

ADAPTING TO CLIMATE CHANGE: THE POTENTIAL ROLE OF STATE COMMON-LAW PUBLIC TRUST DOCTRINES

Robin Kundis Craig*

ABSTRACT

Climate change is already altering historical expectations regarding water supply and aquatic ecosystems. In turn, changes in water supply may call into question the continued utility of existing water law rules in many areas of the country, unsettling private rights and expectations in water allocations in favor of more public interests and values in water, including protections for ecosystems and their services.

Water law is already more sensitive than many other kinds of law to the ecological conditions that dominate in an area. As a result, water law is a likely legal mechanism for effectuating climate change adaptation, at least as it relates to water resources. In particular, and far more than most fields of property law, water law is almost uniquely available to support some of the adaptive management regimes that climate change adaptation will require.

This Article argues that, within water law, state public trust doctrines can be particularly well-suited to providing legal support for adaptive management-based climate change adaptation regimes. In particular, it notes that courts have long adapted public trust doctrines in the United States to local needs and circumstances, and several states now explicitly characterize their public trust doctrines as evolutionary. With respect to water resources, therefore, these common-law public trust doctrines give willing states a legal vehicle for: (1) acknowledging climate change as a threat to public resources; (2) continually reassessing the cumulative impacts climate change is causing; (3) supporting fledgling adaptive management efforts by state agencies; and, at the extreme, (4) engaging in judicial adaptive management, in the sense of rebalancing private rights and public values in impacted aquatic resources, ecosystems, and ecosystem services.

* Attorneys' Title Insurance Fund Professor of Law and Associate Dean for Environmental Programs, the Florida State University College of Law, Tallahassee, Florida. I would like to thank the environmental faculty of the Vermont Law School, especially Pat Parenteau, for inviting me to be their Distinguished Summer Environmental Law Visitor and to deliver the substance of this Article as a lecture. I would also like to thank my colleagues at the Florida State University College of Law for their comments on my presentation of this paper: Rob Atkinson, Shawn Bayern, Curtis Bridgeman, Beth Burch, Tara Grove, Adam Hirsch, Wayne Logan, Dan Markel, Dave Markell, Gregg Polsky, Jim Rossi, J.B. Ruhl, Mark Seidenfeld, Nat Stern, Manuel Utset, and Lesley Wexler. Nevertheless, I remain solely responsible for the content of this Article. I may be contacted at: rcraig@law.fsu.edu.

The strength and genius of the common law lies in its ability to adapt to the changing needs of the society it governs.¹

Whatever disadvantages attach to a system of unwritten law, . . . it has at least this advantage, that its elasticity enables those who administer it to adapt it to the varying conditions of society, and to the requirements and habits of the age in which we live, so as to avoid the inconsistencies and injustice which arise when the law is no longer in harmony with the wants and usages and interests of the generations to which it is immediately applied.²

INTRODUCTION

In May 2007, the U.S. District Court for the Eastern District of California noted that the Delta smelt, a small fish endemic to the California Bay/Sacramento-San Joaquin Delta and already listed for protection under the federal Endangered Species Act, would likely be put further at risk by climate change-driven decreases in water volume and increases in water temperature in the Delta.³ Because the U.S. Fish and Wildlife Service failed to consider the effects of these changing hydrological conditions on the smelt, its Biological Opinion, issued pursuant to the Endangered Species Act, was arbitrary and capricious.⁴ The resulting injunction threatened to shut down water delivery to millions of southern Californians.⁵ Moreover, delivery of water to southern California in 2009 was only 40% of users' expectations, a result of both continued drought and species considerations.⁶

Climate change is also endangering Montana's \$300 million recreational fishing industry and \$2.4 billion agricultural industry, both of which depend on rivers and streams.⁷ Trout fishing makes up a substantial component of the fishing industry, but the trout begin to die when water

1. Brooks v. Robinson, 284 N.E.2d 794, 797 (Ind. 1972).

2. Wason v. Walter, LR 4 Queen's Bench 73, 93 (1868), as quoted in Andrew T. Kenyon, *Defamation and Critique: Political Speech and New York Times v. Sullivan in Australia and England*, 25 MELB. U. L. REV. 522, 526 (2001).

3. NRDC v. Kempthorne, 506 F. Supp. 2d 322, 328, 365–70 (E.D. Cal. 2007).

4. *Id.* at 370.

5. Jeanne Marie Kerns, *California Cuts Water Supply by a Third to Protect Endangered Delta Smelt Fish*, ASSOCIATED CONTENT, Sept. 2, 2007, http://www.associatedcontent.com/article/366070/california_cuts_water_supply_by_a_third.html.

6. Bettina Boxall, *State Water Deliveries Up*, L.A. TIMES GREENSPACE BLOG, May 20, 2009, <http://latimesblogs.latimes.com/greenspace/2009/05/water-deliveries.html>.

7. *The News Hour with Jim Lehrer: Montana: Trout and Drought*, (PBS television Broadcast Oct. 31, 2008) [hereinafter *Trout and Drought*], available at http://www.climatecentral.org/videos/%20broadcast/Montana_trout_%20and_drought?page=3.

temperatures reach 78°F or higher.⁸ Average spring air temperatures have been rising since the 1950s at a pace consistent with projected climate change impacts.⁹ Higher temperatures mean earlier snowmelt and hence less and slower-moving water in the summer, which in turn allow in-stream temperatures to rise above the trout's tolerance¹⁰—and temperatures are expected only to keep increasing.¹¹ As for agriculture, the decrease in the total volume of water available during the summers makes irrigation increasingly difficult.¹²

As these two examples illustrate, climate change is already altering historical expectations regarding water supply and aquatic ecosystems. In turn, changes in water supply may call into question existing water law rules and water consumption patterns in many areas of the country. These impacts may unsettle private rights and expectations in water allocations in favor of more public interests and values in water, including protections for ecosystems and their services.

Water law is already more sensitive than many other kinds of law to the ecological conditions that dominate in an area—hence the divide in the United States between riparian and prior appropriation doctrine states.¹³ If water-stressed areas begin to receive greatly increased overall supplies of water, or if previously water-rich areas begin to experience continual shortages, their systems of water law may also begin to evolve to reflect these new realities, particularly with respect to the public/private divide.

In other words, water law is a likely legal mechanism for effectuating climate change adaptation. In contrast to climate change mitigation, which seeks to reduce overall greenhouse gas emissions, climate change adaptation describes the multi-faceted process of adjusting human behavior and rights to cope with changes to the environment and to coupled socio-ecological systems that climate change is already causing and will continue to cause for at least decades and probably centuries. Far more than most areas of property law, water law is almost uniquely available to support some of the adaptive management regimes that climate change adaptation will require.

8. *Id.*

9. *Id.*

10. *Id.*

11. *Id.*

12. *Id.*

13. Robert H. Abrams & Noah D. Hall, *Framing Water Policy in a Carbon Affected and Carbon Constrained Environment*, 49 NAT. RESOURCES J. (forthcoming 2009) (manuscript at 16–18), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1380350; Frank Trelease, *New Water Legislation: Drafting for Development, Efficient Allocation, and Environmental Protection*, 12 LAND & WATER L. REV. 385, 414–16 (1977).

This Article argues that, within water law, state public trust doctrines can be particularly well-suited to providing legal support for adaptive management-based climate change adaptation regimes. Under the classic statement of the American public trust doctrine, each state holds title to the beds and banks of the federally-defined navigable waters within its borders in trust for the people of that state, to protect the public's right to use those waters for navigation, commerce, and fishing.¹⁴ As such, the state is restricted in its ability to alienate public trust lands.¹⁵ As commentators have observed, this classic public trust doctrine serves several legal purposes: it functions as a restriction on state governments'—including state agencies'—abilities to undermine the public interests in navigable waters; it provides a legal mechanism and standard of review for judicial review of state agency decision-making; and it allows democratization of the governance processes for allocating natural resources.¹⁶

This Article, however, begins from the premise—which will be developed more extensively in a later work—that focusing too intently on the classic public trust doctrine and its origins vitiates the real import of the public trust doctrine “on the ground” (or, perhaps more accurately, “in the water”). Specifically, it is the individualized state expansions of the classic public trust doctrine and several states' characterizations of their public trust doctrines as adaptable and evolutionary that give these doctrines their legal power in a world where climate change adaptation is and will become increasingly necessary.

Climate change impacts to water resources are occurring and will likely be quite severe in many locations, but uncertainties remain regarding the precise magnitude of these impacts, the timeframes over which they will occur, and their interactions with other climate change impacts and human activities. These uncertainties underscore the important roles for both the common law's flexibility and adaptability in general, and evolutionary state public trust doctrines in particular, with respect to both climate change adaptation and adaptive management.

Part I of this Article reviews the potential effects of climate change on water resources, the need for climate change adaptation, and the role of adaptive management in effectuating such adaptation. Part II reviews the federal law contours of state public trust doctrines—the legal principles that

14. Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 452 (1892).

15. *Id.* at 452–53.

16. Richard J. Lazarus, *Changing Conceptions of Property and Sovereignty in Natural Resources: Questioning the Public Trust Doctrine*, 71 IOWA L. REV. 631, 641–43 (1986); Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471, 556–65 (1970).

this Article refers to as the “classic public trust doctrine.” These principles still ground and inform state common-law public trust doctrines; indeed, in a few states, they remain the limits of the state’s willingness to protect public rights and values in waters.¹⁷

Building on this background, Part III begins by detailing the historical evolutions of the public trust doctrine in the United States from both its commonly understood English common law origins and from the classic statement of the doctrine by the U.S. Supreme Court. These evolutions have already included the early adoption of a navigable-in-fact test to identify navigable waters subject to public rights; adaptations of the doctrine to reflect local needs and priorities; and the contemporary and emerging creations of state ecological public trust doctrines.

Part III ends by showing that several states have more explicitly embraced this common-law adaptability, consciously describing their public trust doctrines as evolutionary and responsive to changing public need. In these states, the public trust doctrine has become more than just one means of re-balancing public and private rights. It has also become an open acknowledgement that the public/private balance in water resources is by definition an evolving relationship that must respond to new information, new articulations of values, and new public and private needs and opportunities. Unusually among property doctrines, therefore, these state public trust doctrines are already adaptive and hence of potentially great value in climate change adaptation and its supporting adaptive management regimes.

I. CLIMATE CHANGE, WATER RESOURCES, AND ADAPTATION

A. *Climate Change Impacts on Water Resources*

Climate change is altering water resources in the United States and will continue to do so for several centuries.¹⁸ Climate change, of course, is the result of increasing concentrations of greenhouse gases, especially carbon dioxide (CO₂), in the atmosphere. Concentrations of these gases have been

17. *See, e.g.*, *People v. Emmert*, 597 P.2d 1025, 1026–30 (Colo. 1979) (adhering to the federal commerce test of navigability and refusing to extend the state public trust doctrine to protect recreational uses).

18. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *CLIMATE CHANGE 2007: SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS* 7–10 (Nov. 2007) [hereinafter 2007 IPCC SYNTHESIS REPORT]; U.S. CLIMATE CHANGE RESEARCH PROGRAM, *GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES: A STATE OF KNOWLEDGE REPORT* 41 (2009) [hereinafter 2009 U.S. CLIMATE CHANGE IMPACTS REPORT] (“Evidence is mounting that human-induced climate change is already altering many of the existing patterns of precipitation in the United States, including when, where, how much, and what kind of precipitation falls.”).

building since the Industrial Revolution.¹⁹ Their most immediate effect is increased air temperatures, but those increasing air temperatures lead fairly immediately to changes in water resources.²⁰ As the U.S. Global Change Research Program (USGCRP) recently noted:

Substantial changes to the water cycle are expected as the planet warms because the movement of water in the atmosphere and oceans is one of the primary mechanisms for the redistribution of heat around the world. . . . A warmer climate increases evaporation of water from land and sea, and allows more moisture to be held in the atmosphere. For every 1°F rise in temperature, the water holding capacity of the atmosphere increases by about 4 percent. In addition, changes in atmospheric circulation will tend to move storm tracks northward with the result that dry areas will become drier and wet areas wetter. Hence, the arid Southwest is projected to experience longer and more severe droughts from the combination of increased evaporation and reductions in precipitation.²¹

The Southeast is also expected to experience decreased precipitation and increased drought, while overall precipitation increases are projected for the Northeast, Midwest, and Alaska.²²

The USGCRP detailed many of the expected climate change impacts on water resources in the United States. For example, it noted that:

Changes in the water cycle, which are consistent with the warming observed over the past several decades, include:

- changes in precipitation patterns and intensity
- changes in the incidence of drought
- widespread melting of snow and ice
- increasing atmospheric water vapor
- increasing evaporation
- increasing water temperatures

19. 2007 IPCC SYNTHESIS REPORT, *supra* note 18, at 5.

20. U.S. ENVIRONMENTAL PROTECTION AGENCY, DRAFT: NATIONAL WATER PROGRAM STRATEGY: RESPONSE TO CLIMATE CHANGE 6–7 (2008), available at http://www.epa.gov/ow/climatechange/docs/3-27-08_ccdraftstrategy_final.pdf [hereinafter 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY].

21. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 41–42.

22. *Id.* at 42.

- reductions in lake and river ice
- changes in soil moisture and runoff[.]²³

In addition, across the country more precipitation will fall as rain rather than snow, decreasing snowpack storage and late summer flows from snowmelt.²⁴

The U.S. Environmental Protection Agency (EPA) has offered its own summary of climate change impacts on U.S. water supplies, with overlapping but different emphases. According to the EPA:

Today, the scientific consensus on climate change is changing our assumptions about water resources. Over the coming years, we in the United States can expect:

- shorelines to move as a result of sea level rise;
- changes in ocean chemistry to alter aquatic habitat and fisheries;
- warming water temperatures to change contaminant concentrations in water and alter aquatic system uses;
- new patterns of rainfall and snowfall to alter water supply for drinking and other uses and lead to changes in pollution levels in aquatic systems; and
- more intense storms to threaten water infrastructure and increase polluted storm water runoff.

There remains significant uncertainty about the exact scope and timing of climate change–related impacts on water resources²⁵

These changes in water resources will have a variety of impacts on human uses of water and coupled socio-ecological systems that individual states will consider relevant to their public trust doctrines. As noted, the public trust doctrine classically protects public navigation, commerce, fishing,²⁶ and many states have extended such protections to public recreation as well.²⁷ Increasing numbers of states are also applying their public trust doctrines to ecological preservation (what I have elsewhere termed “ecological public trust doctrines”²⁸) and to water rights and water

23. *Id.* at 41.

24. *Id.* at 42.

25. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at Foreword.

26. Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 452 (1892).

27. See discussion *infra* Part III.C.2.

28. 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.*

resource management.²⁹ Given these public trust foci, three of the most important climate-change-driven alterations to water resources in this respect are: (1) changes in hydrological and flow regimes that could affect water transportation and recreation; (2) changes in water supply, in terms both of amount of water and of timing of flows; and (3) changes in aquatic and riparian ecosystems, which—as in Montana—could affect, among other things, fishing and water-based hunting.³⁰

1. Impacts on Navigation and Boat-Based Recreation

Changes in hydrological and flow regimes are likely to alter aquatic transportation and boat-based recreation in many parts of the country. As noted, climate change is already changing the timing of water supplies in many parts of the country, especially those that rely on snow melt for late spring, summer, and early fall flows. Thus, in the West and Northeast streamflows based on snowmelt are expected to peak one to four weeks earlier than has been true historically because of warming from climate change.³¹ In places where recreational use of rivers, such as white-water rafting and kayaking, depends on these peak flows, recreational uses will accordingly also be shifted.

More general alternations of flow regimes could also affect boat-based recreation and transportation. For example, runoff feeding streamflows is expected to decrease in all parts of the West, especially the interior Southwest.³² In areas where boating (recreational or commercial) is already marginal, decreased flows may seriously impair or eliminate navigation.

In contrast, both streamflows and flooding will generally be increasing in the Midwestern and Northeastern regions of United States.³³ The USGCRP recently emphasized that warming can produce increased as well as decreased precipitation, “and more precipitation comes in heavier rains (which can

80–91 (2010).

29. *Id.* at 84–86 (describing California’s management) and 86–88 (describing Hawaii’s management).

30. *See* 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 41.

The impacts of climate change include too little water in some places, too much water in other places, and degraded water quality. Some locations are expected to be subject to all of these conditions during different times of the year. Water cycle changes are expected to continue and to adversely affect energy production and use, human health, transportation, agriculture, and ecosystems

Id.

31. *Id.* at 43.

32. *Id.* at 45.

33. *Id.* at 43, 45; 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at 11, 13, 71.

cause flooding) rather than light events.”³⁴ Over the last century, precipitation in the United States as a whole has been increasing, and “the heaviest 1 percent of rain events increased by nearly 20 percent[,]” especially in the Northeast.³⁵ “[E]xtended periods of heavy precipitation have also been increasing over the past century, most notably in the past two to three decades in the United States.”³⁶ Like decreased flows, these climate-change-driven flooding events could impair traditional navigation and recreational boating patterns, although for safety reasons rather than because of lack of water.

Climate change is also likely to result in a number of negative impacts for water-related recreation, with consequent effects on recreation- and tourism-dependent economies. As the USGCRP noted, “[w]eather conditions are an important factor influencing tourism visits[,]” and climate change is likely to influence both local and tourist use of lakeshores and rivers for activities such as swimming and ice fishing.³⁷

2. Impacts on Water Supply

Of perhaps more immediate importance, although less traditionally associated with the public trust doctrine, public water supplies are also at risk from climate change.³⁸ The USGCRP has pointed out that:

In 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.³⁹

The USGCRP did note that water supply systems are generally built with spare capacity and that “[w]ater resource planning today considers a broad range of stresses and hence adaptation to climate change will be one factor among many in deciding what actions will be taken to minimize vulnerability.”⁴⁰ However, with increasing temperatures and increasing populations come increasing needs for electricity for cooling—and

34. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 44.

35. *Id.*

36. *Id.*

37. *Id.* at 88.

38. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at ii.

39. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 47.

40. *Id.* at 48.

increasing withdrawals of cooling water at power plants. As a result, “[i]ndustrial and municipal demands [for water] are expected to increase slightly[]” as a result of climate change.⁴¹

The U.S. Bureau of Reclamation has already identified several areas in the western United States where water conflicts and crises are likely to occur by 2025 even *without* additional stresses from climate change.⁴² Conflicts affecting water supply, induced at least in part by water stress, are already becoming common throughout the country, often but not always driven legally by the federal Endangered Species Act.⁴³ In addition, “[c]limate change will present a new set of challenges for designing upgrades to the nation’s water delivery and sewage removal infrastructure[,]” particularly because of more frequent flooding events and increases and shifts in human populations.⁴⁴

Drought will be one source of water supply stress from climate change. Increasing periods of drought are expected in many parts of both the western and eastern United States,⁴⁵ and “[t]he number of dry days between precipitation events is also projected to increase, especially in the more arid areas.”⁴⁶ The Southwest and mid-continental areas are particularly vulnerable.⁴⁷ Repeated periods of prolonged drought will disrupt the year-to-year regularity of water supplies in these regions, requiring multi-year water supply planning, conservation, and changes in storage patterns. History suggests that climate-change-induced droughts could be much worse than anything Americans are prepared to cope with:

Multi-decade “megadroughts” in the years 900 to 1300 were substantially worse than the worst droughts of the last century, including the Dust Bowl era. The causes of these events are only partially known; if they were to reoccur, they would clearly stress water management, even in the absence of climate change⁴⁸

41. *Id.* at 49; *see also* 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at 20–22 (discussing the relationship between energy demands and water supply).

42. U.S. BUREAU OF RECLAMATION, WATER 2025: PREVENTING CRISES AND CONFLICTS IN THE WEST 9 (2005), *available at* <http://biodiversity.ca.gov/Meetings/archive/water03/water2025.pdf>.

43. Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 869–78 (2008); *see also* 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 48–49 (discussing some existing water disputes in water-stressed areas).

44. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 48.

45. *Id.* at 43.

46. *Id.* at 44.

47. *Id.*

48. *Id.* at 49.

Seasonal disruptions of traditional water supply expectations are also occurring and increasingly likely. As noted, late summer and early fall flows are expected to decrease in many parts of the country, especially the West, as a result of decreasing overall snowpack and earlier melting.⁴⁹ As the USGCRP observed:

Over the last 50 years, there have been widespread temperature-related reductions in snowpack in the West, with the largest reductions occurring in lower elevation mountains in the Northwest and California where snowfall occurs at temperatures close to the freezing point. The Northeast has also experienced snowpack reductions during a similar period.⁵⁰

Changes in base snowpack combine with earlier snow melting to cause seasonal shortages in water supply that are already being felt in places like Montana:

Runoff in snowmelt-dominated areas is occurring up to 20 days earlier in the West, and up to 14 days earlier in the Northeast. Future projections for most snowmelt-dominated basins in the West consistently indicate earlier spring runoff, in some cases up to 60 days earlier. For the Northeast, projections indicate spring runoff will advance by up to 14 days. Earlier runoff produces lower late-summer streamflows, which stress human and environmental systems through less water availability and higher water temperatures.⁵¹

Sea-level rise poses a different kind of water supply threat to low-lying coastal states like Florida and Louisiana.⁵² The average global sea level is rising in response to climate change.⁵³ As salt water rises along the nation's coasts, it will invade coastal streams, rivers, lakes, and aquifers, a process known as saltwater intrusion.⁵⁴ Such changes in salinity are likely to render coastal fresh water unusable for many human needs.

49. *Id.* at 42, 43.

50. *Id.* at 45.

51. *Id.* at 45–46.

52. *Id.* at 43.

53. 2007 IPCC SYNTHESIS REPORT, *supra* note 18, at 7–8.

54. *Id.* at 13; *see also* 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 47 (“Sea-level rise is expected to increase saltwater intrusion into coastal freshwater aquifers, making some unusable without desalination.”).

