ON INTEGRITY: SOME CONSIDERATIONS FOR WATER LAW

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I. INTRODUCTION: INTEGRITY AS HYDROLOGIC CONSTRUCT

> *Integrity.* 1. The quality of having strong ethical principles. 2. The state of being whole.
>
> Oxford English Dictionary[1]

Integrity has become a prominent topic of public discourse, ironically triggered by its conspicuous absence in a series of recent, highly-publicized corporate scandals. In reflecting upon the collapse of the Enron Corporation, Forbes Magazine mused that it "was Socrates who first said that virtue cannot be taught, yet paradoxically he spent the balance of his life trying to do so anyway."[2] The magazine posed the question whether business schools can mold the ethics of their students as future executives. One professor, articulating a seeming consensus among many, observed: "With Enron, you can point to the players' bad character, or you can look at how the company's institutions, compensation methods and so forth *disalign* the values of executives from those of the shareholders. . . . I see business ethics as a plea for good institutional design."[3]

The same considerations might be applied in the context of water allocation law and policy. This Article will examine the extent to which there may be a *disalignment* of values between water law and principles of hydrology, ecology, and the public good. Taken together, these principles suggest a value system that I will call "hydrologic integrity." Invoking the dual dimensions of integrity—both ethical and holistic—this Article will explore the potential of the integrity concept to serve as a critical touchstone for the advancement of sound water policy. The invocation of integrity is not intended to be outcome-determinative, but rather to promote the coherence and consistency of a wide range of legal outcomes.

What does it mean to incorporate integrity into water law? This is more than an abstract or philosophical inquiry. Instead, the question invites consideration of the essential relationship between water policy and core scientific and social values. The development of a hydrologic construct premised on integrity is essentially a problem of scale: the law must identify meaningful geographical, ecological, temporal, and social units that will be protected as an integral whole. Integrity, therefore, is dependent upon a careful, thoughtful determination of boundaries. This exercise in line-drawing is daunting. If the boundaries encompass too small an area, water law becomes little more than a parochial fight over a critical and life-sustaining resource.

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1. CONCISE OXFORD ENGLISH DICTIONARY (rev. 10th ed. 2002). Integrity is related to "integer," a thing complete in itself. *Id.*

2. Penelope Patsuris, *Can Integrity Be Taught?*, FORBES, Oct. 4, 2002, *available at* http://www.forbes.com/2002/10/04/1004virtue.html (last visited Aug. 16, 2004).

3. *Id.* (emphasis added) (quoting Loyola University Chicago Assistant Professor Alexei Marcoux).

Conversely, if the boundaries encompass too large an area, water becomes merely a fungible commodity incapable of sustaining fragile and unique biological and human communities.

The federal Clean Water Act provides a useful starting point for this analysis. The statutory statement of purpose incorporates a sweeping acknowledgement of the relationship between water policy and integrity, setting forth the objective "to restore and maintain the chemical, physical, and biological *integrity* of the Nation's waters."[4] The drafters' use of the word "integrity" was conscious and deliberate. As the legislative history explains,

> The word "integrity" as used is intended to convey a concept that refers to a condition in which the natural structure and function of ecosystems is maintained. . . . Although man is a "part of nature" and a product of evolution, "natural" is generally defined as that condition in existence before the activities of man invoked perturbations which prevented the system from returning to its original state of equilibrium.[5]

Expanding upon the aspects of integrity protected under the Clean Water Act, this Article will explore the relevance to water law of chemical, physical, ecosystem, social, and ethical integrity. Just as the Clean Water Act intended to prevent unacceptable "perturbations" of ecosystems, so also this Article will consider the extent to which the law itself may work an unacceptable perturbation of fundamental hydrologic and social principles. In many instances, water policy compartmentalizes the law in ways that have little to do with hydrologic reality and in ways that are antithetical to wholeness and integrity. Examples include the legal bifurcation of surface and groundwater, quantity and quality, land and water, and the present and the future. Conversely, integrity-destroying policies may find legal support in arguments that are deceptively integral and holistic in tone. For example, Florida Everglades litigants opposed the regulation of phosphorous pollution under the guise of an argument styled the "unitary waters" theory.[6]

This Article views three contemporary water disputes through the lens of hydrologic integrity. Case studies include the massive program to restore the Florida Everglades;[7] proposals for north-south water transfers in Florida, evocative of the centuries-long dispute between northern and southern Cali-

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4. 33 U.S.C. § 1251(a) (2001) (emphasis added).

5. H.R. REP. NO. 92-911, at 76 (1972). For an analysis of the Clean Water Act's latent protection of physical and biological integrity, see Robert W. Adler, *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical and Biological Integrity*, 33 ENVTL. L. 29 (2003). Professor Adler also discusses the replacement of the view of ecosystem equilibrium, as asserted by the statute, with the idea that ecosystems are dynamic. *Id.* at 45 n.86; *see also* Michael C. Blumm & William Warnock, *Roads Not Taken: EPA vs. Clean Water*, 33 ENVTL. L. 79 (2003) (discussing landmark cases in which the EPA evaded the Clean Water Act's fundamental objective).

6. *See infra* Part II.D (examining the *Miccosukee* litigation).

7. *See infra* Part II.A.

fornia;[8] and the struggle to apportion a three-state river system among competing users as diverse as sprawling Atlanta and the sleepy oyster town of Apalachicola, Florida.[9] Surprisingly, perhaps, all three case studies focus upon Florida, a state that enjoys an average annual rainfall of about 54 inches.[10] The fact that not even a water-rich eastern state is immune from water controversies of national significance underscores the pressing need to ensure that water law reflects principles of hydrologic reality, fairness, and integrity.

II. CHEMICAL AND PHYSICAL INTEGRITY

Although Congress recognized the protection of chemical and physical integrity as central purposes of the Clean Water Act,[11] it defined neither of those terms directly. To shed light on the notion of chemical integrity, one might search for a definition of pollution. But here, the Act promotes ambiguity rather than clarity by providing two related—but potentially divergent—definitions. The Act defines "pollution" broadly, as "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water."[12] The definition of "pollutant" is narrower, defined as materials "discharged into water,"[13] including garbage, chemical wastes, biological materials, radioactive materials, and heat.[14] The Act provides even less affirmative guidance with respect to the promotion of physical integrity. Rather, section 101(g) of the Act explicitly limits the federal regulatory reach over state water allocation decisions, presumably including state infrastructure affecting the physical integrity of water:

> It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act. It is the further policy of Congress that nothing in this Act shall be construed to supersede or abrogate rights to quantities of water which have been established by any State.[15]

This Article will use the phrase "chemical integrity" to refer to water quality, whether affected by alteration, addition, or discharge. The phrase "physical integrity" will refer to the quantity, timing, and distribution of water flows throughout an aquatic system.

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8. *See infra* Part III.
9. *See infra* Part IV.
10. NATIONAL CLIMATIC DATA CENTER, UNITED STATES NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANNUAL PRECIPITATION, FLORIDA, *available at* http://www.ncdc.noaa.gov/oa/ncdc.html (providing the average annual rainfall for Florida from 1895-2004).
11. *See supra* notes 4-5 and accompanying text.
12. 33 U.S.C. § 1362(19) (2001 & Supp. 2004).
13. 33 U.S.C. § 1362(6) (2001).
14. *Id.*
15. 33 U.S.C. § 1251(g) (2001).

The degradation and ongoing restoration of the Florida Everglades will be presented as a case study that implicates the notions of chemical and physical integrity. In physical terms, the integrity of the Everglades has been disrupted through human flood control projects of staggering proportions: an average of 1.7 billion gallons of water is redirected *each day* directly into the Atlantic Ocean or the Gulf of Mexico, diverted from its historic meandering path through the Everglades wetland complex.[16] In chemical terms, phosphorus, mercury, and other pollutants from agricultural and urban runoff have degraded the waters of the Everglades,[17] drastically reducing the abundance of birds and wildlife. About 68 species are federally listed as endangered or threatened, and the wading bird population has decreased by more than 90%.[18]

This opening case study is a hopeful one. Both state and federal governments have passed legislation designed to restore the physical integrity of the Everglades and to increase its water supply.[19] Moreover, despite the ambiguity of the Clean Water Act, the Supreme Court has refused to mechanically limit the reach of federal control over Everglades pollution in the name of protecting state regulation of water quantity.[20]

If the Everglades is a story involving chemical and physical integrity, it also has a curious, little-known subtext that invokes notions of ethical integrity. If asked to discuss the role of integrity in the modern world, many respondents would cite to the scandal accompanying the collapse of the Enron Corporation as the quintessential example of a systematic failure of integrity in the realm of business.[21] But fewer respondents would recognize a direct link between Enron and notions of integrity in the realm of water law and policy, much less cite to Enron's attempted involvement in Everglades restoration. Through its subsidiary, Azurix Corporation, Enron sought to get into the business of buying and selling water as a market commodity.[22] The concept of water markets is ill-defined, inconsistently articulated, and highly dependant upon the water laws of the relevant state.[23] Perhaps na-

16. U.S. Army Corps of Eng'rs, *The Comprehensive Everglades Restoration Plan (CERP): Quality, Quantity, Timing and Distribution, at* http://www.evergladesplan.org/about/rest_plan_03.cfm (last visited Dec. 7, 2004).

17. *Id.*

18. South Florida Water Management District, *Everglades Information: FAQs, at* http://glades.sfwmd.gov/empact/home/02_everglades/08_faq.shtml (last visited Dec. 7, 2004) [hereinafter SFWMD, *Everglades Information: FAQs*]; *see also* South Florida Water Management District, *Everglades Information: Overview, at* http://glades.sfwmd.gov/empact/home/02_everglades/index.shtml (last visited Dec. 7, 2004) [hereinafter SFWMD, *Everglades Information: Overview*].

19. *See infra* notes 46-52 and accompanying text.

20. *See infra* Part II.D.

21. *See supra* notes 2-3 and accompanying text.

22. Michael Pollick & Chris Davis, *Dead in the Water: Enron's Grab for Florida's Water Was Factor in Collapse*, SARASOTA HERALD-TRIBUNE, Mar. 17, 2002, *available at* http://www.whoseflorida.com/azurix.htm (last visited Aug. 16, 2004).

23. *See* Joseph W. Dellapenna, *The Importance of Getting Names Right: The Myth of Markets for Water*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 317, 320 (2000) (disputing the existence of true water markets).

ively equating water markets with energy markets,[24] Enron briefly maintained an online website for water trading, "Water2Water.com."[25] Attempting to pun its way into the world of Florida water, Azurix conducted a seminar entitled *Liquid Assets*, advocating a market-based approach to water in Florida.[26] The company reportedly offered financial assistance to Florida for the state's share of the Everglades Restoration Project in return for the right to sell some of the water made available by the project.[27] Azurix, its online water trading website, and its potential involvement in Everglades restoration all collapsed spectacularly.[28] In the aftermath, the failure was cast not only as an unsuccessful business venture, but also as one tainted by a lack of integrity.[29]

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24. Dale Kasler, *Water Deals: A Trickle in a Thirsty State*, SACRAMENTO BEE, Aug. 25, 2002, *available at* http://www.sacbee.com/content/news/projects/liquid_assets/story/4128788p-515180c.html (last visited Aug. 26, 2004) (reporting that a "former regional director of the U.S. Bureau of Reclamation said entrepreneurs have been naïve . . . [in thinking they] could trade water like lumber . . . [without] fathom[ing] the complexities of a public resource ruled by layers of government and wrapped in emotion").

25. Michael Grunwald, *How Enron Sought to Tap the Everglades: Water Unit Lobbied Jeb Bush on Privatization Bid, But Access Led Nowhere*, WASH. POST, Feb. 8, 2002, at A12, *available at* http://www.washingtonpost.com/wp-dyn/articles/A42307-2002Feb7.html (last visited Aug. 16, 2004). [The author of this Article found the former Azurix water trading website while conducting research for a previous article. Ignoring at her peril the rule that website sources should be downloaded and printed immediately lest they disappear at some future date, the author subsequently sought in vain to verify the accuracy of a footnote citation to Water2Water for scrupulous law review editors (instead substituting an admittedly lackluster substitute citation).]

26. Pollick & Davis, *supra* note 22 (describing the seminar as Azurix's "coming-out party in Florida").

27. *See* Grunwald, *supra* note 25.

28. *Id.* (describing Water2Water.com as a "fiasco" and noting that "Azurix stock dropped 75 percent in less than a year as the company went through $1 billion in capital . . . . When Enron's bonds were downgraded to junk last fall, it was saddled with more than $900 million in Azurix debts, a key element in its decision to file for bankruptcy protection."); Timothy Egan, *Near Vast Bodies of Water, Land Lies Parched*, N.Y. TIMES, Aug. 12, 2001, *available at* http://www.mindfully.org/Water/Water-Land-Parched.htm (last visited Aug. 16, 2004) (describing the 2001 collapse of Azurix with losses exceeding $300 million).

