to reduce the risk of uncertain future harm.²⁷ I agree with Richard Revesz and Michael Livermore that cost-benefit analyses, properly structured, can be invaluable tools in environmental policymaking.²⁸ Nevertheless, cost-benefit analyses of climate change adaptation are necessarily constrained by the lack of scientific certainty regarding the likely magnitude of average global temperature increases, the timing of those increases, and the severity, location, and timing of socio-ecological impacts.²⁹ As a result, these analyses are riddled with questionable assumptions about how bad climate

24. *Id.* at 4, 32.

25. *Id.* at 32.

26. *Id.*

27. As Robert Mendelsohn recently summarized:

Economists usually present a rather gloomy view of climate change. They argue that efficient policies should only slow climate change this century, not stop it. Aggressive near-term policies lead to abatement costs that outweigh the avoided future climate damages. Strict abatement policies should be delayed into the future as damages increase. Only modest control programs are warranted in the near term.

Robert O. Mendelsohn, *A Critique of the Stern Report*, 29 REG. 42, 42 (2006).

28. RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH 18 (2008). “Cost-benefit analysis . . . can be an enormously powerful tool for proregulatory groups. It can show that the interests they represent—the environment, consumers, or workers—are not opposed to the economy. Instead, regulation is necessary to preserve economic value and maximize wealth because protecting the environment and protecting health and safety are an essential part of a well-functioning economy.” *Id.*

29. See, e.g., Kelly C. de Bruin & Rob B. Dellink, *How Harmful Are Adaptation Restrictions 2* (Fondazione Eni Enrico Mattei, Working Paper No. 58, 2009) (challenging the assumption of most such studies that adaptation will be done in an optimal manner and emphasizing that “[t]here remains a large amount of uncertainty regarding climate change damages and how much of these are avoided through adaptation”).

change will be and how fast it will occur, and most such analyses do not even consider the truly “worst case” scenarios.³⁰

The “GIGO” principle³¹ thus cautions skepticism in relying on these analyses while formulating adaptation policy. But if portraying climate change adaptation as a conscious choice between well-understood benefits and risks unhelpfully misframes the problem and obscures the many complexities and uncertainties involved, how *should* we be looking at climate change impacts when we formulate adaptation policy?

Well, how about as an on-going and growing emergency?

Cost-benefit analyses and most discussions of climate change adaptation assume that humans and at least a minimally functional biosphere will survive climate change.³² Such assumptions reveal that, despite visions such as Nordhaus’s and Shellenberger’s, Americans are not yet thinking of climate change as a potential disaster.

But what if we did? If climate change itself constitutes an emergency, then adaptation can be helpfully reframed as emergency preparedness and response.³³ As in other emergency management contexts, the value of anticipating the crises that climate change impacts will create is in avoiding death, destruction, and a paralyzing sense of hopelessness—i.e., to prevent a bad situation from escalating into a full-blown disaster. Emergency preparedness exists to minimize damage and loss of life when emergencies, whether natural or human-caused, actually occur. Emergency response mechanisms, at least when they function correctly,³⁴ similarly minimize loss

30. See, e.g., Robert S. Pindyck, *Uncertain Outcomes and Climate Change Policy* 1 (MIT Sloan Research Paper No. 4742-09, 2009) (“Economic analyses of climate change policies often focus on a set of ‘likely’ scenarios—those within a roughly 66 to 90 percent confidence interval—for emissions, increases in temperature, economic impacts, and abatement costs.”), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1448683; see *id.* at 3 (concluding that “because of its focus on the middle of the distribution of outcomes, traditional cost-benefit analysis may be misleading”); Mendelsohn, *supra* note 27, at 42–46 (detailing the numerous economic assumptions made in the Stern Report and making a number of its own in the process).

31. WiseGEEK, What Is Garbage In Garbage Out?, <http://www.wisegeek.com/what-is-garbage-in-garbage-out.htm> (last visited Feb. 23, 2010); Webopedia, Garbage In, Garbage Out, http://www.webopedia.com/TERM/g/garbage_in_garbage_out.html (last visited Feb. 23, 2010).

32. E.g., J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. (forthcoming 2010) (manuscript at 11, on file with VJEL and the author), available at <http://ssrn.com/abstract=1517374> (consciously assuming for purposes of discussion that “at some point, probably many decades into the future, the mitigation measures will gain traction on greenhouse gas emissions and will arrest further climate change to lead us into a new stabilized climate regime”).

33. J.B. Ruhl has predicted that catastrophe and crisis avoidance and mitigation will become an overarching policy priority in climate adaptation policy. *Id.* at 40–43. I suggest a slightly different perspective—that there is value, legally and politically, in viewing the whole business of climate change adaptation (at least in certain sectors, such as water supply) as emergency preparedness.

34. The responses to Hurricane Katrina remain a national black eye in this regard.

of life and property destruction and, in truly extreme emergencies, prevent the loss of communities and civilizations.³⁵ Most importantly, framing a phenomenon as an emergency prioritizes the survival of the community, focusing attention and resources on ensuring its survival in ways that can be difficult during “business as usual.”

The law, too, recognizes the concept of emergency. As in the socio-political sphere, framing an event as a legal emergency often serves to shift the balance among competing goals and priorities in order to focus attention on community survival, even at the expense of individual property or civil rights. For example, the U.S. Constitution itself allows Congress to suspend the writ of habeas corpus “when in cases of rebellion or invasion the public safety may require it.”³⁶ Quarantine of individuals against their will remains a viable public health measure in the face of epidemic or pandemic communicable diseases,³⁷ despite the admitted abuses of quarantine measures in the past.³⁸ Most relevantly for this article, the doctrine of public necessity remains a viable defense to property destruction or limitations imposed on property rights.³⁹

This article argues that reframing climate change impacts as a long-term emergency better allows for the survival of communities *as* communities—that is, as something more than the mere physical survival of individual humans. Specifically, reframing climate change adaptation as long-term emergency preparedness can allow recognition that communities are always coupled socio-ecological systems, dependent on the surrounding natural resources—such as water—and the ecosystem services that they provide. As a result, community survival requires attention to more than just basic individual human needs. Focusing on the already semi-public natural resource of water, this article further argues that the doctrine of public necessity should play a significant role in reshaping water law in order to allow for effective climate change adaptation with respect to allocation of water resources.

35. Notably, in the December 2009 Copenhagen negotiations on climate change, nations whose very existence is at stake made some of the most stringent arguments for action. *See* AFP, *You Caused It, You Fix It: Tuvalu Takes Off the Gloves*, THE SYDNEY MORNING HERALD, Dec. 10, 2009, <http://www.smh.com.au/environment/climate-change-you-caused-it-you-fix-it-tuvalu-takes-off-the-gloves-20091210-kksq.html> (noting that “[t]he 42-member Alliance of Small Island States (AOSIS), including Tuvalu, and the bloc of mainly African Least Developed Countries, have rejected the widely held goal of keeping global temperatures from rising more than 2 degrees Celsius as inadequate” to protect them from sea-level rise and “crippling drought”).

36. U.S. CONST. art. I, § 9, cl. 2.

37. *See* LAWRENCE O. GOSTIN, PUBLIC HEALTH LAW: POWER, DUTY, RESTRAINT 205–24 (2000) (providing a history of quarantine law).

38. *Id.* at 207–08.

39. RESTATEMENT (SECOND) OF TORTS § 196 (1995); *see infra* discussion Part III.A.

Invoking public necessity requires that we be able to view climate change, or at least its impacts on water, as a form of emergency. Part I discusses in more detail the water supply shortages that the United States is already facing and the potential for climate change impacts to exacerbate those problems. Moreover, the public necessity doctrine is most frequently a defense to the destruction of or imposition upon property rights. Thus, Part II discusses the status of water and water rights as property. Finally, Part III discusses the potential role of the concept of public necessity in the law and policy of climate change adaptation. The legal doctrine of public necessity strengthens governments' normal police powers, allowing them to take extraordinary measures to protect human life and the community in times of emergency. More broadly, however, the policies behind public necessity recognize that in times of emergency, community survival trumps the technicalities of individual rights, especially private property rights. Such community-focused authority to protect and manage water resources may become one important tool in climate change adaptation law, aided by the fact that water possesses the adaptation advantage of already being considered a semi-public resource.

I. WATER SUPPLY SHORTAGES AND CLIMATE CHANGE

Water provides an iconic starting point for discussing climate change as an emergency. First, impacts on water are among the most universal and most anticipated climate change impacts; indeed, there is evidence that rising global average temperatures and consequent alterations in weather patterns are already affecting lakes, streams, and rivers around the country. Second, as noted, fresh water supplies in many regions of the country are already stressed, and shortages were anticipated even without the additional complication of climate change. Thus, the sense that something must be done to guarantee public water supplies for the future is already palpable. Finally, water, more than any other natural resource, is an absolute necessity for life. Even under the most favorable conditions, humans will die within ten days of being deprived of water, and can die within two days in more unfavorable conditions.⁴⁰ In addition, without water there is no food, no ecosystems, and no industry. Therefore, if climate change impacts any resource enough to justify re-framing climate change adaptation as an emergency, water is that resource.

40. Survival Topics, *How Long Can You Survive Without Water?*, <http://survivaltopics.com/survival/how-long-can-you-survive-without-water> (last visited Feb. 23, 2010).

A. Water Stress in the United States, Pre-Climate Change

As the GAO reported in 2003, water shortages are anticipated throughout the nation in the next few decades even without the complications of climate change. A variety of causes are contributing to these shortages:

Specifically, the building of new, large reservoir projects has tapered off, limiting the amount of surface-water storage, and the storage that exists is threatened by age and sedimentation. Significant ground-water depletion has already occurred in many areas of the country; in some cases the depletion has permanently reduced an aquifer's storage capacity or allowed saltwater to intrude into freshwater sources. Tremendous population growth, driving increases in the use of the public water supply, is anticipated in the Western and Southern states, areas that are already taxing existing supplies. Demand to leave water in streams for environmental, recreational and water quality purposes add to supply concerns.⁴¹

Construction of new water reservoirs peaked in the 1960s, and in 2003 the U.S. Bureau of Reclamation had only one new project, while the U.S. Army Corps of Engineers had none.⁴² As for existing reservoirs, "[t]he American Society of Engineers has rated over 2,000 dams as unsafe, and nearly 10,000 as having high hazard potential, according to the Federal Emergency Management Agency's fiscal year 2001–2002 report to Congress on the National Dam Safety Program."⁴³ Moreover, sedimentation behind these projects' dams reduces their storage capacity at a rate of about 1.5 million acre–feet of water per year.⁴⁴ Thus, just maintaining existing water storage and delivery requires a significant investment of money.⁴⁵

Perhaps partially in response to decreasing development of surface water supplies, groundwater depletion has been increasing across the United States.⁴⁶ As one particularly dramatic example, by 1999 the High

41. 2003 GAO STATE WATER SURVEY REPORT, *supra* note 4, at 7; *see id.* at 48 (emphasizing that "[n]umerous signs point to the danger that our freshwater supply is reaching its limits").

42. *Id.* at 48; *see id.* at 49 fig.15 (charting the number of reservoir construction projects in the United States and showing a steep decline after the 1960s).

43. *Id.* at 49.

44. *Id.* at 50.

45. *Id.* at 49–50.

46. *Id.* at 51–52.

Plains Aquifer, which stretches from South Dakota and Wyoming to Texas, had had an estimated 220 million acre–feet of water—more than half the volume of water in Lake Erie—removed.⁴⁷ Robert Glennon has more extensively traced this problem, noting that “[t]he laws regulating groundwater pumping often flout the scientific principles of hydrology. Our legal system has created rules that foster the economic interests of those who benefit from using water.”⁴⁸ The irony, as he emphasizes, is that “[a]s groundwater pumping increases, we, as humans, suffer the costs.”⁴⁹ In addition, in coastal states, groundwater depletion can result in saltwater intrusion into the aquifer, potentially contaminating much of the fresh water that remains.⁵⁰

Population growth is also a significant source of stress to water supplies, especially in states like California, Texas, and Florida.⁵¹ As the GAO observed in 2003, “[m]any of the states that are growing the most or at the fastest rates are also those that are currently stressing freshwater supplies.”⁵² Moreover, by 2003 many metropolitan areas across the United States, including Atlanta, Chicago, Tampa, Denver, and New York City, were already experiencing water supply stress as a result of population growth.⁵³

Finally, protection of the environment, including aquatic ecosystems, has increased significantly over the last thirty years.⁵⁴ It is worth emphasizing in the water context that these ecological protections simultaneously provide for other human values, such as flood control, recreation, fishing, and ecosystem services,⁵⁵ because such protections can also limit the availability of water for human water supply needs.⁵⁶ As the GAO summarized in 2003:

47. *Id.* at 53 fig.17.