Outside of predictable effects from saltwater intrusion, the effects of climate change on groundwater supplies are more uncertain.⁵⁵ Nevertheless, “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.”⁵⁶ Moreover, groundwater and surface water resources are often connected, such that climate-change-induced changes in surface water resources could also affect groundwater supplies.⁵⁷ As a result, according to the USGCRP, “[s]hallow groundwater aquifers that exchange water with streams are likely to be the most sensitive part of the groundwater system to climate change.”⁵⁸

Finally, climate change will complicate water supply management by undermining—or completely obliterating—managers’ abilities to rely on past assumptions and models. As the USGCRP pointed out:

Water planning and management have been based on historical fluctuations in records of stream flows, lake levels, precipitation, temperature, and water demands. All aspects of water management including reservoir sizing, reservoir flood operations, maximizing urban stormwater runoff amounts, and projected water demands have been based on these records. Water managers have proven adept at balancing supplies and demand through the significant climate variability of the past century. Because 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.⁵⁹

As a result, adaptability and flexibility will be critical.⁶⁰

3. Impacts on Aquatic, Marine, and Riparian Ecosystems

In connection with the changes to water supply detailed above, climate change will impact aquatic and riparian ecosystems, altering the ecosystem

55. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 46–47.

56. *Id.* at 47.

57. *Id.*

58. *Id.*

59. *Id.* at 49.

60. *Id.* (“The 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.”).

goods and services upon which humans depend.⁶¹ For example, most of the United States is experiencing or will experience increasing water temperatures in many streams, lakes, and rivers.⁶² The results could be tremendously disruptive, both economically and otherwise. As noted in the Introduction, trout streams in Montana have in the past supported a \$300 million recreational fishery.⁶³ However, the USGCRP has noted that “[s]almon and other coldwater fish species in the United States are at particular risk from warming.”⁶⁴ These losses are likely to be significant—up to 40% of Pacific Northwest salmon by 2050; about half of wild trout populations in the southern Appalachian Mountains and Pennsylvania; 60% or more of trout populations in the West and about 90% of bull trout; and up to 90% of trout habitat in North Carolina and Virginia.⁶⁵

Increasing water temperatures also change the chemical reactivity of water and its components. For example, as water in lakes, reservoirs, and rivers warms, its capacity to hold dissolved oxygen decreases, reducing the water body’s ability to support animal life.⁶⁶ According to the USGCRP, “[l]ow oxygen stresses aquatic animals such as coldwater fish and the insects and crustaceans on which they feed. Lower oxygen levels also decrease the self-purification capabilities of rivers.”⁶⁷

In January 2009, researchers at the University of Copenhagen, Denmark, reported similar effects in the world’s oceans.⁶⁸ Specifically, their modeling predicted significant losses of dissolved oxygen in surface ocean waters over the next two centuries because of rising temperatures caused by climate change, with a related expansion of ocean “dead zones” (hypoxic zones) that support little to no life.⁶⁹

Climate change will also make existing water pollution worse.⁷⁰ As the USGCRP summarized:

The negative effects of water pollution, including sediments, nitrogen from agriculture, disease pathogens, pesticides, herbicides, salt, and thermal pollution, will be

61. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at ii, iii.

62. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 46.

63. *Trout and Drought*, *supra* note 7.

64. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 87.

65. *Id.*

66. *Id.* at 46.

67. *Id.*

68. Gary Shaffer, Steffen Malskaer Olsen & Jens Olaf Pepke Pedersen, *Long-term Ocean Oxygen Depletion in Response to Carbon Dioxide Emissions from Fossil Fuels*, 2 NATURE GEOSCIENCE 105 (2009).

69. *Id.* at 105–08.

70. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at ii.

amplified by observed and projected increases in precipitation intensity and longer periods when streamflows are low. The U.S. Environmental Protection Agency expects the number of waterways considered “impaired” by water pollution to increase. Heavy downpours lead to increased sediment in runoff and outbreaks of waterborne diseases. Increases in pollution carried to lakes, estuaries, and the coastal ocean, especially when coupled with increased temperature, can result in blooms of harmful algae and bacteria.⁷¹

However, the USGCRP has also noted that, in those areas of the country with sustained *increases* in water flows, climate change may actually decrease water pollution problems by increasing the dilution of pollutants.⁷²

Other kinds of climate-change-driven alterations of water conditions are also occurring. For example, the build-up of greenhouse gases like carbon dioxide in the atmosphere can promote chemical interactions between air and water that change water quality, affecting the relevant aquatic ecosystems. Ocean acidification is one of the most studied of these climate change impacts.⁷³ Ocean acidification begins when carbon dioxide in the atmosphere dissolves into seawater.⁷⁴ Once dissolved, carbon dioxide reacts with the seawater to form carbonic acid⁷⁵—the same reaction that gives sodas their fizz and their ability to dissolve tooth enamel.

The oceans are naturally basic, with a pH of about 8.16, and that pH level has been remarkably stable over geological time.⁷⁶ However, since the Industrial Revolution, the average ocean surface water pH has dropped by 0.1 units.⁷⁷ While this change may seem small, the pH scale is logarithmic, so that a pH decrease of 0.1 units means that the oceans have become 30% more acidic in the last 250 years.⁷⁸ Moreover, the ocean’s pH is expected to drop another 0.3 to 0.4 units by the end of the century as a result of the increasing carbon dioxide concentrations in the atmosphere.⁷⁹ Decreasing

71. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 46. The EPA’s view of climate change and water pollution is presented in the 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20.

72. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 46.

73. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at 18.

74. OCEAN ACIDIFICATION: A SUMMARY FOR POLICYMAKERS FROM THE SECOND SYMPOSIUM ON THE OCEAN IN A HIGH-CO₂ WORLD 2 (2009), available at <http://www.ocean-acidification.net/OAdocs/SPM-lorezv2.pdf>.

75. *Id.*

76. *Ocean Acidification: Another Undesired Side Effect of Fossil Fuel-burning*, SCIENCE DAILY, May 24, 2008, <http://www.sciencedaily.com/releases/2008/05/080521105151.htm>.

77. OCEAN ACIDIFICATION, *supra* note 74, at 3.

78. *Id.*

79. *Id.* at 5.

pH is projected to reduce the availability of calcium carbonate by about 60% by the end of the century.⁸⁰ A number of marine organisms such as corals, mussels, snails, sea urchins, and certain types of microscopic plants and animals (calcareous phytoplankton and zooplankton, respectively) use calcium carbonate to build their shells, and lab testing has demonstrated that many species cannot survive well in water at pH levels equal to the projected decreases.⁸¹ Moreover, ocean acidification can cause acidosis, the buildup of carbonic acid in organisms' bodily fluids, which in turn can cause "lowered immune response, metabolic depression, behavioural depression affecting physical activity and reproduction, and asphyxiation."⁸²

Changing interactions between salt water and fresh water systems are also likely to affect aquatic and marine ecosystems.⁸³ As noted, sea level is rising in response to climate change, altering the fresh water/salt water interface in many parts of the United States. At the same time, however, increased rainfall and flooding in the eastern United States may alter the delicate salinity balance in many estuaries, those ecosystems where freshwater streams and rivers flow into the oceans. Estuaries are more sensitive than many aquatic ecosystems to changes in salinity and thus are likely to experience water quality problems and loss of ecosystem productivity as a result of climate change.

B. The Need for Adaptation and Adaptive Management

As the above discussion makes clear, climate change is altering the fundamental environmental conditions that support humans' and other species' use of water, including: timing and amount of precipitation; timing and amount of snowmelt; flow regimes; water temperatures; and water chemistry. Such changes will last over several decades and probably several centuries.⁸⁴ Moreover, over that long term, these changes are certain to exacerbate existing conflicts regarding the "proper" use and allocation of water between public uses and values and private rights, especially because climate change is likely to directly impact uses protected by state common-law public trust doctrines.

80. *Ocean Acidification*, *supra* note 76.

81. *Id.*

82. The Ocean Acidification Network, How Will Ecosystems be Affected?, <http://ioc3.unesco.org/oanet/FAQeco.html> (last visited Jan. 26, 2010).

83. 2008 EPA DRAFT NATIONAL WATER PROGRAM STRATEGY, *supra* note 20, at ii.

84. Robin Kundis Craig, "Stationarity is Dead" – *Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 14, 23–24 and sources cited in n.75 (2010).

Thus, adapting to the changing realities of water resources is and will be necessary. At the extreme, Americans cannot persist in past use patterns when future realities will make those patterns impossible to sustain—trout cannot survive in trout streams because of increased water temperatures or water rights cannot be satisfied because of lack of water. Even before such uses become impossible, however, adjustments in water use patterns are likely to become necessary.

What is known about climate change impacts confirms that adaptation will be necessary. However, the many uncertainties still shrouding the details of what the particular climate change impacts will be in specific areas counsel strongly in favor of an adaptive management approach.⁸⁵ Adaptive management is a “learn by doing process” that acknowledges a lack of complete understanding of the resource being managed and that actively incorporates monitoring, data gathering, and evaluation as part of the management process, with regular and iterative evaluations of whether current management approaches still make sense and match overall management goals.⁸⁶ Researchers in many disciplines, at a variety of institutions, and at all levels of government have already concluded that adaptive management of natural resources is the best and necessary approach to climate change adaptation.⁸⁷

85. *Id.* at 65–67.

86. J.B. Ruhl, *Regulation by Adaptive Management—Is It Possible?*, 7 MINN. J. L. SCI. & TECH. 21, 28–30, 38 (2005).

87. *E.g.*, Emma L. Tompkins & W. Neil Adger, *Does Adaptive Management of Natural Resources Enhance Resilience to Climate Change?*, 9 ECOLOGY & SOC’Y 10–20 (2004), available at <http://www.ecologyandsociety.org/vol9/iss2/art10/>; DEP’T OF ENV’T & HERITAGE, AUSTRALIAN GOV’T, CLIMATE CHANGE IMPACTS & RISK MANAGEMENT: A GUIDE FOR BUSINESS AND GOVERNMENT 19–21 (2006), available at <http://www.climatechange.gov.au/community/local-government/~media/publications/local-govt/risk-management.ashx> (recommending adaptive management strategies in a risk management approach to adapting to climate change); International Council for Local Environmental Initiatives (ICLEI) Oceania, *Adaptive and Resilient Communities (ARC) Program: Local Government Climate Change Adaptation Toolkit*, <http://www.iclei.org/index.php?id=adaptation-toolkit> (last visited July 2, 2009) (recommending the Australian Government’s risk management/adaptive management approach); Tony Prato & Dan Fagre, *Coping with Climate Change*, ACTIONBIOSCIENCE.ORG, Oct. 2006, http://www.actionbioscience.org/environment/prato_fagre.html (“Adaptive management (AM) is a science- and information-based approach that is well suited for managing natural resources for climate and landscape change.”). According to the Massachusetts Department of Fish and Game:

The uncertainty surrounding the extent and potential impacts of climate change requires a flexible management approach that can be continually revised and adapted. The Department’s adaptive management strategies are iterative processes where monitoring and assessment continually refine our policies and management decisions. By closely linking research and management we are better able to anticipate and respond to the effects of climate change.

Commonwealth of Massachusetts Department of Fish & Game, *Adapting to Climate Change*, <http://www.mass.gov/dfwele/climatechange.htm> (last visited Jan. 26, 2010). Joshua Lawler suggests the following:

Adaptive management, however, requires supportive legal regimes that allow for flexibility in management decisions, in the sense of allowing managers to adjust and even completely alter management programs in response to increased understanding and/or changing conditions. Although water law has historically been adaptable and remains so compared to other property institutions, institutional and legal barriers have developed in the United States that, if not balanced by countervailing legal doctrines promoting flexibility, will function as barriers to adaptive management of water resources. These actual and potential barriers include water allocation agreements, such as treaties, interstate compacts, and court decrees, which are difficult to modify; reservoir “rule curves” designed to allow projects to capture seasonal flood waters, changes of which require a full Environmental Impact Statement analysis under the National Environmental Policy Act (NEPA)⁸⁸ and, in many cases, full Section 7 consultations under the Endangered Species Act;⁸⁹ the western prior appropriation doctrine and water rights established under it, which are generally considered vested property rights protected by the Takings Clauses in the Fifth and Fourteenth Amendments of the U.S. Constitution and their equivalents in most state constitutions; and water-law-based disincentives to water conservation, such as forfeiture of water rights for non-use.⁹⁰ Cumbersome administrative procedure requirements and public meetings laws have also been identified as barriers to active adaptive management.⁹¹

While state public trust doctrines cannot remove all of these barriers, in many states they have already successfully negotiated some of them, such as private property rights. Moreover, because almost all state public trust doctrines are based in state common law, they retain an ability to evolve to meet new circumstances. Indeed, in several states there is already an explicit expectation of such future evolution.

Nevertheless, state common law public trust doctrines have distinct and important ties to federal law. Because those contours continue to inform the

What is new is a turning toward a more agile management perspective. To address climate change, managers will need to act over different spatial and temporal scales. The focus of restoration will need to shift from historic species assemblages to potential future ecosystem services. Active adaptive management based on potential future climate impact scenarios will need to be a part of everyday operations. And triage will likely become a critical option.

Joshua J. Lawler, *Climate Change Adaptation Strategies for Resource Management and Conservation Planning*, 1162 ANNALS OF THE N.Y. ACAD. OF SCI. 79, 79 (2009).

88. National Environmental Policy Act, 42 U.S.C. §§ 4321–4370f (2006).

89. Endangered Species Act, 16 U.S.C. § 1536(a)(2) (2006).

90. 2009 U.S. CLIMATE CHANGE IMPACTS REPORT, *supra* note 18, at 49–50.

91. Craig, *supra* note 84, at 65–67; Ruhl, *supra* note 86, at 37–55.

states' public trust doctrines, this Article next presents a brief overview of relevant federal principles.

II. THE FEDERAL CONTOURS OF STATE PUBLIC TRUST DOCTRINES

While most of the relevance of state public trust doctrines for climate change adaptation derives from their status as state common law, as will be discussed in Part III, several foundational aspects of those doctrines—including the most classic statement of the public trust doctrine—come from the U.S. Supreme Court and federal law. This Part thus provides a brief overview of the federal contours of the public trust doctrine that continue to inform state common law, including: (1) the recognition that governmental/public control of waters—classically, navigable waters—is important to sovereign well-being; (2) the consequent limitations on governments' abilities to alienate such waters and on private title in them; (3) states' acquisition of title to the beds and banks of waters navigable under federal law; and (4) the Supreme Court's recognition of the public trust doctrine in American law.

A. *The Importance of Navigable Waters to Sovereign Well-Being*

As has been extensively discussed by scholars, the public trust doctrine has an extensive history dating back to Roman law.⁹² Such principles also have a long history in English common law,⁹³ and “[t]he Magna Carta provided that the Crown would remove ‘all fish-weirs . . . from the Thames and the Medway and throughout all England, except on the sea coast.’”⁹⁴

92. For example, the U.S. Supreme Court has traced the protections for public rights in water to the Institutes of Justinian, which stated that “[r]ivers and ports are public; hence the right of fishing in a port, or in rivers are in common[.]” *Idaho v. Coeur d’Alene Tribe of Idaho*, 521 U.S. 261, 284 (1997) (internal quotes and citation omitted). For more extensive discussions of the public trust doctrine’s history, see Jeffrey W. Henquinet & Tracy Dobson, *The Public Trust Doctrine and Sustainable Ecosystems: A Great Lakes Fisheries Case Study*, 14 N.Y.U. ENVTL. L.J. 322, 324–30 (2006); Allan Kanner, *The Public Trust Doctrine, Parens Patriae, and the Attorney General as the Guardian of the State’s Natural Resources*, 16 DUKE ENVTL. L. & POL’Y F. 57, 61–86 (2005); Lazarus, *supra* note 16, at 633–36; Eric Nelson, *The Public Trust Doctrine and the Great Lakes Glass v. Goeckel*, 11 ALB. L. ENVTL. OUTLOOK J. 131, 136–40 (2006); Sax, *supra* note 16, at 475–91; George D. Smith II & Michael W. Sweeney, *The Public Trust Doctrine and Natural Law: Emanations within a Penumbra*, 33 B. C. ENVTL. AFF. L. REV. 307, 310–14 (2006); Barton H. Thompson, *The Public Trust Doctrine: A Conservative Reconstruction and Defense*, 15 SOUTHEASTERN ENVTL. L.J. 47, 50–54 (2006).

93. “The special treatment of navigable waters in English law was recognized in Bracton’s time. He stated that ‘[a]ll rivers and ports are public, so that the right to fish therein is common to all persons. The use of river banks, as of the river itself, is also public.’” *Coeur d’Alene Tribe of Idaho*, 521 U.S. at 284 (quoting 2 H. BRACTON, DE LEGIBUS ET CONSUEUDINIBUS ANGLIAE 40 (George E. Woodbine ed., S. Thorne transl., 1968)).

94. *Id.* (quoting SOURCES OF ENGLISH LEGAL AND CONSTITUTIONAL HISTORY 53 (M. Evans &

Bringing this tradition to the United States, the Court declared in 1842 that

when the [American] Revolution took place, the people of each state became themselves sovereign; and in that character hold the absolute right to all their navigable waters and the soils under them for their own common use, subject only to the rights since surrendered by the Constitution to the general government.⁹⁵

The historical persistence of a public trust concept reflects a pragmatic recognition that relinquishing public ownership and control of waters—especially navigable waters—to private control and profit is likely to undermine the overall well-being of a nation or state. As the U.S. Supreme Court has recognized, “navigable waters uniquely implicate sovereign interests.”⁹⁶ Indeed, Richard Lazarus has pointed out that “[f]ederal insistence that navigable waterways were subject to special public rights and, therefore, national sovereign authority, was first formalized when states attempted to grant exclusive franchises to navigate their waterways.”⁹⁷

Thus, in 1892 the U.S. Supreme Court adopted the New York courts’ view that:

“The title to lands under tide waters, within the realm of England, were, by the common law, deemed to be vested in the king as a public trust, to subserve and protect the public right to use them as common highways for commerce, trade and intercourse. The king, by virtue of his proprietary interest could grant the soil so that it should become private property, but his grant was subject to the paramount right of public use of navigable waters, which he could neither destroy nor abridge. . . .

. . . .

“The principle of the common law to which we have adverted is founded upon the most obvious principles of public policy. The sea and navigable rivers are natural highways, and any obstruction to the common right, or exclusive appropriation of their use[] is injurious to commerce, and if permitted at the will of the sovereign, would be very likely to end in materially crippling, if not destroying it. The laws of most nations have sedulously guarded the public use of navigable waters within

R. Jack eds., 1984) and citing *Martin v. Waddell*, 41 U.S. (16 Pet.) 367, 410–13 (1842) (“tracing tidelands trusteeship back to Magna Carta”).

95. *Martin*, 41 U.S. at 410.

96. *Coeur d’Alene Tribe of Idaho*, 521 U.S. at 284.

97. Lazarus, *supra* note 16, at 636–37 (citing *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1 (1824)).

their limits against infringement, subjecting it only to such regulation by the State, in the interest of the public[] as is deemed consistent with the preservation of the public right.”⁹⁸

In so doing, the Court, like the New York courts before it, connected the overall protection of public rights in navigable waters to the protection and promotion of commerce and economic growth as a matter of overriding public policy.

In federal law, the U.S. Supreme Court has formalized the impulse to protect public rights in navigable waters as the rather static federal navigation servitude.⁹⁹ The states’ public trust doctrines, through an odd fusion of federal law basics and state common-law innovation, have allowed for more dynamic interpretation of that same impulse.¹⁰⁰

98. Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 458 (1892) (omissions not recognized by court) (quoting *People v. N.Y. and Staten Island Ferry Co.*, 1877 WL 11834, at *4 (N.Y. 1877)); *see also* *Shively v. Bowlby*, 152 U.S. 1, 11 (1894). The Court in *Shively* stated:

By the common law, both the title and the dominion of the sea, and of rivers and arms of the sea, where the tide ebbs and flows, and of all the lands below high water mark, within the jurisdiction of the Crown of England, are in the King. Such waters, and the lands which they cover, either at all times, or at least when the tide is in, are incapable of ordinary and private occupation, cultivation and improvement; and their natural and primary uses are public in their nature, for highways of navigation and commerce, domestic and foreign, and for the purpose of fishing by all the King’s subjects. Therefore the title, *jus privatum*, in such lands, as of waste and unoccupied lands, belongs to the King as the sovereign; and the dominion thereof, *jus publicum*, is vested in him as the representative of the nation and for the public benefit.

Id. But see the Florida Constitution, which states:

The title to lands under navigable waters, within the boundaries of the state, *which have not been alienated* . . . is held by the state, by virtue of its sovereignty, in trust for all the people. *Sale of such lands may be authorized by law, but only when in the public interest.*

FLA. CONST. art. 10, § 11 (emphasis added).

99. *Lazarus*, *supra* note 16, at 637 (citing *Louisville Bridge Co. v. United States*, 242 U.S. 409, 424 (1917)); *United States v. Bellingham Bay Boom Co.*, 176 U.S. 211, 215–16 (1900); *Gilman v. Philadelphia*, 70 U.S. (3 Wall.) 713, 724–25 (1866); *Pennsylvania v. Wheeling & Belmont Bridge Co.*, 54 U.S. (13 How.) 518, 577–78 (1851)).

100. The Delaware courts, as one extreme example, have made it clear that the Delaware public trust doctrine includes the state’s police powers to regulate, “including the protection of life, health, comfort, and property or the promotion of public order, morals, safety, and welfare.” *Groves v. Sec’y, Dep’t of Natural Res. & Envtl. Control*, 1994 WL 89804, at *6 (Del. Super. Ct. 1994). In addition, the courts have expressed dissatisfaction with the argument that fishing and navigation are the *only* public uses allowed in navigable waters and concluded instead that the state has authority to protect the public interest beyond those two uses. *State ex. rel. Buckson v. Pa. R.R. Co.*, 228 A.2d 587, 603–05 (Del. Super. Ct. 1967). Nevertheless, except as prohibited by the federal navigation servitude, the state legislature “may impair or take away these public rights [navigation and fishing] for public purposes.” *Bailey v. Philadelphia, Wilmington & Baltimore R.R. Co.*, 4 Del. (4 Harr.) 389, 1846 WL 726, at *1 (Del. 1846).