29. *See* Kasler, *supra* note 24 (quoting a California water market advocate's criticism of the prevalent attitude that water marketing is "either wrong, immoral or illegal to make money off it—that's the mindset"); Public Citizen's Critical Mass Energy and Environment Program, *Liquid Assets: Enron's Dip into Water Business*, Mar. 2002, *at* www.citizen.org/documents/LiquidAssets.pdf (last visited Aug. 24, 2004) (alleging that "[b]ecause in Florida, water could not be bought or sold, Azurix lobbied to change the law," in part by using the services of a former manager of the local sponsor of the Everglades restoration project) (the Public Citizen foundation was founded by Ralph Nader in 1971); Grunwald, *supra* note 25 (writing that the Chairman of the Florida Legislature's Everglades Committee termed the proposal "the most sinister business proposition the state has ever had"); Pollick & Davis, *supra* note 22 (citing with disapproval the statement of California consultant and *Liquid Assets* participant that "I don't think water is so damn special"); *Enron Chief Scorned Asset Division*, LONDON FINANCIAL TIMES, Feb. 11, 2002, *available at* http://specials.ft.com/enron/FT3AB0FQKXC.html (last visited Aug. 16, 2004) (describing the head of Azurix as "sexy, tough and arrogant" and noting that "typically for Enron, Azurix was financed creatively").

A. Case Study: The Florida Everglades

> Nothing anywhere else is like [the Everglades]: their vast glittering openness, wider than the enormous visible round of the horizon, the racing free saltness and sweetness of their massive winds, under the dazzling blue heights of space. . . . The miracle of the light pours over the green and brown expanse of saw grass and of water, shining and slow-moving below, the grass and water that is the meaning and the central fact of the Everglades of Florida. It is a river of grass.
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> Marjorie Stoneman Douglas (1947)[30]

The Florida Everglades is a vast collection of "swamps, marshes, sloughs, prairies, tree islands and forests" that constitutes a resource of "global significance."[31] Historically covering an area of about eight million acres, this "river of grass" flowed southward from Lake Okeechobee to the Atlantic Ocean in a slow continuous sheet of water[32] that flowed only a quarter mile each day.[33] The area was a "paradise for wildlife."[34] Early visitors reported skies dark with wading and migratory birds,[35] as well as numerous deer, Florida panthers, alligators, crocodiles, and other species.[36]

The Everglades has been the persistent focus of human ingenuity, first to *reclaim* (that is, drain) the wetland, and now to *restore* it. Like the Everglades itself, these human interventions have been massive, slow-moving, and vulnerable to disruption by the political process. Two features, in particular, have drawn human attention. First, the soils are fertile, moist, and rich, having accumulated throughout thousands of years.[37] Second, the area is very flat, barely above sea level, and prone to flooding.[38] Taken together, these two characteristics made the Everglades an inevitable magnet to agriculture and an irresistible challenge to human settlement, respectively. The

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30. MARJORY STONEMAN DOUGLAS, THE EVERGLADES: RIVER OF GRASS 5-6 (1947). First published in 1947, *River of Grass* was an important piece of the author's more than one-half century of advocacy for protection of the Everglades. The author died in 1998, at the age of 107. PEARSON EDUC., *Infoplease, Biography: Marjory Stoneham Douglas, at* http://infoplease.com/ipa/A0905518.html (last visited Feb. 25, 2004).

31. Joel VanArman et al., *South Florida Water Management District, in* WATER RESOURCES ATLAS OF FLORIDA 260, 277 (Edward A. Fernald & Elizabeth D. Purdum eds., 1998).

32. *Id.* at 278; SFWMD, *Everglades Information: Overview, supra* note 18.

33. SFWMD, *Everglades Information: Overview, supra* note 18.

34. AUDUBON SOC'Y, *Restoring the Everglades: The Past—River of Grass, at* http://www.audubonofflorida.org/main/glades/pg1.html [hereinafter AUDUBON SOC'Y, *Restoring the Everglades*] (last visited Dec. 7, 2004).

35. SFWMD, *Everglades Information: FAQ's, supra* note 18.

36. AUDUBON SOC'Y, *Restoring the Everglades, supra* note 34.

37. *See generally* South Florida Water Management District, *Everglades Information: Geology, at* http://glades.sfwmd.gov/empact/home/02_everglades/03_geology.shtml (last visited Feb. 23, 2005).

38. *See* South Florida Water Management District, *Everglades Information: History, at* http://glades.sfwmd.gov/empact/home/02_everglades/02_history.shtml (last visited Feb. 23, 2005).

nation responded with dazzling engineering expertise to this pairing of opportunity and challenge through the Central and Southern Florida Project (the "Project"), authorized by Congress in 1948 to reclaim the area for agriculture and settlement.[39] As the Supreme Court has noted, the Project "consists of a vast array of levees, canals, pumps, and water impoundment areas in the land between south Florida's coastal hills and the Everglades" designed to promote flood protection, water conservation and drainage.[40] As boasted by the Army Corps of Engineers, the United States "constructed the most elaborate and effective water management system in the world"[41] under the auspices of the Project.

Unfortunately, as the Corps acknowledges, the Project has also had a negative impact upon the Everglades and South Florida ecosystems.[42] The components of the Project are named in clinical, precise engineering terms that emphasize the Project's technical competence, but belie the ecological destruction that they have wrought. Taken together, structures with names such as WCA-3 (water conservation area), L-33 and L-37 (levees), and S-9 (pump station) have destroyed the natural physical integrity of the Everglades, instead artificially segmenting the great wetland into a sequence of sometimes-dry engineered management units.[43] As a result of the construction of some 1,400 miles of canals, 181 primary control structures, and 2,000 secondary structures, the historic Everglades has been reduced in size by about 40%, and once-flourishing bird populations have declined by about 93%.[44]

Slowly, the nation has reversed its course with respect to Everglades policy. In 1988, the United States filed suit against two Florida agencies for allegedly contaminating the Everglades National Park and the Loxahatchee National Wildlife Refuge with phosphorus-contaminated farm runoff.[45] In response to the lawsuit, the Florida legislature passed the Everglades Protec-

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39. Flood Control Act of 1948, Pub. L. No. 80-858, § 203, 62 Stat. 1171, 1174 (authorizing Phase I of the project).

40. S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95, 99-100 (2004). The Project was designed to correct for the ill-fated drainage canals of the early 1900s, which "proved to be a source of trouble" by "lower[ing] the water table, allowing salt water to intrude upon coastal wells, and . . . prov[ing] incapable of controlling flooding." *Id.*

41. U.S. Army Corps of Eng'rs, *Learning About the Everglades: A Brief History*, *at* http://www.evergladesplan.org/facts_info/learning.cfm (last visited Feb. 23, 2004) [hereinafter *Learning About the Everglades*] (linking to the website for the South Florida Corps district).

42. *Id.*

43. VanArman et al., *supra* note 31, at 279.

44. DIANE RAINES WARD, WATER WARS: DROUGHT, FLOOD, FOLLY, AND THE POLITICS OF THIRST 221-22 (2002); VanArman et al., *supra* note 31, at 279. Anecdotal observations by the author are consistent with these statistics. During a five-day kayak trip through the aptly-named Ten Thousand Islands region of the Everglades, this transplanted Northerner was surprised by the relative paucity of bird life in the otherwise balmy paradise of South Florida. The disappointment was ameliorated in large part, however, by other delights (island camping, mosquito-dispelling breezes, inquisitive dolphins, and a magical 4 A.M. moonlight paddle).

45. *See* United States v. S. Fla. Water Mgmt. Dist., 847 F. Supp. 1567, 1569 (S.D. Fla. 1992) (describing the history of the litigation). The Florida Department of Environmental Regulation (now, the Florida Department of Environmental Protection) was also a named defendant. *Id.*

tion Act,[46] and the parties entered into a settlement agreement approved by the court in 1992.[47] The state passed additional legislation, including the Everglades Forever Act of 1994[48] and amendments thereto.[49]

In 1996, Congress outlined a comprehensive roadmap for Everglades restoration.[50] The resulting Comprehensive Everglades Restoration Plan (CERP), developed with extensive public notice and comment,[51] was approved by Congress in the Everglades Restoration Act of 2000.[52] Overall, the CERP contemplates the construction of 55 projects to restore the Everglades ecosystem,[53] at an estimated cost of eight billion dollars to be shared by the federal government and the state of Florida.[54] The South Florida Water Management District, which operates the Project, is also the local sponsor of the restoration plan.[55] Federal agencies estimate that it will take more than thirty years to realize the restoration benefits contemplated by the CERP.[56]

B. The Historical Context: Separating Water Quality and Quantity

> Petitioners . . . assert . . . that the Clean Water Act is only concerned with water "quality," and does not allow the regulation of water "quantity." This is an artificial distinction. In many cases . . . a suf-

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46. Marjory Stoneman Douglas Everglades Protection Act, 1991 Fla. Sess. Law Serv. ch. 91-80 (West) (codified as amended at FLA. STAT. ANN. chp. 373.4592 (West 2000)).

47. *S. Fla. Water Mgmt. Dist.*, 847 F. Supp. at 1582.

48. Everglades Forever Act, 1994 Fla. Sess. Law Serv. ch. 94-115 (West) (codified as amended at FLA. STAT. ANN. chp. 373.4592 (West 2000)).

49. Act effective May 20, 2003, 2003 Fla. Sess. Law Serv. ch. 2003-12 (West) (codified as amended at FLA. STAT. ANN. chp. 373.4592 (West 2000)). On or about May 20, Florida Governor Jeb Bush signed into law amendments to the Everglades Forever Act. *Id.* Critics of the amendments included Judge William M. Hoeveler, U.S. District Court, S.D. Florida—the judge who had approved the 1992 consent decree and presided over the litigation since its inception in 1988. In a 2003 order, Judge Hoeveler described the bill as "clearly defective" legislation that "opens the door to ten or more extra years [delay in implementing the consent decree and Everglades cleanup] with no showing that such a lengthy extension is necessary." United States v. S. Fla. Water Mgmt. Dist., No. 88-CV-1886, 2003 WL 21145799, at *1 (S.D. Fla. 2003). Judge Hoeveler noted his dismay at the legislative process, writing that

> [t]he bill was moved quickly through the legislative process, reportedly at the behest of more than forty lobbyists for the sugar industry. There simply is no acceptable explanation for the speed by which this was accomplished, given the fact that the deadlines remain three and a half years off and given the state's assurances that much of the cleanup project is proceeding on track.

Id. The sugar industry responded with a successful challenge to Judge Hoeveler's impartiality. After 15 years of service on the case, the judge was disqualified from further participation. United States v. S. Fla. Water Mgmt. Dist., 290 F. Supp. 2d 1356, 1362 (S.D. Fla. 2003); Craig Pittman, *Judge in Glades Case Removed*, ST. PETERSBURG TIMES, Sept. 24, 2003, at 1A.

50. Water Resources Development Act of 1996, Pub. L. 104-303, 110 Stat. 3658.

51. *See* Programmatic Regulations for the Comprehensive Everglades Restoration Plan, 68 Fed. Reg. 64,200, 64, 200 (Nov. 12, 2003) (final programmatic regulations).

52. Water Resources Development Act of 2000, Pub. L. No. 106-541, tit. VI, 114 Stat. 2572, 2680.

53. *See* § 601(b)(2)-(e), 114 Stat. at 2681-84.

54. *See* SFWMD, *Everglades Information: Overview*, *supra* note 18.

55. Programmatic Regulations for the Comprehensive Everglades Restoration Plan, 33 C.F.R. § 385.8 (2004).

56. *Learning About the Everglades*, *supra* note 41.

> ficient lowering of the water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, navigation or, as here, as a fishery.[57]

In perhaps the most counterintuitive triumph of law over hydrologic reality, water quantity and water quality have been governed traditionally by two distinct regimes of state and federal law, respectively. But the physical reality of water does not fit neatly into this bifurcated scheme, and has presented numerous factual scenarios capable of confounding even the most thoughtful jurist or legislator.