48. ROBERT GLENNON, *WATER FOLLIES: GROUNDWATER PUMPING AND THE FATE OF AMERICA’S FRESH WATERS* 9 (2002).

49. *Id.* at 10.

50. 2003 GAO STATE WATER SURVEY REPORT, *supra* note 4, at 56 (“According to USGS, incidences of saltwater intrusion have been documented in almost all coastal states, especially along the Atlantic coast—affecting areas from Miami, Florida, to Cape Cod, Massachusetts.”).

51. *Id.* at 56–58.

52. *Id.* at 58.

53. *Id.* at 60.

54. *Id.* at 61.

55. *See* STATE OF CAL., THE RES. AGENCY, & DEP’T OF WATER RES., *MANAGING AN UNCERTAIN FUTURE: CLIMATE CHANGE ADAPTATION STRATEGIES FOR CALIFORNIA’S WATER* 21 (2008) (emphasizing the importance of protecting ecosystems as part of a comprehensive climate change adaptation strategy for water supply), available at <http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf> [hereinafter *MANAGING AN UNCERTAIN FUTURE*].

56. 2003 GAO STATE WATER SURVEY REPORT, *supra* note 4, at 61.

[T]he public places higher value on leaving water instream for endangered species, recreation, and scenic enjoyment, which may limit the use of existing water supplies and the development of new supplies. Federal laws such as the Endangered Species Act and the Wild and Scenic Rivers Act reflect these environmental values. However, when water is left instream to protect wetlands, fisheries, and endangered species or to preserve the wild and scenic status of a river, it cannot be simultaneously available for traditional offstream uses such as irrigation and municipal and industrial supply.⁵⁷

Depletion of fresh water supplies creates both economic and ecological problems. “For example, in the summer of 1998, a drought that ranged from Texas to the Carolinas resulted in an estimated \$6 to \$9 billion in losses to the agriculture and ranching sectors.”⁵⁸ “The nationwide economic costs of water shortages are not known because the costs of shortages are difficult to measure” Even so:

[The] National Oceanic and Atmospheric Administration has identified eight water shortages from drought or heat waves, each resulting in \$1 billion or more in monetary losses over the past 20 years. For example, the largest shortage resulted in an estimated \$40 billion in damages to the economies of the Central and Eastern United States in the summer of 1988.⁵⁹

Other regional losses from drought have also been significant. Thus, the Susquehanna River Basin Commission reported:

[A]s a result of the 1999 drought, 34 counties in New York State declared an agricultural disaster with losses of about \$2.5 billion, and it estimated Pennsylvania crop losses at \$500 million, with some farmers losing as much as 70 to 100 percent of their crops. The Commission also reported that other water-dependent industries, such as nurseries, suffered significant losses and electrical power plants had

57. *Id.*

58. *Id.* at 5–6.

59. *Id.* at 8; *see id.* at 67–68 (providing more detail regarding these economic losses).

trouble getting sufficient water supplies to meet operational needs because of low stream flows.⁶⁰

Two years later, drought cost the State of Washington “between \$270 million to \$400 million in damages to agricultural production, a loss of 4,600 to 7,500 agricultural jobs, and placed at risk an additional 950 to 1,400 jobs in the food processing, wholesaling, trucking, warehousing, and transportation services sectors.”⁶¹

Ecologically, fresh water shortages and drought can lead to “damages to plant and animal species, wildlife habitat, and water quality.”⁶² The Florida Everglades provides a good example. To address the recurring problems of both drought and flooding in this region, Congress authorized extensive channeling and draining of the Everglades beginning in 1948, including levees and sixteen pump-stations to direct water flow.⁶³ “This re-engineering of the natural hydrologic environment reduced the Everglades to about half its original size”⁶⁴ and resulted in “a 90 percent reduction in the population of wading birds.”⁶⁵ Groundwater pumping, too, can cause extensive environmental damage because of its hydrological connections to surface water.⁶⁶ As Robert Glennon has concluded, “[t]he hidden tragedy and irremediable fact is that groundwater pumping that has *already* occurred will cause environmental damage in the future.”⁶⁷

Finally, the GAO emphasized that “[w]ater shortages can also raise social concerns, such as conflicts between water users, reduced quality of life, and give rise to the perception of inequities in the distribution of disaster relief assistance.”⁶⁸ For example, the federally operated Klamath River project on the California-Oregon border has been the subject of ongoing “water wars” between farmers, fishermen, tribes, and environmentalists.⁶⁹ These conflicting interests came to a head in the drought of 2001–2002, forcing “several federal agencies—including Reclamation, the Fish and Wildlife Service, and the National Marine Fisheries Service—[to try] to balance the water needs of, among others, irrigators, who receive water from the project, and endangered fish, which

60. *Id.* at 68.

61. *Id.*

62. *Id.* at 6.

63. *Id.* at 8.

64. *Id.*

65. *Id.* at 6; *see id.* at 70–71 (discussing the impacts on the Florida Everglades in more detail).

66. GLENNON, *supra* note 48, at 210.

67. *Id.* at 212.

68. 2003 GAO STATE WATER SURVEY REPORT, *supra* note 4, at 6.

69. *Id.* at 8–9.

must have sufficient water to survive.”⁷⁰ In 2001, irrigation water was withheld from farmers to protect the fish, and “farmers experienced crop losses”⁷¹ The next year, the farmers got their water, but the fishermen, tribes, and environmentalists claimed that the resulting low flows killed 30,000 adult salmon and steelhead trout.⁷²

B. Climate Change and Water Supply in the United States

Climate change impacts are only likely to exacerbate the extent and severity of water shortages and their attendant problems. Indeed, even in 2003 the GAO acknowledged that “[t]he potential effects of climate change create additional uncertainty about future water availability and use.”⁷³

Two 2009 reports agree that climate change impacts increase the vulnerability of water supply in the U.S. The U.S. Global Change Research Program (USGCRP or Program) addressed the probable impacts of climate change on the United States’s water supply in *Global Climate Change Impacts in the United States*.⁷⁴ The primary conclusion of this report with respect to water resources is that “[c]limate change has already altered, and will continue to alter, the water cycle, affecting where, when, and how much water is available for all uses.”⁷⁵ In addition, “[c]limate change will place additional burdens on already stressed water systems.”⁷⁶

The National Association of Clean Water Agencies (NACWA) produced a more specific report, entitled *Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs*.⁷⁷ Like the USGCRP, the NACWA emphasizes that “[t]he effects of climate change are already impacting our water and wastewater utilities—those entities entrusted with supplying our communities, our industries, and our natural environment with essential water management services.”⁷⁸

Most basically, according to the USGCRP, climate change is altering almost all aspects of the water cycle: changing precipitation patterns, precipitation intensity, and incidences of drought; melting snow and ice; increasing atmospheric water vapor, evaporation, and water temperatures;

70. *Id.* at 6.

71. *Id.*

72. *Id.* at 6, 8–9, 72–74.

73. *Id.* at 48.

74. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11.

75. *Id.*

76. *Id.*

77. 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9.

78. *Id.* at ES-1; *see id.* at 1-1 to 1-2 (detailing these impacts and their implications for water utilities).

decreasing river and lake ice; and changing soil moisture and runoff.⁷⁹ In the U.S., the Program predicts that the Midwest, Northeast, and Alaska will experience increases in annual precipitation, runoff, and soil moisture, while the West and especially the Southwest will receive less water in all these forms.⁸⁰

In the West, reductions in the amount of precipitation and winter snowpack are increasingly severe threats to already stressed water supplies,⁸¹ a fact of which California in particular is already well aware.⁸² Mid-continental areas are also “particularly threatened by future drought.”⁸³ However, even in the East, more overall rainfall does not mean an end to water supply problems. In those regions, “extended dry periods have become more frequent,” and rain, when it comes, is already tending to come in less frequent but heavier events.⁸⁴ Moreover, areas in both the West and Northeast depend on winter snowpack for summer water supply, and winter snowfall has already been both decreasing in amount and melting sooner in the spring throughout the U.S.⁸⁵ As the USGCRP noted, “[e]arlier runoff produces lower late-summer streamflows, which stress human and environmental systems through less water availability and higher water temperatures.”⁸⁶ Summarizing the USGCRP’s findings, the NACWA emphasized that most regions of the U.S. will experience “increased uncertainty in water supply”; the Southwest and Puerto Rico will also experience a significantly reduced supply of water, while Alaska and the Northeast will require additional storage in order to cope with more variability in precipitation and earlier snowmelt.⁸⁷

Climate change impacts are also changing the quality of the water supply. Most directly, “[i]ncreased air temperatures lead to higher water temperatures, which have already been detected in many streams, especially

79. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11.

80. *Id.* at 41–42.

81. *Id.* at 44–45.

82. “For California water managers, the future is now. Climate change is already having a profound impact on water resources as evidenced by changes in snowpack, river flows and sea levels.” California Department of Water Resources, *Climate Change*, <http://www.water.ca.gov/climatechange> (last modified Apr. 22, 2009) (last visited Feb. 19, 2010).

83. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 44.

84. *See id.* (noting that in the Northeast “the annual number of days with very heavy precipitation has increased most in the past 50 years” while extended dry periods have also become more frequent, and “[t]he number of dry days between precipitation events is also projected to increase”).

85. *Id.* at 45–46.

86. *Id.* at 46.

87. 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9, at ES-4 to ES-5; *see id.* at 2-2 to 2-3 (providing a slightly more detailed summary).

during low-flow periods.”⁸⁸ Increasing temperatures, in turn, can lead to water stratification and reductions in dissolved oxygen levels, stressing aquatic organisms and reducing water bodies’ self-purification capacities.⁸⁹ Finally, “[t]he negative effects of water pollution, including sediments, nitrogen from agriculture, disease pathogens, pesticides, herbicides, salt, and thermal pollution, will be amplified by observed and projected increases in precipitation intensity and longer periods when streamflows are low.”⁹⁰

Nor is groundwater likely to serve as a water supply solution. As noted, groundwater supplies in many parts of the U.S. are already overused, substantially reducing the water levels in aquifers. While the climate change impacts on groundwater are not yet well understood, “increased water demands by society in regions that already rely on groundwater will clearly stress this resource, which is often drawn down faster than it can be recharged.”⁹¹ Moreover, because groundwater is often connected to surface water and recharged through water migrating through soil, climate change impacts on surface water flow and soil moisture will also affect groundwater levels and replenishment.⁹² Finally, climate change is likely to increase the contamination of aquifers, such as through saltwater intrusion as a result of sea-level rise and changes in microorganisms’ capacity to eliminate pollution.⁹³

All of these impacts are likely to tax already stressed water-supply systems, especially because, as noted, “[i]n many places, the nation’s water systems are already taxed due to aging infrastructure, population increases, and competition among water needs for farming, municipalities, hydropower, recreation, and ecosystems. Climate change will add another factor to existing water management challenges, thus increasing vulnerability.”⁹⁴ The economic and social costs of adapting water supply to climate change impacts are likely to be especially high in areas that experience more extreme events, such as droughts and floods, compared to areas that experience gradual changes in the amount and timing of precipitation.⁹⁵

88. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 46.

89. *Id.*

90. *Id.*

91. *Id.* at 46–47.

92. *Id.* at 47.

93. *Id.*

94. *Id.*; see 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9, at 3-5 to 3-7 (detailing the impacts to water supply processes).

95. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 47.

Water demand is also likely to increase as a result of climate change impacts. Increasing temperatures are likely to increase demand for water for drinking, cooling, and recreation, while drying soils will require more water for irrigation.⁹⁶ There are also likely to be direct correlations between energy consumption and water demand as a result of increasing temperatures: “[h]igher temperatures are projected to increase cooling water withdrawals by electrical generating stations. In addition, greater cooling requirements in summer will increase electricity use, which in turn will require more cooling water for power plants.”⁹⁷

As a result, water planning needs to change to accommodate climate change impacts. Traditionally, such planning has quite rationally been based on historical fluctuations in water supply.⁹⁸ However, as the USGCRP pointed out, “[b]ecause climate change will significantly modify many aspects of the water cycle, the assumption of an unchanging climate is no longer appropriate for many aspects of water planning. Past assumptions derived from the historical record about supply and demand will need to be revisited for existing and proposed water projects.”⁹⁹

II. WATER, CLIMATE CHANGE, AND THE PROPERTY RIGHTS BARRIER

As the previous part demonstrates, both non-climate-change trends and climate change impacts are contributing to a growing water supply crisis in the United States. Historical evidence also indicates that the concept of a water supply “emergency” is not so far-fetched as it might sound: “[m]ulti-decade ‘megadroughts’ in the years 900 to 1300 were substantially worse than the worse droughts of the last century, including the Dust Bowl era.”¹⁰⁰ Adaptation strategies, however, will almost immediately confront the often-tangled mix of property rights permeating water law. That collision is the subject of this part.