B. Limitations on Private Title in Navigable Waters

One important aspect of the public trust doctrine is that it limits states' ability to abdicate sovereign control over navigable waters, generally by acting as a restriction on alienation of title. Thus, for example, federal patents conveying properties riparian to the most traditional navigable waters, tidelands, do *not* follow the general rule regarding riparian conveyances:

Proprietors, bordering on streams not navigable, unless restricted by the terms of their grant, hold to the centre of the stream; but the better opinion is, that proprietors of lands bordering on navigable rivers, under titles derived from the United States, hold only to the stream, as the express provision is, that all such rivers shall be deemed to be, and remain public highways.¹⁰¹

This limitation also applies to federal patents conveying land bordering navigable-in-fact waters.¹⁰²

C. State Title to the Beds and Banks of the Navigable Waters

State implementations of their public trust doctrines have their starting point in state ownership of the beds and banks of navigable waters. The original 13 states acquired title to beds and banks underlying tidal and, as would later be confirmed, navigable-in-fact, nontidal waters as a matter of their conquest of England.¹⁰³ All other states acquired such ownership by operation of the Equal Footing Doctrine, under which all subsequent states were admitted with the

101. *St. Paul & Pacific R.R. Co. v. Schurmeir*, 74 U.S. 272, 287 (1868).

102. *See, e.g., Barney v. City of Keokuk*, 94 U.S. 324, 336 (1876) (stating as a general rule that private title to lands under navigable-in-fact waters extends only to the high-water mark); *Shively*, 152 U.S. at 11, 49–50 (adopting the English common law rule that federal conveyances go to the high-water mark).

103. *Bonelli Cattle Co. v. Arizona*, 414 U.S. 313, 317–18 (1973), *overruled on other grounds by Oregon ex rel. State Land Bd. v. Corvallis Sand & Gravel Co.*, 429 U.S. 363, 387 (1977); *Utah v. United States*, 403 U.S. 9, 10 (1971); *Den ex dem. Russell v. Ass'n of Jersey Co.*, 56 U.S. 426, 433 (1853); *Lessee of Pollard v. Hagan*, 44 U.S. 212, 223 (1845); *Martin v. Lessee of Waddell*, 41 U.S. (16 Pet.) 367, 410 (1842).

same rights as the original 13.¹⁰⁴ A given state's title to navigable waters is fixed as of the date of its admission to the United States.¹⁰⁵

As between the federal government and the states, the default rule and strong presumption is that the relevant state owns the beds of the navigable waters within its borders.¹⁰⁶ Sovereign ownership of tidal waters—waters affected by the ebb and flow of the tide—arises as a direct adoption of English common law.¹⁰⁷ Moreover, the U.S. Supreme Court clarified in 1988 that states own the beds of *all* tidal waters, whether or not those waters are navigable-in-fact.¹⁰⁸

States also own the beds and banks of all navigable-in-fact waters.¹⁰⁹ However, waters must be navigable-in-fact as of the date of the state's admission into the union for the state to receive title.¹¹⁰

Again, state title to the beds and banks of navigable-in-fact waters is a question of federal law, determined in accordance with the federal test of navigability.¹¹¹ Nevertheless, the Supreme Court has not been uniformly consistent in how it defines “navigable-in-fact” waters for these purposes. Under the classic test of navigability from *The Daniel Ball*, waters

are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water. And they constitute navigable waters of the United States within the meaning of the acts of Congress, in contradistinction from the navigable waters of the States, when they form in their ordinary condition by themselves, or by uniting with other waters, a continued highway over which commerce is or may be carried on

104. *Idaho v. United States*, 533 U.S. 262, 272 (2001); *Idaho v. Coeur d'Alene Tribe of Idaho*, 521 U.S. 261, 283–84 (1997); *United States v. Alaska*, 521 U.S. 1, 5 (1997); *Montana v. United States*, 450 U.S. 544, 551 (1981); *Bonelli Cattle Co.*, 414 U.S. at 317–18; *United States v. Holt State Bank*, 270 U.S. 49, 55 (1926); *Shively*, 152 U.S. at 48–50; *Weber v. Bd. of Harbor Comm'rs*, 85 U.S. (18 Wall.) 57, 65–66 (1873); *Mumford v. Wardell*, 73 U.S. (6 Wall.) 423, 436 (1867).

105. *Corvallis Sand & Gravel Co.*, 429 U.S. at 370–71 (citing *Wilcox v. Jackson*, 13 Pet. 498 (1839)).

106. *Idaho*, 533 U.S. at 272–73; *Coeur d'Alene Tribe of Idaho*, 521 U.S. at 283; *Alaska*, 521 U.S. at 34; *Utah Div. of State Lands v. United States*, 482 U.S. 193, 197–98 (1987); *Montana*, 450 U.S. at 552; *Shively*, 152 U.S. at 26–50.

107. *Ill. Cent. R.R. Co. v. Illinois*, 146 U.S. 387, 435 (1892); *Barney*, 94 U.S. at 336–38.

108. *Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469, 476–81 (1988).

109. *Ill. Cent. R.R. Co.*, 146 U.S. at 435–36.

110. *Utah v. United States*, 403 U.S. 9, 10 (1971) (citing *Shively*, 152 U.S. at 26–28; *Martin v. Waddell*, 41 U.S. (16 Pet.) 367, 410, 416–17 (1842)); *United States v. Oregon*, 295 U.S. 1, 14 (1935).

111. *Utah*, 403 U.S. at 10 (citing *The Daniel Ball*, 77 U.S. (10 Wall.) 557, 563 (1870)).

with other States or foreign countries in the customary modes in which such commerce is conducted by water.¹¹²

The Daniel Ball test thus closely aligns navigability with usefulness in interstate commerce, suggesting that waterways must be navigable by fairly large boats and ships.

However, the Supreme Court has also found that a waterway is navigable-in-fact under less demanding measures. For example, in *The Montello*, the Court concluded:

It would be a narrow rule to hold that in this country, unless a river was capable of being navigated by steam or sail vessels, it could not be treated as a public highway. The capability of use by the public for purposes of transportation and commerce affords the true criterion of the navigability of a river, rather than the extent and manner of that use. If it be capable in its natural state of being used for purposes of commerce, no matter in what mode the commerce may be conducted, it is navigable in fact, and becomes in law a public river or highway. Vessels of any kind that can float upon the water, whether propelled by animal power, by the wind, or by the agency of steam, are, or may become, the mode by which a vast commerce can be conducted, and it would be a mischievous rule that would exclude either in determining the navigability of a river. It is not, however, as Chief Justice Shaw said, “every small creek in which a fishing skiff or gunning canoe can be made to float at high water which is deemed navigable, but, in order to give it the character of a navigable stream, it must be generally and commonly useful to some purpose of trade or agriculture.”¹¹³

Moreover, the Court has emphasized that the water need not be “part of a navigable interstate or international commercial highway” in order for the state to take title to its bed.¹¹⁴

Thus, depending on where a state court wants to focus its attention, the U.S. Supreme Court’s statements regarding navigability for state title purposes allow for more liberal and more stringent approaches to claiming title and, as a consequence, asserting and protecting public rights. The

112. *The Daniel Ball*, 77 U.S. (10 Wall.) at 563; see also *Utah*, 403 U.S. at 10–11 (citing *The Daniel Ball* as the first important test of navigability for state title purposes and stating that that test applies to all waters, not just rivers).

113. *The Montello*, 87 U.S. (20 Wall.) 430, 441–42 (1874).

114. *Utah*, 403 U.S. at 10 (citing *United States v. Utah*, 283 U.S. 64, 75 (1931); *Oregon*, 295 U.S. at 14).

Court itself, however, has asserted that its many phrasings all describe the same navigable-in-fact test.¹¹⁵

D. The Public Trust Doctrine as Enunciated in the U.S. Supreme Court

The U.S. Supreme Court most explicitly recognized the existence of the public trust doctrine in the 1892 case of *Illinois Central Railroad Co. v. Illinois*,¹¹⁶ which remains the “lodestar” Supreme Court case in this area.¹¹⁷ The legal basis—federal common law, federal constitutional law, or state law—for some aspects of the Court’s pronouncements regarding the public trust doctrine, such as the alienability of public trust lands, is questionable.¹¹⁸ Such haziness of source, however, did not prevent many states from adopting the Supreme Court’s statements as binding federal law. As Richard Lazarus has observed, “[s]tate courts have repeatedly turned to [federal pronouncements] in the late nineteenth and early twentieth centuries to justify rejecting or at least carefully scrutinizing shortsighted or even corrupt legislative attempts to convey into private hands critical coastal or inland waterway resources.”¹¹⁹

According to the Supreme Court in *Illinois Central Railroad*, the state holds title to lands under submerged lands,

[b]ut it is a title different in character from that which the State holds in lands intended for sale. It is different from the title which the United States hold in the public lands which are open to preemption and sale. It is a title held in trust for the people of the State that they may enjoy the navigation of the waters, carry on commerce over them, and have liberty of fishing therein freed from the obstruction or interference of private parties.¹²⁰

115. *United States v. Utah*, 283 U.S. at 76 (attempting to unify the descriptions of the navigable-in-fact test from *The Daniel Ball*, *The Montello*, and other Supreme Court decisions).

116. *Ill. Cent. R.R. Co. v. Illinois*, 146 U.S. 387 (1892). For discussions of the history of this case and its relationship to state public trust doctrines, see generally Douglas L. Grant, *Underpinnings of the Public Trust Doctrine: Lessons from Illinois Central Railroad*, 33 ARIZ. ST. L.J. 849 (2001); Joseph D. Kearney & Thomas W. Merrill, *The Origins of the American Public Trust Doctrine: What Really Happened in Illinois Central*, 71 U. CHI. L. REV. 799 (2004); Eric Pearson, *Illinois Central and the Public Trust Doctrine in State Law*, 15 VA. ENVTL. L.J. 713 (1996).

117. Lazarus, *supra* note 16, at 640.

118. See, e.g., *Appleby v. City of New York*, 271 U.S. 364, 395 (1926) (stating that the alienability ruling in *Illinois Central* was based on state law); Lazarus, *supra* note 16, at 639–40 (“It is far from clear what source of law the Court was drawing upon to reach its result.”).

119. Lazarus, *supra* note 16, at 640.

120. *Ill. Cent. R.R. Co.*, 146 U.S. at 452.

Thus, the three public uses of waters that the classic public trust doctrine protects are navigation, commerce, and fishing.¹²¹

In addition, according to the *Illinois Central* Court, the doctrine acts as a restraint on the state's ability to alienate the beds and banks of navigable waters or to abdicate regulatory control over those waters:

The interest of the people in the navigation of the waters and in commerce over them may be improved in many instances by the erection of wharves, docks and piers therein, for which purpose the State may grant parcels of the submerged lands; and, so long as their disposition is made for such purpose, no valid objections can be made to the grants. . . . But that is a very different doctrine from the one which would sanction the abdication of the general control of the State over lands under the navigable waters of an entire harbor or bay, or of a sea or lake. Such abdication is not consistent with the exercise of that trust which requires the government of the State to preserve such waters for the use of the public. The trust devolving upon the State for the public, and which can only be discharged by the management and control of property in which the public has an interest, cannot be relinquished by a transfer of the property. The control of the State for the purposes of the trust can never be lost, except as to such parcels as are used in promoting the interests of the public therein, or can be disposed of without any substantial impairment of the public interest in the lands and waters remaining.¹²²

This restraint on alienation—and its perception as a federal law requirement—has been important in several states, notably Arizona.¹²³

121. *Id.*; see also *Shively v. Bowlby*, 152 U.S. 1, 13 (1894) (emphasizing the public rights of fishing and navigation).

122. *Ill. Cent. R.R. Co.*, 146 U.S. at 452–53.

123. See, e.g., *Defenders of Wildlife v. Hull*, 18 P.3d 722, 726 (Ariz. Ct. App. 2001) (relying on *Illinois Central Railroad* to conclude that the restraint on alienation of submerged lands is a common-law rule grounded in the Constitution that invalidates the Arizona legislature's attempts to disclaim or restrict state ownership of those lands).

III. CLIMATE CHANGE ADAPTATION AND THE ADAPTABILITY OF THE COMMON-LAW PUBLIC TRUST DOCTRINE

A. *The General Value of the Common Law in a Climate Change Era*

Climate change's pervasive effects on water resources will demand responsive changes in the law to preserve desired balances between public and private rights in water and the ecosystems and ecosystem services that aquatic systems support.¹²⁴ The common law in all forms, including state public trust doctrines, is likely to play a significant role in this legal adaptation.

Common law is an inherently adaptive institution, a fact that is widely acknowledged.¹²⁵ This adaptability allows the law to respond both to changing social values and to changing social, economic, technological, or ecological realities. In this capacity, as Frank Partnoy has summarized, the common law is generally considered to offer two advantages over other legal institutions: "First, it provides a mechanism for resolving disputes in a fair and efficient manner. Second, it generates a supply of incremental and consistent legal rules that reflect social practice."¹²⁶ In particular, the common law blends flexibility in adapting law to particular facts with the "'stickiness' of precedent," allowing the law to reflect special circumstances, changing conditions, and/or changing norms, while at the same time encouraging judges to be mindful of existing rights and expectations.¹²⁷

It is true that legislatures can provide—and have provided—solutions to emerging legal problems. Indeed, with respect to climate change

124. For a more expansive discussion of legal changes necessary for climate change adaptation, see generally Craig, *supra* note 84.

125. See, e.g., Brooks v. Robinson, 294 N.E.2d 794, 797 (Ind. 1972) ("The strength and genius of the common law lies in its ability to adapt to the changing needs of the society it governs."); Allan C. Hutchinson, *Work-in-Progress: Gadamer, Tradition, and the Common Law*, 76 CHI-KENT L. REV. 1015, 1060 (2000) (noting "the impressive pragmatic strength of the common law in being able to adapt to fresh challenges and new conditions"); Harry Steinberg, *Effect of Changes in Decisional Law on Other Cases Depends Upon Status When New Ruling Is Made*, 71 N.Y. STATE BAR J. 12, 12 (Nov. 1999) ("One of the advantages of our common-law system is that it constantly adapts and changes as society's needs and priorities change.").

126. Frank Partnoy, *Synthetic Common Law*, 53 U. KAN. L. REV. 281, 291 (2005); see also Angela J. Rafoth, *Congress and the Multiparty, Multiforum Trial Jurisdiction Act of 2002: Meaningful Reform or a Comedy of Errors?*, 54 DUKE L.J. 255, 288–89 (2004) ("The primary advantage of the common law approach is its flexibility to deal with the different circumstances of each case or set of cases, because judges can adapt the rules that develop as necessary.").

127. Partnoy, *supra* note 126, at 331 (citation omitted). Partnoy also argues that most of the arguments against use of the common law are rooted in "the economic notion that a common law system is a tragedy of the commons: overuse is rampant, court resources are rationed, and outcomes are inefficient." *Id.* at 300–01 (citing, e.g., Richard A. Epstein, *Law and Economics: Its Glorious Past and Cloudy Future*, 64 U. CHI. L. REV. 1167, 1169–70 (1997)).

adaptation, legislation in the near term could: beneficially identify general priorities for adaptation measures within a given state, fund increased monitoring and studies to identify climate change impacts, require consideration of climate change impacts in governmental decision-making (especially resource allocation), create new general regulatory authorities as the state may deem necessary, and authorize relevant state agencies to engage in adaptive management of natural resources.¹²⁸

However, legislation is unlikely to be an adequate mechanism for addressing the specific and local impacts of climate change, because the extent and severity of specific climate change impacts in specific states and localities are likely to remain uncertain for some time yet.¹²⁹ An additional complication is that society will likely need to adapt to climate change over centuries. Thus, even if near-term impacts become relatively certain and predictable, no adaptation policy enacted in the next decade or so could possibly predict and account for all of the social, demographic, geopolitical, and economic changes guaranteed to occur over the next two to five centuries, let alone the ecological ones. Given these uncertainties and long-term horizon, any climate change legislation seeking to prescribe specific adaptation measures at the waterway level is likely either to fail to survive the legislative process or to emerge in a form that is at best ineffective and at worst obstructive.¹³⁰

Conversely, these impediments to legislation highlight the fact that the problem of adapting to climate change possesses all four of the prominent characteristics of legal problems that have previously generated resurgences in the common law. First, the relevant impacts of climate change are often intensely local, affecting local ecologies, values, and customs. As such, climate change impacts present even greater justifications for state-based legal evolution than did products liability in tort, which generated repeated reliance upon, and justification for, state common-law development.¹³¹

128. See Craig, *supra* note 84, at 40–70 (discussing helpful measures that the law should be undertaking).

129. 2008 EPA DRAFT WATER PROGRAM STRATEGY, *supra* note 20, at 23; Craig, *supra* note 84, at 24–27; see also Partnoy, *supra* note 126, at 298. “Common law rules are more adaptable than codified rules. As society changes, judges can quickly alter the relevant legal rules. Statutes, in contrast, are fixed and difficult to change. The legislature would find it too costly and burdensome to make similar, quick changes to reflect changes in society.” *Id.*

130. See Partnoy, *supra* note 126, at 298 (“Legislation often cannot anticipate future controversies, especially in rapidly changing areas of practice.”).

131. A number of scholars have argued the need for common-law experimentation and/or local law dominance in products liability cases, including: Betsy J. Grey, *The New Federalism Jurisprudence and National Tort Reform*, 59 WASH. & LEE L. REV. 475, 517–18 (2002); Linda S. Mullenix, *Mass Tort Litigation and the Dilemma of Federalization*, 44 DEPAUL L. REV. 755, 768 (1995); Robert L. Rabin, *Federalism and the Tort System*, 50 RUTGERS L. REV. 1, 29 (1997); Mark C. Weber, *Complex Litigation*

Second, climate change is a self-evolving stressor to legal rights and institutions—that is, the processes of climate change will continue to generate ecological and socio-ecological impacts that affect legal rights and obligations irrespective of how the legal system is responding. So characterized, it shares many of the features of rapidly evolving technologies such as the Internet. The legal perturbations that these technologies have caused have led both to a resurgence in common law solutions for problems that prima facially applicable laws did not adequately address and to calls to abandon existing regulatory structures altogether.¹³²

Third, no one is yet quite sure how even to approach the specifics of climate change adaptation, suggesting that this field of law may benefit from the oft-cited “laboratory of the states” aspects of common law in the United States. In this vein, scholars examining emerging taxation systems in Asia have recommended continued reliance on the common law, including borrowing solutions from common law countries around the globe, emphasizing as a “strength” the common law’s ability “to adapt and even lead to change within the community”¹³³

Fourth, the end state and/or end goal of climate change adaptation law is not yet perfectly clear. As such, “the common-law genius for the evolution of law”¹³⁴ could become a very effective tool for adapting the law not only to changing circumstances, but also to changing social goals. Mary Wood, for example, has recognized that in the climate change context:

In light of the climate decision-making vacuum left by the political branches, it is worthy of note that one of the great

and the State Courts: Constitutional and Practical Advantages of the State Forum Over the Federal Forum in Mass Tort Cases, 21 HASTINGS CONST. L.Q. 215, 238–39 (1994); Frances E. Zollors et al., *Looking Backward, Looking Forward: Reflections on Twenty Years of Product Liability Reform*, 50 SYRACUSE L. REV. 1019, 1040–41 (2000). *But see* Samuel Issacharoff & Catherine M. Sharkey, *Backdoor Federalization*, 53 UCLA L. REV. 1353, 1384–85 (2006) (arguing that, unlike most torts, products liability needs federal regulation).

132. See Partnoy, *supra* note 126, at 290 (noting that, despite the tendency “to relegate the common law to the role of historical nicety” in the modern regulatory state, “[i]n a few areas of rapidly evolving technology, common law is experiencing a renaissance, with some scholars advocating common law adjudication as a higher-speed alternative to the often-sluggish modern administrative state”). See generally PETER HUBER, *LAW AND DISORDER IN CYBERSPACE: ABOLISH THE FCC AND LET COMMON LAW RULE THE TELECOSM* 8, 106 (1997); Frank H. Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. CHI. LEGAL F. 207, 215–16 (1996); Bruce P. Keller, *Condemned to Repeat the Past: The Reemergence of Misappropriation and Other Common Law Theories of Protection for Intellectual Property*, 11 HARV. J.L. & TECH. 401, 403 (1998); Lawrence Lessig, *The Path of Cyberlaw*, 104 YALE L.J. 1743, 1752 (1995).

133. Andrew Halkyard & Stephen Phua Lye Huat, *Common Law Heritage and Statutory Diversion—Taxation of Income in Singapore and Hong Kong*, 2007 SINGAPORE J. LEGAL STUD. 1, 24.

134. S. Ronald Ellis, Q.C., *Corporate Responsibility of Tribunal Members—CCAT 2008*, 22 CAN. J. ADMIN. L. & PRAC. 1, 16 (2009).

strengths of the common law has always been its ability to adapt to emerging societal needs. As the Oregon Supreme Court stated long ago:

.....
 “The very essence of the common law is flexibility and adaptability. . . . If the common law should become . . . crystallized . . ., it would cease to be the common law of history, and would be an inelastic and arbitrary code. It is one of the established principles of the common law, which has been carried along with its growth, that precedents must yield to the reason of different or modified conditions.”¹³⁵

Indeed, she points to what this Article will refer to as the evolutionary public trust doctrines from California and New Jersey as particularly helpful common-law doctrines,¹³⁶ concluding that “[i]n the face of climate crisis, which presents an urgency to which the political branches have not responded, the common law’s adaptability to new situations may prove crucial.”¹³⁷

B. Historical Evolution #1: Expansion of “Navigable Waters” Beyond the English Tidal Test

1. The “Navigable-in-Fact” Test in the U.S. Supreme Court

At least as litigated in the United States, various aspects of the public trust doctrine have always been adaptively responsive to the physical realities of waters in this country. For example, state ownership of non-tidal “navigable-in-fact” waters was a federal adaptation of English law to American realities.