State common-law water allocation systems generally have neglected the regulation of water pollution, largely as a matter of historic happenstance. As states devised systems for water allocation among competing users, they gave little thought to pollution as a widespread phenomenon to be addressed through a comprehensive regulatory approach. Indeed, some early eastern decisions protected to some degree riparian landowners' right to pollute, rather than the right of their neighbors to be free from pollution.[58] Others curtailed pollution on an ad hoc basis, either as a nuisance, or as going beyond the reasonable use of water.[59] But in any case, the riparian doctrine failed to develop the institutional capacity to incorporate water quality protection on a comprehensive, systematic, and prophylactic basis. The western states were similarly not oriented toward integrating pollution control into their systems of water rights, at least as a matter of common law.[60]

The federal government stepped into this regulatory void, primarily through the federal Clean Water Act (CWA).[61] Although federal regulators have assumed a dominant role in pollution control, the CWA is an exercise of cooperative federalism.[62] The states' roles are accommodated through a dizzying array of compartmentalized statutory provisions that distinguish federal from state authority,[63] water quality from water quantity,[64] point source from nonpoint source pollution, and the discharge of "pollutants" from other "pollution" activities that may also degrade water quality.[65] More specifically, the federal government is given the primary authority to regulate water quality, acting through the "national pollutant discharge elimination system" (NPDES), which addresses end-of-the-pipe (or "point

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57. PUD No. 1 v. Wash. Dep't of Ecology, 511 U.S. 700, 719 (1994).
58. *See generally* Joseph A. Dellapenna, *The Right to Consume Water Under "Pure" Riparian Rights*, *in* 1 WATERS AND WATER RIGHTS § 7.01, § 7.03(e), at 7-84 (Robert E. Beck ed., 1991).
59. *See* A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 3.65 (Marie-Joy Paredes & John J. Sullivan eds., 2004).
60. *See generally* Anne W. Squier, *Water Quality, Water Quantity: The Reluctant Marriage*, 21 ENVTL. L. 1081, 1081-86 (1991).
61. Federal Water Pollution Prevention and Control Act, 33 U.S.C. §§ 1251-1387 (2000).
62. *See* § 1253(a).
63. *See, e.g.*, §§ 1361, 1370.
64. *See* § 1252.
65. *See* § 1362.

source") pollution.[66] In contrast, the states' primary authority to regulate water quantity through state allocation law is preserved through a savings clause that admonishes the federal government to refrain from interfering in matters of state water allocation.[67] In addition, the states are authorized to regulate "nonpoint source" pollution—produced by diffused runoff—through provisions in the statute that have been overlooked or underutilized until relatively recently.[68]

Although the quality versus quantity schism is apparent in numerous state laws, this section will take an anecdotal, fish-eye view of how it affects the federal Clean Water Act. Facing the complex federalism of the CWA, the courts have struggled mightily. As an intuitive matter, many courts begin with the idea of *integrity*, citing the statutory purpose "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[69] In some cases—such as *NWF v. Gorsuch*[70] and *NWF v. Consumers Power Co.*[71]—the courts become distracted by microscopic examinations of statutory language, arriving at results that may be antithetical to hydrologic integrity.[72] In those cases, jurists may quibble over whether state or federal law should apply, while pollution evades regulation altogether and fish are asphyxiated, puréed, desiccated, slimed, or otherwise brought to their doom.[73] As one scholar noted wryly,

> There are many reasons why law does not happen. The fish do not understand these reasons. Only human satisfaction blinks on or shuts down when these laws come alive or go inert. Laws that do not deliver benefits directly to the fish do not deserve to be called environmental laws. They should be called pretended law.[74]

But more recently, the courts have begun to implement the integrity mandate with more vigor, advancing a broad view of the aquatic alterations actionable under the CWA.[75] In *PUD No. 1*[76] and *Catskill Mountain Trout*

66. § 1342.
67. *See supra* note 15 and accompanying text.
68. *See generally* Oliver A. Houck, *Clean Water Act Developments, 1999-2000*, SE55 A.L.I.-A.B.A. 107 (2000). *See also* Sierra Club v. Meiburg, 296 F.3d 1021, 1033 (11th Cir. 2002) (unsuccessfully attempting to compel the EPA to enforce nonpoint source pollution standards).
69. Clean Water Act, 33 U.S.C. § 1251(a) (2000); *see also* 33 U.S.C. § 1362(19) (2000) (defining "pollution" as "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water").
70. 693 F.2d 156 (D.C. Cir. 1982); *see infra* Part II.B.1.
71. 862 F.2d 580 (6th Cir. 1988); *see infra* Part II.B.2.
72. *See, e.g.*, *Consumers Power Co.*, 862 F.2d at 587, 590 (addressing the EPA's construction of statutory terms).
73. *See, e.g.*, *id.* at 588-90 (discussing whether state or federal law should apply regarding pollution control programs).
74. William H. Rodgers, Jr., *Defeating Environmental Law: The Geology of Legal Advantage*, 19 PACE ENVTL. L. REV. 687, 705 (2002).
75. *See, e.g.*, PUD No. 1 v. Wash. Dep't of Ecology, 511 U.S. 700 (1994).
76. *See infra* Part II.B.3.

Unlimited v. City of New York,[77] the Supreme Court and the Second Circuit, respectively, held that both reduced stream flow and interbasin transfers of previously-contaminated water can constitute water pollution.[78] In both cases, the courts struggled with problems created by the statute's distinction between water quality and water quantity, and between federal and state authority.[79]

After Part II.B's discussion of the four CWA fish cases, the discussion in Part II.C returns to the Florida Everglades, considering the Supreme Court's 2004 decision in *South Florida Water Management District v. Miccosukee Tribe of Indians*.[80] In that case, the Supreme Court took up the question addressed by the Second Circuit in *Trout Unlimited*,[81] considering whether the decades-long struggle to reduce phosphorus levels in the Everglades can be regulated under the CWA in cases where already-polluted water is pumped from one area of the Everglades to another.[82] This Article will suggest that a conscious, consistent, and confident reliance upon the hydrologic integrity mandate of the CWA would help the courts to reach more coherent results as they navigate through the cooperative federalism maze of the CWA.

1. Asphyxiated Fish: NWF v. Gorsuch

Beginning in the early 1970s, lawyers and judges began to face the question of whether the Clean Water Act regulates the changes in water quality caused by dams.[83] There was little dispute that many dams caused downstream water pollution by depleting dissolved oxygen content, supersaturating waters, raising or lowering temperature by as much as thirty degrees Fahrenheit, increasing dissolved minerals and nutrients, and causing sediment releases.[84] There was also little dispute that these changes could result in dead fish.[85] In an extreme example, the construction and early operation of Missouri's Harry S. Truman Dam caused supersaturation of downstream waters, killing by asphyxiation more than 400,000 fish in 1978, and at least 100,000 fish in 1979.[86] On the other hand, the cost of prevention

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77. 273 F.3d 481 (2d Cir. 2001); *see infra* Part II.B.4.
78. *PUD No. 1*, 511 U.S. at 721; *Catskill Mountains*, 273 F.3d at 494.
79. *See, e.g., PUD No. 1*, 511 U.S. at 717-21.
80. 541 U.S. 95 (2004); *see infra* Part II.D.
81. *Catskill Mountains*, 273 F.3d at 491.
82. *Miccosukee Tribe of Indians*, 541 U.S. at 102-03.
83. *See Consumers Power Co.*, 862 F.2d at 587; Rodgers, *supra* note 74, at 700 (discussing the 1973 EPA memorandum contending that dams are not "point sources" within the meaning of the Clean Water Act).
84. NWF v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982) (*Gorsuch II*), *rev'g*, NWF *v.* Gorsuch, 530 F. Supp. 1291, 1297-98, 1300 (D.D.C. 1982) (*Gorsuch I*).
85. *Gorsuch II*, 693 F.2d at 161-64.
86. As the district court explained, when a fish takes in supersaturated water, "[b]ubbles form in the fish and may block the flow of blood in the blood vessels, in severe cases stopping the entire flow of blood and causing death from lack of oxygen. . . . The condition is called gas bubble disease." *Gorsuch I*, 530 F. Supp. at 1302.

was the subject of some uncertainty, potentially involving the modification of anywhere from 3,000 to 50,000 dams nationwide.[87]

As the dispute reached the courts, it was ultimately framed in terms emphasizing legal compartmentalization, rather than aquatic integrity.[88] In *NWF v. Gorsuch*,[89] the plaintiffs sought to compel the administrator of the Environmental Protection Agency (EPA) to regulate dam-caused pollution under the Clean Water Act.[90] In response, the defendants highlighted the Act's division of authority between the states and the federal government.[91] The EPA sought to limit its own regulatory jurisdiction, successfully arguing for a "clear and precise distinction between point sources, which would be subject to direct Federal regulation, and nonpoint sources, control of which was *specifically reserved* to State and local governments," even though the state nonpoint program was admittedly an "experiment."[92] The nonfederal defendant-intervenors argued for an additional bifurcation—the separation of water quality and water quantity—interpreting federal control over quality narrowly in order to preserve broad state control over the quantity.[93] The intervenors cited to section 101(g) of the Act: "It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated, or otherwise impaired by this [Act]."[94] The court agreed, concluding that "Congress did not want to interfere any more than necessary with state water management, of which dams are an important component."[95]

The case is traditionally cited for its pronounced, pre-*Chevron* deference to the EPA's limited interpretation of the scope of its own authority.[96] But the bifurcation aspect of the case is equally compelling, produced by the court's embrace of the distinction between water quantity and water quality, coupled with the Clean Water Act's separation between point and nonpoint sources of pollution.[97] There are two noteworthy aspects of the court's commitment to a compartmentalized view of water pollution and water allocation. First, the court struggled with the CWA's distinction between federally regulated *pollutants* (limited to substances added to water) and state regulated *pollution* (including water conditions, such as low dissolved oxygen, cold, and supersaturation).[98] Similarly, the court accepted the EPA's

87. *Gorsuch II*, 693 F.2d at 182.
88. *See, e.g.*, *Gorsuch I*, 530 F. Supp. at 1295.
89. *Id.* at 1291.
90. *Id.* at 1295.
91. *Gorsuch II*, 693 F.2d at 165.
92. *Id.* at 176 (quoting from the legislative history of the 1977 statutory amendments).
93. *Id.* at 178-79.
94. *Id.* at 178 (quoting 33 U.S.C. § 1251(g) (2000)). The Act also states: "It is the further policy of Congress that nothing in this Chapter shall be construed to supersede or abrogate rights to quantities of water which have been established by any State." § 1251(g).
95. *Gorsuch II*, 693 F.2d at at 178.
96. *Id.* at 174 (concluding that "we must accept [the EPA's] interpretation [that low dissolved oxygen, cold, and supersaturation are not pollutants] unless it is manifestly unreasonable").
97. *Id.* at 156.
98. *Id.* at 171-74. The district court had rejected this distinction, as advanced by the defendants, for

narrow view of the statutory trigger for federal regulation, the *addition* of a pollutant.[99] In the court's view, even though a dam may cause pollution, it does not add pollutants sufficient to create federal jurisdiction unless it "physically introduces a pollutant into water from the outside world."[100] Thus, the federal EPA was not obligated to prevent fish kills resulting from adverse modifications of stream conditions because dams do not physically and directly *add* heat, cold, minerals, or sediment to the water that passes through them. Rather, in the EPA's view as accepted by the court, those changed conditions occur upstream as water accumulates in reservoirs, and the modified water simply passes unchanged through the dam.[101] With respect to the creation of supersaturated conditions, the EPA successfully argued that the transformation "occurs downstream, *after* the water is released from the dam."[102] In both cases, the dam itself does not cause the *addition* of *pollutants* to the water.[103]

Ironically, the court framed its separation of federal quality and state quantity authority as an effort to promote, rather than to destroy, integrity.[104] The court acknowledged multiple times the federal goals to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" and to achieve a zero-discharge status,[105] but relegated this language to the realm of purely hortatory goals, rather than binding policy.[106] In a novel approach to the statutory promise of integrity, the court adopted a retrogressive view of history: rather than rely upon an increasing federal pollution control presence in the face of the states' failure to address the problem,[107] the court revived the vision of state control over both water quality and water quantity:

> In light of its intent to minimize federal control over state decisions on water *quantity*, Congress might also, if confronted with the issue, have decided to leave control of dams insofar as they affect water *quality* to the states. Such a policy would reduce federal/state fric-

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its perceived failure to recognize that, "the [CWA] must be given a reasonable interpretation, not parsed and dissected with the meticulous technicality applied in testing a common law indictment or a deed creating an estate in fee tail." *Gorsuch I*, 530 F. Supp. at 1304 (quoting NRDC v. Costle, Inc., 564 F.2d 573, 579 (D.C. Cir. 1977)).

99. *Gorsuch II*, 693 F.2d at 174-75.

100. *Id.*

101. *Id.* at 175.

102. *Id.*

103. *Id.*

104. *Id.* at 177.

105. *Id.* at 166, 177, 179.

106. *Id.* at 180-81 (asserting that "[w]hat started out as a national 'policy' in the Senate bill was watered down to a 'goal' in the House") (citations omitted). The court concluded: "In short, while Congress wanted to eliminate pollution if practicable, it realized that it might have to settle for something less." *Id.*

107. The court acknowledged that Congress had "recognize[ed] the weaknesses of past state water pollution efforts" but noted that Congress "explicitly chose not to completely federalize water pollution control, but instead directed the states to establish their own pollution control programs under EPA oversight." *Id.* at 178.