A. Property Rights Barriers in Water Law to Adapting to Water Supply Changes

Adapting to water supply shortages and crises is likely to require substantial effort. Obvious and inexpensive alternative sources of fresh

96. *Id.* at 48.

97. *Id.* at 49.

98. *Id.*

99. *Id.*

100. *Id.*

water are generally nonexistent, requiring substantial investment in conservation, alternative supply infrastructure, or both—preferably without decimating the aquatic ecosystems that communities rely upon in the process.

In its 2009 report, the NACWA identified several strategies to adapt water supply to climate change impacts. These include:

- Increasing focus on conservation to extend existing source water supplies
- Using new water sources including seawater desalination, lower quality groundwater, and wastewater reuse
- Increasing storage and conveyance to manage new water sources and accommodate changes in the intensity and timing of precipitation and runoff
- Increasing treatment in locations where increased precipitation causes increased turbidity, increased temperature results in reduced water quality, and lower quality source water requires greater levels of treatment. Additionally, wastewater reuse and recycling for water supply augmentation will require advanced treatment and in most locations, additional distribution system infrastructure.
- Adapting to address plant or conveyance flooding damage (as a result of sea level rise or storm surge) that may affect some drinking water facilities in coastal locations. Adapting to address inland flooding associated with extreme precipitation events including levee and related structural protection. Flooding tends to be more problematic for wastewater treatment plants because water treatment plants tend to be located at higher elevations; however, water intake facilities, treatment plants, and distribution systems have recently experienced flood damage during extreme precipitation events.
- Creating water management portfolios that combine and integrate these various water supply and treatment

components to add flexibility and support sustainable water supply.¹⁰¹

Thus, with the exception of widespread adoption of conservation strategies, which need not be expensive, climate change adaptation for water supply purposes is likely to require extensive—and expensive¹⁰²—infrastructure investments.

If water were purely a commons resource like air, creating and implementing adaptation strategies would be purely a matter of public policy and normal governmental decision-making processes. However, water is not like air. Instead, private and governmental property and contractual rights can impede effective climate change adaptation by making re-allocation of water use and water priorities expensive and legally difficult. Notably, when the USGCRP identified several “institutional and legal barriers” to necessary changes in water allocation and use, many of them derive from the complex property rights matrices surrounding water.¹⁰³ As the Program explained:

- The allocation of water in many interstate rivers is governed by compacts, international treaties, federal laws, court decrees, and other agreements that are difficult to modify.

- Reservoir operations are governed by “rule curves” that require a certain amount of space to be saved in a reservoir at certain times of year to capture a potential flood. Developed by the U.S. Army Corps of Engineers based on historical flood data, many of these rule curves have never been modified, and modifications might require Environmental Impact Statements.

- In most parts of the West, water is allocated based on a “first in time means first in right” system, and because agriculture was developed before cities were established, large volumes of water typically are allocated to agriculture. Transferring agricultural rights to municipalities, even for short periods during drought, can involve substantial expense and time and can be socially divisive.

101. 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9, at ES-5 to ES-6.

102. *Id.* at ES-1 (stating that “[t]he assessment indicates that the cost to utilities could range from \$448 billion to \$944 billion”).

103. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 49.

- Conserving water does not necessarily lead to a right to that saved water, thus creating a disincentive for conservation.¹⁰⁴

Moreover, as if to drive home the critical connection between climate change adaptation and the law defining property rights in water, the USGCRP emphasized that “[t]he ability to modify operational rules and water allocations is likely to be critical for the protection of infrastructure, for public safety, to ensure reliability of water delivery, and to protect the environment.”¹⁰⁵

Recent droughts in California provide a concrete example of perceived limitations on the law’s ability to mandate rational adaptation strategies to cope with water supply crises. By 2009, California was anticipating severe water shortages. As the California Department of Water Resources (CDWR) summarized in September 2008:

Following two critically dry years, 2009 has the potential to be one of the most severe drought years in California’s recorded history. Water supplies in major reservoirs and many groundwater basins are already well below average. Court-ordered restrictions on water deliveries from the Delta have significantly reduced supplies from the state’s two largest water systems. Climate change is reducing mountain snowpack—a critical source of natural water storage. Finally, California’s population is growing rapidly, but our statewide water system that has not kept pace.¹⁰⁶

To cope with the anticipated drought, the CDWR instituted a Drought Water Bank for 2009 to facilitate water transfers between water-strapped buyers and willing sellers.¹⁰⁷ To implement the Water Bank, CDWR sought to “purchase water from willing sellers from water suppliers upstream of the Sacramento-San Joaquin Delta. This water will be transferred using State Water Project (SWP)” and would then become “available for purchase by public and private water suppliers in California based on certain needs criteria as applicable.”¹⁰⁸

104. *Id.* at 49–50.

105. *Id.* at 49.

106. CAL. DEP’T OF WATER RES., CALIFORNIA’S DROUGHT: 2009 DROUGHT WATER BANK OVERVIEW 1 (2008), available at http://www.water.ca.gov/drought/docs/2009water_bank.pdf.

107. *Id.* at 2.

108. *Id.*

The Water Bank, however, depended on willing sellers. The CDWR emphasized this point:

Water will be purchased for the 2009 Drought Water Bank from willing sellers. Willing sellers may make water available in four main ways:

- Reservoir releases above normal operations
- Groundwater substitution—using groundwater instead of surface water supplies that are normally used
- Cropland idling—not growing a crop (above normal fallowing practices) that would have been grown except for the water transfer
- Crop substitution—growing a less water-intensive crop than would have been planted except for the water transfer[.]¹⁰⁹

Other policies limited who could become a “willing seller.” For example, “[n]o more than 20 percent of the cropland idled in any county may be considered as a source of transfer water without a detailed economic analysis of the effects on the overall economy on the county from which the water is transferred.”¹¹⁰

However, the 2009 Drought Water Bank is considered a failure. The causes are many, but the economics of water rights played a big role. For example, according to the *Sacramento Bee*, “[m]any farmers were leery of entering into a complex water deal with the state, fearing they might be liable for unexpected environmental damages, become ineligible for federal subsidy programs or simply lose money if the sale fell through.”¹¹¹ Perhaps more important, the state simply was not paying enough, at \$275 per acre-foot of water, to compete with the profits to be made from rice, a thirsty crop: “rice prices [we]re at their highest levels in nearly 30 years, thanks in part to a prolonged drought in Australia that . . . knocked out the California rice industry’s biggest international competitor.”¹¹²

109. *Id.* at 5.

110. *Id.*

111. Jim Downing, *Economic, Environmental Hurdles Block Critical California Water Transfers*, THE SACRAMENTO BEE, May 12, 2009, at 14A, available at <http://www.sacbee.com/ourregion/story/1853186.html>.

112. *Id.*

As a result, the 2009 Drought Water Bank was able to transfer only 82,000 acre-feet of water, far less than the 600,000 acre-feet the state government had hoped for.¹¹³ Given this perceived inability to re-allocate water to deal with the drought, in February 2009 Governor Schwarzenegger declared a state of emergency in California because of the water shortage,¹¹⁴ asking for a federal disaster area declaration about four months later.¹¹⁵ Arguably, therefore, the larger public good lost out to private property rights (real or perceived) in water.

B. Property Rights in Water

The water rights surrounding public water supply can entail a complex web of federal law allocations,¹¹⁶ allocations through interstate compact,¹¹⁷ reclamation project contracts,¹¹⁸ federal reserved rights,¹¹⁹ riparian rights inherent in riparian or littoral property ownership,¹²⁰ appropriative water rights,¹²¹ groundwater rights,¹²² instream water rights,¹²³ and environmental restrictions on water use and withdrawal.¹²⁴ Obviously, many strands of this web are federal, limiting the legal efficacy of the common law.

113. *Id.*

114. Press Release, Governor Schwarzenegger, Gov. Schwarzenegger Takes Action to Address California's Water Shortage (Feb. 27, 2009), <http://gov.ca.gov/press-release/11556>.

115. Press Release, Governor Schwarzenegger, Gov. Schwarzenegger Requests Federal Disaster Declaration, Issues Executive Order to Provide Assistance (June 19, 2009), available at <http://gov.ca.gov/press-release/12562>.

116. *E.g.*, Boulder Canyon Project Act, ch. 42, 45 Stat. 1057 (1928) (apportioning the Colorado River); Wyoming v. Colorado, 259 U.S. 419 (1922) (apportioning the Laramie River).

117. *E.g.*, Susquehanna River Basin Compact, Pub. L. No. 91-575, 84 Stat. 1509 (1970); Delaware River Basin Compact, Pub. L. No. 87-328, 75 Stat. 688 (1961); Colorado River Compact, 42 Stat. 171 (1921).

118. Douglas L. Grant, *ESA Reductions in Reclamation Water Contract Deliveries: A Fifth Amendment Taking of Property?*, 36 ENVTL. L. 1331, 1334-35 (2006) (concluding "that in most, if not all, states and in most, if not all, circumstances, municipalities and irrigation districts or district members do have property rights under state law" pursuant to reclamation project contracts).

119. *E.g.*, Cappaert v. United States, 426 U.S. 128, 139-42 (1976) (awarding the United States a senior water right for Devil's Hole).

120. *E.g.*, Biddison v. Va. Marine Res. Comm'n, 680 S.E.2d 343, 347 (Va. Ct. App. 2009) (identifying riparian rights as qualified, but valuable property rights).

121. Pub. Util. Dist. No. 1 of Pend Oreille County v. Wash. Dep't of Ecology, 51 P.3d 744, 750 n.2 (Wash. 2002) (describing the perfection of appropriative water rights in Washington).

122. *E.g.*, Cent. & W. Basin Water Replenishment Dist. v. S. Cal. Water Co., 109 Cal. App. 4th 891, 905-06 (2003) (describing ground water rights in California).

123. *E.g.*, Joyce Livestock Co. v. United States, 156 P.3d 502, 515-17 (Idaho 2007) (describing instream water rights in Idaho).

124. *E.g.*, NRDC v. Kempthorne, 506 F. Supp. 2d 322 (E.D. Cal. 2007) (halting the operations of the Central Valley Project under the federal Endangered Species Act to protect the listed delta smelt); Cent. Platte Natural Res. Dist. v. Wyoming, 513 N.W.2d 847, 856-57 (Neb. 1994) (discussing the need

Nevertheless, much water allocation law remains the product of state water law, generally considered a form of state property law.¹²⁵ As such, pinning down the state-law property rights in water—and identifying the common-law and statutory mechanisms available to adjust or reallocate those property rights—is likely to become an important step in implementing climate change adaptation policies with respect to water supply. The time to think about these legal mechanisms is now, because climate change impacts are affecting water supply in more places than just California. For example, within this more local law framework, “[t]he New York City Department of Environmental Protection (DEP), the agency in charge of providing the city’s drinking water and wastewater treatment, is beginning to alter its planning to take into account the effects of climate change—sea-level rise, higher temperatures, increases in extreme events, and changing precipitation patterns—on the city’s water systems.”¹²⁶

“Water rights” generally refers to rights to remove fresh water from its natural watercourse and to use that water for some consumptive purpose, such as irrigation, drinking water, or industrial manufacturing. Because water law is largely state law, the exact principles and requirements governing the withdrawal and use of water can vary considerably from location to location. However, in broad-brush strokes, the eastern states inherited the doctrine of riparianism from England, which ties the right to use water to ownership of the land adjoining the water source, i.e., the riparian landowners.¹²⁷ Common-law riparian doctrine emphasizes domestic use,¹²⁸ water sharing,¹²⁹ correlative and adjustable rights to water,¹³⁰ and a limit on withdrawals from the natural watercourse.¹³¹

to consult with the Game & Parks Commission before granting new water rights and the special issues connected with instream flows for wildlife purposes).

125. GEORGE A. GOULD, DOUGLAS L. GRANT & GREGORY S. WEBER, *WATER LAW* 23 (7th ed. 2005); Reed D. Benson, *Deflating the Deference Myth: National Interests vs. State Authority Under Federal Laws Affecting Water Use*, 2006 UTAH L. REV. 241, 242; Charlton H. Bonham, *Perspectives from the Field: A Review of Western Instream Flow Issues and Recommendations for a New Water Future*, 36 ENVTL. L. 1205, 1208 (2006).

126. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 50.

127. George A. Gould, *Water Rights Systems*, in *WATER RIGHTS OF THE EASTERN UNITED STATES* 7, 8–9 (Kenneth R. Wright ed., 1998); Benson, *supra* note 125, at 250.

128. Mich. Citizens for Water Conservation v. Nestlé Waters N. Am., Inc., 709 N.W.2d 174, 194–95 (Mich. Ct. App. 2005); Cummins v. Travis County Water Control & Improvement Dist., 175 S.W.3d 34, 47 (Tex. Ct. App. 2005); Penn. Dep’t of Env’tl. Res. v. Phila. Suburban Water Co., 581 A.2d 984, 986 (Pa. Commw. Ct. 1990).

129. Ace Equip. Sales, Inc. v. Buccino, 848 A.2d 474, 480 (Conn. App. Ct. 2004).

130. Pine Knoll Ass’n v. Cardon, 484 S.E.2d 446, 449 (N.C. Ct. App. 1997); United States v. State Water Res. Control Bd., 227 Cal. Rptr. 161, 170 (Cal. Dist. Ct. App. 1986); Robinson v. Ariyoshi, 65 Haw. 641, 648–49 (1982).

However, the legal connection of consumptive use rights to riparian land ownership limits non-riparian development,¹³² and most eastern states have transitioned to “regulated riparianism” and administrative permitting,¹³³ which allow for increased consumptive and off-site use of water. In contrast, the perpetually drought-threatened western states generally rejected riparianism in favor of the prior appropriation doctrine.¹³⁴ Prior appropriation operates on a principle of “first in time, first in right”—the first user to apply water to a beneficial use, without waste or abandonment, acquires a continued right to a water supply superior to that of later users drawing water from the same source.¹³⁵

Nevertheless, such generalizations grossly oversimplify the status of water rights as property rights. In particular, water rights have never been considered the same kind of “property” as either land or personal property. Under both riparian and prior appropriation systems, water rights are generally considered usufructory rights—that is, the right to take and use part of a flow, rather than guaranteed ownership of particular molecules of water.¹³⁶ As the Idaho Supreme Court recently explained:

A water right does not make the appropriator the owner of the source of the water, nor does it give the appropriator control over that source. . . . It does not even make the appropriator the owner of the water. . . . A water right

131. *Mich. Citizens for Water Conservation*, 709 N.W.2d at 194; *White’s Mill Colony, Inc. v. Williams*, 609 S.E.2d 811, 817–18 (S.C. Ct. App. 2005); *Portage County Bd. of Comm’rs v. Akron*, 808 N.E.2d 444, 462 (Ohio Ct. App. 2004).

132. Richard F. Ricci, Frankin W. Boenning & Kristina D. Pasko, *Battles Over Eastern Water*, 21 NAT. RES. & ENV’T 38, 38 (2006).

133. *Id.*; Jeremy Nathan Jungreis, “Permit” Me Another Drink: A Proposal for Safeguarding the Water Rights of Federal Lands in the Regulated Riparian East, 29 HARV. ENVTL. L. REV. 369, 371 (2005) (noting that “[t]wenty eastern states now impose some form of regulated riparianism”).

134. Benson, *supra* note 125, at 250–51; Ricci, Boenning & Pasko, *supra* note 132.

135. *State ex rel. Office of State Eng’r v. Lewis*, 150 P.3d 375, 383 (N.M. Ct. App. 2006); *Archuleta v. Gomez*, 140 P.3d 281, 284 (Colo. Ct. App. 2006); *W. Maricopa Combine, Inc. v. Ariz. Dep’t of Water Res.*, 26 P.3d 1171, 1180 (Ariz. Ct. App. 2001); *Hawley v. Kan. Dep’t of Agric.*, 132 P.3d 870, 873 (Kan. 2006).

136. Stephen Draper has emphasized that such limitations inhere in the nature of water itself:

Because they are irreplaceable source waters, the earth’s surface water (rivers, streams, lakes, and wetlands) and groundwater (aquifers) are unique natural resources. Unlike oil or minerals, life-sustaining flowing water is a shared, mobile, common-pool resource that is used and reused for different purposes as it moves through the hydrological cycle. Prior to capture by withdrawal or diversion, a claim of exclusive ownership of water is difficult to sustain.

Stephen E. Draper, *The Unintended Consequences of Tradable Property Rights to Water*, 20 NAT. RES. & ENV’T 49, 49 (2005). See Sax, *supra* note 1, at 482 (“Water is not like a pocket watch or piece of furniture, which an owner may destroy with impunity. The rights of use in water, however long standing, should never be confused with more personal, more fully owned, property.”).

simply gives the appropriator the right to the use of the water from that source, which right is superior to that of later appropriators when there is a shortage of water.¹³⁷

In addition, both systems of water rights allow for adjustments to those rights in particular circumstances. Thus, under common-law riparianism, riparian owners are under a continual obligation to accommodate each others' (new) uses¹³⁸ and must share shortages of water,¹³⁹ while prior appropriation anticipates that those who are "last in right" may in fact receive no water if actual stream flows cannot satisfy all claims.¹⁴⁰ Under both systems, therefore, water rights are contextual and contingent, and no one has an absolute entitlement to a specific amount of water regardless of the status of the supply.

Thus, property rights in water are, as my students have been happy to tell me, "weird"—or, as scholars prefer, nebulous and complex.¹⁴¹ The important point here is that, as a matter of property rights psychology, water is just different. Indeed, Carol Rose has observed that:

If water were our chief symbol for property, we might think of property rights—and perhaps other rights—in quite a different way. We might think of rights literally and figuratively as more fluid and less fenced in; we might think of property as entailing less of the awesome Blackstonian power of exclusion and more of the qualities of flexibility, reasonableness and moderation, attentiveness to others, and cooperative solutions to common problems.¹⁴²

Given the anticipated obstacles to adaptation arising from property rights, this weirdness of water may prove of great value in the climate

137. *Joyce Livestock Co. v. United States*, 156 P.3d 502, 516 (Idaho 2007) (citation omitted).

138. *Anglers of Ausable, Inc. v. Dep't of Env'tl. Quality*, 770 N.W.2d 359, 374–77 (Mich. Ct. App. 2009).

139. *City of Canton v. Shock*, 63 N.E. 600, 603 (Ohio 1902).

140. *Cent. Platte Natural Res. Dist. v. Wyoming*, 512 N.W.2d 392, 401 (Neb. Ct. App. 1993), *aff'd in part, rev'd in part on other grounds*, 513 N.W.2d 847 (Neb. 1994).

141. *See, e.g.*, David B. Anderson, *Water Rights as Property in Tulare v. United States*, 38 MCGEORGE L. REV. 461, 463 (2007) ("As a species of property, California water rights are indeed both unconventional and obscure."); Megan Hennessy, *Colorado River Water Rights: Property Rights in Transition*, 71 U. CHI. L. REV. 1661, 1665 (2004) (noting that in the Colorado River "[p]rivate parties hold property rights, albeit imperfect ones, in water"); Henry E. Smith, *Governing Water: The Semicommons of Fluid Property Rights*, 50 ARIZ. L. REV. 445, 450 (2008) (arguing "that water law tends to be a semicommons").

142. Carol M. Rose, *supra* note 2, at 351.

change era. The pressure to clarify and refine the status of water as a property right often comes in response to water shortages, which both increase conflicts between users and encourage governments to promote market “solutions” to water allocation problems.¹⁴³ However, as Stephen Draper has noted, “[o]ne key concern is whether a strategy to solve water scarcity based primarily on economics may have unintended consequences that outweigh its benefits.”¹⁴⁴ Notably, the drive to preserve a public rights component in water remains strong even in the face of increasing shortages,¹⁴⁵ undermining the imperative to fully privatize water that can arise in other property contexts.

As I have argued elsewhere, water’s status as a semi-public resource derives most directly from its dual status: unlike air, water is both a good and a medium, both a drinkable commodity and the defining characteristic of numerous ecosystems.¹⁴⁶ In addition, water provides a number of services to humans, including navigation and commerce, hydropower, waste disposal and assimilation, fishing and hunting, recreation, water purification, and flood control.¹⁴⁷ These services mean that many cities, towns, and communities are coupled socio-ecological systems, with community welfare dependent at least in part on the well-being of the aquatic ecosystems themselves.¹⁴⁸

143. See, e.g., Michael McKenzie, *Water Rights in NSW: Properly Property?*, 31 SYDNEY L. REV. 443, 443–45 (2009) (discussing new drivers for defining private property rights in Australia); Charles W. Snyder III & Nicholas R. Utley, Comment, *Acknowledging a Georgia Farmer’s Property Interest in Water*, 2 JOHN MARSHALL L. REV. 183, 183–84 (2009) (noting the numerous ambiguities regarding the status of riparian rights as property under Georgia law and the urgency of defining such rights in the face of water shortages).

144. Stephen E. Draper, *supra* note 136, at 49.

145. See, e.g., McKenzie, *supra* note 143, at 444 (arguing that clearly defining private property rights in water “does not sit . . . easily with other mechanisms set out in the [strategic] framework for achieving efficiency and sustainability; in particular, those that focus on environmental protection and social welfare”). But see Scott Andrew Shepard, *The Unbearable Cost of Skipping the Check: Property Rights, Takings Compensation & Ecological Protection in the Western Water Law Context*, 17 N.Y.U. ENVTL. L.J. 1063, 1065–68 (2009) (accepting the status of western appropriative water rights as property and resisting any public law limitation on that property status); Dale B. Thompson, *Of Rainbows and Rivers: Lessons for Telecommunications Spectrum Policy from Transitions in Property Rights and Commons in Water Law*, 54 BUFF. L. REV. 157, 183–89 (2006) (discussing the requirement under prior appropriation law that third-party interests be protected during the course of water transfers).

146. Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 834 (2008).

147. *Id.* at 838–46.

148. “Socio-ecological systems (1), social-ecological systems (2), and coupled human-environmental systems (3) are commonly used in the literature to describe systems of human-environment interactions.” Elinor Ostrom, Marco A. Janssen & John M. Anderies, *Going Beyond Panaceas*, 104:39 PNAS: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 15,176, 15,176 (2007).

This fact of coupled socio-ecological systems is critical for climate change adaptation strategies.¹⁴⁹ Indeed, the public dependence on water as a medium has already generated several water-specific legal doctrines that limit private property rights in water in favor of public values, such as the federal navigation servitude¹⁵⁰ and state public trust doctrines.¹⁵¹

Together, the usufructory, contingent nature of private water rights and the existence of legal protections for public values in water indicate that water is a particularly malleable resource, legally speaking, when it comes to accommodating new public needs and interests. These public water rights are also a particularly important resource in protecting against a pervasive private-property-rights mentality, even in the absence of climate change impacts. In the face of those impacts and increasing shortages of water, and given the importance of water to life, ecosystems, and ecosystem services, water supply is likely to become an important testing ground for public necessity theories, both legally and politically. It is to those theories that this article now turns.

III. REFRAMING CLIMATE CHANGE AS AN EMERGENCY: PUBLIC NECESSITY AND ITS IMPLICATIONS FOR WATER LAW AND POLICY

The importance of water supply is difficult to overestimate, but climate change threatens that supply. As the NACWA emphasized in 2009:

Water is the most important natural resource, necessary for stable economic growth, as well as for human and environmental health. Our nation's water and wastewater infrastructure enables our prosperity by delivering clean water to our homes and industries and by transporting wastewater for treatment. Our increasing understanding of climate change impacts on water and wastewater suggests

149. Craig, *supra* note 12, at 16–21, 35–45, 47–49.

150. *Lewis Blue Point Oyster Cultivation Co. v. Briggs*, 229 U.S. 82, 86–88 (1913) (holding that an oyster cultivator was not entitled to compensation when congressionally ordered dredging of a navigable water destroyed the oyster beds).

151. *See* Ill. Cent. R.R. v. Illinois, 146 U.S. 387, 452 (1892) (recognizing the existence of the public trust doctrine in American law and its limitations on the ability of states to completely privatize navigable waters); *see generally* Robin Kundis Craig, *A Comparative Guide to the Eastern Public Trust Doctrines: Classifications of States, Property Rights, and State Summaries*, 16 PENN ST. ENVTL. L. REV. 1 (2007) (summarizing all eastern states' public trust doctrines); Robin Kundis Craig, *A Comparative Guide to the Western States' Public Trust Doctrines: Public Values, Private Rights, and the Evolution Toward an Ecological Public Trust*, 37 ECOLOGY L.Q. 53 (Mar. 2010) (summarizing the western states' public trust doctrines).

that significant adaptation measures will be required for our infrastructure to continue protecting public health and the environment.¹⁵²

Thus, Part I of this article suggested that water is likely to be one of the first foci of climate change adaptation battles, as supplies in many parts of the country fall short of demand.