All of the important “navigable waters” in England are tidally influenced, so a tidal test of navigability adequately identified the waters in which the public should have rights. The United States, however, is a much larger country with several large, clearly navigable, but equally clearly non-tidal, waters. Preserving the English tidal test for navigability would have effectively sacrificed these internal transportation highways to

135. Mary Christina Wood, *Advancing the Sovereign Trust of Government to Safeguard the Environment for Present and Future Generations (Part I): Ecological Realism and the Need for a Paradigm Shift*, 39 ENVTL. L. 43, 78 (2009) (quoting *In re Hood River*, 227 P. 1065, 1086–87 (Or. 1924)).

136. *Id.* (citing *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971); *Matthews v. Bay Head Improvement Ass’n*, 471 A.2d 355, 365 (N. J. 1984)).

137. *Id.*

private interests, allowing for both obstruction of these waters and private tolls for passage.

Unsurprisingly, therefore, the U.S. Supreme Court decisively extended the public trust doctrine to navigable-in-fact waters. In *Illinois Central Railroad Co.*, for example, it explained that the Great Lakes are the functional equivalents of oceans:

The same doctrine is in this country held to be applicable to lands covered by fresh water in the Great Lakes over which is conducted an extended commerce with different States and foreign nations. These lakes possess all the general characteristics of open seas, except in the freshness of their waters, and in the absence of the ebb and flow of the tide. In other respects they are inland seas, and there is no reason or principle for the assertion of dominion and sovereignty over and ownership by the State of lands covered by tide waters that is not equally applicable to its ownership of and dominion and sovereignty over lands covered by the fresh waters of these lakes.¹³⁸

More interesting, perhaps, is the fact that even earlier decisions in the Court had little trouble establishing a navigable-in-fact test for inland rivers and streams.¹³⁹ In 1876, for example, the Court announced:

[Th]e common law with regard to navigable waters; although, in England, no waters are deemed navigable except those in which the tide ebbs and flows. In this country, as a general thing, all waters are deemed navigable which are really so; and especially it is true with regard to the Mississippi and its principal branches.¹⁴⁰

2. Wrestling with English Common Law in the States

Our current comfort with the navigable-in-fact test perhaps obscures the fact that the Supreme Court was indeed evolving the common law of navigable waters—and the public trust doctrine—to suit American needs. The history of the public trust doctrines in the eastern states makes the reality of this legal adaptation clear. In particular, the earliest states often had to wrestle with the English tidal test for public ownership of public waters before the

138. *Ill. Cent. R.R. Co. v. Illinois*, 146 U.S. 387, 435 (1892).

139. *See, e.g., The Daniel Ball*, 77 U.S. (10 Wall.) 557, 563 (1870) (holding that the English common law tidal test has no applicability in the United States).

140. *Barney v. City of Keokuk*, 94 U.S. 324, 336 (1876).

U.S. Supreme Court had clearly established the navigable-in-fact test, with varying results that persist into their contemporary public trust doctrines.

For example, some eastern states—notably Maryland, Massachusetts, New Jersey, and Rhode Island—continue to use only the common-law tidal test for both title and state public trust purposes.¹⁴¹ The Maryland courts in particular have repeatedly acknowledged that the navigable-in-fact test exists but have refused to apply it.¹⁴² Of course, these states are much like England in their geography, making it unlikely that their legal adherence to the tidal test significantly limits their public trust doctrines.

Other eastern states took a slightly different route, adopting the navigable-in-fact test very late in the state's history after long employing only the tidal test. Delaware, for example, did not explicitly adopt the navigable-in-fact test until 1988.¹⁴³ As a result, private landowners have more extensive rights in the non-tidal navigable waters than they do in tidal waters. Specifically, landowners own the beds of these non-tidal waters to the low-water mark,¹⁴⁴ which the Delaware courts consider a long-standing property rule that cannot be changed without effectuating a taking of private property.

In contrast, eastern states that have significant non-tidal navigable-in-fact waters often reached the same pragmatic conclusion about navigability as the U.S. Supreme Court, especially when the state courts did not have to issue major decisions regarding navigable waters before the 19th century. For example, Connecticut became a state in 1788, but its courts did not issue significant decisions about navigable waters until 1811. These early decisions clearly recognized public rights in tidal waters.¹⁴⁵ However, by 1845, the Connecticut Supreme Court had also declared the Connecticut River a navigable water, even above tide water,¹⁴⁶ and by 1850, the court had clearly articulated its adoption of a navigable-in-fact test.¹⁴⁷

141. See, e.g., *Hirsch v. Md. Dep't of Natural Res.*, 416 A.2d 10, 12 (Md. 1980); *Brosnan v. Gage*, 133 N.E. 622, 624 (Mass. 1921); *Borough of Neptune City v. Borough of Avon-By-The-Sea*, 294 A.2d 47, 52 n.2 (N.J. 1972); *Greater Providence Chamber of Commerce v. State*, 657 A.2d 1038, 1042 (R.I. 1995).

142. See, e.g., *Hirsch*, 416 A.2d at 12 n.3; *Van Ruymbeke v. Patapsco Indus. Park*, 276 A.2d 61, 64 (Md. 1971); *Owen v. Hubbard*, 271 A.2d 672, 676 n.1 (Md. 1970); *Wagner v. City of Baltimore*, 124 A.2d 815, 820 (Md. 1956); *Wicks v. Howard*, 388 A.2d 1250, 1251 (Md. Ct. Spec. App. 1978).

143. *Hagan v. Del. Anglers & Gunners Club*, 1988 WL 606, at *2-3 (Del. Ch. 1988).

144. *Phillips v. State ex rel. Dep't of Natural Res. & Envtl. Control*, 449 A.2d 250, 252 (Del. 1982).

145. See, e.g., *Chapman v. Kimball*, 9 Conn. 38, 1831 WL 142, at *2-3 (1831); *Lay v. King*, 5 Day 72, 1811 WL 162, at *4 (Conn. 1811); *Peck v. Lockwood*, 5 Day 22, 1811 WL 159, at *3-4 (Conn. 1811).

146. *Enfield Toll Bridge Co. v. Hartford & New Haven R.R. Co.*, 17 Conn. 40, 1845 WL 431, at *5 (1845).

147. *Town of Wethersfield v. Humphrey*, 20 Conn. 218, 1850 WL 664, at *7 (1850).

In 1822, the South Carolina Constitutional Court explicitly concluded that the tidal test of navigability was not sufficient because “our rivers are navigable several hundred miles above the flowing of the tide”;¹⁴⁸ as a result, South Carolina uses both tests to establish state title and public trust rights.¹⁴⁹ Similarly, faced with the fact that their states’ respective sections of the Mississippi River were not navigable under the English tidal test, both the Iowa Supreme Court (1956)¹⁵⁰ and the Minnesota Supreme Court (1865)¹⁵¹ immediately adopted the navigable-in-fact test for state title purposes—and both questioned the widely accepted view of English common law and tidal navigability in doing so. As for insight into the public policies of navigability, however, it is the outrage of the Iowa Supreme Court that is most illuminating:

Are we to be told that the Mississippi river is not a navigable stream, and its bed private property? The father of the floods, private property! The great river, to see which the conqueror of Florida periled the lives of his followers, to find for himself a grave in its waters, instead of gold in its sands, belongs to every petty owner who pays a dime for the land on its banks! The river, which carries to the sea the products of millions of people, the boundary of states without number; which carries to a single port commerce numbered by hundreds of millions of dollars, and numbers the ships which float on its waters by thousands, cannot be private property.¹⁵²

Indeed, many eastern states with significant internal navigable waters never bothered with the English tidal test of navigability. Predictably, this approach is most common among the later-admitted, non-coastal eastern states, such as Indiana, Michigan, Missouri, Pennsylvania, Tennessee, and Wisconsin.¹⁵³

148. *Cates’ Ex’rs v. Wadlington*, 1 McCord 580, 1822 WL 696, at *2 (S.C. Const. 1822).

149. *State v. Pac. Guano Co.*, 22 S.C. 50, 56–57 (1884).

150. *McManus v. Carmichael*, 3 Clarke 1, 1856 WL 139, at *3–5 (Iowa 1856) (declaring with respect to the English tidal test of navigability that “there is, in fact, no such common law rule”). The court extended this test beyond the Mississippi River, applying it to the Des Moines River in 1883. *Wood v. Chicago R.I. & P.R. Co.*, 15 N.W. 284, 284–85 (Iowa 1883); *see also* *Musser v. Hershey*, 42 Iowa 356, 1876 WL 377, at *3 (1876) (stating the Mississippi River rule as a general principle of Iowa law).

151. *Schurmeier v. St. Paul & Pac. R.R. Co.*, 10 Minn. 82, 1865 WL 43, at *10 (Minn. 1865) (“It is not true in fact, as has been alleged, that the navigability in fact of a river above the flowing of the tide is a state of things unknown to or unprovided for by it.”). By 1893, the court had explicitly rejected the tidal test for purposes of establishing state title to navigable waters. *Lamprey v. Metcalf*, 53 N.W. 1139, 1143 (Minn. 1893). This test is now codified at MINN. STAT. ANN. § 103G.711 (West 2009).

152. *McManus*, 1856 WL 139, at *4.

153. *See, e.g., State v. Kivett*, 95 N.E.2d 145, 148 (Ind. 1950) (determining the navigability of a

A different kind of pragmatism—and perhaps with more obvious recognition of the importance of the public trust and public rights in waters—came in those eastern states that adhered to the English tidal test of navigability for state title purposes but adopted some form of navigable-in-fact test to ensure that public rights were preserved. Kentucky, Nebraska, Ohio, and Vermont offer four examples of this approach. Kentucky has relied upon the English tidal test to declare that no waters in Kentucky are navigable for purposes of state title.¹⁵⁴ Nevertheless, public rights exist in any waterway that can float a log.¹⁵⁵ In 1906, the Nebraska Supreme Court emphasized that Nebraska had adopted the English common law, and hence it rejected the navigable-in-fact test for title as a mistake, instead adhering to the common-law ebb-and-flow tidal test—even for the Missouri River.¹⁵⁶ Nevertheless, despite the lack of state title, “[t]he public retains its easement of the right of passage along and over the waters of the river as a public highway. This is the interest of the public in connection with such rivers which is paramount, and which is, and should be, protected by the courts.”¹⁵⁷ Early Ohio cases also construed English common law strictly and recognized state title only in tidal waters.¹⁵⁸ However, for purposes of applying the public trust doctrine, the Ohio courts quickly adopted a fairly broad navigable-in-fact test.¹⁵⁹ Finally, according to the Vermont courts, the drafters of Vermont’s Constitution recognized the common-law tidal test

water body by examining the capacity); *Mich. Citizens for Water Conservation v. Nestle Waters N. Am., Inc.*, 709 N.W.2d 174, 218 (Mich. Ct. App. 2005), *rev’d in part for lack of standing*, 737 N.W.2d 447 (Mich. 2007), *reh’g denied*, 739 N.W.2d 332 (Mich. 2007) (adopting the log-floatation test and failing to consider the tidal test); *Lamprey*, 53 N.W. at 1143–44 (rejecting the tidal test); *Cooley v. Golden*, 23 S.W. 100, 104–05 (Mo. 1893) (explicitly rejecting the English tidal test); *Fulmer v. Williams*, 15 A. 726, 727 (Pa. 1888) (rejecting the tidal test); *Elder v. Burrus*, 25 Tenn. (6 Hum.) 358, 1845 WL 1939, at *5–7 (1845) (rejecting the tidal test); *Muench v. Pub. Serv. Comm’n*, 53 N.W.2d 514, 519 (Wis. 1952) (holding that all rivers and streams “which are navigable in fact for any purpose whatsoever” are to be considered navigable waters).

However, two coastal states—Florida and North Carolina—have also rejected the pure common-law tidal test, requiring instead that tidal waters also be navigable-in-fact before the public trust doctrine applies. *See, e.g.*, N.C. GEN. STAT. § 146-64 (2007); *Clement v. Watson*, 58 So. 25, 26–27 (Fla. 1912) (holding that tide waters need to be navigable); *Lopez v. Smith*, 109 So.2d 176, 179 (Fla. Dist. Ct. App. 1959) (holding that waters subject to the ebb and flow of the tide are not “navigable” unless they are navigable-in-fact); *Gwathmey v. State ex rel. Dep’t of Env’t, Health, & Natural Res. ex rel. Cobey*, 464 S.E.2d 674, 682 (N.C. 1995) (stating that if water is navigable for pleasure boating, it must be a navigable water as it relates to the public trust doctrine).

154. *Baxter v. Davis*, 67 S.W.2d 678, 680 (Ky. 1934).

155. *Floyd County v. Allen*, 227 S.W. 994, 995 (Ky. 1921).

156. *Kinkead v. Turgeon*, 109 N.W. 744, 744–47 (Neb. 1906).

157. *Id.* at 747.

158. *Lessee of Blachard v. Porter*, 11 Ohio 138, 142–43 (1841); *Gavit’s Adm’rs v. Chambers and Coats*, 3 Ohio 495, 496–98 (1828).

159. *Hickok v. Hine*, 23 Ohio 523, 527–28 (1872).

dilemma from the beginning, in 1777, and thus constitutionally assured public rights in all “boatable” waters. The courts interpret “boatable waters” to be navigable-in-fact waters; otherwise, there would be no public trust rights in Vermont, because no waters in Vermont are influenced by the ebb and flow of the tide.¹⁶⁰

C. Historical Evolution #2: Definitions of Navigability and Protections of Public Uses that Reflect State-Specific Public Interests

As noted, as between the federal and state governments, the question of title to the beds and banks of both tidal and navigable-in-fact waters is clearly a matter of federal law.¹⁶¹ Nevertheless, once federal law has conferred title to the beds and banks of navigable waters on a particular state, that state has broad authority to redefine the property rights as between itself and private citizens.¹⁶² Similarly, the states have broad authority to define the public and private rights in the waters themselves.¹⁶³

Thus, despite the origin of state control over navigable waters in federal law, federal law also allows states to then adjust the particular constellation of public and private rights in water to the particular circumstances of that state. States have been more than willing to use this common-law authority, demonstrating both the inherently pragmatic nature of state public trust doctrines and those doctrines’ flexibility in the face of changing circumstances.

The U.S. Supreme Court’s formulation of the classic public trust doctrine in *Illinois Central Railroad* made it clear that the waters subject to the doctrine are closely correlated with the public uses to be protected: navigable waters are subject to the public trust in order to protect public rights of navigation, commerce, and fishing. So viewed, an obvious entry point for evolving state public trust doctrines to local circumstances has been the definition of “navigable” (sometimes “public”) waters. As Richard Lazarus has observed, “application of the public trust doctrine has shifted to include navigable waters that do meet the federal test of navigability for the

160. *New England Trout & Salmon Club v. Mather*, 68 Vt. 338, 340–42, 35 A. 323, 324 (1896). Illinois and New York had similar histories. *See Schulte v. Warren*, 75 N.E. 783, 785 (Ill. 1905) (rejecting the log floating test and recognizing a stream as navigable in fact “only where it affords a channel for useful commerce and of practical utility to the public as such”); *Fulton Light, Heat & Power Co. v. State*, 94 N.E. 199, 202 (N.Y. 1911) (same).

161. *Utah v. United States*, 403 U.S. 9, 10 (1971); *United States v. Oregon*, 295 U.S. 1, 14 (1935); *United States v. Utah*, 283 U.S. 64, 75 (1931).

162. *Oregon ex rel. State Land Bd. v. Corvallis Sand & Gravel Co.*, 429 U.S. 363, 370–72 (1977) (overruling *Bonelli Cattle Co. v. Arizona*, 414 U.S. 313 (1973)); *Shively v. Bowlby*, 152 U.S. 1, 40 (1894); *Packer v. Bird*, 137 U.S. 661, 669 (1891); *Hardin v. Jordan*, 140 U.S. 371, 380 (1891).

163. *Arkansas v. Tennessee*, 246 U.S. 158, 176 (1918).

purposes of state sovereign title, but instead satisfy the lesser state law standard of navigability.”¹⁶⁴

That global statement, however, masks the local “flavor” of individual state pronouncements of what should count as “navigable” and what public uses should be protected. Looking comparatively at individual state public trust doctrines, in contrast, often provides insight into local priorities and values as well as underscoring the flexibility of the public trust doctrine as a legal construct.

1. Logs

Logging was (and often still is) an important economic activity in many states, and many states adopted definitions of “navigable waters” that would preserve the public’s right to use waters of sufficient size to float logs to market. For example, although Kentucky adheres solely to the English tidal test of navigability for purposes of state title, the public has rights to use any waterway in which logs can be floated. In a 1921 case discussing this rule, a private citizen was operating a boom on Beaver Creek, allowing “enormous quantities of logs” to accumulate in the water.¹⁶⁵ As a result, water was diverted from its normal channel onto land, where it damaged the supports for a bridge.¹⁶⁶ In the resulting lawsuit by the bridge owner seeking damages, the Kentucky Supreme Court concluded:

Whether Beaver Creek is a navigable stream matters not; it was certainly a floatable stream in certain seasons of the year. . . . If the stream in its natural condition is capable of being used to float rafts, logs, etc., and has in fact been used for that purpose the public has an easement in it and the right to so use it, but not in such manner as to destroy by neglect or wantonly the property of those on its banks.¹⁶⁷

As a result, ordinary principles of negligence, not riparian property rights, determined the outcome of the litigation.¹⁶⁸ Similarly, although Mississippi at common law adhered to the tidal test of navigability, the public had rights to use any waterway that could be used by canoes, motorboats, flatboats, for log floatation, fishing, tourism, or recreation.¹⁶⁹

164. Lazarus, *supra* note 16, at 647–48.

165. *Floyd County v. Allen*, 227 S.W. 994, 994 (Ky. 1921).

166. *Id.*

167. *Id.* at 995.

168. *Id.*

169. *Ryals v. Pigott*, 580 So.2d 1140, 1145–46, 1150–52 (Miss. 1990); *see also* *Hobart-Lee Tie*

By statute, South Carolina declares that “[a]ll streams which have been rendered or can be rendered capable of being navigated by rafts of lumber or timber by the removal of accidental obstructions and all navigable watercourses and cuts are hereby declared navigable streams and such streams shall be common highways and forever free”¹⁷⁰ Although renumbered, versions of this statute have existed in South Carolina since 1853, and its object, according to the South Carolina Supreme Court, “was plainly to make navigable stream ways open to public use.”¹⁷¹ All courts have agreed, however, that the statute did not alter either the federal test of title navigability or the state’s common-law test of public use navigability based on “valuable floatage.” Instead, the U.S. Supreme Court in 1905 upheld the statute as a proper exercise of South Carolina’s police power, which makes private interests subservient to public needs,¹⁷² while the South Carolina Supreme Court has continued to emphasize under state law that “[v]aluable floatage is not necessarily commercial floatage.”¹⁷³

To be sure, many state courts have viewed log floatation as an inherently commercial activity falling squarely within the federal title test of navigability, especially in states where logging has been an important commercial industry. Thus, for example, the Maine Supreme Judicial Court stated in 1849 that the test of navigability is “whether a stream is inherently and in its nature, capable of being used *for the purposes of commerce*, for the floating of vessels, boats, rafts *or logs*.”¹⁷⁴ Likewise, for purposes of state title to the beds and banks, Montana uses a federal test of navigability based on *The Montello* and *The Daniel Ball*.¹⁷⁵ However, in the Montana Supreme Court’s interpretation, this is essentially a log floatation test. For example, evidence that the Dearborn River was used in 1887 to float approximately 100,000 railroad ties and used in 1888 and 1889 to float log drives supported a finding that the river was navigable for state title purposes.¹⁷⁶

Co. v. Grabner, 219 S.W. 975, 976 (Mo. Ct. App. 1920) (holding that the public has rights to use waters that can float logs, even if those waters are not navigable for title purposes).

170. S.C. CODE ANN. § 49-1-10 (2008).

171. Speights v. Colleton County, 84 S.E. 873, 874 (S.C. 1915).

172. Manigault v. Springs, 199 U.S. 473, 481 (1905).

173. State *ex rel.* Medlock v. S.C. Coastal Council, 346 S.E.2d 716, 719 (S.C. 1986).

174. Brown v. Chadbourne, 31 Me. 9, 21 (1849) (emphasis added); *see also* Moore v. Sanborne, 2 Mich. 519, 1853 WL 1958, at *6 (1853) (establishing a log floatation test of navigability that could be satisfied three ways); Lamprey v. Metcalf, 53 N.W. 1139, 1143 (Minn. 1893) (indicating that log floatation is enough to make a river navigable).

175. Mont. Coal. for Stream Access, Inc. v. Curran, 682 P.2d 163, 166 (Mont. 1984); *see* *The Montello*, 87 U.S. (20 Wall.) 430, 441–42 (1874); *The Daniel Ball*, 77 U.S. (10 Wall.) 557, 563 (1870).

176. Mont. Coal. for Stream Access, Inc., 682 P.2d at 166; *see also* Edwards v. Severin, 785 P.2d 1022, 1023–24 (Mont. 1990) (concluding that the Yellowstone River is a navigable river because it could float logs).

The Nevada Supreme Court has similarly interpreted the federal title test to be a log floatation test, concluding that:

Although no Supreme Court case has expressly based its decision of title navigability on the capacity of a stream to float out logs, the emphasized portions of . . . *The Montello* and *Appalachian Power* leads us to believe that in the setting of this case navigability for title has been established. Log driving was the first and apparently only important commercial use of the Carson. The river was fortuitously and ideally located geographically for this use. The Carson River was and is navigable.¹⁷⁷

In the same vein, the Washington Supreme Court has declared a slough navigable when it

has been and can be used as a public highway for boats, scows, and other ordinary modes of water transportation *for general commercial purposes, and especially for rafting, booming, and floating and towing of logs up and down the same*; that said slough has been so used for at least twenty years.¹⁷⁸

Nevertheless, any facile equivalence of log floatation and commercial use belies the true complexity of log floatation and public trust navigability. First, several state courts and one state legislature that were consciously applying the federal test of title navigability decided specifically that log floatation was *not* enough to make a waterway navigable.¹⁷⁹ Moreover, like

177. *State v. Bunkowski*, 503 P.2d 1231, 1236 (Nev. 1972); *see also Shoemaker v. Hatch*, 13 Nev. 261, 267 (1878) (concluding that the Truckee River is navigable because it is “a highway for the floatage of wood and timber, and has been treated by the officers of the government as a navigable stream”).