> tion and would permit states to develop integrated water management plans that address both quality and quantity.[108]

The court then retreated from this promise of integrity by qualifying its confidence in the states' ability to control pollution:

> Finally, we cannot say, on the record before us, that federal intervention is needed because the states have abdicated their . . . responsibility over a truly pressing national problem. The record does not show how vigorous state enforcement has been, but at least some efforts have been made to remedy dam-caused pollution.[109]

The court concluded weakly that "someone" most likely would have brought dam-caused pollution to Congress' attention during the drafting and amendment of the Clean Water Act if it "was truly of major proportions."[110]

2. *Puréed Fish:* NWF v. Consumers Power Company

Six years after the District of Columbia Circuit rendered its opinion in *Gorsuch II*, the Sixth Circuit took up the issue of water quality changes brought about by a hydroelectric power dam in Ludington, Michigan.[111] In *NWF v. Consumers Power Co.*, the environmental plaintiff sought to bring the dam within the scope of federal authority under the Clean Water Act.[112] The Sixth Circuit described the Ludington facility as "one of the largest pumped storage facilities in the world, which can move in one day more than 20 billion gallons of water between its manmade reservoir and Lake Michigan."[113] In the process, the court delicately noted that a substantial number of fish were "entrained" and destroyed as they passed through the facility's pumps and turbines.[114] In a subsequent reference to *Consumers Power*, the Second Circuit used blunter terms to describe the hydrologic and ecological reality of the process:

> [T]he defendant had withdrawn water from Lake Michigan, along with some surprised fish, for hydroelectric power generation. The water and fish were then returned to the Lake after passing through hydroelectric generators, which *puréed* some of the fish. The court

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108. *Id.* at 178-79.
109. *Id.* at 183.
110. *Id.* ("Moreover, if dam-caused pollution was truly of major proportions, someone, be it EPA, the Wildlife Federation, or other environmental groups, would most likely have brought it to Congress' attention, either in 1972 or in 1977.").
111. NWF v. Consumers Power Co., 862 F.2d 580 (6th Cir. 1988).
112. *Id.*
113. *Id.* at 581.
114. *Id.* (euphemistically describing "live and dead fish, and fish remains" as "entrained fish").

> found that returning the fish to the Lake, albeit in a different form, was not an "addition" because the fish had already been there.[115]

The Sixth Circuit acknowledged that the "[m]illions of pounds of live fish, dead fish and fish remains annually discharged into Lake Michigan by the Ludington facility are pollutants within the meaning of the [Clean Water Act], since they are 'biological materials.'"[116] However, relying upon the District of Columbia's decision in *Gorsuch II*, the Sixth Circuit concluded that no permit was required under the Clean Water Act because the Ludington facility did not *add* pollutants to Lake Michigan from the outside world.[117] The court reasoned that, although "manipulation of water by the . . . turbine changes the form of the pollutant from live fish to a mixture of live and dead fish," there "can be no doubt that the Ludington facility does not create the fish which become entrained in the process of generating electricity."[118]

The court's careful focus upon the statutory text threatened to obscure the pragmatic consequences advanced by its decision. The court recited the Clean Water Act's objective to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters,"[119] but favored a non-integrated approach under which this type of pollution would be controlled—if at all—by agencies other than the EPA and under statutes other than the CWA.[120] Despite the court's optimism that such other authorities would fill the regulatory void,[121] it would be at least a decade before such options would begin to become viable.[122] In the interim, the Ludington facility, and others like it, could continue to produce water conditions the court described as "inimical to life"[123] by "transform[ing] . . . biomass from

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115. Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York, 273 F.3d 481, 491-92 (2d Cir. 2001) (emphasis added).

116. *Consumers Power Co.*, 862 F.2d at 583 (quoting 33 U.S.C. § 1362(6) (2000) (defining "pollutant" as including "biological materials")).

117. *Id.* at 583-84 (citing *Gorsuch II*, 693 F.2d at 165, for the proposition that the permitting requirements of the Clean Water Act do not apply unless five elements are satisfied, including the addition of pollutants to regulated waters).

118. *Id.* at 585.

119. *Id.* at 582 (quoting 33 U.S.C. § 1251 (2000)).

120. The court suggested that the dam's destruction of fish might be controlled either under state nonpoint source control through water quality standards, or by the Federal Energy Regulatory Commission's authority to issue dam operating licenses under the Federal Power Act. *Id.* at 588, 590.

121. The court asserted:

> Thus, the absence of EPA regulations does not mean that there will be no regulatory oversight of the effect of the Ludington facility on fish resources. Indeed, one of the major purposes of the passage of the Federal Power Act . . . was to provide a regulatory regime sensitive to problems affecting fishery resources. . . . EPA regulation would not add anything superior to existing FERC regulation in terms of knowledgeability or dedication to the fish.

Id. at 590.

122. Section 10(j)(1) of the Federal Power Act was added as part of the Electric Consumers Protection Act of 1986, 16 U.S.C. § 803(j)(1) (2000), and provides that every FERC license must include conditions to "protect, mitigate damage[] to, and enhance, fish and wildlife."

123. *Consumers Power Co.*, 862 F.2d at 587.

a living, useful form into a lifeless entity with no apparent value."[124] The court concluded that the problem could not be addressed by the EPA under the Clean Water Act absent congressional amendment of the legislation.[125] The court's approach might very well have been the inevitable product of the bifurcated quality and quantity, federal and state, point source and non-point source distinctions suggested by the Clean Water Act.

Nevertheless, the unsatisfying aspect of the *Consumers Power* opinion has been aptly captured by one commentator, who bemoaned generally the narrow interpretation of the EPA's Clean Water Act authority:

> Found there are the generic fishway criteria that *might have been applied* and enforced against . . . dams. These criteria include rules on elevation between . . . pools . . . [and] fishway channel velocities. . . . Fish will die in these conditions. But we know with legal certitude that they will not die from the "addition" of "pollutants" from a "point source."[126]

The court's approach illustrates the perils of an overly-legalistic focus upon the narrow requirement of "addition" to the exclusion of the broader goal of "integrity." Surely any scientist would describe the transformation of Lake Michigan from habitat for millions of live fish to cemetery for millions of decomposing fish as an assault upon the lake's integrity. Only a myopic lawyer or jurist could view them as the same, a view that could be broadened by a focus upon the resultant water quality and integrity.

3. *Fish Out of Water:* PUD No. 1

In *Gorsuch II* and *Consumers Power*, dam operators and federal regulators prevailed in their argument that the EPA lacks statutory authority to regulate aspects of water quality that might impinge upon state authority to allocate water quantity. In a case that reached the United States Supreme Court in 1994, the converse factual situation was at issue: the state of Washington sought to prescribe a minimum quantity of water that a proposed hydroelectric facility dam must bypass over the objection of the project proponents that the Clean Water Act authorized the states to regulate only the quality of certain discharges.

PUD No. 1 v. Washington Department of Ecology[127] concerned the proposed Elkhorn Hydroelectric Project on the Dosewallips River in Washington.[128] The Project would divert most of the river's flow out of its bed to pass through streamside electricity-generating turbines.[129] Only a "residual

124. *Id.* (quoting NWF v. Consumers Power Co., 657 F. Supp. 989, 1006-07 (W.D. Mich. 1987)).
125. *Id.* at 587 (quoting *Gorsuch II*, 693 F.2d at 183).
126. Rodgers, *supra* note 74, at 701-02.
127. 511 U.S. 700 (1994).
128. *Id.* at 708.
129. *Id.* at 708-09.

minimum flow of between 65 and 155 [cubic feet per second]" would remain in the 1.2-mile reach dewatered by the project.[130] To protect the Dosewallips fishery, the Washington State Department of Ecology sought to impose a requirement that at least 100-200 cubic feet per second remain in the river bed throughout the bypass reach during various months of the year.[131] The state agency acted pursuant section 303 of the Clean Water Act, which requires states to adopt federally-approved water quality standards for their intrastate waters based upon the designated uses of the waters.[132] The particular river segment at issue—located in close proximity to both the Olympic National Park and the Olympic National Forest—had been designated as "Class AA (extraordinary)," with its designated uses including the migration, rearing, spawning, and harvesting of salmon and other fish.[133] The project proponents challenged the state standards, claiming, *inter alia*, that the CWA provisions exclude "water quantity issues from direct regulation under the federally controlled water quality standards authorized in § 303."[134]

Justice O'Connor dismissed this notion as "peculiar."[135] Writing for a 7-2 majority,[136] she began her opinion with the familiar refrain that the Clean Water Act was intended to promote the "chemical, physical, and biological integrity of the Nation's waters."[137] Unlike the authors of *Gorsuch II* and *Consumers Power*, Justice O'Connor invoked the statutory purpose as more than mere aspirational incantation. Instead, she recited the statute's language of scientific integrity as the springboard for a decision that also promoted the legal integrity of the Clean Water Act's program to protect fish and aquatic life. She suggested that fish could die just as easily from lack of water as from pollution, describing the distinction between water quality and quantity as "artificial."[138] She concluded with a statement recognizing that the integrity of water encompasses aspects of both quality and quantity, asserting that "there is recognition in the Clean Water Act itself that reduced stream flow, *i.e.*, diminishment of water quantity, can constitute water pollution."[139]

The petitioners' sought to counter the state's recital of the integrity mantra with an ideal of their own—that of federalism. Agreeing with the

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130. *Id.* at 709.
131. State, Dep't of Ecology v. PUD No. 1, 849 P.2d 646, 650 (Wash. 1993) (describing state measures to "prohibit the degradation of fish habitat and spawning in the Dosewallips"), *aff'd sub nom*, PUD No. 1 v. Washington, 500 U.S. 700 (1994).
132. *PUD No. 1*, 500 U.S. at 704 (citing 33 U.S.C. § 1313 (2000)).
133. *Id.* at 706, 708.
134. *Id.* at 720.
135. *Id.*; *see also State, Dep't of Ecology*, 849 P.2d at 651 (quoting the project operator's argument that "water quality standards [under the CWA] are limited to pollution and discharges, as opposed to stream flow levels").
136. Justice Thomas, joined by Justice Scalia, wrote a dissenting opinion. *PUD No. 1*, 511 U.S. at 724.
137. *Id.* at 704 (quoting 33 U.S.C. § 1251(c) (2000)).
138. *Id.* at 719.
139. *Id.*

petitioners, the dissent argued that the majority's opinion would "significantly disrupt the carefully crafted federal-state balance" created by Congress.[140] Furthermore, the dissent argued for its own type of integrity—linguistic integrity. Asserting that statutory interpretation is a "holistic endeavor,"[141] the dissent chastised the majority for unduly extending the states' role under the CWA.[142] Citing to *Webster's Ninth New Collegiate Dictionary*, the dissent argued for a distinction between "discharge" and "intake":

> The term "discharge" is not defined in the CWA, but its plain and ordinary meaning suggests "a flowing or issuing out," or "something that is emitted." . . . A minimum stream flow requirement, by contrast, is a limitation on the amount of water the project can take in or divert from the river. . . . That is, a minimum stream flow requirement is a limitation on intake—the opposite of discharge. Imposition of such a requirement would thus appear to be beyond a State's authority as it is defined by § 401(a)(1).[143]

The majority did not reach its conclusion easily, but engaged in the same sort of linguistic gymnastics followed by the *Gorsuch II* and *Consumers Power* courts. In *Gorsuch II*, the D.C. Circuit declined to extend federal jurisdiction to the prevention of fish-killing alterations of water conditions, instead advancing a technical distinction between pollution and pollutants.[144] Likewise, in *Consumers Power,* the Sixth Circuit declined to extend federal jurisdiction to the prevention of fish mutilation and entrainment, instead advancing a technical distinction between the addition of dead fish from an outside source and the separation of existing fish into an array of body parts.[145] The *PUD No. 1* Court reached the opposite conclusion—extending state jurisdiction to the maintenance of water levels necessary to sustain fisheries—but did so by means of a similarly tortured linguistic interpretation. The Court refused to limit the states' authority under the CWA to regulate only discharges resulting from federally-permitted dams, but recognized also state authority to regulate the applicants themselves who sought such federal permits.[146] This awkward struggle with linguistic inter-

140. *Id.* at 724 (Thomas, J., dissenting) (claiming that state imposition of minimum stream flows impinged upon federal dam-licensing authority established under the Federal Power Act).

141. *Id.* at 726 (quoting United Savings Ass'n of Tex. v. Timbers of Inwood Forest Assocs., Ltd., 484 U.S. 365, 371 (1988)).

142. *Id.*

143. *Id.* at 725.

144. *See supra* notes 12-13 and accompanying text.

145. *See supra* notes 116-18 and accompanying text.

146. PUD No. 1 v. Washington Dep't of Ecology, 511 U.S. 700, 711 (1994). As the Court noted, section 401 of the CWA "requires States to provide a water quality certification before a federal [dam] license or permit can be issued for activities that may result in any discharge into intrastate navigable waters." *Id.* at 707 (quoting 33 U.S.C. § 1341 (2000)). The states' authority is further described in two subsections of section 401. Under section 401(a), states must certify "that any such *discharge* [from a federally licensed dam] will comply with the applicable provisions" of the CWA. *Id.* at 707 (emphasis

pretation—by courts both extending and limiting the scope of authority under the CWA—is perhaps a testament to the ambiguity of congressional intent and the need to give increased weight to the integrity mandate of the CWA.