The considerable expense of water supply adaptation will only increase the stakes of such battles. The NACWA estimated that water utilities may need to spend \$448 to \$944 billion by 2050 to adapt to climate change impacts.¹⁵³ That assessment did not include “the larger societal costs associated with disruptions to water and wastewater services such as adverse impacts to the natural environment and public health when extreme weather events cause sewage to overflow in rivers, streams, and coastal areas.”¹⁵⁴ It also did not include the costs of emergency response and recovery (ER&R) to restore water supply and wastewater treatment after extreme events, such as flooding or hurricanes.¹⁵⁵ Finally, the NACWA’s cost estimate did not include the costs of adapting to impacts that occur beyond 2050, which could increase costs further¹⁵⁶—especially given that many scientists now conclude that the greenhouse gas emissions that have already occurred have committed the world to climate change for at least another century or two.¹⁵⁷

Thus, adapting to ensure the American public an adequate water supply represents a significant and probably long-term investment for the U.S. Given the history of water supply, moreover, the expense is likely to be borne predominantly by the public through various levels and types of governmental institutions and agencies. It will be next to impossible, in other words, to ignore the public component of adapting water supplies to climate change impacts.

These public facets of adapting water supplies will only increase when the ecological components of community needs are factored in as well. Hard decisions are likely to be necessary regarding absolute and relative priorities for changing water supplies, and experiences in the Klamath River Basin and the Sacramento Bay Delta suggest that decisions to allocate water to ecosystems (or, more accurately in those cases, to species)

152. 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9, at ES-1.

153. *Id.*; *see id.* at 3-2 (breaking down the costs by region and dividing them between water supply and wastewater expenses).

154. *Id.* at ES-2.

155. *Id.* at 3-4, 3-5.

156. *Id.* at 4-1.

157. Craig, *supra* note 12, at 23–24.

at the expense of human use generates considerable controversy, especially when made on a season-to-season basis. At the same time, there is no denying many communities' dependence on functional aquatic ecosystems, or the benefits to general water supply adaptation strategies of maintaining aquatic ecosystems to aid in water filtration and flood control. These realities all suggest that true community survival—and public acceptance of the ecological components of that survival—would benefit from recasting climate change adaptation plans for water supply as a long-term emergency preparedness strategy, with an emphasis on pre-crisis public discussion, education, and planning.

While property rights in water are an acknowledged impediment to water supply climate change adaptation measures, Part II of this article demonstrated that water also has a long-standing public character. Thus, if water supply is a likely first impetus for climate change adaptation battles, it is also a particularly fertile subject for testing the policies and law of public necessity in a climate change era.

A. The Legal Doctrine of Public Necessity

At the state level, the basis for most public welfare regulation is the police power. The police power, of course, is not limited to emergencies but extends generally to support regulation to promote public health, safety, and welfare.¹⁵⁸

Ordinary exercises of the police power, however, are subject to the workings of the Fifth Amendment's Takings Clause, made applicable to the states and their subdivisions through the Fourteenth Amendment.¹⁵⁹ Since the early twentieth century, takings jurisprudence has included regulatory takings, a constitutional protection against requiring relatively few private property owners to bear a disproportionate burden in providing for the public welfare.¹⁶⁰ Regulatory takings jurisprudence is one reason that California, for example, looks for willing sellers to supply its drought banks.

The public necessity doctrine, in contrast, recognizes that in times of true emergency or public necessity, private rights fall to public need—

158. *Baer v. City of Bend*, 292 P.2d 134, 137 (Or. 1956) (“It cannot be successfully contended that the exercise of the police power for the protection of the public health . . . is restricted to situations of overriding public necessity or emergency or infectious or contagious diseases . . .”).

159. *Kelo v. City of New London*, 545 U.S. 469, 472 n.1 (2005) (citing *Chi., Burlington & Quincy R.R. v. Chicago*, 166 U.S. 226 (1897)).

160. *Penn. Coal Co. v. Mahon*, 260 U.S. 393, 415–16 (1922).

gratis.¹⁶¹ According to the U.S. Supreme Court, “the common law had long recognized that in times of imminent peril—such as when fire threatened a whole community—the sovereign could, with immunity, destroy the property of a few that the property of many and the lives of many more could be saved.”¹⁶² In the context of water, the public necessity doctrine is thus roughly parallel in philosophy to the federal navigation servitude¹⁶³: private rights cannot interfere with the protection of the overriding public welfare.

In application, the public necessity doctrine can have two meanings. Most generally, the public necessity doctrine acts as the umbrella classification for three common-law defenses to takings or damages liability, as the South Dakota Supreme Court laid out in 1978:

There are three important exceptions to the requirement of compensation where, without the owner’s consent, private property is intentionally, purposefully or deliberately taken or damaged for the public use, benefit or convenience. They are the taking or destruction of property (1) during actual warfare; (2) to prevent an imminent public catastrophe; and (3) to abate a public nuisance. In each instance, the power to “take or damage” without compensation is based upon the public necessity of preventing an impending hazard which threatens the lives, safety, or health of the general public.

....

161. *Surocco v. Geary*, 3 Cal. 69, 73 (1853) (“At such times, the individual rights of property give way to the higher laws of impending necessity.”).

162. *United States v. Caltex, Inc.*, 344 U.S. 149, 154 (1952). Prosser explains further: Where the danger affects the entire community, or so many people that the public interest is involved, that interest serves as a complete justification to the defendant who acts to avert the peril to all This notion does not require the “champion of the public” to pay for the general salvation out of his own pocket. The number of persons who must be endangered in order to create a public necessity has not been determined by the courts.

PROSSER & KEETON, *THE LAW TORTS* § 24 (5th ed. 1984).

163. See *Lewis Blue Point Oyster Cultivation Co. v. Briggs*, 229 U.S. 82, 86–88 (1913) (holding that an oyster cultivator was not entitled to compensation when congressionally ordered dredging of a navigable water destroyed the oyster beds). In this context, it is worth noting that one set of private necessity cases revolves around the destruction of property to preserve an individual’s right of passage through navigable waters. John Alan Cohan, *Private and Public Necessity and the Violation of Property Rights*, 83 N.D. L. REV. 651, 670–73 (2007).

The public necessity privilege is an extension of every individual's privilege to take whatever steps appear reasonable to prevent an imminent public disaster.¹⁶⁴

More narrowly, but more commonly, the doctrine refers to the second of these three defenses—destruction “to prevent an imminent public catastrophe.”¹⁶⁵

Two facets of this narrower conception of the public necessity doctrine limit its application: the requirement of a public necessity or emergency; and the requirement that the destruction or limitation of private property be reasonably necessary to address that threat. These limitations will be important in applying the public necessity doctrine in the context of climate change adaptation, and so this section explores each in turn.

1. A Public Necessity or Emergency Exists

In the classic application of the public necessity doctrine, an imminent disaster, such as fire¹⁶⁶ or flood,¹⁶⁷ threatens the community, and destruction

164. *City of Rapid City v. Boland*, 271 N.W.2d 60, 65 (S.D. 1978). Other courts and some scholars have also viewed public necessity as a broader umbrella doctrine. *See, e.g., Patel v. City of Everman*, 179 S.W.3d 1, 11 (Tex. App. 2004) (“Where a plaintiff establishes that a governmental entity intentionally destroyed his property because of a real or supposed public emergency, the government entity may then defend its actions by proof of a great public necessity. In other words, the governmental entity has to show that the property destroyed was a nuisance on the day it was destroyed.”) (citations omitted); *City of Chi. v. Birnbaum*, 274 N.E.2d 22, 24 (Ill. 1971) (upholding the destruction of vacant buildings against a takings claim because “[t]he record indicates that the public welfare, health and safety of the surrounding area was imperiled by these circumstances, and the city properly and of public necessity exercised its police power and abated this nuisance by ordering the buildings demolished”); *Cohan*, *supra* note 163, at 690–732 (including both military and emergency cases within a discussion of public necessity).

165. *City of Rapid City*, 271 N.W.2d at 65; *see, e.g., Scott v. City of Del Mar*, 68 Cal. Rptr. 2d 317, 322 (1997) (distinguishing “public necessity to avert impending peril” from non-emergency nuisances).

166. *See, e.g., Bowditch v. Boston*, 101 U.S. 16, 18 (1879) (discussing the common-law right to destroy property to prevent a fire from spreading); *Field v. City of Des Moines*, 39 Iowa 575, 577 (1874) (noting that the right to the destruction of property to prevent the spread of fire is established in the common law); *Surocco*, 3 Cal. at 73 (discussing the need to destroy a building to check the progress of a fire); *Am. Print Works v. Lawrence*, 23 N.J.L. 9, 1850 WL 119, at *7 (N.J. 1850) (stating that there is a right to destroy property in order to arrest the spread of fire); *Hale v. Lawrence*, 21 N.J.L. 714, 1848 WL 154, at *11 (N.J. 1848) (holding that there is a private right to destroy a building in order to prevent mass destruction by a fire).

167. *See generally Dudley v. Orange County*, 137 So. 2d 859, 861–63 (Fla. Ct. App. 1962) (denying injunctive relief against county's action to dam waters that were causing flooding on plaintiff's land); *McKell v. Spanish Fork City*, 305 P.2d 1097, 1100 (Utah 1957) (holding that city is not liable for damages incurred by measures taken to control an extraordinary flood); *Short v. Pierce County*, 78 P.2d 610, 616 (Wash. 1938) (holding that “appellants may not recover for damage caused by acts of agents of the county in an attempt to control immediate danger from the flood”); *Atken v. Village of Wells River*,

of private property is necessary to protect the community as a whole.¹⁶⁸ Nevertheless, the concepts of “emergency” and “imminence” can vary across jurisdictions, and these variations are likely to be relevant to the doctrine’s application in climate change adaptation. Some commentators, for example, put more emphasis on the “necessity” than on the “emergency,” explaining that:

The right to destroy under such circumstances is a natural right which springs from the *necessity* of the case. Where, therefore, it is sought by statute to *add* to the right or to *create* the right to destroy in case of *emergency* rather than *necessity*, such attempt constitutes an exercise of the power of eminent domain and compensation must be made.¹⁶⁹

Both the Restatement (Second) of Torts and most courts, however, have tended to emphasize the “imminence” and “emergency” aspects of the public necessity doctrine. The Restatement, for example, states that “[o]ne is privileged to enter land in the possession of another if it is, or if the actor reasonably believes it to be, necessary for the purpose of averting an imminent public disaster.”¹⁷⁰ Similarly, the South Dakota Supreme Court noted that “[o]nce the impending disaster has passed, the government may not rely upon the doctrine of necessity to justify the subsequent destruction of property.”¹⁷¹ As a result, a city’s destruction of buildings in the wake of a severe flood in order to facilitate citywide cleanup efforts was not insulated from the compensation requirement, absent a new threat to the public:

Had the Boland property been destroyed during the flood in an attempt to control the rising waters of Rapid Creek, the destruction would undoubtedly have been justified as a public necessity. The destruction of the property 21 days after the flood waters had subsided cannot be justified as necessary to save lives or property from the flood. If there

40 A. 829, 830 (Vt. 1898) (finding that a taking had not occurred when the plaintiff’s property was destroyed to avert imminent injury from flooding).

168. Cohan, *supra* note 163, at 653.

169. *City of Rapid City*, 271 N.W.2d at 66 (quoting I NICHOLS, EMINENT DOMAIN § 1.43[1] and [2]); see *Hale*, 1848 WL 154, at *11 (noting that the right is “founded upon necessity and not expediency”).