178. *Dawson v. McMillan*, 75 P. 807, 808–09 (Wash. 1904) (internal quotes and citation omitted) (emphasis added).

179. *See* GA. CODE ANN. § 44-8-5(a) (2002) (“The mere rafting of timber or the transporting of wood in small boats shall not make a stream navigable.”); *Olive v. State*, 5 So. 653, 656 (Ala. 1889) (adhering to the federal test and emphasizing that seasonal floating of logs and flatboats is not enough to establish navigability in waters that are “above the ebb and flow of the tides”); *Schulte v. Warren*, 75 N.E. 783, 785 (Ill. 1905) (declaring that log floatation is not enough to establish navigability); *Campbell Brown & Co. v. Elkins*, 93 S.E.2d 248, 262 (W. Va. 1956) (distinguishing waters that are navigable for commerce from waterways that are floatable by logs and rafts).

In 1889, the Florida Supreme Court declared that a river would be considered navigable if it was useful for floating logs. *Bucki v. Cone*, 6 So. 160, 162 (Fla. 1889). More recent cases, however, have asserted that Florida follows the federal test of navigability. *Bd. of Trs. of the Internal Improvement Trust Fund v. Fla. Pub. Util. Co.*, 599 So. 2d 1356, 1357 n.1 (Fla. Dist. Ct. App. 1992); *Anderson v. Bell*, 411 So. 2d 948, 949 (Fla. Dist. Ct. App. 1982).

decisions to include log floatation as part of navigability, determinations to exclude log floatation can reflect individual state public policies. For example, the Tennessee Supreme Court has specifically cited, as a countervailing policy to public access and use, the state's encouragement of private mill development on non-navigable waters, which would have been undermined if the courts allowed the public to float logs down every otherwise non-navigable stream that could support such use.¹⁸⁰

Second, equating log floatation with commerce ignores the fact that state courts were often consciously deciding public policy for the public benefit when they announced a log floatation test for public trust purposes. Perhaps the most obvious of these decisions comes from Oregon. In its early cases, the Oregon Supreme Court adopted a fairly liberal log floatation test for navigability that extended public use rights to navigable-in-fact waters. Thus, it held in 1869 that:

[A]ny stream in this state is navigable on whose waters logs or timbers can be floated to market, and that they are public highways for that purpose; and that it is not necessary that they be navigable the whole year for that purpose to constitute them such. If at high water they can be used for floating timber, then they are navigable; and the question of their navigability is a question of fact, to be determined as any other question of fact by a jury. Any stream in which logs will go by the force of the water is navigable.¹⁸¹

Importantly, however, the court explicitly also emphasized that this rule best served Oregon public policy and interests:

And we think it the rule that best accords with common sense and public convenience, for these rapid streams, penetrating deep into the mountains, are the only means by which timber can be brought from these rugged sections, without great labor and expense; and by their use large tracks of timber, otherwise too remote or difficult of access, can be rendered of great value, as the country shall grow and timber become scarce.¹⁸²

Thus, “[a] stream which, in its natural condition, is capable of being commonly and generally useful for floating boats, rafts or logs, for any

180. *Allison v. Davidson*, 39 S.W. 905, 909 (Tenn. 1896) (holding that log floatation is not enough to make a river commercially navigable for purposes of state title).

181. *Felger v. Robinson*, 3 Or. 455, 457–58 (1869).

182. *Id.* at 458.

useful purpose of agriculture or trade, though it be private property, and not strictly navigable, is subject to the public use as a passage way.”¹⁸³

2. Recreation

Some states have long considered navigability to include recreational uses of waters, regardless of commercial import. For example, in 1914 the Minnesota Supreme Court declared that “[n]avigability for pleasure is as sacred in the eye of the law as is navigability for any other purpose.”¹⁸⁴ Five years later, it confirmed the state’s “settled policy designed to preserve inland waters which afford recreation to the public, as well as waters susceptible of use for commercial purposes.”¹⁸⁵

The North Dakota, Ohio, and Wisconsin courts also have relatively long histories of protecting recreational rights in waters. In North Dakota since at least 1949, a water will be deemed navigable-in-fact for state title purposes if it supports rowing for pleasure and hunting, the cutting and selling of ice, or hunting from flat-bottomed boats.¹⁸⁶ Similarly, public uses supporting navigability do not have to be commercial or pecuniary:

A use, public in its character, may exist when the waters may be used for the convenience and enjoyment of the public, whether traveling upon trade purposes or pleasure purposes. . . . Purposes of pleasure, public convenience, and enjoyment may be public as well as purposes of trade. Navigation may as surely exist in the former as in the latter.¹⁸⁷

183. *Weise v. Smith*, 3 Or. 445, 449 (1869); *see also* *Guilliams v. Beaver Lake Club*, 175 P. 437, 442 (Or. 1918) (holding that a stream is available to the public where it is practically navigable); *Lebanon Lumber Co. v. Leonard*, 136 P. 891, 892 (Or. 1913) (“The true test, therefore, to be applied . . . is whether a stream is inherently and in its nature capable of being used for the purposes of commerce, for the floating of vessels, boats, rafts, or logs.”); *Kamm v. Normand*, 91 P. 448, 450 (Or. 1907) (“A stream . . . that is capable of floating logs, unaided by artificial means, during freshets or stages of water occurring with reasonable frequency and continuing long enough to make its use of commercial value, is a public highway for that purpose.”); *Nutter v. Gallagher*, 24 P. 250, 252 (Or. 1890) (holding that the watercourse in question was not navigable because of the short distance and lack of “service to the public generally”); *Haines v. Hall*, 20 P. 831, 835 (Or. 1888) (“Whether the creek in question is navigable or not . . . depends upon its capacity in a natural state to float logs and timber, and whether its use for that purpose will be an advantage to the public.”).

184. *State v. Korrer*, 148 N.W. 617, 618 (Minn. 1914) (quoting *City of Grand Rapids v. Powers*, 50 N.W. 661, 662 (Mich. 1891)); *see also* *Lamprey v. Metcalf*, 53 N.W. 1139, 1143 (Minn. 1893) (indicating that pleasure boating is enough to make a river navigable).

185. *Erickschen v. Sibley County*, 170 N.W. 883, 884 (Minn. 1919).

186. *State v. Brace*, 36 N.W.2d 330, 333 (N.D. 1949).

187. *Roberts v. Taylor*, 181 N.W. 622, 626 (N.D. 1921).

Ohio courts acknowledge a “gradually changing concept of navigability” for public trust purposes.¹⁸⁸ They have used this evolutionary view most decisively to expand Ohio’s public trust doctrine both to any water that will support recreation and to the recreational uses themselves. Thus, by the 1950s, the Ohio Supreme Court had concluded that waters that supported recreational uses were public waters subject to the public trust doctrine.¹⁸⁹ Moreover, in 1975 the Ohio Court of Appeals both consciously traced the evolution of the “navigable-in-fact” test in Ohio from the federal law test and declared that, because the Little Miami River was used for recreational purposes, “the state of Ohio holds the waters of the Little Miami River in trust for the people of Ohio.”¹⁹⁰ The court also confirmed that, although under Ohio law (because of early adherence to the English tidal test) the beds and banks of non-tidal navigable-in-fact waters are privately owned, the public trust doctrine preserves “all legitimate [public] uses, be they commercial, transportational, or recreational.”¹⁹¹

By 1952, the Wisconsin Supreme Court had concluded that a water is navigable in fact if it is “capable of floating any boat, skiff or canoe, of the shallowest draft used for recreational purposes.”¹⁹² The public’s public trust rights include not only traditional water recreation but also the enjoyment of scenic beauty.¹⁹³ Nevertheless, like log floatation, recreational use does not always fit comfortably within the federal title test and its focus on commerce. Indeed, many states have steadfastly refused to adopt a recreational test for navigability.¹⁹⁴

188. *Coleman v. Schaeffer*, 126 N.E.2d 444, 445 (Ohio 1955).

189. *Mentor Harbor Yachting Club v. Mentor Lagoons, Inc.*, 163 N.E.2d 373, 375 (Ohio 1959) (noting that “naturally navigable” waters are public waters and that boating for pleasure and recreation make a river navigable); *Coleman*, 126 N.E.2d at 445–47 (indicating that recreational boating makes a river navigable).

190. *State ex rel. Brown v. Newport Concrete Co.*, 336 N.E.2d 453, 455–57, 457 (Ohio Ct. App. 1975).

191. *Id.* at 458; *see also In re Adjudication of the Existing Rights to the Use of All the Water*, 55 P.3d 396, 404 (Mont. 2002) (holding that “[u]nder the Constitution and the public trust doctrine, the public has an instream, non-diversionary right to the recreational use of the State’s navigable surface waters”).

192. *Muench v. Pub. Serv. Comm’n*, 53 N.W.2d 514, 519 (Wis. 1952).

193. *Id.* at 519, 521 (citing WIS. STAT. ANN. § 31.06 (1929)).

194. *See* MISS. CODE ANN. § 1-3-31 (2005) (defining “navigable waters” to be “all rivers, creeks and bayous in this state, twenty-five (25) miles in length, and having sufficient depth and width of water for thirty (30) consecutive days in the year to float a steamboat with carrying capacity of two hundred (200) bales of cotton”); *People v. Emmert*, 597 P.2d 1025, 1027–28 (Colo. 1979) (refusing to follow the “modern trend”—as represented by Wyoming’s interpretation of similar provisions in its constitution—that allows public rights in non-navigable rivers, concluding that Art. XVI, § 5 of the Colorado Constitution does *not* preserve public recreation rights); *Town of Wethersfield v. Humphrey*, 20 Conn. 218, at *7 (1850) (“A hunter or fisherman, by drawing his boat through the waters of a brook or shallow creek, does not create navigation, or constitute their waters channels of commerce.”); *Hagan v. Del.*

In states where recreational use has not always been an assumed part of the definition of navigability, the variety of tactics used to expand state public trust doctrines to recreation often reveal the courts' consciousness that they are "changing the rules." Nevertheless, many courts have gone ahead and made the change. For example, and especially in the West, some states have avoided the navigability/recreational use problem by tying the public's recreational use rights to the state's ownership of the water itself, avoiding the issue of federal title navigability altogether. Thus, in 1961, the Wyoming Supreme Court concluded that "the actual usability of the waters is alone the limit of the public's right to so employ them."¹⁹⁵ Except in federally navigable waters, "the exclusive control of waters is vested in the state," and hence "[i]t follows the state may lay down and follow such criteria for cataloging waters as navigable or nonnavigable, as it sees fit, and the state may also decide the ownership of submerged lands, irrespective of the navigable or nonnavigable character of waters above them."¹⁹⁶ As a result, because the Wyoming Constitution gives the waters to the state, fine distinctions of navigability are unimportant.¹⁹⁷ "The test of navigability does not determine other uses to which the State may put its waters even though navigability would determine the title to the land underlying them."¹⁹⁸

Other states have more clearly acknowledged that the incorporation of recreational uses is an expansion of their public trust doctrines. Often, however, these cases arise in contexts where private landowners appear to be (or can be characterized as) "interfering" with long assumed public rights to

Anglers' & Gunners' Club, 655 A.2d 292, 294 (Del. Ch. 1995) (citation omitted) (concluding that "mere private, not-for-profit recreational use of a body of water" is insufficient to establish navigability); *Kansas ex rel. Meek v. Hays*, 785 P.2d 1356, 1364–65 (Kan. 1990) (refusing to extend public trust concepts to streams that are not navigable under the federal commerce test, based on state ownership of the water and KAN. STAT. ANN. § 82a-702); *Walker Lands, Inc. v. E. Carroll Parish Police Jury*, 871 So.2d 1258, 1266 (La. Ct. App. 2004) ("Recreational use of a body of water alone is not enough to say that the body of water is being used for a commercial purposes."); *Skinner v. Osage County*, 822 S.W.2d 437, 444 (Mo. Ct. App. 1991) ("This definition of 'navigable' does not include, as it does in some other states, rivers which may only be floatable by small crafts like rowboats and canoes."); *Mountain Props., Inc. v. Tyler Hill Realty Corp.*, 767 A.2d 1096, 1100 (Pa. Super. Ct. 2001) (noting that recreational or tourism uses are not sufficient to make a waterway navigable); *Taylor Fishing Club v. Hammett*, 88 S.W.2d 127, 129 (Tex. Civ. App. 1935) ("Every inland lake or pond that has the capacity to float a boat is not necessarily navigable. It must be of such size and so situated as to be generally and commonly useful as a highway for transportation of goods or passengers between the points connected thereby."); *see also State ex rel. Town of Westerly v. Bradley*, 877 A.2d 601, 607 (R.I. 2005) (holding that a prohibition on swimming in a breachway did not violate the state public trust doctrine because public trust rights were not implicated).

195. *Day v. Armstrong*, 362 P.2d 137, 143 (Wyo. 1961).

196. *Id.*

197. *Id.* at 144.

198. *Id.*

use waters for certain recreational purposes. For example, in 1969, the prospect of the loss of fishing streams to public use prompted the Oklahoma Supreme Court to distinguish navigability for title purposes from navigability for public use purposes.¹⁹⁹ It described the Kiamichi River as follows:

[W]e find that the Kiamichi River is one of the beautiful streams of southeastern Oklahoma; that it has for many years been known as one of the best fishing streams in the State and used by the public for fishing, recreation and pleasure; that at one time the stream was used for commercial purposes in that logs were floated down its channel to be used for mill purposes; that at the site of the controversy herein the river was between 150 and 200 feet in width; that many small boats are used to travel the river.²⁰⁰

Nevertheless, the river was not navigable for title purposes and private landowners owned the bed of the river. However, that ownership is “subject to the rights of the public to use the river as a public highway,” and the landowner “does not . . . have exclusive fishing rights therein.”²⁰¹ Thus, the Kiamichi River *was* “navigable” in the sense that the public could use the river,²⁰² preserving the rights of recreational fishermen statewide.

Arkansas’s adoption of a state-law definition of “navigable” to include recreational uses remains one of the most self-conscious common-law evolutions of public trust doctrines. Until 1980, Arkansas employed the federal definition of “navigable waters.”²⁰³ In that year, however, the Arkansas Supreme Court explicitly changed the state law definition of “navigability.”²⁰⁴ In the case, plaintiff McIlroy was winding up the estate of a riparian landowner and sought a declaration that the estate’s rights on the Mulberry River were superior to those of the public.²⁰⁵ He sued the Ozark Society, a conservationist group, and two companies that rented canoes for recreational use on the river.²⁰⁶ The Arkansas Supreme Court noted that the Mulberry River “can be floated by canoe or flatbottomed boat for at least six months of the year[,]” that “canoeists find it an exciting stream testing the skill of an experienced canoeist[,]”²⁰⁷ and that the evidence “demonstrates conclusively that the Mulberry had been used by the public

199. *Curry v. Hill*, 460 P.2d 933, 935 (Okla. 1969).

200. *Id.*

201. *Id.*

202. *Id.* at 936.

203. *State v. McIlroy*, 595 S.W.2d 659, 663 (Ark. 1980).

204. *Id.* at 664–65.

205. *Id.* at 660.

206. *Id.*

207. *Id.* at 661.

for recreational purposes for many years. It has long been used for fishing and swimming and is today also popular among canoeists.”²⁰⁸

However, there was no escaping the conclusion that the river was not navigable for traditional commercial purposes. Undaunted, the Arkansas Supreme Court emphasized that “[d]etermining the navigability of a stream is essentially a matter of deciding if it is public or private property” and that, outside the specific circumstances where federal law governed, “the states may adopt their own definitions of navigability.”²⁰⁹ The court concluded that Arkansas’s existing definition of navigability was unsuitably mired in the needs of prior generations:

[I]n the case of *Barboro v. Boyle*, 119 Ark. 377[, 382-83], 178 S.W. 378[, 380] (1915), this Court foresaw, no doubt, that things would change in the future and that recreation would become an important interest of the people of Arkansas. . . . Since that time no case presented to us has involved the public’s right to use a stream which has a recreational value, but lacks commercial adaptability in the traditional sense. Our definition of navigability is, therefore, a remnant of the steamboat era. . . .

. . . .

Arkansas, as most states in their infancy, was mostly concerned with river traffic by steamboats or barges when cases . . . were decided. We have had no case regarding recreational use of waters such as the Mulberry. It may be that our decisions did or did not anticipate such use of streams which are suitable, as the Mulberry is, for recreational use.²¹⁰

Presented with the opportunity, however, the court followed decisions from Massachusetts, Ohio, Michigan, California, Minnesota, and Oregon and extended its public trust doctrine to waters that are useful only for recreational purposes²¹¹—although over the dissent of Chief Justice

208. *Id.* at 662.

209. *Id.* at 663.

210. *Id.* at 664–65.

211. *Id.* (citing *Attorney General v. Woods*, 108 Mass. 436, 440 (1870); *People v. Mack*, 19 Cal. App. 3d 1040 (1971); *Kelley ex rel. MacMullan v. Hallden*, 214 N.W.2d 856, 864 (Mich. App. 1974); *Lamprey v. State*, 53 N.W. 1139 (Minn. 1893); *State ex rel. Brown v. Newport Concrete Co.*, 336 N.E.2d 453, 457 (Ohio Ct. App. 1975); *Luscher v. Reynolds*, 56 P.2d 1158 (Or. 1936)); *see also* Ark. River Rights Comm. v. Echubby Lake Hunting Club, 126 S.W.3d 738, 744 (Ark. 2003) (affirming the recreation use test); *Pierson v. Coffey*, 706 S.W.2d 409, 412 (Ky. Ct. App. 1985) (holding that the “[public right of navigation] also includes the right to use the public waterways for recreational purposes such as boating, swimming, and fishing”).

Other states have been more oblique in opening their definitions of “navigability” to recreational use. *See, e.g., Baker v. State ex rel. Jones*, 87 So.2d 497, 498 (Fla. 1956) (suggesting that

Fogleman, who argued that “[t]he test of navigability is the means of determining the property rights of riparian owners[]” and hence that the court was altering the vested property rights of those landowners.²¹² Nevertheless, members of the public in Arkansas now have the rights to use these waters “for the purposes of bathing, hunting, fishing and the landing of boats” in addition to navigation and commerce.²¹³

Maine presents an example of a state that has struggled to expand public trust uses to recreation. Maine’s public trust doctrine most clearly protects the public’s rights to fish, fowl, and navigate in the navigable waters.²¹⁴ However, in 1981, in an advisory opinion, the Maine Supreme Judicial Court suggested that the public trust doctrine could and should evolve to include recreational uses.²¹⁵ In 1985, the Maine Legislature accepted what it saw as the Court’s invitation and enacted a very broad public trust doctrine in the Public Trust in Intertidal Land Act.²¹⁶ In this statute, “[t]he Legislature finds and declares that the intertidal lands of the State are impressed with a public trust and that the State is responsible for protection of the public’s interest in this land.”²¹⁷ Moreover, the Act declares that “[t]he public trust is an evolving doctrine reflective of the customs, traditions, heritage and habits of the Maine people” and that the public uses protected “include, but are not limited to, fishing, fowling, navigation, use as a footway between points along the shore and use for recreational purposes.”²¹⁸

Thus, the Maine Legislature explicitly described the Maine public trust doctrine as evolutionary and responsive to public needs and values. The Act, however, applies to intertidal lands, which it defines as “all land of this State affected by the tides between the mean high watermark and either 100 rods seaward from the high watermark or the mean low watermark, whichever is closer to the mean high watermark.”²¹⁹ Because Maine

navigability would be established if “it is suitable for pleasure boating or that it is desirable for bathing or fishing”). More recent cases, however, have asserted that Florida follows the federal test of navigability.

212. *McIlroy*, 595 S.W.2d at 667 (Fogleman, C.J., dissenting).

213. *Anderson v. Reames*, 161 S.W.2d 957, 960–61 (Ark. 1942); *see also* *Town of Orange v. Resnick*, 109 A. 864, 865 (Conn. 1920) (noting that the public has “rights of fishing, boating, hunting, bathing, taking shellfish, gathering seaweed, cutting sedge, and of passing and repassing” in the federally navigable waters); *Broward v. Mabry*, 50 So. 826, 830 (Fla. 1909) (noting that the public has the right to use the navigable waters for navigation, commerce, fishing, and bathing and “other easements allowed by law”).

214. *Conservation Law Found., Inc. v. Dep’t of Envtl. Prot.*, 823 A.2d 551, 563 (Me. 2003).

215. *Opinion of the Justices*, 437 A.2d 597, 607 (Me. 1981).

216. ME. REV. STAT. ANN. tit. 12, §§ 571–573 (1985).

217. *Id.* § 571.