4. Muddy Fish: Catskill Mountains

Almost two decades after *Gorsuch II* and *Consumers Power* held that dam discharges do not require Clean Water Act permits for waters merely passing through dam structures,[147] the Second Circuit took up the issue in *Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York.*[148] Bolstered by a victory at the district court level, the state defendants—New York City and the State of New York—appeared to have a solid legal and equitable case that the City's practice since before World War II of transferring pristine, upstate, Catskill Mountain drinking water to ten million downstream city residents did not require a federal discharge permit. But in a decision with potentially widespread ramifications for dam operators throughout the nation, the Second Circuit rejected the so-called "singular entity" theory of navigable waters, under which "an addition to one water body is deemed an addition to all of the waters of the United States."[149] Rather, the Second Circuit held that interbasin water transfers could cause an "addition" of pollutants within the meaning of the Clean Water Act, provided that the dam introduced pollutants from "any place outside the particular water body to which pollutants are introduced."[150] At issue was the city's vintage and extensive water supply network that supplies approximately 40% of the drinking water consumed by New York City.[151]

The dispute centered upon the 18-mile Shandaken Tunnel, which diverted up to 650 million gallons of water daily from the Schoharie Reservoir to Esopus Creek, for ultimate delivery to the City for consumption.[152] Along with water, the tunnel introduced silts and fine red clays into the premier trout fishery of Esopus Creek.[153] As a result of the city's waterworks, Esopus Creek suffered from a visible increase of turbidity and sus-

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added). Furthermore, section 401(d) requires that such state certifications will set forth any "other limitations" that are necessary to "assure that any *applicant*" will comply with applicable provisions of the CWA. *Id.* at 707-08 (emphasis added). The Court concluded that states therefore have the authority to protect the water quality impacts resulting from both the discharge itself, and more broadly, from other activities of the applicant not necessarily related to the discharge: "The text refers to the compliance of the applicant, not the discharge." *Id.* at 711.

147. *See supra* Parts II.B.1 and II.B.2.

148. 273 F.3d 481 (2d Cir. 2001).

149. *Id.* at 493 (criticizing Dubois v. United States Dep't of Agric., 102 F.3d 1273, 1296-97 (1st Cir. 1996)).

150. *Id.* at 489-91.

151. Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York, 244 F. Supp. 2d 41, 46 (N.D.N.Y. 2003) (*Catskill Mountains* (remand)).

152. *Id.* at 46-47.

153. *Catskill Mountains*, 273 F.3d at 485.

pended solids, and a significant decrease in its value for flyfishing.[154] As the plaintiffs complained,

> The water coming from the Tunnel carries extremely high levels of fine clay particles, which turn the clear waters of Esopus Creek to a muddy brown below the Tunnel. Local fishermen call this stretch of the Esopus 'Yoohoo Creek' after the chocolate-flavored soft drink. Schoharie water is so polluted with silt that Esopus Creek below the Shandaken Tunnel is largely unfishable.[155]

The plaintiffs demonstrated no significant injury to the trout themselves from the muddy conditions, other than some evidence of a decrease in fish size below the tunnel.[156]

Like the defendants in *Gorsuch*[157] and *Consumers Power*,[158] the New York defendants argued that federal regulation was inappropriate in the absence of the addition of pollutants from point sources.[159] Furthermore, they claimed that principles of federalism counseled against federal regulation of state water management, particularly of such an important system that supplied water to approximately 50% of the state's population.[160] In support of their position, the defendants cited the Clean Water Act's statement that "[i]t is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated, or otherwise impaired by this [Act]."[161]

The *Catskills* litigation implicates the notion of integrity in subtle, and at times counterintuitive, ways. At its heart, the resolution of the dispute requires a thoughtful determination of ecosystems and *scale*—the appropriate size of hydrologic units that should be granted independent legal significance for the purpose of regulatory schemes such as the Clean Water Act. Upon first consideration, the defendants' "singular entity" theory is enticingly holistic, conceptually linking all of the subwatersheds of the Catskills region into a unified whole. For example, New York City argued that it

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154. *Id.*

155. Riverkeeper, *Catskills Mountain Chapter of Trout Unlimited et al. v. City of New York*, *at* www.riverkeeper.org/campaign.php/watershed/we_are_doing/154 (last visited June 27, 2005); *see also* Brief of Defendants-Appellees at 14, *Catskill Mountains*, 273 F.3d 481 (2d Cir. 2001) (No. 00-9447) (noting the paucity of evidence that the defendants "physically introduced" pollution "into water from the outside world").

156. *Catskill Mountains* (remand), 244 F. Supp. 2d at 50.

157. NWF v. Gorsuch, 693 F.2d 156, 165 (D.C. Cir. 1982).

158. NWF v. Consumers Power Co., 862 F.2d 580, 582 (6th Cir. 1988).

159. The defendants argued that

> the City does not 'do' anything to the water it diverts to the Esopus Creek. It simply redirects water from certain Catskills streams into the Esopus Creek, which is in a different Catskills subwatershed. The City does not add anything to the water or alter it in any way.

Brief of Defendants-Appellees at 14, *Catskill Mountains* (No. 00-9447).

160. *Id.* at 12 (citing to *Gorsuch II*, 693 F.2d at 156, for the proposition that there is "specific indication in the [Clean Water] Act that Congress did not want to interfere any more than necessary with state water management, of which dams are an important component").

161. *See Catskill Mountains*, 273 F.3d at 494 (quoting 33 U.S.C. § 1251(g) (2000)).

"simply redirects water from certain Catskills streams into the Esopus Creek, which is in a different Catskills subwatershed. The City does not add anything to the water or alter it in any way."[162] The implication of this argument is that numerous subwatersheds should be regarded together as a single entity of sweeping scope, potentially encompassing all of the nation's navigable waters.[163] As a corollary of this broad and integral view, the movement of water and natural sediments throughout a unified watershed is distinct from the type of industrial pollution that Congress intended to regulate under the Clean Water Act.[164]

The Second Circuit, however, invoked an inapposite notion of integrity that would give separate legal status to such subwatersheds.[165] The court began by noting its agreement with the basic premise of the *Gorsuch* and *Consumers Power* courts. The Second Circuit agreed that no permit would be required to transfer water where both source and destination were identical,[166] reasoning that "[i]f one takes a ladle of soup from a pot, lifts it above the pot, and pours it back into the pot, one has not 'added' soup or anything else to the pot. . . . In requiring a permit for such a 'discharge,' the EPA might as easily require a permit for Niagara Falls."[167] At that point, however, the Second Circuit noted its departure from the assumptions of the District of Columbia and Sixth Circuits:

> The present case . . . strains past the breaking point the assumption of "sameness" made by the *Gorsuch* and *Consumers Power* courts. Here, water is artificially diverted from its natural course and travels several miles from the Reservoir through Shandaken Tunnel to Esopus Creek, a body of water utterly unrelated in any relevant sense to the Schoharie Reservoir and its watershed. No one can reasonably argue that the water in the Reservoir and the Esopus are in any sense the "same," such that "addition" of one to the other is a logical impossibility.[168]

Reciting the familiar statutory purpose of "restor[ing] and maintain[ing] the chemical, physical, and biological integrity of the Nation's waters,"[169] the Second Circuit concluded that "[a]rtificially transferring water and pollutants between watersheds as the City has done here might well interfere with that integrity."[170] As a result of the court's opinion, the City applied for a

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162. Brief of Defendants-Appellees at 14, *Catskill Mountains* (No. 00-9447).
163. This idea is developed further in Part II.D.
164. *See Catskill Mountains*, 273 F.3d at 481.
165. *Id.* at 494.
166. *Id.* at 492 n.3.
167. *Id.* at 492.
168. *Id.*
169. *Id.* at 494 (quoting 33 U.S.C. § 1251(a)).
170. *Id.*

federal discharge permit, thus subjecting itself to a variety of terms and conditions designed to protect Esopus Creek as a pristine waterway.[171]

The practical ramifications of the permit process—including the extent to which both Esopus Creek and New York's water supply can be protected—will no doubt help to shape the evolving notion of integrity as a guide to water policy. The U.S. Supreme Court weighed in on the issue in 2004, as discussed in Part III.D below.

C. The Opportunity: Replumbing the Everglades

The Everglades restoration plan promises to restore the physical and chemical integrity of the ecosystem. At its heart is the challenge of physical restoration. As the project sponsors explain, "Getting the water right is the critical part of restoring the south Florida ecosystem."[172] Furthermore, the "principal goal of restoration is to deliver the right amount of water, of the right quality, to the right places, and at the right time."[173] The plan ambitiously expects to "return most of pre-drainage flow," at least to the National Park portion of the Everglades.[174] Indeed, the project is so ambitious that former Interior Secretary Bruce Babbitt wrote that "[r]estoration of a natural system of this scale and sensitivity has never before been attempted and it is the most ambitious environmental restoration project in the history of civilization."[175]

The effort has been referred to as the "replumbing" of the Everglades.[176] Ironically, perhaps, the ills caused by existing flood-control irrigation works will be cured by yet more engineering.[177] Although the project will remove over 240 miles of levees and canals, it will also construct new reservoirs covering more than 217,000 acres and 300 aquifer storage and recovery

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171. The State of New York had designated the relevant portion of the creek as a "class A(T) stream" and set a water quality turbidity standard of "no increase that will cause a substantial visible contrast to natural conditions." *Catskill Mountains* (remand), 244 F. Supp. 2d at 47 (quoting N.Y. COMP. CODES R. & REG. tit. 6 § 703(2) (2002)).

172. U.S. Army Corps of Eng'rs, *The Comprehensive Everglades Restoration Plan (CERP), Cornerstone for Entire South Florida Ecosystem Restoration Effort*, *at* http://www.evergladesplan.org/about/rest_plan_01.cfm (described as "the official website of the Comprehensive Everglades Restoration Plan") (last visited Dec. 7, 2004).

173. U.S. Army Corps of Eng'rs, *The Comprehensive Everglades Restoration Plan (CERP), Quality, Quantity, Timing and Distribution*, *at* http://www.evergladesplan.org/about/rest_plan_03.cfm (last visited Mar. 2, 2005) [hereinafter *CERP, Quality, Quantity*].

174. SFWMD, *Everglades Information: Overview*, *supra* note 18.

175. South Florida Water Management District, *The Living Everglades, Everglades Information: Water Resources*, *at* http://glades.sfwd.gov/empact/home/02_everglades/05_water_resources/index.shtml (last visited Mar. 18, 2005) (quoting BRUCE BABBITT, THE THIN GREEN LINE (1996)).

176. *See, e.g.*, *Bill Moyers Reports, Earth on Edge*, *available at* http://www.pbs.org/earthonedge/ecosystems/coastal2.html (last visited Feb. 21, 2005).

177. In the context of a different ecosystem, the Columbia River Basin, one commentator has noted the irony of relying upon technological fixes to resolve technology-induced problems. *See* Michael C. Blumm, *The Amphibious Salmon: The Evolution of Ecosystem Management in the Columbia River Basin*, 24 ECOLOGY L.Q. 653, 654 (1997) ("Strangely, reliance on large-scale technological fixes to cure the Columbia Basin's ills has continued . . . . The river's ecosystem is now so hostile to young salmon that they are barged and trucked downriver to escape . . . dams.").

wells.[178] Overall, the plan includes more than sixty technical elements that will take more than three decades and $7.8 billion to complete.[179]

D. The Opportunity: The Miccosukee *Litigation*

The U.S. Supreme Court has spoken twice within a decade on the topic of aquatic integrity, within the context of the Clean Water Act.[180] In two opinions written by Justice O'Connor, the Court considered the jurisdictional reach of the federal statute to protect the chemical, physical, and biological integrity of the nation's waters. As considered in Part II.B.3 above, the 1994 decision *PUD No. 1* suggested that diminishment of water quantity can constitute water pollution and rejected, as artificial, a rigid distinction between water quality and quantity.[181] In 2004, the Court considered whether the mere conveyance of polluted water from one relatively dirty location in the Everglades to another relatively pristine location—without adding more contaminants—constituted the addition of pollutants from a point source within the meaning of the Clean Water Act. In *South Florida Water Management District v. Miccosukee Tribe of Indians*, the Court held that "a point source need not be the original source of the pollutant; it need only convey the pollutant to 'navigable waters.'"[182] Accordingly, such an affront to the ecological integrity of the Everglades might fall within the statutory permitting authority, provided that the lower court determined on remand that the source water body and receiving water body are "meaningfully distinct."[183]