170. RESTATEMENT (SECOND) OF TORTS § 196 (1995).

171. *City of Rapid City*, 271 N.W.2d at 66.

was an impending disaster, it could only have been that of an epidemic threatening the public health.¹⁷²

While the South Dakota Supreme Court thus suggested that preventive measures might be treated more leniently than post-disaster actions with respect to the public necessity doctrine, other courts have appeared skeptical about applying the doctrine to longer-term, preemptive protection efforts. Thus, while not deciding that a taking had occurred, the North Carolina Supreme Court ruled that a beachfront property owner's claim against the Town of Carolina Beach in connection with a beach erosion control project was not time-barred and could proceed despite the town's public necessity defense.¹⁷³ Specifically, the town argued that beach erosion was a severe and continuing problem that it sought to control by building a seawall, and "[t]he construction of the berm, or seawall was essential as a matter of public necessity to prevent a complete eventual erosion of the beach and the destruction of the town itself."¹⁷⁴ More directly, the U.S. District Court for the District of Oregon determined that the explosion of a dockside grain elevator as a result of a nearby ship fire was not sufficiently imminent to justify setting the ship adrift because it was "highly improbable that a spark could have been carried from the ship to the grain gallery since a steady drizzle was falling and the wind was blowing away from the dock. The fire was small and confined to the engine room."¹⁷⁵

Nevertheless, and importantly for climate change adaptation measures, courts have also recognized a relationship between the public necessity doctrine and disaster preparedness. For example, in 1989 the Idaho Supreme Court decided that the Idaho legislature had abrogated the common-law doctrine of public necessity in enacting the State Disaster Preparedness Act.¹⁷⁶ The Act "grants immunity from liability for death, injury, or damages resulting from" civil defense or disaster relief activities

172. *Id.* at 66–67.

173. *Carolina Beach Fishing Pier, Inc. v. Town of Carolina Beach*, 163 S.E.2d 363, 372 (N.C. 1968).

174. *Id.* at 366.

175. *Protectus Alpha Navigation Co. v. N. Pac. Grain Growers, Inc.*, 585 F. Supp. 1062, 1067 (D. Or. 1984). However, the facts that emergency workers ordered the defendant *not* to release the ship, that the fire could have probably been contained, and that both firefighters' lives and the ship were lost as a result of the defendant's overly hasty action probably influenced the court's seemingly stringent view of imminence. *See id.* at 1064–65. As the court remarked, the defendant's "perversity turned a small shipboard fire into a marine disaster." *Id.* at 1068.

176. *Marty v. State of Idaho*, 786 P.2d 524, 534–35 (Idaho 1989) (citing IDAHO CODE ANN. §§ 46-1002, 46-1011, 46-1017 (1988)).

taken pursuant to the Act's authority.¹⁷⁷ This case thus suggests that public necessity protection can and has extended to emergency preparedness activities.¹⁷⁸

2. The Destruction or Limitation Is Reasonably Necessary

Necessity is not an excuse for willy-nilly destruction of private property, regardless of the seriousness of the emergency. Thus, courts require that destructive actions be reasonably necessary given the particular emergency being addressed. In the words of the U.S. District Court for the District of Oregon, "[t]he defense applies only when the emergency justifies the action and when the defendant acts reasonably under the circumstances."¹⁷⁹

Thus, for example, the real need for flood control did not excuse the Los Angeles County Flood Control District from paying for damage to a resident's property, when the immediate cause of the damage was the District's poor drainage design and construction. Specifically, during heavy flooding, drainage grates that the District installed became obstructed by flood flotsam, "flooding plaintiff's land to a depth of several feet. As a result of the overflowing of the water, many thousands of concrete blocks were damaged and considerable sums were expended by plaintiff in cleaning up the premises."¹⁸⁰ The plaintiff argued that "but for the installation of the grating, which interfered with and diverted the natural flow of water so that it was discharged over plaintiff's land, the resultant damage would not have occurred."¹⁸¹

The California Court of Appeals upheld the lower court's award of damages to the plaintiff for a physical taking of the plaintiff's property. It emphasized that "in the absence of any compelling emergency or the pressure of public necessity, the courts will be slow to invoke the doctrine of police power to protect public agencies in those cases where damage to private parties can be averted by proper construction and proper precautions

177. *Id.* at 535 (referring to and quoting IDAHO CODE ANN. § 46-1017 (1988)).

178. *See Dudley v. Orange County*, 137 So. 2d 859, 861-63 (Fla. App. 1962) (denying, pursuant to public necessity principles, that Florida officials owed compensation for flooding properties while responding to a disaster in conformance with the Florida Civil Defenses Act).

179. *Protectus Alpha Navigation Co.*, 585 F. Supp. at 1067. Applying the public necessity doctrine can involve a form of risk-benefit analysis. *See Cohan, supra* note 163, at 654 ("Under the necessity doctrine, there is a weighing of interests: the act of invasion of another's property is justified under the necessity doctrine only if done to protect or advance some private or public interest of a value greater than, or at least equal to, that of the interest invaded.")

180. *Ward Concrete Prods. Co. v. L.A. County Flood Control Dist.*, 309 P.2d 546, 548 (Cal. App. 1957).

181. *Id.* at 550.

in the first instance.”¹⁸² As a policy matter, moreover, “[u]nnecessary damage to his property is of no benefit to the public; rather it only entails unwarranted sacrifice and loss on the individual’s part, which should be compensable damage.”¹⁸³ Similarly, public necessity was no defense to casting loose a burning ship when a dockside “grain facility could have been protected by much less drastic methods.”¹⁸⁴

As the California Court of Appeals suggested, however, actors often enjoy more leeway as to what constitutes “necessary” destruction in the actual throes of an emergency. In the early 20th century, for example, the King’s Bench in England excused a gamekeeper’s decision to start a backfire in order to stop a larger fire, even though it turned out that the backfire was not actually necessary, because there was “a real and imminent danger” and the backfire was a reasonable response under those emergency circumstances.¹⁸⁵ Almost ninety years later, the California Court of Appeals explained the relevance of an existing emergency with regard to actions under the California Emergency Services Act:

In situations in which the state must take steps necessary to quell an emergency, it must be able to act with speed and confidence, unhampered by fear of tort liability. A state of emergency imposes severe time constraints, forcing decisions to be made quickly and often without sufficient time to carefully analyze all potential repercussions.¹⁸⁶

Given the exigent circumstances involved, a California Reclamation District owed no compensation for damages resulting when it cut a levee in order to prevent “potentially massive flooding” as a result of a severe storm.¹⁸⁷

182. *Id.* at 551.

183. *Id.* (quoting *House v. L.A. County Flood Control Dist.*, 153 P.2d 950, 953 (Cal. 1944)).

184. *Protectus Alpha Navigation Co.*, 585 F. Supp. at 1068; see *Barton-Barnes, Inc. v. State of New York*, 583 N.Y.S.2d 547, 548 (N.Y. App. Div. 1992) (upholding an award of damages when state officials destroyed a PCB-contaminated vehicle rather than undertaking reasonable efforts to eradicate the toxic contamination).

185. *Cope v. Sharpe*, 1 K.B. 496, 504 (1912).

186. *Thousand Trails, Inc. v. Cal. Reclamation Dist. No. 17*, 124 Cal. App. 4th 450, 458 (2004).

187. *Id.* at 464.

*B. The Public Necessity Doctrine and Climate Change Adaptation:
Reframing Climate Change Impacts on Water Supply As an
Emergency*

1. The Argument

Of the two standard limitations on the public necessity doctrine, the “emergency” prong is likely to prove far more problematic for invoking public necessity in the context of climate change adaptation than the “reasonably necessary measures” prong. With respect to water supply, for example, what constitutes a “reasonably necessary” action to adapt to climate change impacts will follow more-or-less naturally from the articulation of an area’s particular water-supply crisis—a critical shortage of fresh water, a disastrously polluted supply, the death of critical aquatic ecosystems, the loss of water filtration ecosystem services, or some combination thereof.

In contrast, climate change appears to distort the normal understanding of emergency: how can a phenomenon that is likely to last for at least a couple of centuries qualify as an “imminent” and “impending” disaster? One obvious, although not entirely satisfactory, response is that a number of commentators have displayed no hesitation in classifying climate change as a global emergency.¹⁸⁸ For example, in connection with the opening of the climate change negotiations in Copenhagen in December 2009, fifty-six newspapers in forty-five countries published a shared editorial, announcing that “humanity faces a profound emergency.”¹⁸⁹ Underscoring that theme, the editorial concluded that “[t]he politicians in Copenhagen have the power to shape history’s judgment on this generation: one that saw a challenge and rose to it, or one so stupid that we saw calamity coming but did nothing to avert it.”¹⁹⁰

188. See generally JAMES HANSEN, STORMS OF MY GRANDCHILDREN: THE TRUTH ABOUT THE COMING CLIMATE CATASTROPHE AND OUR LAST CHANCE TO SAVE HUMANITY (2009); RICHARD HEINBERG, POWER DOWN: OPTIONS AND ACTIONS FOR A POST-CARBON WORLD (2004); MAYER HILLMAN, TINA FAWCETT & SUDHIR CHELLA RAJAN, THE SUICIDAL PLANET: HOW TO PREVENT GLOBAL CLIMATE CATASTROPHE (2007); JAMES LOVELOCK, THE REVENGE OF GAIA: EARTH’S CLIMATE CRISIS & THE FATE OF HUMANITY (2007); FRED PEARCE, WITH SPEED AND VIOLENCE: WHY SCIENTISTS FEAR TIPPING POINTS IN CLIMATE CHANGE (2007); FRED PEARCE, THE LAST GENERATION: HOW NATURE WILL TAKE HER REVENGE FOR CLIMATE CHANGE (2006); MARTIN REES, OUR FINAL HOUR: A SCIENTIST’S WARNING . . . (2007); PETER D. WARD, UNDER A GREEN SKY: GLOBAL WARMING, THE MASS EXTINCTIONS OF THE PAST AND WHAT THEY CAN TELL US ABOUT OUR FUTURE (2008).

189. E.g., Editorial, *Star Joins the Global Climate Crusade*, TORONTO STAR, Dec. 7, 2009, at A1, available at <http://www.thestar.com/printarticle/735124>.

190. *Id.*

Even allowing for a fair amount of hyperbole and rhetorical flourish, such discussions make two particularly important points about the “emergency” nature of climate change impacts. First, several have accepted the concept that emergencies can be of long duration, the most obvious example of which is James Kunstler’s multi-stranded weaving of *The Long Emergency*.¹⁹¹ Thinking of climate change as a long-term emergency brings to the forefront the issue of intergenerational equity—or, in James Hansen’s more vivid call to action, “The Storms of [Our] Grandchildren”¹⁹²—underscoring that lack of action now is extremely likely to have real consequences, even if those consequences are displaced in time.

Second, many commentators have also noted that climate change impacts might not in fact be slow. Thus, citing to a 2002 National Research Council report, James Speth rightly points out that “[a]lthough many people assume that the impacts of climate change will unfold gradually, as the earth’s temperature slowly rises, the buildup of greenhouse gases may in fact lead to abrupt and sudden, not gradual, changes.”¹⁹³

Nevertheless, a more satisfactory answer to climate change’s emergency status is that climate change impacts are already occurring—i.e., that the emergency, slow-moving or not, is already upon us, and things are

191. JAMES HOWARD KUNSTLER, *THE LONG EMERGENCY: SURVIVING THE END OF OIL, CLIMATE CHANGE, AND OTHER CONVERGING CATASTROPHES OF THE TWENTY-FIRST CENTURY* (2006). According to Kunstler:

Whether the cause of global warming is human activity and “greenhouse emissions,” a result of naturally occurring cycles, or a combination of the two, this does not alter the fact that it is having swift and tremendous impacts on civilization and that its effects will contribute greatly to the Long Emergency.

Global warming projections by the Intergovernmental Panel on Climate Change (IPCC) show a widespread increase in the risk of flooding for tens of millions of people due to increased storms and sea-level rise. Climate change is projected to aggravate water scarcity in many regions where it is already a problem. It will increase the number of people exposed to vector-borne disease (e.g., malaria and dengue fever) and waterborne disease (e.g., cholera). It will obviate the triumphs of the green revolution and bring on famines. It will prompt movements of populations fleeing devastated and depleted lands and provoke armed conflicts over places that are better endowed.

Id. at 9.