218. *Id.*

219. *Id.* § 572.

originated as part of Massachusetts, Maine landowners still benefit from a 1641 Massachusetts colonial ordinance that conveyed title to private landowners of the intertidal lands between the high and low water marks (although not extending more than 100 rods from the high water mark).²²⁰ As a result, to the extent that the Public Trust in Intertidal Lands Act purported to allow the public to use the intertidal *lands*, such as for walking, it undermined private property rights without compensation. In 1989, the Maine Supreme Judicial Court accordingly held these aspects of the Act unconstitutional: “Although contemporary public needs for recreation are clearly much broader [than traditionally allowed], the courts and the legislature cannot simply alter these long-established property rights to accommodate new recreational needs”²²¹ As a result, the public’s use of the intertidal lands remains limited to fishing, fowling, and navigation—although those uses can be recreational as well as commercial.²²²

In contrast, the New Hampshire Comprehensive Shorelands Protection Act²²³ more successfully protected public recreational use rights, in part because private landowners own only to the high water mark in New Hampshire.²²⁴ Nevertheless, the New Hampshire Legislature also characterized recreational use under the public trust doctrine as having a firmer historical basis. The statute begins by recognizing that “[t]he shorelands of the state are among its most valuable and fragile natural resources and their protection is essential to maintain the integrity of public waters[,]”²²⁵ while the public waters “are valuable resources held in trust by the state.”²²⁶ The Act avoided the historic private property problem Maine faced by “recogniz[ing] and confirm[ing] the historical practice and common law right of the public to enjoy the greatest portion of New Hampshire coastal shoreland, in accordance with the public trust doctrine subject to those littoral rights recognized at common law.”²²⁷ As a result, “[a]ny person may use the

220. *Bell v. Town of Wells*, 557 A.2d 168, 173 (Me. 1989); *see also* *State v. Lemar*, 87 A.2d 886, 887 (Me. 1952) (citing to earlier Massachusetts case to support proposition).

221. *Bell*, 557 A.2d at 169.

222. *Id.* at 173–76. Specifically, there is no public right to bathing, sunbathing, or recreational walking on the privately owned intertidal lands. *Id.*; *see also* *Stansbury v. MDR Dev., L.L.C.*, 871 A.2d 612, 620–21 (Md. Ct. Spec. App. 2005) (noting that although in Maryland the public generally has recreational use rights in the publicly owned tidal waters, which the state owns to the high water mark, submerged lands validly conveyed to private owners before 1862 are subject only to the public’s rights of fishing and navigation).

223. N.H. REV. STAT. ANN. §§ 483-B:1 to 483-B:20 (2001 & supp. 2009).

224. *State v. George C. Stafford & Sons, Inc.*, 105 A.2d 569, 573 (N.H. 1954).

225. N.H. REV. STAT. ANN. § 483-B:1(I) (2001 & supp. 2009).

226. *Id.* § 483-B:1(II).

227. *Id.* § 483-C:1(I).

public trust coastal shorelands of New Hampshire for all useful and lawful purposes, to include recreational purposes”²²⁸

3. Public Use As Navigability

Other states have gone farther than either the log floatation or recreational test and simply connect the concept of navigability to public use of waters, in the sense that use by the public defines navigability. Thus, the Iowa Supreme Court has stated that “[t]he real test of navigability in this country, is ascertained by *use*,”²²⁹ and as such the public trust doctrine “has now expanded to embrace the public’s use of lakes and rivers for recreational purposes”²³⁰—including a right of access to those waters. At the same time, the Iowa Supreme Court has also adopted a broad perspective on public uses: “The public trust doctrine . . . is not limited to navigation or commerce; it applies broadly to the public’s *use* of property, such as waterways, without ironclad parameters on the types of uses to be protected.”²³¹ Risking circular logic for its public trust doctrine, the Iowa Supreme Court has thus come close to deciding that all waters that the public actually wants to use are by definition public waters.

Similarly, in 2005, the South Carolina Court of Appeals stated that, outside of tidally navigable waters, if “the waterway in question has the capacity to support ‘valuable floatage’ . . . it is deemed navigable and thus open to the public.”²³² It then continued:

“Valuable floatage” is not determined by resort to generic guidelines as to what specific size or class of vessel or object can achieve buoyancy in the waterway. Rather, the term is defined broadly to include any “legitimate and beneficial public use.”

228. *Id.*; see also N.C. GEN. STAT. § 1-45.1 (2007) (establishing that public trust rights “include, but are not limited to, the right to navigate, swim, hunt, fish, and enjoy all recreational activities in the watercourses of the State and the right to freely use and enjoy the State’s ocean and estuarine beaches and public access to the beaches”). The North Carolina statute further states:

The public has traditionally fully enjoyed the State’s beaches and coastal waters and public access to and use of the beaches and coastal waters. The beaches provide a recreational resource of great importance to North Carolina and its citizens and this makes a significant contribution to the economic well-being of the State.

N.C. GEN. STAT. § 113A-134.1(b) (2007).

229. *McManus v. Carmichael*, 3 Clarke 1, 1856 WL 139, at *1 (Iowa 1856).

230. *Larman v. State*, 552 N.W.2d 158, 161 (Iowa 1996) (citing *State v. Sorenson*, 436 N.W.2d 358, 363 (Iowa 1989)).

231. *Sorenson*, 436 N.W.2d at 363.

232. *White’s Mill Colony, Inc. v. Williams*, 609 S.E.2d 811, 815 (S.C. Ct. App. 2005) (applying S.C. CONST. art. XIV, § 4 and S.C. CODE ANN. § 49-1-10 (West 2008)).

Such public use includes all varieties of commercial traffic, ranging from passage of the largest freighter to the floating of raw timber downstream to mill. Recreational uses are no less important – boating, hunting, and fishing have been found to fall within the ambit of valuable floatage. In this vein, considerations such as whether the waterway is natural or man-made or whether it is impassable by any vessel at certain times of year have been found to have no bearing on the question of navigability. The focus remains strictly on the capacity, irrespective of actual use.²³³

Thus, any waterways with any capacity for public use of any sort will be deemed open to the public.

4. Oysters, Salmon, Geoducks, and Seaplanes

Locally important resources such as fish and shellfish have often provided states with key components of their public trust doctrines. For example, as early as 1892, the Alabama Supreme Court declared that “the people of Alabama own absolutely the oyster-beds and oysters,” and oysters may be fished only in accordance with the laws of the state.²³⁴ Alaska statutes, in turn, define “public waters” to include any waters, “whether inland or coastal, fresh or salt, that is reasonably suitable for . . . *habitat for fish and wildlife in which there is a public interest, or migration and spawning of fish in which there is a public interest . . .*”²³⁵

In Oregon, as in Alaska, salmon fisheries have long been a component of the state’s economic and social identity. Unsurprisingly, then, fish have played a large role in the state’s public trust doctrine. First, “[t]he state, as trustee for the people, bears the responsibility of preserving and protecting the right of the public to the use of the waters for those purposes.”²³⁶ Second, these trustee responsibilities have been applied to fishing regulation to prevent private takeovers of particular salmon fisheries. Indeed, statutes purporting to convey exclusive rights to fish in navigable waters violated the Privileges and Immunities Clause of the Oregon Constitution.²³⁷ Third, nevertheless, because the state has jurisdiction over

233. *Id.* at 815–16 (quoting *State ex rel. Medlock v. S.C. Coastal Council*, 346 S.E.2d 716, 719 (S.C. 1986) and citing *Hughes v. Nelson*, 399 S.E.2d 24, 25 (S.C. Ct. App. 1990); *State v. Head*, 498 S.E.2d 389, 394–95 (S.C. Ct. App. 1997)).

234. *State v. Harrub*, 10 So. 752, 753 (Ala. 1892).

235. ALASKA STAT. § 38.05.965(18) (2008) (emphasis added).

236. *Or. Shores Conservation Coal. v. Or. Fish & Wildlife Comm’n*, 662 P.2d 356, 364 (Or. Ct. App. 1983).

237. *Hume v. Rogue River Packing Co.*, 92 P. 1065, 1072–73 (Or. 1907); *see also Johnson v. Hoy*, 47 P.2d 252, 252 (Or. 1935) (holding that the Legislature cannot grant an exclusive right to fish for

navigable waters, it can regulate fishing.²³⁸ Specifically, fishing methods can be enjoined if they interfere with the public's common right of fishing.²³⁹

In the State of Washington, in contrast, it is the local shellfish delicacy, the geoduck, that has inspired most of the public trust doctrine interest. The Washington Court of Appeals has stated that the public trust doctrine applies to the Department of Natural Resources' regulation of shellfish such as geoducks.²⁴⁰ Nevertheless, the Department's regulation of the commercial geoduck harvest pursuant to Washington statutes did not violate the public trust doctrine despite the public right to fish, because the state must "balance the protection of the public's right to use resources on public land with the protection of the resources that enable these activities[.]" the Department had not given up its control over the state's geoduck resources, and the regulation facilitated sustainable geoduck harvesting and natural regeneration of the resource, serving the public interest.²⁴¹ Because the state owns the beds of navigable waters and because shellfish are considered part of the beds under Washington law, the Department "has a continuing obligation under the public trust doctrine to manage the use of the resources on the land for the public interest."²⁴²

Other adaptations of public trust doctrines to reflect state-specific needs are also evident. For example, like South Carolina and Iowa, Alaska uses a very broad definition of "navigable waters" for purposes of protected public use rights. However, this statutory definition provides one of the most modern expressions of navigability among the states—and a reflection of local public needs. Alaska law defines "navigable water" for purposes other than state title to be:

any water of the state forming a river, stream, lake, pond, slough, creek, bay, sound, estuary, inlet, strait, passage, canal, sea or ocean, or any other body of water or waterway within the territorial limits of the state or subject to its jurisdiction, that is navigable in fact for any useful public purpose, including but not limited to water suitability for commercial navigation, floating of

salmon).

238. *Anthony v. Veatch*, 220 P.2d 493, 498 (Or. 1950); *Oregon v. Nielsen*, 95 P. 720, 722 (Or. 1908).

239. *Johnson*, 47 P.2d. at 252; *Radich v. Fredrickson*, 10 P.2d 352, 355 (Or. 1932).

240. *Wash. Geoduck Harvest Ass'n v. Wash. Dep't of Natural Res.*, 101 P.3d 891, 895 (Wash. Ct. App. 2004).

241. *Id.* at 895–97.

242. *Id.* at 896; *see also Nelson Alaska Seafoods, Inc. v. Washington*, 177 P.3d 1161, 1164 (Wash. Ct. App. 2008) (upholding a tax on geoduck harvests on the first commercial owner and noting that the Department of Natural Resources merely regulated the harvest in accordance with the public trust doctrine).

logs, landing and takeoff of aircraft, and public boating, trapping, hunting waterfowl and aquatic animals, fishing, or other public recreational purposes²⁴³

It is hard to miss Alaska's unique dependence on seaplanes in this definition.

*D. Contemporary Evolution of the Public Trust Doctrine:
Ecological Public Trusts*

1. Overview

A current example of the evolutionary nature of the public trust doctrine is the increasing willingness of states to connect public trust principles to environmental conservation—what I have called elsewhere the “ecological public trust.”²⁴⁴ In many states, this connection serves most prominently to buttress state environmental regulatory authority and, unlike the police power, to limit the government's ability to allow further degradation of the trust resources.²⁴⁵ However, in some states, and especially in states that have forged the connection between the public trust doctrine and ecological protection through the common law, the ecological public trust has also become a mechanism for limiting and conditioning private property rights (especially water rights) in favor of protecting public values and ecosystem integrity in the aquatic resource.

Suggestively for the climate change era, moreover, common-law ecological public trust doctrines emerged and continue to emerge *despite* the adoption of pervasive statutory environmental and natural resources law in the 1970s and 1980s, both federal and state. Given these statutory regimes, the need for broader public trust principles to protect ecological values seemed highly questionable. Thus, Richard Lazarus concluded in 1986 that:

[T]he day of ‘final reckoning’ for the [public trust] doctrine is here, or soon will be, and reliance upon it is no longer in order. As shown in the following sections, the law of standing, tort law, property law, administrative law, and the police power have all evolved in response to increased societal concern for and

243. ALASKA STAT. § 38.05.965(13) (2008) (emphasis added).

244. Craig, *supra* note 28, at 80–91.

245. *Id.* at 82–83; *see also* J.B. Ruhl & James Salzman, *Ecosystem Services and the Public Trust Doctrine: Working Change from Within*, 15 SOUTHEASTERN ENVTL. L.J. 223, 228 (2006) (arguing that “the chief impact of the public trust doctrine is facilitating public access to and use of tidelands”).

awareness of environmental and natural resources problems and are weaving a new and unified fabric for natural resources law. Whether these developments are viewed as totally independent of the doctrine or, alternatively, as somehow having subsumed the doctrine's principles does not matter. The conclusion is the same from either perspective: much of what the public trust doctrine offered in the past is now, at best, superfluous and, at worst, distracting and theoretically inconsistent with new notions of property and sovereignty developing in the current reworking of natural resources law.²⁴⁶

Nevertheless, scholars continue to assert the need to expand the public trust doctrine to address remaining or emerging environmental problems. For example, in 1991, Alison Rieser summarized the drive to broaden public trust concepts as follows:

Due largely to recent decisions of the California courts, the notion that the public has a right to expect certain lands and natural areas to retain their natural characteristics is finding its way into American law. Through interpretation and expansion of the common law public trust doctrine, state courts are identifying governmental duties to redefine existing private property rights where such rights may threaten the ecological value of natural areas. Courts have subjected to this special duty primarily properties associated with navigable waters. Litigants and state agencies, however, appear poised and willing to invoke the public trust doctrine with respect to a number of other resources unrelated to navigation. Several public trust commentators—including Professor Joseph Sax, the modern doctrine's earliest and most prominent proponent—either urge or foresee a continuing expansion in the doctrine's scope. Some predict that courts will eventually apply public trust protections to all waterbodies, as well as to such diverse resources as old growth forests, mountains, and wildlife.²⁴⁷

246. Lazarus, *supra* note 16, at 658.

247. Alison Rieser, *Ecological Preservation as a Public Property Right: An Emerging Doctrine in Search of a Theory*, 15 HARV. ENVTL. L. REV. 393, 393–94 (1991) (citations omitted). See generally Susan Morath Horner, *Embryo, Not Fossil: Breathing Life into the Public Trust in Wildlife*, 35 LAND & WATER L. REV. 23, 25 (2000) (recognizing the large body of scholarship on the doctrine and discussing “the elements and boundaries of the doctrine with regard to wildlife”); Gary D. Meyers, *Variation on a Theme: Expanding the Public Trust Doctrine to Include Protection of Wildlife*, 19 ENVTL. L. 723, 728–35 (1989) (“The public trust doctrine encompass[es] wildlife preservation with its legal reach.”).

More recently, Mary Wood has argued for comprehensively expanded public trust concepts in American environmental and natural resources law to address emerging environmental crises and the impacts of climate change.²⁴⁸

In many ways, however, the states have anticipated these scholarly calls for the expansion of public trust concepts. The emergence of ecological public trust doctrines is the cutting edge of public trust common law.

2. Ecological Public Trusts Based in State Constitutions

In some states, an ecological public trust has emerged through state courts connecting public trust concepts to state constitutional provisions that mandate environmental protection. For example, on May 18, 1971, the citizens of Pennsylvania amended their Constitution to provide that:

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania's public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.²⁴⁹

According to the Pennsylvania Supreme Court, this constitutional “amendment thus installs the common law public trust doctrine as a constitutional right to environmental protection susceptible to enforcement by an action in equity.”²⁵⁰

Constitutional ecological public trust doctrines often act as a source of authority for and duties upon state agencies rather than a driver of continuing rebalancing of public and private rights and values. As one example, these doctrines can reinforce, as a matter of state constitutional law, conservation-related aspects of the classic public trust doctrine. Thus, Rhode Island has enshrined—and expanded—its public trust doctrine in constitutional provisions. Most importantly for the ecological public trust:

The people shall continue to enjoy and freely exercise all the rights of fishery, and the privileges of the shore, to which they have been heretofore entitled under the charter and usages of this state, including but not limited to fishing from the shore, the gathering of seaweed, leaving the shore to swim in the sea and

248. Wood, *supra* note 135, at 65–84.

249. PA. CONST. art. I, § 27.

250. *Commonwealth v. Nat'l Gettysburg Battlefield Tower, Inc.*, 311 A.2d 588, 596 (Pa. 1973) (Jones, C.J., dissenting) (emphasis omitted).

passage along the shore; and they shall be secure in their rights to use and enjoyment of the natural resources of the state with due regard for the preservation of their values; and it shall be the duty of the general assembly to provide for the conservation of the air, land, water, plant, animal, mineral and other natural resources of the state, and to adopt all means necessary and proper by law to protect the natural environment of the people of the state by providing adequate resource planning for the control and regulation of the use of the natural resources of the state and for the preservation, regeneration and restoration of the natural environment of the state.²⁵¹

The Rhode Island courts have made clear that this constitutional provision codified Rhode Island's public trust doctrine²⁵²; as a result, that doctrine extends to environmental and natural resource protection. However, the Rhode Island public trust doctrine now restricts, as a matter of constitutional law, the state's authority to impair public rights in its handling of public trust lands,²⁵³ an expansion of the classic restraint on alienation.

Even within an administrative focus, however, constitutional ecological public trusts can shift the import of the classic public trust doctrine. For example, the Louisiana Constitution declares that "[t]he natural resources of the state, including air and water, and the healthful, scenic, historic, and esthetic quality of the environment shall be protected, conserved, and replenished insofar as possible and consistent with the health, safety, and welfare of the people."²⁵⁴ In 1998, the Louisiana Court of Appeals identified this provision as the state's public trust doctrine.²⁵⁵

This constitutionalized ecological public trust doctrine has served most prominently to insulate regulatory conservation measures from legal challenge by people who would seek to over-use their public trust rights, potentially creating a tragedy of the commons. For example, Louisiana's Marine Resources Conservation Act, which banned gill netting, did not violate the state public trust. As the Louisiana Court of Appeals recognized:

251. R.I. CONST. art. I, § 17; *see also* R.I. CONST. art I, § 16 (articulating that state regulatory authority to protect public trust uses is a legitimate use of the police power).

252. *State ex rel. Town of Westerly v. Bradley*, 877 A.2d 601, 606–07 (R.I. 2005); *Champlin's Realty Assocs., L.P. v. Tillson*, 823 A.2d 1162, 1166 (R.I. 2003).

253. *Town of Westerly*, 877 A.2d at 606–07; *Town of Warren v. Thornton-Whitehouse*, 740 A.2d 1255, 1259 (R.I. 1999).

254. LA. CONST. art. IX, § 1.

255. *La. Seafood Mgmt. Council v. La. Wildlife & Fisheries Comm'n*, 719 So. 2d 119, 124 (La. Ct. App. 1998).

In order to fulfill the mandate of the Public Trust Doctrine, given the very nature of use of natural resources, the Legislature may find it necessary from time to time to make adjustments to previously-enacted laws in response to the changes in the variations of natural resources resulting from the use or conservation of those resources.²⁵⁶

Similarly, Louisiana's public trust doctrine also allows the state to protect its coastline from erosion, even when such state actions damage oyster leases, and clauses in such leases protecting the state's erosion-control activities are valid.²⁵⁷ Moreover, in so acting, the state incurs no liability for regulatory takings.²⁵⁸

Louisiana thus demonstrates an important, if sometimes subtle, inversion that ecological public trust doctrines can effect: a shift away from potentially exploitative short-term active public *use* to more sustainable regulation and conservation. This inversion has also been evident in the intersections of public trust law and both Oregon's regulation of salmon fishing²⁵⁹ and Washington's regulation of geoducks.²⁶⁰ Indeed, the Washington Supreme Court has explicitly noted that "it would be an odd use of the public trust doctrine to sanction an activity that actually harms and damages the waters and wildlife of this state."²⁶¹ This facet of the ecological public trust doctrine has important implications for aquatic and marine conservation more generally, such as in the use of protected areas.²⁶²

In addition, the ecological public trust doctrine in these states remains a latent, constitution-backed legal framework from which the common law could evolve in the future. For example, Section 67 of the Vermont Constitution provides that:

The inhabitants of this State shall have liberty in seasonable times, to hunt and fowl on the lands they hold, and on other lands not inclosed, and in like manner to fish in all boatable and other

256. *Id.* at 125.

257. *Avenal v. State*, 886 So. 2d 1085, 1100–02 (La. 2004).

258. *Id.* at 1106.

259. *See supra* notes 236–39 and accompanying text.

260. *See supra* notes 240–42 and accompanying text.

261. *Weden v. San Juan County*, 958 P.2d 273, 284 (Wash. 1998).

262. *See Donna R. Christie, Marines Reserves, the Public Trust Doctrine and Intergenerational Equity*, 19 J. LAND USE & ENVTL. L. 427, 431 (2004) ("One of the most often heard criticisms of the use of marine reserves is that they violate the public trust doctrine."); *id.* at 433–34 (discussing the public trust doctrine and conservation).

waters (not private property) under proper regulations, to be made and provided by the General Assembly.²⁶³

In 1986, the Vermont Supreme Court suggested that this provision, by naming certain rights, limits the evolution of Vermont's public trust doctrine.²⁶⁴ Three years later, however, the court announced that "the public trust doctrine retains an undiminished vitality."²⁶⁵

Finally, constitutional provisions have themselves acted as the impetus for the expansion and evolution of a state's public trust doctrine toward more ecological ends. For example, for many years, Illinois limited public uses of navigable waters to the traditional navigation, commerce, and fishing.²⁶⁶ However, in 1970, Illinois amended its Constitution. Two provisions in the new Article XI declare that "[t]he public policy of the State and the duty of each person is to provide and maintain a healthful environment for the benefit of this and future generations[]"²⁶⁷ and that "[e]ach person has the right to a healthful environment."²⁶⁸

In 1976, the Illinois Supreme Court announced a much more expansive view of its public trust doctrine in light of these constitutional—as well as statutory—developments in the state:

On this question of changing conditions and public needs, it is appropriate to observe that there has developed a strong, though belated, interest in conserving natural resources and in protecting and improving our physical environment. The public has become increasingly concerned with dangers to health and life from environmental sources and more sensitive to the value and, frequently, the irreplaceability of natural resources. This is reflected in the enactment of the Illinois Environmental Protection Act in 1971 and in the ratification by the people of this State of sections 1 and 2 of article XI of the 1970 Constitution²⁶⁹

Connecting the public trust doctrine to Illinois's environmental constitutional rights reinforces private rights of action under the Illinois

263. VT. CONST. ch. II, § 67.

264. *Cabot v. Thomas*, 147 Vt. 207, 213, 514 A.2d 1034, 1038 (1986).