In particular, *Miccosukee Tribe* focused upon three components of the Central and Southern Florida Flood Control Project.[184] The C-11 canal collects phosphorous-laden water from agricultural, urban, and residential land and drains it westward to the S-9 pump station, where it is pumped against gravity and deposited into a remnant of the original Everglades called WCA-3.[185] The process serves at least two functions: the supplying of water to wetlands habitat and the draining of flood water to preserve human settlement.[186] As noted by the Court, without such drainage, "the populated western portion of Broward County would flood within days."[187] The Mic-

178. *CERP, Quality, Quantity, supra* note 173.
179. U.S. Army Corps of Eng'rs, *The Comprehensive Everglades Restoration Plan (CERP), What Is the Plan?, at* http://www.evergladesplan.org/about/rest_plan.cfm (last visited Feb. 21, 2005).
180. *See* PUD No. 1 v. Washington Dep't of Ecology, 511 U.S. 700 (1994); S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95 (2004).
181. *See supra* note 139 and accompanying text.
182. 541 U.S. at 105.
183. *Id.* at 101-02, 112.
184. *Id.* at 99-101.
185. *Id.* at 100-01. At oral argument, counsel for the tribe asserted that "C-11 is a canal that has gas stations, urban shopping malls, [and] industrial parks around it." Transcript of Oral Argument at 39, *Miccosukee Tribe*, 541 U.S. 95 (2004) (No. 02-626).
186. *Miccosukee Tribe*, 541 U.S. at 100-01.
187. *Id.* at 111. Broward County is located in southeastern Florida, just north of the Miami metropolitan region.

cosukee tribe and an environmental organization brought suit against the South Florida Water Management District, alleging that the District had been illegally discharging pollutants through S-9 into the Everglades without the requisite permit.[188] The tribe—which had resided in the Everglades for generations and which enjoyed a perpetual lease to most of WCA-3—alleged that phosphorous and other nutrients discharged by the S-9 pump were causing long term degradation to the water quality and biological health of the wetland ecosystem.[189] As noted by the district court, "The way of life of the Tribe and its members, including their religious, cultural, economic, and historical identity, relies upon . . . preservation of the Everglades in its natural state."[190] Although the tribe acknowledged that the Everglades restoration plan contained provisions to address just such pollution, it sought to ensure that the District would comply with the plan within a reasonable period of time.[191]

The argument of both sides to the dispute implicated the idea of integrity, albeit in widely divergent ways. The parties agreed that the S-9 pump was the but-for cause of the contaminated wetland, and that the canal and wetland were physically and artificially separated by Project levees.[192] The real point of disagreement was that of scope—the determination of the proper scale of the water body whose wholeness and integrity should be preserved independent of adjacent areas.[193] The tribe considered the historic Everglades as separate pieces, seeking to protect the remaining, relatively healthy WCA-3 area as an integral unit, distinct from the polluted canal.[194] In support of this view, the tribe argued that current differences in water chemistry between the wetland and the canal qualified them for separate legal treatment as two distinct water bodies.[195] The tribe argued for ecological integrity, noting that the C-11 canal is an artificial canal surrounded by gas stations, shopping malls, and other trappings of urban society:

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188. Miccosukee Tribe of Indians v. S. Fla. Water Mgmt. Dist., 1999 WL 33494862 (S.D. Fl. 1999). The tribe was joined as plaintiffs by The Friends of the Everglades.

189. *Id.* at *1.

190. *Id.*

191. *See* Transcript of Oral Argument, *supra* note 185, at 46. The attorney for the plaintiffs stated: "We . . . believe, . . . as Congress did, that the Clean Water Act—that the programs in place were not always implemented and that the Clean Water Act was necessary as a backstop to stop the backsliding." *Id.* For a cynical view of the restoration process, see W. Hodding Carter, Editorial, *A Wetland Dying of Thirst*, N.Y. TIMES, July 15, 2004 (claiming that "[d]espite the enactment four years ago of the Federal Everglades Restoration Plan, America's largest wetland is most certainly not being restored").

192. *Miccosukee Tribe*, 541 U.S. at 101.

193. *Id.* at 103.

194. *Id.*

195. The district court agreed with this view, intermingling it with the idea of current, physical separation. The court stated that the canal and the Everglades are "separate bodies of United States water with . . . different quality levels. They are two separate bodies of water because the transfer of water or its contents from C-11 into the Everglades would not occur naturally." *Id.*. The Eleventh Circuit also seemed to accept this argument, stating that "in determining whether pollutants are added to navigable waters for purposes of the [Act], the receiving body of water is the relevant body." *Id.* (quoting Miccosukee Tribe of Indians v. S. Fla. Water Mgmt. Dist., 280 F.3d 1364, 1365 (11th Cir. 2002)).

> And it does not have the ecology of the Everglades. Nobody stands at a gas station and says to their child, there, John, is the Everglades. It . . . . doesn't have Everglades water because Everglades water would naturally flow west to east, and [the District has] . . . blocked that flow from the Everglades into the sloughs and into the Atlantic Ocean.[196]

The tribe concluded that the District's position would destroy the statutory protection for the ecological integrity of the Everglades and other waters of the United States.[197]

In contrast to the tribe's focus on current water chemistry conditions and ecological integrity, the District emphasized historic physical conditions, arguing that "WCA-3 and C-11 were historically part of the same ecosystem and . . . they remain hydrologically related."[198] Overcoming water law's traditional proclivity to separate surface and groundwater,[199] the District emphasized that the Everglades region is an unconfined aquifer such that "there is no meaningful distinction between ground and surface waters."[200] As a consequence, the District argued, the canal and wetlands "are not distinct water bodies at all, but instead are two hydrologically indistinguishable parts of a single water body."[201] As an alternative and more aggressive argument, the District advanced the "unitary waters" theory under which all navigable waters throughout the nation "should be viewed unitarily for purposes of [Clean Water Act] permitting" requirements.[202] In its commitment to the unified treatment of all surface and ground water within the Everglades—and possibly within the entire nation—the District necessarily disavowed a commitment to biological and ecosystem integrity. Rather, the District argued for interbasin water transfers unregulated by the Clean Water Act:

> If we read the Clean Water Act to require . . . [a] permit for every engineered diversion of one navigable water into another, thousands of new permits might have to be issued, particularly by western States, whose water supply networks often rely on engineered transfers among various natural water bodies.[203]

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196. Transcript of Oral Argument, *supra* note 185, at 41.

197. At oral argument, counsel for the tribe stated that the defendants' interpretation of the Clean Water Act would allow dischargers "to dispose of . . . pollutants anywhere in the United States with a navigable water of any designated use or of any water quality standard and would decimate the Clean Water Act's protection not only of the Everglades, but of the case law that—that your Honors have had cited in the brief." *Id.* at 54-55.

198. S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95, 113 (2004) (Scalia, J., dissenting in part). The United States as amicus curiae supported the District as defendant-petitioner.

199. *See infra* Part IV.C.

200. Brief of Petitioner at *4, *Miccosukee Tribe*, 541 U.S. 95 (2004) (No. 02-626).

201. *Miccosukee Tribe*, 541 U.S. at 109.

202. *Id.* at 98.

203. *Id.* at 108 (citing to the amicus brief for Colorado and others on behalf of the petitioners, 2002

The District cloaked its position in the language of federalism, suggesting that application of the federal water quality controls to state diversions would improperly impair the states' authority to allocate quantities of water within their jurisdictions.[204]

The Court methodically waded through the various notions of integrity advanced by the parties. Similar to her opinion in *PUD No. 1*, Justice O'Connor began her analysis with a quotation of the statutory purpose "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[205] But the Court's vision for transforming that aspiration into concrete legal requirements remains largely inscrutable.[206] Some of the Court's language suggests that its primary focus is upon ecosystem integrity. For example, it acknowledges that the reduction of phosphorus is necessary to "restore the ecological integrity of the Everglades."[207] The Court also mused that the Clean Water Act's structure "suggests that the Act protects individual water bodies as well as the 'waters of the United States' as a whole."[208] On the other hand, some of the Court's statements indicate a reliance upon linguistic integrity, treating all the navigable waters of the United States as a single legal entity.[209] For example, the Court indicated that the unitary waters legal argument would be available to the petitioner on remand, even though it had not raised the argument before the Eleventh Circuit or in its briefs for petition for certiorari.[210] Moreover, the Court indicated its willingness to treat surface and ground water unitarily, at least in the Everglades: "Because Everglades soil is extremely porous, water flows easily between ground and surface waters, so much so that '[g]round and surface waters are essentially the same thing.'"[211]

III. ECOSYSTEM INTEGRITY

> A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

U.S. Briefs 626, at *2-*4).

204. *Id.*

205. *Id.* at 102 (quoting 33 U.S.C. § 1251 (2000)).

206. In their subsequent press releases, both sides claimed victory before the U.S. Supreme Court. *See, e.g.*, News Release, South Florida Water Management District, U.S. Supreme Court Decision "A Victory for the Everglades" (Mar. 23, 2004), *available at* http://www.sfwmd.gov/newsr/3_04_newsrel.html (stating that the Supreme Court "today ruled in favor of the South Florida Water Management District (SFWMD) in overturning the lower court's decision that would have forced water managers across the country to change their operational procedures").

207. *Miccosukee Tribe*, 541 U.S. at 102.

208. *Id.* at 107.

209. Justice Scalia, who dissented in part, noted in oral argument that the unitary waters theory, although extreme in its practical ramifications, "is really textually not very extreme at all." Transcript of Oral Argument, *supra* note 185, at 16.

210. *Miccosukee Tribe*, 541 U.S. at 109.

211. *Id.* at 110.

Aldo Leopold[212]

Part II considered the notions of chemical and physical integrity. In Part III, the focus expands to the concept of ecosystem integrity, which refers to the complex interrelationships of water, flora, fauna, and land. As explained below—and as Aldo Leopold reminds us—ecological integrity has dimensions both technical and ethical.

The phrase "ecological integrity" is redundant, composed of two words independently evocative of the idea of wholeness. The adjective "ecological" refers to the science of ecology, the study of the interrelationship of organisms and their physical environment.[213] Coining the term "Oecologie" in 1866, German biologist Ernst Heinrich Haeckel described it as "the investigation of the total relations of the animal both to its inorganic and its organic environment."[214] Emphasizing the importance of the inorganic or nonliving environment included in Haeckel's definition, British ecologist Sir Arthur Tansley introduced the term "ecosystem" in 1935, defining it as a system "of which plants and animals are components, though not the only components."[215] Bringing the concept of ecology to the public consciousness in the mid-twentieth century, Aldo Leopold wrote of a "land ethic" that "simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."[216] Roughly contemporaneously, Eugene Odum also emphasized the importance of both living and nonliving matter, describing the ecosystem as "a system composed of biotic communities and their abiotic environment interacting with each other."[217] Water is certainly preeminent among these abiotic, inorganic, nonliving environmental components, bearing an intimate relationship to all forms of life.

The phrase "ecological integrity" is also redundant in its ethical connotations. Just as amorality is the antithesis of integrity, so also is ecology devoid of morality an incomplete concept. As Aldo Leopold noted around 1953, the science of ecology has ethical implications. Two decades later—following turmoil over the war in Vietnam, the struggle for civil rights, and the threats posed by pollution—the social implications of ecology achieved widespread recognition. Of particular interest was ecology's suggestion that

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212. ALDO LEOPOLD, A SAND COUNTY ALMANAC: WITH ESSAYS ON CONSERVATION FROM ROUND RIVER 262 (1953).

213. *See* EUGENE P. ODUM, FUNDAMENTALS OF ECOLOGY 25 (2d ed. 1971). For a discussion of the historical development of the science of ecology, see ROBERT B. KEITER, KEEPING FAITH WITH NATURE: ECOSYSTEMS, DEMOCRACY, AND AMERICA'S PUBLIC LANDS 47-65 (2003).

214. ERNST HEINRICH HAECKEL, GENERELLE MORPHOLOGIE DER ORGANISMEN, *quoted in* DONALD WORSTER, NATURE'S ECONOMY: A HISTORY OF ECOLOGICAL IDEAS 192 (2nd ed. 1994).

215. Arthur Tansley, *The Use and Abuse of Vegetational Concepts and Terms*, 16 ECOLOGY 284, 301 (1935).

216. LEOPOLD, *supra* note 212, at 239. *See generally* KEITER, *supra* note 213, at 65-66; Joseph Sax, *The Ecosystem Approach: New Departures for Land and Water Closing Remarks*, 24 ECOLOGY L.Q. 883 (1997).