192. HANSEN, *supra* note 188, at 250–70.

193. SPETH, *supra* note 16, at 25; *see* HANSEN, *supra* note 188, at ix (“Planet Earth, creation, the world in which civilization developed, the world with climate patterns that we know and stable shorelines, is in imminent peril. The urgency of the situation crystallized only in the past few years The startling conclusion is that continued exploitation of all fossil fuels on Earth threatens not only the other millions of species on the planet but also the survival of humanity itself—and the timetable is shorter than we thought.”).

only going to get worse.¹⁹⁴ For example, in *Massachusetts v. EPA*, a majority of the Supreme Court Justices suggested that the “in-progress” aspect of climate change was relevant to evaluating its imminence, even though effects were likely to continue for several decades longer. Although this discussion took place in the context of imminent injury for standing purposes, the issue is essentially the same. According to the Court, “[t]he harms associated with climate change are serious and well recognized. Indeed, the NRC Report itself identifies a number of environmental changes that have already inflicted significant harms”¹⁹⁵ Of particular relevance to the litigation were the existing and continuing impacts on Massachusetts’s coast:

According to petitioners’ unchallenged affidavits, global sea levels rose somewhere between 10 and 20 centimeters over the 20th century as a result of global warming. These rising seas have already begun to swallow Massachusetts’ coastal land. Because the Commonwealth “owns a substantial portion of the state’s coastal property,” it has alleged a particularized injury in its capacity as a landowner. The severity of that injury will only increase over the course of the next century: If sea levels continue to rise as predicted, one Massachusetts official believes that a significant fraction of coastal property will be “either permanently lost through inundation or temporarily lost through periodic storm surge and flooding events.” Remediation costs alone, petitioners allege, could run well into the hundreds of millions of dollars.¹⁹⁶

In the water supply context, similarly, climate change impacts are already affecting water management decisions and imposing hardships on water users. In October 2008, for example, California published its plan for adapting its water supplies to climate change impacts.¹⁹⁷ This white paper acknowledges that “[e]xtreme climatic events will become more frequent, necessitating improvements in flood protection, drought preparedness, and emergency response” and that “[a]n array of adaptive water management strategies . . . must be implemented to better address the risk and

194. See, e.g., SPETH, *supra* note 16, at 27 (“In short, there is little doubt that the process of human-induced global warming has begun in earnest, that the consequences are already serious, and that they could be devastating if the buildup of greenhouse gases is not halted.”).

195. *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007).

196. *Id.* at 522–23 (citations and footnotes omitted).

197. MANAGING AN UNCERTAIN FUTURE, *supra* note 55.

uncertainty of changing climate patterns.”¹⁹⁸ The analysis views California’s water situation as a “crisis,” with “no doubt” that climate change impacts are already contributing.¹⁹⁹ Climate change poses challenges that include loss of snowpack storage, drought, floods, water quality impacts, sea level rise, and impacts on hydroelectric generation.²⁰⁰ The state has perceived an “imperative to act,” noting that “[w]ith the state’s water resources already stressed, additional stress from climate change will only intensify the competition for clean, reliable water supplies.”²⁰¹ Immediate actions include funding and investment in infrastructure, moving to regional management, and aggressively increasing efficiency in water use.²⁰² Importantly, however, California also stresses the need to protect ecosystems, recognizing that “[w]ater supply and flood management are significantly more sustainable and economical over time when they preserve, enhance, and restore ecosystem functions”²⁰³

Impacts on water supply also prompt a third answer to why climate change should qualify as an emergency, at least in specific contexts: response time. Specifically, the “imminence” of a potential crisis for public necessity purposes needs to be calibrated to the time required to adequately prepare for and deal with it. Fires start fast and spread fast, and officials deciding what houses to blow up react minute-to-minute and hour-to-hour to shifts in wind direction and the path of conflagration. In contrast, floods often come with comparably long warning—but can require that entire time to sandbag and board up properties and evacuate the endangered population. Nevertheless, few would hesitate to classify a steadily approaching flood as an imminent emergency just because its full impact was a week (or longer) into the future.²⁰⁴

Responding to existing stresses and climate change’s impacts on water supply requires a much longer time frame than either fires or floods. Securing adequate water supply, according to the NACWA, will require substantial investments in massive infrastructure improvements, changes, and additions. Securing the funding, figuring out what exactly should be done, and building that infrastructure is likely to take several decades.

198. *Id.* at 2.

199. *Id.* at 3.

200. *Id.* at 4–7.

201. *Id.* at 8.

202. *Id.* at 9–14.

203. *Id.* at 21.

204. *See, e.g.,* *McKell v. Spanish Fork City*, 305 P.2d 1097, 1098 (Utah 1957) (allowing that an “exceptional” combination of heavy winter snows and an unusually warm spring “made it apparent that flooding in the area was imminent,” even though residents had considerable time to plan and prepare).

These longer-term response time realities justify classifying climate change impacts on water supply as an “imminent” disaster.

Finally, allowing climate change impacts on water supply to be considered a long-term emergency gives decision makers better opportunity to make rational decisions about what to destroy *before* communities’ ecological dependencies are sacrificed *de facto*. If a foreseeable water supply crisis does not qualify as a public necessity emergency until people are actually going thirsty, the community is likely to have already lost its surrounding aquatic ecosystems and ecosystem services. Legally acknowledging a longer-term emergency in the case of water supply gives communities a better chance to protect their socio-ecological requirements as well as the bare minimum fresh water requirements for individual human lives.

2. The Implications

So what does reframing climate change as an emergency mean in terms of applying the public necessity doctrine to climate change adaptation efforts for water supply? Obviously, traditional state common-law principles, such as the doctrine of public necessity, have no ability to change water allocations based on federal law or treaties, including those based on interstate compacts approved by Congress.²⁰⁵ Adapting to climate change impacts affecting water bodies and water supply sources that are governed by these sources of law will require different legal mechanisms. Thus, for example, in 2005 the Bureau of Reclamation began to work to adjust allocations of water within the Colorado River system when water flow and storage are low,²⁰⁶ as they have been for the last several years.²⁰⁷

205. When Congress approves an interstate compact, it becomes federal law. *New York v. Hill*, 528 U.S. 110, 111 (2000).

206. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 51.

207. By 2007:

The Colorado River Basin [was] in the eighth year of drought—the worst eight year period in over a century of continuous recordkeeping This is the first long-term drought in the modern history of the Colorado River, although climate experts and scientists suggest droughts of this severity have occurred in the past and are likely to occur in the future With over 27 million people relying on the Colorado River for drinking water in the United States, and over 3.5 million acres of farmland in production in the Basin, the Colorado River is the single most important natural resource in the Southwest.

BUREAU OF RECLAMATION & DEP’T OF THE INTERIOR, RECORD OF DECISION: COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND THE COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD 1 (2007), *available at* <http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>. More recent studies indicate that the Colorado River will be increasingly unreliable in supplying expected amounts of water to Southwestern states—specifically, “that by 2050 the Colorado won’t be able to provide all of its

Nevertheless, the importance of state water law as a potential impediment to adapting water supplies and preserving socio-ecological communities should not be underestimated. State water law, for example, remains the primary mechanism for defining the property aspects of most water rights, as Part II discussed.

At the state law level, the public necessity doctrine gives governments legal flexibility to deal with actual water shortages in productive ways. As Dale Thompson has observed, “[o]ne thing that has been clear over the history of property law is the need for a property system to adapt to changed circumstances.”²⁰⁸ However, it is not clear that—absent legal supports like the public necessity doctrine—water law will meet that need quickly enough to match the pace and potential devastation of climate change impacts, at least with respect to allowing broader socio-ecological system survival. As Stephen Draper pointed out even before climate change impacts on water resources were being observed:

In many jurisdictions, the policies, laws, and regulations that control water use and availability remain rooted in earlier times when water needs and water availability were different. Legal systems established in a prior century strain to respond to the increasing, changing demands and competitions for water without destabilizing existing water law systems and investment-backed expectations.²⁰⁹

The doctrine of public necessity is a built-in common-law limitation on the assertion of state-law-based property rights in water, one that could spare government coffers the expense of buying out individual water rights while adapting to water supply crises. As a legal doctrine, public necessity’s primary value for climate change adaptation is the authority it gives governments to reallocate established water rights to preserve life and community during actual shortages in water supply.²¹⁰ As one particularly apt example, given California’s failed 2009 water bank, public necessity could serve as the legal basis for truly effective emergency plans based on

allocated water 60 percent to 90 percent of the time . . .” Mike Stark, *Study: Shortages Likely on Colorado River by 2050*, S.F. CHRON., Apr. 20, 2009, <http://www.sfgate.com/cgi-bin/article.cgi?f=/n/a/2009/04/20/state/n145427D24.DTL>.

208. Thompson, *supra* note 145, at 160.

209. Draper, *supra* note 136.

210. Water supplies will remain subject to yearly variations in the climate change era, just as they always have been. In wet years, therefore, reallocation of individual rights would not be necessary, or at least not to the same extent as during drought years. However, in wet years, the flood-related aspects of the public necessity doctrine might become important.

government reallocation and redistribution of water during crisis-level droughts.

Within that authority, moreover, public necessity allows for prioritizing survival necessities at the expense of water luxuries—drinking water ahead of swimming pools, and water for climate-appropriate staple food crops and local food needs (including local fish) ahead of water for luxury, climate-inappropriate, and/or export crops. As part of that prioritization, public necessity also allows governments, during times of shortage, to reallocate individual water rights to the aquatic ecosystems and ecosystem services that communities' larger survival and well-being depends upon, rather than forcing the death of streams and other water bodies that climate change renders effectively over-appropriated.

C. Philosophical Public Necessity and Reframing the Public Policy of Climate Change Adaptation

Thus, the legal doctrine of public necessity could become important in undergirding particular climate change adaptation measures with respect to water, such as reallocating water to the demands of community survival, including socio-ecological survival, over the protests of private water rights holders. Nevertheless, the potentially more pervasively important aspect of the doctrine may well prove to be the basic concept of public necessity and the reordering of priorities that goes with it. Public necessity, in other words, is a public policy and political philosophy as well as a technical common-law doctrine, acknowledging superseding rights of survival that earlier cases traced straight to natural law.²¹¹

As a public policy and political philosophy, public necessity first underscores in times of stress and crisis the general (one hopes) norm that human lives are more important than property. In a 1953 English public necessity case, for example, the trial judge emphasized that “[t]he safety of human lives belongs to a different scale of values from the safety of property. The two are beyond comparison and the necessity for saving life has at all times been considered a proper ground for inflicting such damage as may be necessary on another’s property.”²¹²

211. *Bowditch v. Boston*, 101 U.S. 16, 19 (1879) (“In these cases the common law adopts the principle of the natural law, and finds the right and the justification in the same imperative necessity”); *Surocco v. Geary*, 3 Cal. 69, 73 (1853) (linking public necessity with natural law); *Hale v. Lawrence*, 21 N.J.L. 714, 1848 WL 514, at *11 (N.J. 1848) (stating that there is a natural right to destroy property in order to protect life, liberty, or property).

212. *Southport Corp. v. Esso Petroleum Co., Ltd.*, (1953) 2 Q.B. 1204, 1209–10 (H.L.); see *Field v. City of Des Moines*, 39 Iowa 575, 577 (1874) (“The rights of private property, sacred as the law

Second, within the context of human lives, public necessity shifts the law's focus from individuals to the community.²¹³ As John Cohan has aptly recognized, “[t]he principle behind public necessity is that the law regards the welfare of the public as superior to the interests of individuals and, when there is a conflict between them, the latter must give way.”²¹⁴

Legal exegeses of the public necessity doctrine have been particularly clear that public necessity embodies a community-focused philosophy and public policy. In 1853, for example, the California Supreme Court upheld the destruction of a plaintiff's house in San Francisco to stop the spread of a fire. As the court explained:

A house on fire, or those in its immediate vicinity, which serve to communicate the flames, becomes a nuisance, which it is lawful to abate, and the private rights of the individual yield to the considerations of general convenience, and the interests of society. Were it otherwise, one stubborn person might involve a whole city in ruin, by refusing to allow the destruction of a building which would cut off the flames and check the progress of the fire, and that, too, when it was perfectly evident that his building must be consumed.²¹⁵

Over a century later, the Oregon Supreme Court employed exactly the same priority—society over the individual—to uphold public fluoridation of drinking water against challenges that such protections against tooth decay unconstitutionally infringed on individual liberty. Touching on both the police power to protect public health and the doctrine of public necessity, the court noted:

There are manifold restraints to which every person is necessarily subject for the common good. On any other basis organized society could not exist with safety to its members. Society based on the rule that each one is a law

regards them, are yet subordinate to the higher demands of the public welfare.”) (quoting DILLON ON MUNICIPAL CORPORATIONS § 756 (1872)).

213. See, e.g., SPETH, *supra* note 16, at 199 (noting that, in addressing climate change, “two additional and allied transformations will be involved: a transformation in consciousness and a transformation in politics”); *id.* at 207 (arguing that American culture needs to transform from “hyperindividualism, narcissism, and social isolation to powerful community bonds reaching from the local to the cosmopolitan and to profound appreciation of interdependence both within and among countries”).

214. Cohan, *supra* note 163, at 653.

215. *Surocco*, 3 Cal at 73.

unto himself would soon be confronted with disorder and anarchy.²¹⁶

Public necessity's priorities could provide a needed check on "rugged individualism" in the climate change adaptation context. Especially in the context of property rights, American culture is arguably too focused on the private at the expense of the public in ways that could undermine effective climate change adaptation—especially adaptation that preserves not just the immediate necessities of life (clean fresh water) but also more extensive socio-ecological networks.²¹⁷ Relevantly, a number of authors have concluded in other contexts that Americans are overly individualistic, to their own detriment.²¹⁸

Public necessity, in contrast, demands a more communitarian view of the law and of property when survival is at stake. Water supply is basic to human survival, and climate change is putting that supply at risk. A public necessity philosophy could therefore help to support the reframing of climate change as a matter of emergency preparedness even as the legal doctrine of public necessity can supply some of the tools needed to achieve that preparedness.