265. *State v. Cent. Vt. Ry., Inc.*, 153 Vt. 337, 342, 571 A.2d 1128, 1130 (1989).

266. *DuPont v. Miller*, 141 N.E. 423, 425 (Ill. 1923); *Schulte v. Warren*, 75 N.E. 783, 787 (Ill. 1905).

267. ILL. CONST. art. XI, § 1.

268. *Id.* § 2.

269. *People ex rel. Scott v. Chicago Park Dist.*, 360 N.E.2d 773, 780 (Ill. 1976) (citation omitted).

Environmental Protection Act, because the public trust doctrine, like the Act, creates a private right of action to challenge environmental harms.²⁷⁰

3. Ecological Public Trusts Based in State Statutes

In other states, the state legislatures have created ecological public trusts by incorporating the state public trust doctrine into more environmentally minded statutory programs. For example, the Mississippi Public Trust Tidelands Act²⁷¹ declares:

[T]he public policy of this state to favor the preservation of the natural state of the public trust tidelands and their ecosystems and to prevent the despoliation and destruction of them, except where a specific alteration of specific public trust tidelands would serve a higher public interest in compliance with the public purposes of the public trust in which such tidelands are held.²⁷²

Moreover, the public trust boundary is ambulatory.²⁷³ Similarly, Mississippi's Coastal Wetlands Protection Act²⁷⁴ recognizes a public trust in coastal wetlands and declares a state policy to preserve them and their ecosystems, "except where a specific alteration of specific coastal wetlands would serve a higher public interest in compliance with the public purposes of the public trust in which coastal wetlands are held."²⁷⁵ In 1986, and citing to this Act, the Mississippi Supreme Court declared that the public uses protected through the public trust doctrine include environmental protection and preservation and "enhancement of aquatic, [sic] avarian and marine life"²⁷⁶

Tennessee took a slightly different approach to incorporating its public trust doctrine into its environmental statutes, effectively expanding the doctrine beyond classic public trust lands and uses. The state Safe Drinking Water Act recognizes "that the waters of the state are the property of the state and are held in public trust for the benefit of its citizens" and declares "that the people of the state are beneficiaries of this trust and have a right to

270. *Timothy Christian Sch. v. Vill. of W. Springs*, 675 N.E.2d 168, 174 (Ill. App. Ct. 1996); *Paepcke v. Pub. Bldg. Comm'n of Chicago*, 263 N.E.2d 11, 18 (Ill. 1970).

271. MISS. CODE ANN. §§ 29-15-1 to -7 (1972).

272. *Id.* § 29-15-3.

273. *Id.* § 29-15-7.

274. MISS. CODE ANN. §§ 49-27-1 to -5 (1972).

275. *Id.* § 49-27-3.

276. *Cinque Bambini P'ship v. State*, 491 So. 2d 508, 512 (Miss. 1986); *see also* *Columbia Land Dev. L.L.C. v. Sec'y of State*, 868 So. 2d 1006, 1012-13 (Miss. 2004) (summarizing the list of public uses from *Cinque Bambini*).

both an adequate quantity and quality of drinking water.”²⁷⁷ The state Water Quality Control Act also recognizes “that the waters of Tennessee are the property of the state and are held in public trust for the use of the people of the state,” then declares the “public policy of Tennessee that the people of Tennessee, as beneficiaries of this trust, have a right to unpolluted waters.”²⁷⁸ Thus, these statutes extend the basic public trust doctrine to water supply and water pollution. However, Tennessee case law has not further illuminated the import of these statutory public trust rights.

4. Common Law Ecological Public Trust Doctrines: California

Finally, several states have created an ecological public trust almost purely through the operation of common law. One of the most prominent of these is California. In the 1971 case of *Marks v. Whitney*, the California Supreme Court announced that:

There is growing public recognition that one of the most important public uses of the tidelands—a use encompassed within the tidelands trust—is the preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space, and as environments which provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area.²⁷⁹

In connection with Lake Tahoe litigation, the court soon extended its recognition of ecological values to nontidal submerged lands as well, underscoring the human-created scarcity and fragility of these resources. It noted that “the [fresh water] shorezone has been reduced to a fraction of its original size in this state by the pressures of development. Such lands now cover less than one half of 1 percent of the state”²⁸⁰ Moreover:

The shorezone is a fragile and complex resource. It provides the environment necessary for the survival of numerous types of fish (including salmon, steelhead and striped bass), birds (such as the endangered species: the bald eagle and the peregrine falcon), and many other species of wildlife and plants. These areas are ideally suited for scientific study, since they provide a gene pool for the preservation of biological diversity. In addition, the shorezone in

277. TENN. CODE ANN. § 68-221-702 (2006).

278. *Id.* § 69-3-102.

279. *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971) (citations omitted).

280. *California v. Superior Court*, 625 P.2d 256, 259 (Cal. 1981).

its natural condition is essential to the maintenance of good water quality, and the vegetation acts as a buffer against floods and erosion.²⁸¹

Thus, the California public trust doctrine extends to “environmental . . . purposes.”²⁸²

California courts have extended public trust concepts not just to aquatic wildlife habitat, but also to the wildlife itself,²⁸³ creating “two distinct public trust doctrines” in the state.²⁸⁴ Wildlife “are natural resources of inestimable value to the community as a whole. Their protection and preservation is a public interest that is now recognized in numerous state and federal statutory provisions[,]”²⁸⁵ and those statutes generally define the contours of the public trust obligation regarding wildlife.²⁸⁶ Nevertheless, members of the general public can sue to enforce the wildlife public trust as well as the navigable water public trust, because the public trust doctrine “places a *duty* upon the government to protect those resources.”²⁸⁷

Public trust interests also can extend California’s authority and duties beyond the navigable waters, and they can affect private rights in waters. For example, “[t]he state’s right to protect fish is not limited to navigable or

281. *Id.*

282. *City of Los Angeles v. Venice Peninsula Props.*, 644 P.2d 792, 793–94 (Cal. 1982).

283. *Ctr. for Biological Diversity, Inc. v. FPL Group, Inc.*, 166 Cal. App. 4th 1349, 1361–62 (Cal. Ct. App. 2008) (citing *Golden Feather Cmty. Ass’n v. Thermalito Irrigation Dist.*, 209 Cal. App. 3d 1276, 1282 (Cal. Ct. App. 1989)).

284. According to the California Supreme Court:

First is the common law doctrine, which involves the government’s “affirmative duty to take the public trust into account in the planning and allocation of water resources” The second is a public trust duty derived from statute, specifically Fish and Game Code section 711.7, pertaining to fish and wildlife: “The fish and wildlife resources are held in trust for the people of the state by and through the department.” There is doubtless an overlap between the two public trust doctrines—the protection of water resources is intertwined with the protection of wildlife. Nonetheless the duty of government agencies to protect wildlife is primarily statutory.

Envtl. Prot. & Info. Ctr. v. Cal. Dep’t of Forestry & Fire Prot., 187 P.3d 888, 926 (Cal. 2008) (citations omitted) (quoting *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 728 (Cal. 1983)); *see also* *Cal. Trout, Inc. v. State Water Res. Control Bd.*, 207 Cal. App. 3d 585, 629–30 (Cal. Ct. App. 1989). The *California Trout* case established that Fish and Game Code § 5946 establishes a public trust rule but noted

[i]t does not follow from the application of the term “public trust” to the state’s interest in fisheries of non-navigable streams that all of the consequences of the public trust doctrine as applicable to navigable waters also apply to non-navigable streams. For example, the beds of non-navigable streams are not owned by the state based upon a public trust fishery interest.

Id. at 630.

285. *Ctr. for Biological Diversity, Inc.*, 166 Cal. App. 4th at 1363.

286. *Id.* at 1364.

287. *Id.* at 1365.

otherwise public waters but extends to any waters where fish are habitated or accustomed to resort and through which they have the freedom of passage to and from the public fishing grounds of the state.”²⁸⁸ Similarly, in *National Audubon Society v. Superior Court* (the “Mono Lake case”), the California Supreme Court determined that the public trust doctrine could restrict or require modifications in established water rights even in non-navigable tributaries of navigable waters.²⁸⁹ Withdrawals of water from Mono Lake’s tributaries were imperiling “both the scenic beauty and the ecological values of Mono Lake”²⁹⁰ As a result, the public trust doctrine required modifications in the prior appropriation system.²⁹¹ Specifically, “the public trust doctrine . . . protects navigable waters from harm caused by diversion of nonnavigable tributaries[.]”²⁹² and “when the public trust doctrine clashes with the rule of priority, the rule of priority must yield.”²⁹³

Nevertheless, despite its acclamation as the vanguard of the ecological public trust doctrine, California does limit the breadth of that doctrine. In particular, the *National Audubon* rule does not apply to water withdrawals from purely non-navigable waters in the absence of an effect on navigable waters.²⁹⁴ Thus, California maintains a connection between its ecological public trust doctrine and a classic public trust doctrine principle: state ownership of the beds and banks of navigable waters.

5. Common Law Ecological Public Trust Doctrines: Hawaii

While California’s ecological public trust doctrine may be the most widely recognized, Hawaii’s is more extensive and more pervasively affects private rights to use waters as well as government regulation. Like California, Hawaii recognizes two different public trust doctrines—the navigable water

288. *Golden Feather*, 209 Cal. App. 3d at 1282; see also *Cal. Trout, Inc.*, 207 Cal. App. 3d at 630 (concluding that “public trust interests pertain to non-navigable streams which sustain a fishery”); *People v. Truckee Lumber Co.*, 48 P. 374, 374–75 (Cal. 1897) (noting that “the right and power to protect and preserve [fish] for the common use and benefit is one of the recognized prerogatives of the sovereign, coming to us from the common law” and asserting that the state’s authority to protect fish for the public is not limited to fish in navigable waters; “[t]o the extent that waters are the common passageway for fish, although flowing over lands entirely subject to private ownership, they are deemed for such purposes public waters, and subject to all laws of the state regulating the right of fishery”).

289. *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 728 (Cal. 1983).

290. *Id.* at 711.

291. *Id.* at 712, 727–28.

292. *Id.* at 721.

293. *El Dorado Irrigation Dist. v. State Water Res. Control Bd.*, 48 Cal. Rptr. 3d 468, 490 (Cal. Ct. App. 2006).

294. *Golden Feather Cmty. Ass’n v. Thermalito Irrigation Dist.*, 209 Cal. App. 3d 1276, 1280 (Cal. Ct. App. 1989).

public trust doctrine and a unique public trust growing out of Hawaii's complex history and Native Hawaiian rights, known as the water resources public trust. Both have contributed to a broad ecological public trust perspective in the state, one that favors public rights over private.

The Hawaii water resources public trust doctrine has largely superseded the navigable waters public trust in the context of water rights and fresh waters. The Hawaii Supreme Court has noted that, in the Kingdom of Hawaii, the right to water was reserved to the people for their common good in all land grants and ownership of the water remained at all times in the people.²⁹⁵ This sovereign reservation imposed a public trust on the water itself, similar to but different from the navigable waters public trust doctrine.²⁹⁶

Given the limited availability of fresh water resources in Hawaii, reassertion of this traditional water resources trust has been deemed critical, both as against assertions of riparian rights²⁹⁷ and in light of the Hawaii Water Code and water use permits. With respect to riparian rights, "underlying every private diversion and application there is, as there always has been, a superior public interest in this natural bounty."²⁹⁸ With respect to the Hawaii Water Code,

[t]he public trust in the water resources of this state, like the navigable waters trust, has its genesis in the common law. . . . The [State Water] Code does not evince any legislative intent to abolish the common law public trust doctrine. To the contrary, . . . the legislature appears to have engrafted the doctrine wholesale in the Code.²⁹⁹

As a result, the Hawaii Water Code "does not supplant the protections of the public trust doctrine," and "the public trust doctrine applies to all water resources without exception or distinction," including ground waters.³⁰⁰

Thus, the Hawaii Supreme Court has clearly rebalanced public and private interests in these scarce resources in favor of the public. As in California, in implementing its water law the State of Hawaii may "revisit

295. *In re Water Use Permit Applications*, 9 P.3d 409, 440–41 (Haw. 2000); *see also* Robinson v. Ariyoshi, 658 P.2d 287, 310–11 (Haw. 1982) (giving the same history).

296. *In re Water Use Permit Applications*, 9 P.3d at 441; *Robinson*, 658 P.2d at 310 (noting that this sovereign interest was more than just a police power interest; "[t]he nature of this ownership is thus akin to the title held by all states in navigable waterways").

297. *Robinson*, 658 P.2d at 311.

298. *Id.* at 312.

299. *In re Water Use Permit Applications*, 9 P.3d at 442 (citations omitted).

300. *Id.* at 445.

prior diversions and allocations, even those made with due consideration of their effect on the public trust.”³⁰¹ Moreover,

the constitutional requirements of “protection” and “conservation,” the historical and continuing understanding of the trust as a guarantee of public rights, and the common reality of the “zero-sum” game between competing water uses demand that any balancing between public and private purposes begin with a presumption in favor of public use, access, and enjoyment.³⁰²

The state water agency’s decisions in favor of private uses of water are subject to a “higher level of scrutiny.”³⁰³ Finally, the state agency must consider the cumulative impact of diversions and “implement reasonable measures to mitigate this impact, including the use of alternative sources.”³⁰⁴

Importantly, according to the Hawaii Supreme Court, “the maintenance of waters in their natural state constitutes a distinct ‘use’ under the water resources trust.”³⁰⁵ Thus, the public trust doctrine encompasses ecological protection and preservation. To underscore that point, in expounding the water resources trust, the Hawaii Supreme Court explicitly has followed the California Supreme Court’s decision in *National Audubon Society*.³⁰⁶

Unlike in California, however, both of Hawaii’s water-based public trusts are incorporated into the state’s much broader constitutional public trust doctrine.³⁰⁷ The Hawaii Constitution provides that:

For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii’s natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the

301. *Id.* at 453 (citation omitted).

302. *Id.* at 454; *see also In re Water Use Permit Applications*, 93 P.3d 643, 650, 657 (Haw. 2004) (noting that “because water is a public trust resource and the public trust is a state constitutional doctrine, this court recognizes certain qualifications to the standard of review regarding the Water Commission’s decisions” and in effect imposes a burden on proposed users to justify their uses of water).

303. *In re Water Use Permit Applications*, 9 P.3d at 454 (citations omitted).

304. *Id.* at 455 (citations omitted).

305. *Id.* at 448.

306. *Id.* at 452 (adopting the reasoning of *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709 (Cal. 1983)).

307. *Kelly v. 1250 Oceanside Partners*, 140 P.3d 985, 1002 (Haw. 2006).

State. All public natural resources are held in trust by the State for the benefit of the people.³⁰⁸

The Hawaii Supreme Court has indicated that these more general constitutional public trust concepts extend to environmental and biodiversity protection, such as regulation of the Palila, an endangered bird.³⁰⁹ In 2006, moreover, it explicitly connected the constitutionally-incorporated navigable waters public trust doctrine to environmental protection when it held that that doctrine applies to the Hawaii Department of Health's implementation of the federal Clean Water Act.³¹⁰ Thus, when environmental groups asserted that the Department violated the public trust doctrine by failing to prevent a developer from violating state water quality standards for coastal waters, the court concluded that state issuance of permits pursuant to the Clean Water Act is subject to the public trust doctrine and that the Department must ensure that water quality measures are actually being implemented, not just required in the permit itself.³¹¹

6. Common Law Ecological Public Trust Doctrines: Other States

Other states besides California and Hawaii have incorporated public trust principles into resource management and ecological conservation, although not so extensively as those two states. Moreover, these other states have yet to clearly apply their ecological public trusts so as to limit private rights in waters. Nevertheless, their incorporations of ecological considerations into their common-law public trusts (even when there are constitutional and statutory connections made) provides a foundation for further evolution of their doctrines' roles in protecting ecosystems and ecosystem functions.

North Dakota has considered the role of the public trust doctrine with regard to more general ecological considerations, but has nevertheless continued to confine the doctrine's application to water resources. The North Dakota Supreme Court acknowledged as early as 1976 that "[i]t is evident that the Public Trust Doctrine is assuming an expanding role in environmental law."³¹² The public trust doctrine does not prohibit all development, and hence the State Engineer can grant permits to drain wetlands—especially when he studied the consequences, imposed

308. HAW. CONST. art. XI, § 1.

309. *Morimoto v. Bd. of Land & Nat. Res.*, 113 P.3d 172, 184 (Haw. 2005).

310. *Kelly*, 140 P.3d at 1011.

311. *Id.*

312. *United Plainsmen Ass'n v. N.D. State Water Conservation Comm'n*, 247 N.W.2d 457, 463 (N.D. 1976) (citation omitted).

conditions, and was subject to a public interest requirement.³¹³ Nevertheless, the public trust doctrine *does* limit the state's discretionary authority "to allocate vital state resources," as enunciated in *Illinois Central Railroad*.³¹⁴ Nor is the doctrine restricted to conveyances of submerged lands; "[t]he State holds the navigable waters, as well as the lands beneath them, in trust for the public," as provided in the North Dakota Constitution and refined by statute.³¹⁵ As a result, "[p]rotecting the integrity of the waters of the state is a valid exercise of the [North Dakota Water Commission's] duties," allowing it, for example, to control the drainage of a lake.³¹⁶

In 1995, the South Carolina Supreme Court greatly broadened the scope of South Carolina's public trust doctrine to create an ecological public trust and new public trust review of agency actions.³¹⁷ The litigation arose because Kiawah Resort Associates (KRA) intended to develop part of the Rhett's Bluff area of Kiawah Island, which bordered the Kiawah River.³¹⁸ It submitted a comprehensive plan that would have included 78 docks and impacted both shellfish and water quality.³¹⁹ After substantial resistance from both state and federal agencies, KRA amended its plan to include only 36 docks.³²⁰ The South Carolina Coastal Council issued the permit, which the Sierra Club challenged under both state administrative law and the public trust doctrine.³²¹

Three aspects of the South Carolina Supreme Court's resulting decision are important. First, the court declared that:

The underlying premise of the Public Trust Doctrine is that some things are considered too important to society to be owned by one person. Traditionally, these things have included natural resources such as air, water (including waterborne activities such as navigation and fishing), and land (including[] but not limited to[] [. . .] seabed and riverbed soils). Under this Doctrine, everyone has the inalienable right to breathe clean air; to drink safe water; to fish and sail, and recreate upon the high seas,

313. *Bottineau County Water Res. Dist. v. N.D. Wildlife Soc'y (In re Application for Permits to Drain Related to Stone Creek Channel Improvements and White Spur Drain)*, 424 N.W.2d 894, 903 (N.D. 1988) (citing *United Plainsmen*, 247 N.W.2d at 463).

314. *Ill. Cent. R.R. v. Illinois*, 146 U.S. 387 (1892); *United Plainsmen*, 247 N.W.2d at 460.

315. *United Plainsmen*, 247 N.W.2d at 461-62 (also noting that "[w]e believe that § 61-01-01, NDCC, expresses the Public Trust Doctrine").

316. *N.D. State Water Comm'n v. Bd. of Managers*, 332 N.W.2d 254, 258 (N.D. 1983).

317. *Sierra Club v. Kiawah Resort Assocs.*, 456 S.E.2d 397 (S.C. 1995).

318. *Id.* at 399.

319. *Id.*

320. *Id.*

321. *Id.* at 399-400.

territorial seas, and navigable waters; as well as to land on the seashores and riverbanks.³²²

Thus, the South Carolina public trust doctrine now clearly extends to environmental protection. Second, the court dissociated public trust review from normal “substantial evidence” administrative review, noting that the relevant inquiry for the former “is whether the docks substantially impair the public interest in public trust land and waters.”³²³ Thus, it appears that state agency actions can be held invalid if they violate either standard of review. Finally, public trust review includes an assessment of the impacts not just on public access but also on marine life and water quality.³²⁴ However, the evidence indicated that KRA’s docks would not substantially impair any of these public trust interests, and so the court upheld the permit.³²⁵

In the late 1990s, the Alaska Supreme Court began outlining its state ecological public trust doctrine. In 1998, for example, it announced that “[t]he public trust doctrine provides that the State holds certain resources (such as wildlife, minerals, and water rights) in trust for public use, ‘and that government owes a fiduciary duty to manage such resources for the common good of the public as beneficiary.’”³²⁶ Moreover, while that court has made it clear that the navigable waters public trust doctrine *per se* does not extend to wildlife management, the state does have a duty under the Alaska Constitution to manage fish, wildlife, and water resources for the peoples’ benefit, “to guarantee the common citizen participation in wildlife harvest, and to divest the [government] of exclusive entitlement to those resources.”³²⁷ Thus, according to the Alaska Supreme Court:

322. *Id.* at 402 (quoting Gregg L. Syridon & Sam A. LeBlanc, *The Overriding Public Interest in Privately Owned Natural Resources: Fashioning a Cause of Action*, 6 TUL. ENVTL. L. J. 287, 291 (1993) (omissions not recognized by court)).

323. *Id.*

324. *Id.*

325. *Id.*

326. *Baxley v. State*, 958 P.2d 422, 434 (Alaska 1998) (quoting *McDowell v. State*, 785 P.2d 1, 16 n.9 (Alaska 1989)). Nevertheless, mining is not an activity protected by the public trust. Commercial uses protected under the *Illinois Central* decision are:

[C]ommerce in the sense of trade, traffic or transportation of goods over navigable waters, a meaning which does not include mining. Most importantly, a mining claim is not a “public use,” but rather an exclusive, depleting use of a non-renewable resource for private profit. We believe that even the most expansive interpretation of the scope of public trust easements would not include private mining enterprises.

Hayes v. A.J. Assocs., Inc., 846 P.2d 131, 133 (Alaska 1993).

327. *McDowell*, 785 P.2d at 16.