217. BETTY JEAN CRAIGE & EUGENE ODUM: ECOSYSTEM ECOLOGIST AND ENVIRONMENTALIST xii (2002), *available at* http://www.cha.uga.edu/bjc/Odum-Intro.htm.

humans were simply one interdependent part of nature, rather than its central focus. Time Magazine declared 1969 the "year of ecology," recognized Eugene Odum and others for their leading work in the discipline, and asserted that the pollution would "soon replace the Viet Nam war as the nation's major issue of protest."[218] Only months later, Newsweek Magazine welcomed the "Age of Ecology" and its important lessons about the "web of life."[219] Consciously linking ecology and ethical imperative in 1985, Bill Devall and George Sessions began their book *Deep Ecology* with the observation, "we assume that the environmental/ecology movement has been a response to the awareness by many people that something is drastically wrong, out of balance in our contemporary culture."[220] Using the science of ecology as a springboard, *Deep Ecology* looked to philosophy, psychology, and sociology to develop a biocentric nature ethic that rejected the norm of human domination.[221]

The case study of Part III.A describes the exploding population growth of southern and southwestern Florida, and potential efforts to capture the seemingly abundant water of North Florida to support the growth of the South. In basic terms, the case study asks to what extent water should be removed from the land, both legally and physically. Part III.B provides a brief historical overview of the common law of water, its recognition of water as a resource distinct from the land, and the prevalence of interbasin water transfers. Part III.C considers the opportunity in Florida to develop a water transfer policy premised upon integrity. Although the notion of ecosystem integrity cannot resolve Florida's water supply problems, it can frame the discussion in transparent terms. Technically, it mandates a focus on the ecosystem as a whole; and ethically it highlights the value choices implicated by water allocation and other resource decisions.

A. Case Study: The Rapid Growth of South Florida

For more than a century, many states have permitted transbasin diversions of their waters.[222] Observers have regarded such diversions with a range of intense reactions, ranging from pride at engineering ingenuity to dismay at ecological disruption. Water-rich Florida, with an average annual rainfall of 54 inches,[223] has remained on the sidelines, experiencing little need for extensive manipulation of its water resources. But the twin pres-

218. *Id.*
219. *Id.*
220. BILL DEVALL & GEORGE SESSIONS, DEEP ECOLOGY 3 (1985).
221. The ethical imperatives of ecology certainly have their share of detractors. *See, e.g.*, Gregory J. Hobbs, Jr., *Ecological Integrity, New Western Myth: A Critique of the Long's Peak Report*, 24 ENVTL. L. 157, 158 (1994) (criticizing the so-called *Long's Peak Report* for favoring an "anti-storage, anti-use, anti-local-government agenda" surrounded by the "strident din of preservationism").
222. *See infra* Part II.B (discussing transbasin diversions).
223. Florida Council of 100, *Improving Florida's Water Supply Management Structure* 4, Sept. 2003 [hereinafter Florida Council of 100], *available at* http://www.fc100.org/documents/waterreportfinal.pdf (last visited Aug. 17, 2004).

sures of rapid population growth, particularly in southern and southwestern Florida, and increased consumption have made water allocation policy a recent issue of statewide concern and bitter debate.[224]

The issue made its dramatic and sudden appearance on the public stage with a September 2003 publication entitled, *Improving Florida's Water Supply Management Structure*.[225] The report's institutional author, the Florida Council of 100, describes itself as a "private, non-profit, non-partisan association whose members represent a cross-section of key business leaders in Florida."[226] Others have suggested that the Council is more political than it acknowledges. *The Jacksonville Business Journal*, for example, describes the Council as "a formidable political force with easy access to the highest state officials and the ability to push an issue such as water allocation to the top of the Florida Legislature's agenda," noting that its membership includes leading political fundraisers.[227]

No doubt mindful of the political ramifications of its report, the Council couched its recommendations in careful generalities. Nevertheless, three of the Council's recommendations were particularly controversial. First, the Council's report called for the "[e]stablish[ment] [of] a Water Supply Commission, with a statewide perspective, to ensure an adequate water supply to sustain the environment and accommodate forecasted population growth."[228] Second, the report recommended finding "ways to encourage public-private partnerships and public-public partnerships."[229] Finally, the report recommended conducting an "analysis to determine [the] practicality of a statewide water distribution system that ensures all safeguards for future growth and protection of the environment" and that would transfer water from water-rich areas to water-poor areas.[230] In public statements, the Chairman of the Council attempted to quell anticipated public opposition. For example, he stated, "We are not, I repeat, we are not recommending the transfer of water from the north to the south. . . . Let's just conduct good science-fact-based analyses."[231]

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224. The Florida Department of Environmental Protection has estimated that Florida's population will increase 25% by 2020. *Id.*

225. *Id.* The issue has garnered public attention sporadically over time. *See* Greg C. Bruno, *The Fight for Water: The Old Debate Heats Up Again*, GAINESVILLE SUN, Oct. 11, 2003, at 1A.

226. Florida Council of 100, *supra* note 223, at 2.

227. P. Douglas Filaroski, *Council of 100 Is Low-Key, But Influential*, JACKSONVILLE BUS. J., Nov. 7, 2003, *available at* http://jacksonville.bizjournals.com/jacksonville/stories/2003/11/10/story3.html; *see also* Bruno, *supra* note 225 (observing that the Council's chairman is a Tampa Bay real estate broker).

228. Florida Council of 100, *supra* note 223, at 20 (Recommendation 1).

229. *Id.* at 23 (Recommendation 4). The commentary accompanying the recommendation favored "[a]llowing market-driven forces to play a role in water management . . . [and] lease lands for water supply development to public water suppliers." *Id.*

230. *Id.* (Recommendation 5). The commentary accompanying the recommendation asserted: "Developing a system that enables water distribution from water-rich areas to water-poor areas seems to make good environmental and economic sense." *Id.* Furthermore, the commentary advocated "establish[ing] an economic value to water" and "involv[ing] the private sector in a public/private solution." *Id.*

231. Lloyd Dunkelberger, *Statewide Water Transfer Plan Advances*, GAINESVILLE SUN, Sept. 26, 2003, at 4A (quoting Lee Arnold, Chairman, Florida Council of 100 Water Management Task Force);

Despite such assurances, the public was quick to fill in the report's rather sparse and skeletal language with a variety of negative interpretations. Opposition forces galvanized rapidly, holding meetings in a variety of homely venues such as camp gymnasiums and small-town high school auditoriums. Speaker after speaker declared protective sentiments to tumultuous applause, making statements such as: "[O]ur water is not for sale."[232] The rhetoric of the debate is instructive, highlighting the extent to which policymakers and the public consider integrity to be a central aspect of water policy. A few critics have spoken explicitly in terms of social or temporal integrity, asserting claims such as: "I think someone from time to time needs to step to the forefront and say, 'This is wrong'";[233] and "[I]t does us no good to develop if we spend generations worth of water."[234] The majority of commentary, however, has focused upon two objections with no direct link to the idea of hydrologic integrity. First, some have opposed the notion of privatizing water under a market system.[235] As a corollary of the first criticism, others have asserted a protectionist rationale against the transfer of water from northern and rural Florida to southern and urban areas.[236]

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see also Bruno, *supra* note 225 (quoting Lee Arnold as saying that "[t]his whole idea of carting water hundreds and hundreds of miles at this point, in Florida, doesn't make any sense").

232. This observation was made by the author during attendance at the Florida Water Congress in High Springs, Florida on December 4, 2003 (sponsored by Alachua County and the City of Gainesville). The conference organizers described the event as a "call to action . . . [that] will focus on the themes of urgency, unity, and protection to inform and strengthen local leadership on the critical issues of water policy." Press Release, Florida Water Congress (Oct. 23, 2003), *available at* http://news.co.alachua.fl.us/view_story.asp?ID=1069.

233. Cindy Swirko, *Hawthorne Man Spurs Water Fight*, GAINESVILLE SUN, Oct. 11, 2003, at 4A (quoting John Martin, City Commissioner, Hawthorne, Florida), *available at* http://search.gainesville.com/apps/pbcs/dll/article?AID=/20031011/local/210110337&searchID=73201866306246.

234. Florida Water Congress, *supra* note 232 (statement of Florida state Senator Rod Smith).

235. *See, e.g.*, Dunkelberger, *supra* note 231, at 4A (quoting the assertion of a Hawthorne City Attorney: "The fact that they are even setting into motion a plan to privatize a public resource is abominable. . . . It's just another circumstance of state government privatizing state resources."); Florida Water Coalition, *Water for Florida's Future: A Call for Leadership*, Jan. 2003 (fearing that "multinational corporations [will] snatch up huge quantities of Florida water," "get a stranglehold on water supply," and then "dictate the public's price for water—selling back at a premium what was ours to begin with"); Curtis Morgan, *Water-Use Plan Faces Opposition*, MIAMI HERALD, Oct. 15, 2003, at 6, *available at* http://www.miami.com/mld/miamiherald/news/7015702.htm?1c (observing that "the Broward County Commission joined nearly 30 other counties in passing a resolution opposing the plan, saying they object to any legislation that shifts water use from a 'publicly regulated process to a market-driven process'"); Press Release, Florida Water Congress, *supra* note 232 (noting that "[r]ecently, public anxiety has been mounting regarding possible changes to state water policy that may encourage the long distance pipelining and privatization of water resources").

236. *See* Amy Wimmer Schwarb, *Plan to Transfer Water Meets Sea of Protest*, ST. PETERSBURG TIMES, Nov. 21, 2003; Florida Water Congress, *supra* note 232 (quoting Mike Byerly, Chair, Alachua County Commission, for the proposition that the "water of north Florida should remain in control of the people of north Florida," and pledging that "we're not pumping one bit of water south"); *Id.* (quoting Rod Smith, Florida Senator, District 14, for the proposition that "our water is not for sale"); Swirko, *supra* note 233, at 4A (quoting Hawthorne City Commissioner John Martin's statement that "[i]f they take water from here [north Florida], they are making a situation in South Florida—with their overgrowth and sprawl—worse and at the same time literally suck[ing] the life's blood out from under our part of the state"); Bruno, *supra* note 225, at 4A (observing that "environmentalists and state water-watchers fear that it's the privatization and piping of North Florida water that the council has in mind"). *But see* Morgan, *supra* note 235 (quoting Broward Commissioner Kristin Jacobs: "It would seem to me

The critical significance of the Florida debate is easy to overlook. The dry, understated tone of the Council's recommendations threatens to obscure their potential to revolutionize Florida water law. Similarly, the wholesale rejection and protectionist tone of critics may prevent their objections from receiving the careful consideration they deserve. Political grandstanding aside, Florida's debate over water transfers squarely raises issues central to hydrologic integrity: Under what circumstances, if any, should water be transported across political and hydrologic lines? Furthermore, should water remain as a pure public good, or should the right to use water be transformed into a market commodity that can be traded privately?

Florida provides a unique laboratory in which to study the policy of water transfers from a fresh perspective. Unlike many other states, Florida has enacted a comprehensive statutory framework for the allocation of water that integrates surface and groundwater, as well as quality and quantity considerations. As such, comprehensive change could occur rather rapidly with the stroke of the legislative pen, rather than with the painstaking accumulation of common-law guidance. And although Florida itself has little or no practical experience with large-scale water transfers,[237] it can look to its sister states—particularly in the West—for the accumulated wisdom gleaned from more than a century of water transfers.[238]

B. The Historical Context: Separating Land and Water

The Florida case study implicates delicate questions of social and ecological policy: When population exceeds water supply in a particular region, is it the job of government to bring water to the people, or to encourage people to live within the carrying capacity of the land? Almost universally—and perhaps with little introspection—states have assumed the responsibility to expand the water supply to meet whatever demands the future may pose.[239]

The human imagination has refused to accept the natural, geographic distribution of water as a limit upon where people may settle and build their

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that it's nothing more than a smoke screen to pit the north and south against each other so [profiteers] can go in and begin to privatize," and "The south doesn't want the north's water"); Dunkelberger, *supra* note 231, at 4A (describing "opponents in water-rich North Central Florida who claim 'partnerships' will become little more than veiled water grabs by resource-depleted South Florida developers").

237. Dunkelberger, *supra* note 231 (stating that "virtually no regional water transfers occur, while local communities have become too protective of their water supplies"). Lee Arnold is quoted for the proposition that "[w]aters are not restricted to county lines, or district lines. . . . The Floridan aquifer doesn't flow along neat little political boundaries." *Id.*

238. Coffin v. Left Hand Ditch Co., 6 Colo. 443, 449-50 (1882).

239. For a challenge to the idea that there are no limits to human settlement, see A. Dan Tarlock, *A Brief Examination of the History of the Persistent Debate About Limits to Western Growth*, 10 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 155, 157 (2004):

> Limits [to human settlement] were an academic subject, but not a subject for serious policy. However, the limits question has now become the subject of serious, respectable debate as the role of government in promoting regional growth recedes at the same time that population growth in many water-short areas continues to surge.