CONCLUSION: THE VALUE OF AN EMERGENCY PREPAREDNESS AND RESPONSE FRAMEWORK

Reframing climate change impacts as an ongoing emergency is a tricky maneuver, to be sure. As James Speth has noted, "[u]nfortunately, the surest path to widespread cultural change is a cataclysmic event that profoundly affects shared values and delegitimizes the status quo and existing leadership."²¹⁹ The "unfortunately" recognizes that such cataclysmic events are also a social roll of the dice: society might reform itself into something highly adaptive and productive²²⁰—but it might also

216. *Baer v. City of Bend*, 292 P.2d 134, 137 (Or. 1956) (quoting *Jacobson v. Massachusetts*, 197 U.S. 11 (1905)).

217. For example, James Speth has noted generally that "[g]reater emphasis on the public side would serve our environment better. In America, for example, large public investments are overdue in land conservation; in environmental education, research, and development; and in incentives to spur more ecologically sophisticated technologies." SPETH, *supra* note 16, at 61.

218. *Id.* at 137–38, 204; Bill McKibben, *Reversal of Fortune*, MOTHER JONES, Mar. 1, 2007, available at 2007 WLNR 26413868; see generally DAVID G. MEYERS, *THE AMERICAN PARADOX: SPIRITUAL HUNGER IN AN AGE OF PLENTY* (2000); ROBERT D. PUTNAM, *BOWLING ALONE: THE COLLAPSE AND REVIVAL OF AMERICAN COMMUNITY* (2000).

219. SPETH, *supra* note 16, at 211.

220. *Id.* at 234.

collapse into chaos, or do nothing much at all. From this perspective, the 9/11 terrorist attacks and Hurricane Katrina can both be viewed as missed opportunities²²¹ to jumpstart rational climate change adaptation policies—the 9/11 attacks as an impetus for comprehensively changing the nation’s energy policy, Hurricane Katrina for thoroughly revamping emergency preparedness, emergency response, and coastal development policies.

In the middle of the 20th century, however, American society did collectively adapt to a crisis that created shortages of staple goods—World War II—through government rationing. Unsurprisingly, such rationing was described in public necessity terms: “The Congress, acting within its legislative powers, was entitled to consider the character of the emergency confronting the nation and the ‘inherent necessities of the governmental coordination.’”²²² Moreover, rationing “was introduced to avoid public anger with shortages and not to allow only the wealthy to purchase commodities,”²²³ revealing a communitarian motivation explicitly seeking to subvert individual prerogatives in the market. While rationing was not always endured ungrudgingly,²²⁴ people did, by and large, accept the reallocation of critical supplies to the war effort.²²⁵

The trick for climate change adaptation is two-fold: (1) getting the public to acknowledge the growing risks of climate change before actual survival becomes the only driver of action; and (2) getting the public to acknowledge the primacy of community survival within a complex and ever-changing mix of impacts.²²⁶ Again, water supply is the logical place to start because we—or at least certain parts of the country—are already careening toward a crisis.

221. James Speth has made this point in a much broader context. *Id.* at 211.

222. *O’Neal v. United States*, 140 F.2d 908, 912–13 (6th Cir. 1944) (citation omitted).

223. *Wars and Battles, The Home Front*, UNITED STATES HISTORY, <http://www.u-s-history.com/pages/h1674.html> (last visited Apr. 17, 2010) [hereinafter *Wars and Battles*].

224. See, e.g., *O’Neal*, 140 F.2d at 912–13 (upholding rationing under the Second War Powers Act of 1942 against challenges); *Country Garden Market v. Bowles*, 141 F.2d 540, 541 (D.C. Cir. 1944) (finding a violation of rationing orders); *Gallagher’s Steak House, Inc. v. Bowles*, 142 F.2d 530, 531 (2d Cir. 1944) (upholding a rationing order).

225. Iselin Theien, *Food Rationing During World War Two: A Special Case of Sustainable Consumption?*, ANTHROPOLOGY OF FOOD, ¶¶ 8–9 (2009), <http://aof.revues.org/index6383.html>; *Wars and Battles*, *supra* note 223 (noting that although black markets did develop, “few complained [about the sacrifice] because they knew it was the men and women in uniform who were making the greater sacrifice”).

226. Perhaps instructively, post-apocalyptic science fiction novels (most addressing nuclear war and its aftermath) have explored the range of likely human reactions to global crises that threaten human survival. *Warday* posited that when it came to allocating critical resources post-apocalypse, the British, with their tradition of queuing up and sharing, fared far better than the individualistic Americans. WHITLEY STRIEBER & JAMES KUNETKA, *WARDAY* (1984).

There are already many competing demands on water supply, and such competition is already leading to legal conflict.²²⁷ Legal battles over natural resources like water can serve as a proxy measure of emerging crises—crises one would hope do not deteriorate into actual violence. Nevertheless, it is worth remembering that water battles in the U.S. have historically included physical—and sometimes deadly—fights.²²⁸ Already, legal conflicts driven by water shortage, like those surrounding the Klamath River in southern Oregon and the Sacramento Bay Delta in central California, are complicated by the potential for real physical violence, and the various interests involved certainly perceive that survival—of species, lifestyles, and industries—is at stake.²²⁹ Contaminated water supplies raise a different kind of survival threat in the form of toxic poisoning²³⁰ and disease²³¹—but again, those threats are already real and will likely only become worse as climate change impacts increase. These problems should only increase our willingness to view water supply as being in, or at least approaching, a state of crisis.²³²

227. In prior work, I have traced the kinds of legal conflicts over water that have already occurred and are currently occurring among competing demands for water, emphasizing the sheer number of legal battles currently in play between environmental protection and human demands to withdraw water and the likelihood that climate change will increase those conflicts. Craig, *supra* note 146, at 869–90. In addition, the U.S. Bureau of Reclamation has identified several areas of the West, in particular, where water conflicts are likely to arise by 2025 and where rural water needs are unlikely to be met. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 11, at 48 (showing a map of “Potential Water Supply Conflicts by 2025”).

228. *E.g.*, *Cnty. Ditches or Acequia of Tularosa Townsite v. Tularosa Cmty. Ditch*, 120 P. 301, 301–02 (N.M. Terr. 1911); *Edson & Foulke Co. v. Winsell*, 118 P. 243, 245–46 (Cal. 1911); *Simpson v. State*, 33 S.W. 1078, 1078–79 (Tex. Crim. App. 1896).

229. Editorial, *A Gush of Possibilities Opens on the Klamath*, OREGONIAN (Sept. 30, 2009), available at http://www.oregonlive.com/opinion/index.ssf/2009/09/a_gush_of_possibilities_opens.html; Rebecca Bowe, *The Water Wars*, S.F. BAY GUARDIAN, Sept. 2, 2009, available at <http://www.sfbg.com/2009/09/02/water-wars>.

230. Contaminated water supplies are a major source of toxic tort litigation, made famous through movies such as “Erin Brockovich” and “A Civil Action.” ERIN BROCKOVICH (Universal Studios 2000); A CIVIL ACTION (Touchstone Pictures 1998).

231. Although John Snow discovered the water-borne nature of cholera in the mid-nineteenth century, the disease remains a deadly killer: “In 1994 cholera swept through a crowded refugee camp in Goma, Zaire, and killed sixty thousand people in less than a month.” ROBERT D. MORRIS, *THE BLUE DEATH: DISEASE, DISASTER, AND THE WATER WE DRINK 1* (2007). Lest Americans get too comfortable, moreover, the United States has had recent outbreaks of water-borne illness, the worst of which occurred in Milwaukee, Wisconsin in 1993, with cryptosporidium as the culprit. *Id.* at 1, 178–214.

232. Indeed, the NACWA views the climate change impacts on water supply as an urgent and critical problem demanding Congress’s immediate attention. In its 2009 report, it advised Congress that: (1) “[c]limate change is occurring and is impacting our critical drinking water and wastewater services at an ever-increasing rate”; (2) timely action to adapt to “the inevitable impacts of climate change . . . is critical—water and wastewater infrastructure planning and implementation operates within a 20- to 40-year timeframe”; (3) “[t]he costs for drinking water and wastewater services to adapt to climate change are significant”; and (4) “[f]ailure to provide a timely response to needed planning for

There are reasons to believe, however, that water battles arising as a result of climate change impacts may be amenable to the emergency preparedness/public necessity reframing—that is, to reallocation and shared rationing rather than “wild west” standoffs. As noted, almost uniquely among natural resources, water retains a strong public character both legally and politically, suggesting that public policies and legal solutions based on public necessity have a better chance of guiding climate change adaptation policy with respect to water than elsewhere. Sandra Zellmer and Jessica Harder, for example, have argued that “[w]ater is a uniquely essential resource with uniquely public attributes, unlike real estate, currency, jewelry, and many other things that are treated as property.”²³³ They regard water, given the web of interests surrounding it, as so unlike other forms of property that they would limit or eliminate regulatory takings claims for interference with water rights, although they would preserve water’s status as property for due process purposes.²³⁴ For them, “[t]he public interest in water . . . is so compelling that . . . private rights are correspondingly limited.”²³⁵

Joseph Sax has gone even further, arguing that water is first and foremost public property, limiting all assertions of private property

climate change adaptation will have serious consequences for the nation,” including “dire disruption or long-term loss of water and sanitation services to homes, municipalities, and industry—with the resultant short- and long-term impacts to human health, and the economy.” 2009 NACWA WATER ADAPTATION COST ANALYSIS, *supra* note 9, at ES-7.

233. Sandra B. Zellmer & Jessica Harder, *Unbundling Property in Water*, 59 ALA. L. REV. 679, 683 (2008). *But see* Carol M. Rose, *supra* note 2, at 351 (arguing that real property rights are also flexible, “however little the symbol of landed property may suggest them”); Michael C. Blumm, *Pinchot, Property Rights, and Western Water: (A Reply to Gregory Hobbs)*, 24 ENVTL. L. 1203, 1205 (1994) (arguing that “property rights in water are no different than property rights in land” and that “both land and water rights are contingent and flexible, able to accommodate the felt necessities of the day”).

234. Zellmer, *supra* note 233, at 686–87; *see* Sax, *supra* note 1, at 482 (“The roots of private property in water have simply never been deep enough to vest in water users a compensable right to diminish lakes and rivers or to destroy the marine life within them.”).

235. Zellmer, *supra* note 233, at 687. From a different perspective, Stephen Draper similarly sees the establishment of tradable property rights in water as being at odds with necessary public rights and values:

A series of unintended consequences arises when water rights are changed from a usufructory right to a property right. A system of tradable property rights would, by its definition and operation, have difficulty guaranteeing adequate river basin planning and management, as well as effective environmental and ecological protection. Additionally, private markets cannot appropriately examine the needs of other public values, such as social equity. Equally problematic is the potential loss of the legal authority and control of the internal water resources of a nation or state.

Draper, *supra* note 136, at 51.

interests.²³⁶ Moreover, as Sax points out, even the U.S. Supreme Court, in the person of Justice Holmes, has championed public rights in water at the expense of private rights:

[F]ew public interests are more obvious, indisputable and independent of a particular theory that the interest of the public of a State to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use. This public interest is omnipresent wherever there is a State. And grows more pressing as population grows. It is fundamental, and we are of the opinion that the private property of riparian proprietors cannot be supposed to have deeper roots.²³⁷

Given these two threads—recognized crises and acknowledged public rights—public water supply appears to be the perfect testing ground for an emergency preparedness/public necessity approach to climate change adaptation. States like California have already acknowledged a water supply crisis and climate change’s role in creating and perpetuating that crisis; other states are likely to follow in the near future, especially if drought conditions persist in the West or resurge in the East. Reframed as a form of emergency preparedness responding to public necessity, therefore, adaptation to climate change impacts on water supply could allow for a transition from claims of individual rights to functional, community-based solutions that allow for the broadest and best survival of individuals, communities, and the ecosystems that support them.

236. In his view, “water is and always has been a public resource. The law is that water flows to benefit those uses that advance the contemporary public interest. No private right may stand in the way of that flux and reflux of water rights.” Sax, *supra* note 1, at 475.

237. Hudson County Water Co. v. McCarter, 209 U.S. 349, 356 (1908).