We have frequently compared the state's duties as set forth in Article VIII to a trust-like relationship in which the state holds natural resources such as fish, wildlife, and water in "trust" for the benefit of all Alaskans. Instead of recognizing the creation of a public trust in these clauses per se, we have noted that the common use clause was intended to engraft in our constitution certain trust principles guaranteeing access to the fish, wildlife and water resources of the state.³²⁸

Nevertheless, in general, the State of Alaska cannot be liable in damages under the public trust doctrine for allowing the destruction of natural resources, such as when a beetle infestation destroys trees.³²⁹

Less decisively, there are also indications from the Texas courts that fish and other aquatic life are subject to public trust principles. As far back as 1942, the Texas Civil Court of Appeals declared:

The waters of all natural streams of this State and of all fish and other aquatic life contained in fresh water rivers, creeks, streams and lakes, or sloughs subject to overflow from rivers or other streams within the borders of this State, are declared to be the property of the State; and the Game, Fish and Oyster Commissioner has jurisdiction over and control of such rivers and aquatic life. The ownership is in trust for the people; and pollution of streams and water courses is condemned The Constitution of Texas, Art. 16, § 59a . . . designates rivers and streams as natural resources, declares that such belong to the State, and expressly invests the Legislature with the preservation and conservation of such resources.³³⁰

In 2005, moreover, the court indicated that the public trust doctrine allows the state to "conserve its natural resources."³³¹

Washington has also flirted with applying some version of a public trust doctrine to wildlife, especially shellfish. For example, as noted, the Washington Court of Appeals has stated that the public trust doctrine applies to the Department of Natural Resources' regulation of shellfish,

328. *Brooks v. Wright*, 971 P.2d 1025, 1031 (Alaska 1999) (citations and internal quotes omitted). *But see* *Pullen v. Ulmer*, 923 P.2d 54, 60–61 (Alaska 1996) (noting that the state has a trust responsibility to manage fish, wildlife, and water resources, including salmon).

329. *Brady v. State*, 965 P.2d 1, 17 (Alaska 1998).

330. *Goldsmith & Powell v. Texas*, 159 S.W.2d 534, 535 (Tex. Civ. App. 1942) (citations omitted).

331. *Cummins v. Travis County Water Control & Improvement Dist. No. 17*, 175 S.W.3d 34, 49 (Tex. App. 2005).

such as geoducks.³³² Nevertheless, the Department's regulation of the commercial geoduck harvest did not violate the public trust doctrine despite the public right to fish because: (1) the state must "balance the protection of the public's right to use resources on public land with the protection of the resources that enable these activities"; (2) the Department had not given up its control over the state's geoduck resources; and (3) the regulation facilitated sustainable geoduck harvesting and natural regeneration of the resource, serving the public interest.³³³ These conclusions thus fairly clearly suggest that Washington is beginning to connect public trust principles to sustainable development.

More general—but also more embryonic—discussions of an ecological public trust have also surfaced in South Dakota, Utah, and Wisconsin. The South Dakota Supreme Court has determined that South Dakota's Environmental Protection Act embodies a broader public trust doctrine than the navigable waters public trust alone would allow.³³⁴ This Act "authoriz[es] legal action to protect 'the air, water and other natural resources and the public trust therein from pollution, impairment or destruction.'"³³⁵ Utah also appears to be extending its public trust doctrine to ecological protection because, according to the Utah Supreme Court, "[t]he 'public trust' doctrine . . . protects the ecological integrity of public lands and their public recreational uses for the benefit of the public at large."³³⁶

Wisconsin's common-law ecological public trust doctrine is nascent. As early as 1972, in the more traditional regulatory mode of the ecological public trust doctrine, the Wisconsin Supreme Court stated that "[t]he state of Wisconsin under the [public] trust doctrine has a duty to eradicate the present pollution and to prevent further pollution in its navigable waters."³³⁷ However, that purely regulatory perspective appears to be evolving into something more general. For example, in 1987, the Wisconsin Supreme Court noted that preservation of "natural resources such as wetlands" was part of Wisconsin's public trust doctrine.³³⁸ In 2007, it expanded upon this concept, stating that the public has an "interest in navigable waters,

332. *Wash. Geoduck Harvest Ass'n v. Wash. Dep't of Natural Res.*, 101 P.3d 891, 895 (Wash. Ct. App. 2004). *But see* *Citizens for Responsible Wildlife Mgmt. v. Washington*, 103 P.3d 203, 205 (Wash. Ct. App. 2004). "No Washington case has applied the public trust doctrine to *terrestrial* wildlife or resources. But we need not decide whether the public trust doctrine applies [to prohibitions on terrestrial hunting and trapping] because, even if it does, Citizens' challenge fails." *Id.* (emphasis added) (citations omitted).

333. *Wash. Geoduck Harvest*, 101 P.3d at 895, 897.

334. *Parks v. Cooper*, 676 N.W.2d 823, 838 (S.D. 2004).

335. *Id.* (quoting S.D. CODIFIED LAWS § 34A-10-1 (2004)).

336. *Nat'l Parks & Conservation Ass'n v. Bd. of State Lands*, 869 P.2d 909, 919 (Utah 1993).

337. *Just v. Marinette County*, 201 N.W.2d 761, 768 (Wis. 1972).

338. *State v. Trudeau*, 408 N.W.2d 337, 343 (Wis. 1987) (citing *Just*, 201 N.W.2d at 768).

including promoting healthful water conditions conducive to protecting aquatic life and fish.”³³⁹ These interests and rights, moreover, can be enforced directly in court because the public trust doctrine also creates a cause of action.³⁴⁰

E. State Public Trust Doctrines As Evolutionary and Adaptive

Of perhaps most interest for climate change adaptation and adaptive management are the states that explicitly characterize their public trust doctrines as flexible, evolving, and responsive to emerging public needs. These states *expect* the scope and applicability of their public trust doctrines to change in the future, generally to protect public needs and values against encroaching private rights and uses.

Perhaps unsurprisingly, California took the lead in announcing this evolutionary view of its public trust doctrine. In 1971, in *Marks*, the California Supreme Court declared that “[t]he public uses to which tidelands are subject are sufficiently flexible to encompass changing public needs. In administering the trust the state is not burdened with an outmoded classification favoring one mode of utilization over another.”³⁴¹ Twelve years later, in *National Audubon Society*, it underscored this vision of the public trust doctrine by acknowledging that “[t]he objective of the public trust has evolved in tandem with the changing public perception of the values and uses of waterways.”³⁴² As noted, these were not just words: In *National Audubon Society*, the court required adjustments in long-standing water rights to protect the emerging public value of environmental conservation.³⁴³

On the east coast, New Jersey has explicitly characterized its public trust doctrine as evolutionary and has acted on that characterization.³⁴⁴ In 1972, in *Borough of Neptune City v. Borough of Avon-by-the-Sea*, the New Jersey Supreme Court declared that “[t]he public trust doctrine, like all common law principles, should not be considered fixed or static, but should be molded and extended to meet changing conditions and needs of the public it was created to benefit.”³⁴⁵ As a result, the doctrine extends to “recreational uses, including bathing, swimming, and other shore

339. *FAS, L.L.C. v. Town of Bass Lake*, 733 N.W.2d 287, 295 (Wis. 2007).

340. *Timm v. Portage County Drainage Dist.*, 429 N.W.2d 512, 516 n.8 (Wis. Ct. App. 1988).
But see State v. Deetz, 224 N.W.2d 407, 413 (Wis. 1974).

341. *Marks v. Whitney*, 491 P.2d 374, 380 (Cal. 1971) (citations omitted).

342. *Nat’l Audubon Soc’y v. Superior Court*, 658 P.2d 709, 719 (Cal. 1983).

343. *Id.*

344. *Borough of Neptune City v. Borough of Avon-by-the-Sea*, 294 A.2d 47, 54–55 (N.J. 1972).

345. *Id.* at 54.

activities.”³⁴⁶ Moreover, this evolving public trust doctrine now requires that the public be allowed to access at least some portions of the dry sand areas of both municipally owned *and private* beaches.³⁴⁷

Thus, like California, New Jersey has allowed evolving public needs to force adjustments of private rights through the state public trust doctrine. In addition, more extensions of the state public trust doctrine are likely. For example, the New Jersey Superior Court has already applied the public trust doctrine to drinking water because “it is clear that since water is essential for human life, the public trust doctrine applies with equal impact upon the control of our drinking water reserves.”³⁴⁸

Other states have found the California and/or New Jersey Supreme Courts’ views of an evolutionary public trust doctrine persuasive. For example, in 1976 when the Illinois Supreme Court connected Illinois’ public trust doctrine to environmental protections, it referred to “changing conditions and public needs.”³⁴⁹ The Illinois court relied on the New Jersey Supreme Court’s decision in *Borough of Neptune City* and cited to the California Supreme Court’s decision in *Marks*.³⁵⁰ In this case, the state Attorney General challenged state legislation conveying 194.6 acres of submerged land in Lake Michigan to United States Steel Corporation for \$19,460, to be filled in and used for a new steel plant.³⁵¹ The Illinois Supreme Court went beyond classic public trust restraints on alienability, emphasizing ecologically that “Lake Michigan is a valuable natural resource belonging to the people of this State in perpetuity” and adaptively that “in considering what is the public interest, courts are not bounded by inflexible standards.”³⁵² In light of these evolving ecological public interests, the attempted conveyance was clearly illegal:

In order to preserve meaning and vitality in the public trust doctrine, when a grant of submerged land beneath waters of Lake Michigan is proposed under the circumstances here, the public

346. *Id.*

347. *Raleigh Ave. Beach Ass’n v. Atlantis Beach Club, Inc.*, 879 A.2d 112, 121–24 (N.J. 2005) (allowing public use of the dry sand portions of municipality owned beaches “operated as a private club”); *Van Ness v. Borough of Deal*, 393 A.2d 571, 572–74 (N.J. 1978) (allowing public use of the dry sand portions of municipally owned beaches); *Borough of Neptune City*, 294 A.2d at 55 (allowing use of municipally owned dry sand immediately adjacent to the high-water line).

348. *Mayor & Mun. Council of City of Clifton v. Passaic Valley Water Comm’n*, 539 A.2d 760, 765 (N.J. Sup. Ct. 1987).

349. *People ex rel. Scott v. Chicago Park Dist.*, 360 N.E.2d 773, 780 (Ill. 1976) (quoting with approval *Borough of Neptune City*, 294 A.2d at 54–55).

350. *Id.*

351. *Id.* at 775.

352. *Id.* at 780.

purpose to be served cannot be only incidental and remote. The claimed benefit here to the public through additional employment and economic improvement is too indirect, intangible and elusive to satisfy the requirement of a public purpose. In almost every instance where submerged land would be reclaimed there would be employment provided and some economic benefit to the State. This court has upheld grants where the land was to be used for a water filtration plant and for an exposition hall, but it has upheld a grant to private individuals in only one instance. There, however, as has been pointed out, the main purpose of the legislation was to benefit the public by the construction of an extension of Lake Shore Drive. The benefit to private interest was to further a public purpose and was incidental to the public purpose. Any benefit here to the public would be incidental. We judge that the direct and dominating purpose here would be a private one.³⁵³

While the Hawaii courts have not as explicitly announced that the Hawaii public trust doctrine is evolutionary, they clearly treat it as such.³⁵⁴ For example, in limiting private rights in water, the Hawaii Supreme Court noted in 1982 that:

The reassertion of dormant public interests in the diversion and application of Hawaii's waters has become essential with the increasing scarcity of the resource and recognition of the public's interests in the utilization and flow of those waters. . . . [W]hile there indeed exist relative usufructory rights among landowners, these rights can no longer be treated as though they are absolute and exclusive interests in the waters of our state.³⁵⁵

Moreover, as noted, the Hawaii Supreme Court has evolved the Hawaii doctrine into a full-blown ecological public trust doctrine, citing *National Audubon Society* with approval as it did so.³⁵⁶

In 1986, the Mississippi Supreme Court followed the California Supreme Court's decision in *Marks* when it announced an expansion of the state's public trust doctrine to environmental protection and preservation and "enhancement of aquatic, avarian and marine life"³⁵⁷ In 1994,

353. *Id.* at 781 (citations omitted).

354. *Robinson v. Ariyoshi*, 658 P.2d 287, 311 (Haw. 1982) (footnote omitted).

355. *Id.*

356. *In re Water Use Permit Applications*, 9 P.3d 409, 452 (Haw. 2000) (adopting the reasoning of *National Audubon Society v. Superior Court*, 658 P.2d 709 (Cal. 1983)).

357. *Cinque Bambini P'ship v. State*, 491 So. 2d 508, 512 (Miss. 1986) (citing *Marks v.*

moreover, it explicitly characterized California's public trust doctrine as evolutionary. "'Suffice it to say that the purposes of the trust have evolved with the needs and sensitivities of the people—and the capacity of trust properties through proper stewardship to serve those needs.'"³⁵⁸

In the 1994 case, the Mississippi Supreme Court upheld the Public Trust Tidelands Act of 1989,³⁵⁹ despite the Act's inclusion of provisions that quieted title to already-filled tidelands in the private landowners.³⁶⁰ In so doing, it described the public trust doctrine not only as evolutionary, but also as the mechanism for effectuating overarching public policy in public waters:

[T]he Legislature and the Secretary of State are charged not only within maintaining title to trust properties in the State's name, but they have a higher duty. This duty being to continuously seek avenues for proper and effective management of the public trust so that there is a return to the public of use, environmental protection and advancement and, in the appropriate areas, a return of economic growth. To stagnantly hold tidelands is not always in the public's best interest, nor is it responsive to the public's trust.³⁶¹

This formulation of the public trust offers two salient features for the climate change era. First, the court could acknowledge and deal with actual on-the-ground realities, such as the fact that many tidelands have already been lost, de facto, to private ownership and control. Second, the evolutionary public trust both allows and requires a "bird's eye," comprehensive view of overall state tidelands policy.

The ability of the public trust doctrine to inspire this cumulative view of natural resources use is also evident in the California Supreme Court's discussion of tidelands in *Marks*, the Hawaii Supreme Court's discussion of water scarcity problems, and public trust doctrine scholarship.³⁶² Moreover, as the Mississippi Supreme Court concluded, "[p]ublic trust must not be equated to stagnation or nonuse but is indeed subject to our stewardship and may be used to meet changing needs."³⁶³

Whitney, 491 P.2d 374, 380 (Cal. 1971)).

358. *Sec'y of State v. Wiesenberg*, 633 So. 2d 983, 989 (Miss. 1994) (quoting *Cinque Bambini*, 491 So. 2d at 512).

359. *Id.* at 986.

360. *Id.* at 993–94.

361. *Id.*

362. *See, e.g., Sax, supra* note 16, at 510 (noting courts' recognition "that the evaluation of resource policy cannot be adequately effectuated by viewing each disposition or development in isolation from the other public resources in the state or region").

363. *Wiesenberg*, 633 So. 2d at 994.

In 1989, the Vermont Supreme Court quoted both California's and New Jersey's broad views of their public trust doctrines in adopting an evolving view of its public trust doctrine:

[T]he public trust doctrine retains an undiminished vitality. The doctrine is not “‘fixed or static,’ but one to ‘be molded and extended to meet changing conditions and needs of the public it was created to benefit.’” The very purposes of the public trust have “evolved in tandem with the changing public perception of the values and uses of waterways.”³⁶⁴

Moreover, the Vermont public trust doctrine provides the state and citizens with a cause of action.³⁶⁵

CONCLUSION: STATE PUBLIC TRUST DOCTRINES AS A LEGAL MECHANISM TO PROMOTE CLIMATE CHANGE ADAPTATION

As the above discussion shows, at least 16 states have at least nascent ecological public trust doctrines, representing an evolution of the American public trust doctrine far beyond its classic protection of public rights to navigate, fish in, and engage in commerce on navigable waters. In addition, since 1971, courts in at least six states have consciously characterized their states' public trust doctrines as adaptive and evolutionary, and four of these states have used those evolutionary doctrines to rebalance private rights and public values in public trust waters.

These states are likely to become active experimenters in evolving legal rights and responsibilities in the climate change adaptation era, at least with respect to responding to climate change impacts on aquatic ecosystems and water supplies. Specifically, states with ecological and/or evolutionary public trust doctrines are better situated to enable climate change adaptation in four ways.

First, and most clearly, in states with ecological and/or evolutionary public trust doctrines, the courts can explicitly acknowledge climate change

364. *State v. Cent. Vt. Ry., Inc.*, 153 Vt. 337, 342, 571 A.2d 1128, 1130 (Vt. 1989) (quoting *Matthews v. Bay Head Improvement Ass'n*, 471 A.2d 355, 365 (N.J. 1984) (quoting *Borough of Neptune City v. Borough of Avon-by-the-Sea*, 294 A.2d 47, 54 (N.J. 1972)) and quoting *Nat'l Audubon Soc'y v. Superior Court of Alpine County*, 658 P.2d 709, 719 (Cal. 1983) (en banc)). Vermont's adoption of the evolutionary status for its public trust doctrine was somewhat surprising, because it reversed the Vermont Supreme Court's 1986 suggestion that § 67 of the Vermont Constitution limits the evolution of Vermont's common law public trust doctrine. *See Cabot v. Thomas*, 147 Vt. 207, 213, 514 A.2d 1034, 1038 (1986).

365. *Parker v. Town of Milton*, 169 Vt. 74, 78–79, 726 A.2d 477, 481 (1998) (citing *Hazen v. Perkins*, 92 Vt. 414, 421–22, 105 A. 249, 251 (1918)).

as a threat—or at least potential threat—to public trust resources. Such acknowledgement would in essence place climate change impacts on a par with overdevelopment of tidelands in California or water pollution and overuse of fresh water in Hawaii.

Moreover, acknowledgement of climate change impacts would also underscore the potential future scarcity of public trust resources. Such perceived scarcity has already been the motive for evolving the public trust doctrines in California, Hawaii, New Jersey, and Oregon. Like California's and Hawaii's, Oregon's courts view water as a limited and precious resource:

The severe restriction upon the power of the state as trustee to modify water resources is predicated not only upon the importance of the public use of such waters and lands, but upon the exhaustible and irreplaceable nature of the resources and its fundamental important to our society and our environment. These resources, after all, can only be spent once. Therefore, the law has historically and consistently recognized that rivers and estuaries once destroyed or diminished may never be restored to the public and, accordingly, has required the highest degree of protection from the public trustee.³⁶⁶

Courts in Oregon—and other states—might therefore find substantial loss of valuable aquatic resources from climate change a sufficient impetus for a more decisive common-law response through the public trust doctrine.

Second, as has been the case in Mississippi, California, and Hawaii, implementation of state common-law public trust doctrines affords state courts the opportunity to cumulatively assess state public trust resources and the values they can or cannot support. In the climate change adaptation era, such court reassessments could become very public statements of the losses and changes that climate change is bringing to the state, potentially inspiring non-judicial adaptation measures and/or increasing public acceptance of adaptation measures.

Third, adaptive and evolutionary public trust doctrines could lend support to state agency experimentation with adaptive management. Given the current uncertainties regarding the type, scope, severity, and duration of climate change impacts in specific localities, the vast majority of commentators on the subject regard adaptive management to be a critical component of climate change adaptation strategies.³⁶⁷ To engage in

366. *Morse v. Or. Div. of State Lands*, 581 P.2d 520, 524 (Or. App. 1978), *aff'd en banc*, 590 P.2d 709 (Or. 1979).

367. *See supra* note 87 and accompanying text.

adaptive management, however, natural resource managers will need the freedom to “learn by doing” and to evolve management strategies and priorities to reflect changing ecological realities. Nevertheless, as several writers have already recognized, significant institutional barriers to adaptive management exist in the modern administrative state.³⁶⁸ State courts in states with ecological and/or evolutionary public trust doctrines should be able to ease the transition to comprehensive adaptive management by both: (1) imposing substantial burdens of proof on litigants seeking to challenge agency adaptive management plans, actions, and adjustments that promote and preserve the public trust in natural resources such as water and aquatic ecosystems; and (2) requiring state agencies to employ adaptive management techniques, to the extent permitted under existing state legislation, to preserve public trust resources.

Fourth, and most radically, courts in states with ecological and/or evolutionary public trust doctrines could engage in a form of judicial adaptive management by adjusting private and other rights in water resources in response to climate change impacts. Indeed, such judicial adaptive management may already be occurring. In South Dakota, for example, several “unseasonably wet years” (which may represent a new climate pattern) created three large lakes over what had previously been dry or marshy lands.³⁶⁹ Members of the public began to use those lakes for recreation and fishing, and the riparian landowners sued to exclude the public, claiming that the new lakes were privately owned.³⁷⁰ In the course of this litigation, the South Dakota Supreme Court “clarified” the state’s public trust doctrine to declare that the public had rights in *all* waters of the state, regardless of the underlying land ownership.

[W]e conclude that all water in South Dakota belongs to the people in accord with the public trust doctrine and as declared by statute and precedent, and thus, although the lake beds are mostly privately owned, the water in the lakes is public and may be converted to public use, developed for public benefit, and appropriated³⁷¹

In some respects, such judicial adaptive management would be little different than prior adjustments in the public trust doctrine, as when the Arkansas Supreme Court changed its definition of “navigable water” to

368. *See supra* notes 88–91 and accompanying text.

369. *Parks v. Cooper*, 676 N.W.2d 823, 524–25 (S.D. 2004).

370. *Id.* at 825.

371. *Id.*

include recreational waters.³⁷² Thus, for example, following their existing precedent, courts in California and Hawaii may decide to reduce or curtail particular water rights in response to climate-change-induced reduced flows in a particular stream in order to protect the stream's aquatic ecosystems and their ecosystem services for the larger public benefit.

Notably, these kinds of decisions by the courts, in response to climate change impacts, will readjust private and public rights in water without the direct causal link that the water rights cases in California and Hawaii have heretofore had—i.e., exercise of the water rights is the direct cause of harm to the ecosystem. In a climate change era, however, such judicial adaptation may well be seen as a natural and warranted extension of public trust law in order to articulate and preserve the public values of lakes, rivers, streams, and their associated ecosystems.

372. *State v. McIlroy*, 595 S.W.2d 659, 663 (Ark. 1980).