Id.

communities. Rather than move people to abundant water supplies, we have preferred instead to move water to the people. At times, this denial of the force of natural limitations has reached comic proportions. As the *Atlantic Monthly* reported in 2002:

> The possibility of towing icebergs to the Middle East and other arid regions around the world was studied and widely discussed during the 1970s. Nothing much came of the idea, for a number of reasons, chief among them being that it was *stupid.* (One report noted that it would take 128 days to tow an iceberg from Antarctica to the Middle East—twenty-four days longer than it would take for the iceberg to melt.)[240]

Twenty years later, a more workable version of the proposal became a reality, as a private water-supply company began using ocean tankers to tow large, fresh-water filled floating bladders to the Greek islands.[241]

Traditional riparian doctrine recognized an intimate connection between water and land. Under riparianism, the use of water was limited to those who owned land contiguous to a natural watercourse.[242] The early natural flow doctrine gave riparian landowners the right to receive the flow of the stream past their land undiminished in quantity or quality.[243] As a practical consequence, this limited the geographic range of water use to the adjacent property or to the original watershed. As expressed through the traditional on-tract limitation, riparian rights must be used only on the adjacent riparian parcel.[244]

During the early nineteenth century, the restrictive natural flow doctrine began to give way to the more flexible reasonable use doctrine. Under that development, the right to use water remains tied to the ownership of riparian property, but riparian uses may alter the natural stream flow, provided that such uses do not interfere with the correlative rights of other riparians to make reasonable use of the watercourse.[245] Many reasonable use jurisdictions invoke the watershed limitation—a rule slightly more generous than

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240. Wayne Curtis, *The Iceberg Wars, Competition for One of Newfoundland's Chief Natural Resources Heats Up*, ATLANTIC MONTHLY, Mar. 2002, at 76 (emphasis added).

241. *See* Alister Doyle, *Sea-Going Water Bags to Quench World Thirst?*, REUTERS NEWS SERVICE, Nov. 27, 2001.

242. Joseph W. Dellapenna, *The Right to Consume Water Under "Pure" Riparian Rights*, *in* 1 WATERS AND WATER RIGHTS § 7.02 (Robert E. Beck ed., 2001 repl. vol.) (stating that the right to use water "pertains to the owner of riparian land, often on the basis . . . [of] protecting the 'natural advantage' which goes with the land").

243. Under the natural flow theory, "[e]ach riparian owner on a waterbody is entitled to have the water flow across, or lie upon, the land in its natural condition, without alteration by others of the rate of flow, or the quantity or quality of the water." *Id.* § 7.02(c).

244. *Id.* § 7.02(a)(2) (discussing "unity of title" and "source of title" tests for determining the scope of riparian lands on which water may be used).

245. *Id.* § 7.02(d) ("Under the reasonable use theory each owner of riparian land is permitted to make use of the water in a waterbody regardless of the effect the use has on the natural flow so long as each user does not transgress the equal right of other riparians to use the water.").

the on-tract limitation. Under this limit, water may be used on nonriparian lands, but only if those lands are located in the same watershed as the source from which the water was removed.[246] The reasonable use version of riparianism remains the dominant paradigm today in the states that still follow a common-law regime.[247]

Thus, both versions of common-law riparianism emphasize an affinity between water rights and land ownership. This connection may have tenuous roots in an ecological impulse.[248] More likely, however, the desire to protect the flow of watercourses was economic or pragmatic in nature:

> At a time when aesthetic or ecological concerns were not often recognized by the law, courts while perhaps intuitively embracing such concerns, found it difficult to express them except through assertions of a property right in the natural flow of a waterbody. The evident overstatement of the asserted right was not troublesome when the most commercially productive uses of water were simple navigation and the turning of small-scale water wheels, both nonconsumptive uses being best served by keeping the water more or less in its natural condition.[249]

Likewise, in 1938 the California Supreme Court provided a rationale for the watershed rule rooted in the norms of property law:

> The principal reasons for the [watershed] rule . . . are that . . . [the water] will, after . . . use, return to the stream, so far as it is not consumed, and that, as the rainfall on such land feeds the stream, the land is in consequence entitled, so to speak, to the use of its waters.[250]

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246. *Id.* § 7.02(a)(2) (describing the watershed rule as "a vestige of the natural flow theory"). A "watershed" can be defined as "that area of land off which precipitation runs into a particular waterbody. Thus two sides of a particular hill or land showing even slight changes in the slope of the land can lie in different watersheds because the water will drain in different directions." *Id.*

247. *Id.* § 7.02(c) (describing the impracticality and lack of importance of the natural flow theory today) (citing RESTATEMENT (SECOND) OF TORTS § 850 cmt. b (1979)).

248. Dellapenna, *supra* note 242, § 7.02(a)(2) (stating that "a few scholars have championed the natural flow theory . . . as protective of the ecological interest in streamflow maintenance") (citing Lynda Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private Interests*, 47 U. PITT. L. REV. 95, 156-81 (1985)); Peter N. Davis, *The Riparian Right of Streamflow Protection in the Eastern States*, 36 ARK. L. REV. 47 (1982). *But see* Belin v. Dep't of Envtl. Res., 291 A.2d 553, 555 (Penn. 1972) (rejecting the watershed rule despite the plaintiffs' argument that riparianism prohibits the transbasin diversion and discharge of cooling and effluent waters from a manufacturing plant).

249. Dellapenna, *supra* note 242, § 7.02(c) (observing that "a rule [such as the natural flow theory] prohibiting material alterations of the water would preserve the water necessary to turn more waterwheels downstream, and thus serve to maximize the wealth of society as a whole") (quoting A. DAN TARLOCK, LAW OF WATER RIGHTS AND RESOURCES § 3.21[1] (1988)).

250. Rancho Santa Margarita v. Vail, 81 P.2d 533, 549 (Cal. 1938).

Ironically, some of the strongest support for the watershed rule comes from the western states in so-called "hybrid" jurisdictions that follow a mix of both ripiarianism and prior appropriation. Far from desiring to preserve the ecological integrity of water and land, these states may have a convoluted agenda: to reduce the land base to which riparianism applies, thus incidentally reducing the acreage to which the watershed rule potentially attaches.[251]

Whatever motivated the courts in traditional riparian jurisdictions to recognize a link between water and riparian land, the rules have been relaxed when economic progress so demanded.[252] Today, the *Restatement (Second) of Torts* rejects both the on-tract[253] and watershed limitations.[254] Among the common-law riparian states, approximately four allow interbasin water transfers, at least in theory, and at least under some conditions; similarly, at least 14 states following a statutory version of riparianism also allow interbasin transfers under some conditions.[255]

Perhaps the greatest relaxation of the water-land connection has occurred in the context of urban water supply. Despite the basic tenet that riparian water rights accrue only to riparian landowners, the common law has recognized various exceptions to allow cities to acquire a secure water supply.[256] New York City, for example, looks to the relatively rural upstate basins to augment its local water supply.[257] As one commentator notes, "Interbasin transfers of water have engendered considerable controversy, and outbreaks of often complex litigation. The New York diversions, for example, required two trips to the US Supreme Court."[258]

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251. As one commentator observed, "Western courts, with their ingrained hostility toward riparian rights, have embraced the watershed rule strongly because the rule tends to diminish the land to which a riparian right applies." Dellapenna, *supra* note 242, § 7.02(a)(2).

252. *Id.* § 7.02(c) (commenting that the natural flow theory "has been displaced in the United States whenever it threatens to prevent the commercially valuable development of water resources").

253. RESTATEMENT (SECOND) OF TORTS § 855 (1979).

254. *Id.* § 43 cmt. d.

255. AMERICAN WATER WORKS ASS'N, WATER RIGHTS OF THE EASTERN UNITED STATES 72 (Kenneth R. Wright, ed. 1998) [hereinafter AWWA]. The information was derived from a survey submitted to each of the states, and somewhat ambiguously described in a simplified presentation. The lack of clarity results from the fact that although "states have followed various informal policies in evaluating and regulating interbasin transfers, few have adopted explicit regulations prescribing the terms under which inter-watershed transfers would be permitted." R. Timothy Weston et al., *Adequate Water Rights and Enhancing the Supply*, *in* AWWA, *supra*, at 72. Of the common-law states, it appears that the following have relaxed, or do not follow, the watershed limitation: New Hampshire, Ohio, Pennsylvania, and Rhode Island. The statutory riparian states following a similar practice include Arkansas, Connecticut, Delaware, Florida, Georgia, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Mississippi, New Jersey, New York, and Virginia.

256. *See* Dimmock v. City of New London, 245 A.2d 569, 572 (Conn. 1968); Purcellville v. Potts, 19 S.E.2d 700, 703 (Va. 1942).

257. Weston et al., *supra* note 255, at 72 (describing "a network of reservoirs, aqueducts, and pipelines, [that transfer] up to 800 [million gallons per day] from the Delaware Basin to the city's Hudson Basin service area") (citing New Jersey v. New York, 347 U.S. 995, 997 (1954)). New York City's importation of water from the Catskill Mountains was the subject of litigation considered above in Part II.B.4.

258. Weston et al., *supra* note 255, at 72 (citing New Jersey v. New York, 283 U.S. 336, 343 (1931); New Jersey v. New York, 347 U.S. 995, 997 (1954)).

In contrast to the riparian doctrine, the western doctrine of prior appropriation not only allowed water to be transported long distances from its source, but generally *required* some sort of diversion or removal of water from its original source to perfect an appropriation.[259] Early descriptions of the western doctrine were couched in terms of an emphatic separation of water from the land. In 1882, for example, the Colorado Supreme Court forcefully rejected the riparian doctrine, noting the "disastrous consequences" that it would bring about in the western states:[260]

> The climate is dry, and the soil, when moistened only by the usual rainfall, is arid and unproductive; except in a few favored sections, artificial irrigation for agriculture is an absolute necessity. Water in the various streams thus acquires a value unknown in moister climes. Instead of being a mere incident to the soil, it rises, when appropriated, to the dignity of a distinct usufructuary estate, or right of property. . . . [We have always encouraged] the diversion and use of water in this country for agriculture; and vast expenditures of time and money have been made in reclaiming and fertilizing by irrigation portions of our unproductive territory. Houses have been built, and permanent improvements made; the soil has been cultivated, and thousands of acres have been rendered immensely valuable. . . . Deny the doctrine of . . . superiority of right by priority of appropriation, and a great part of the value of all this property is at once destroyed.[261]

Indeed, several western states elevated to constitutional status the right to divert water out of natural watercourses for use on distant lands or in distant watersheds.[262]

Under the western doctrine, interbasin water transfers are quite common. A 1990 survey of all the states found that each of the 17 states following the appropriation doctrine for surface water allocation allowed the buying and selling of water rights independent of land.[263]

Thus, the prior appropriation doctrine generally supports the free movement of water, divorced from the landscape of its origin. This practice is discussed generally in pragmatic terms, with little or no weighing of the ecological costs or benefits of separating water from the land. In a few instances, appropriation states may recognize explicitly the conflicting values

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259. Christine A. Klein, *The Constitutional Mythology of Western Water Law*, 14 VA. ENVTL. L. J. 343, 365 (1995).

260. Coffin v. Left Hand Ditch Co., 6 Colo. 443, 449 (1882).

261. *Id.* at 446.

262. Klein, *supra* note 259, at 344.

263. AMERICAN WATER WORKS ASS'N, WATER RIGHTS OF THE FIFTY STATES AND TERRITORIES 32-33 (Kenneth R. Wright ed., 1990). In contrast, only 15 of the 28 states allocating surface water rights under the riparian doctrine allowed for the purchase and sale of water rights. *Id.*; *see also* NATURAL RESOURCES LAW CENTER, TRANSFERRING WATER RIGHTS IN THE WESTERN STATES—A COMPARISON OF POLICIES AND PROCEDURES 53-62 (1989).

at stake—ecological integrity and economic development—and, almost without exception, choose the latter over the former. In some cases, the courts have been apologetic for the ecological damage they were facilitating.[264]

At other times, however, the courts unabashedly chose economic development over ecological integrity. In *United States v. New Mexico*,[265] the U.S. Supreme Court reviewed a general stream adjudication by the State of New Mexico, through which it allocated water rights to numerous users of the Rio Mimbres.[266] As the Court noted, the river was used for a variety of ecological and industrial purposes: "The river originates in the upper reaches of the Gila National Forest, but during its course it winds more than 50 miles past privately owned lands and provides substantial water for both irrigation and mining."[267] In particular, the Court considered "what quantity of water, if any, the United States reserved out of the Rio Mimbres when it set aside the Gila National Forest in 1899."[268] As the Court acknowledged, when Congress reserved a portion of the federal domain for a specific federal purpose such as a national forest, it impliedly reserved enough water to accomplish the purpose of the reservation.[269] Under the facts of the case, the Court narrowly construed the legislation establishing the national forests as evidencing only two congressional purposes for the creation of national forests: "to conserve water flows, and to furnish a continuous supply of timber for the people."[270] In so holding, the Court declined to recognize an arguable third purpose of national forests suggested by the literal language of statutory purpose—"to improve and protect the forest."[271] Instead, the Court held that aesthetic, environmental, recreational, or wildlife-preservation uses were not among the primary purposes for which forests were established and water rights reserved.[272] Therefore, the Court rejected the Forest Service's claim that Congress intended in 1899 to reserve sufficient water

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264. Empire Water & Power Co. v. Cascade Town Co., 205 F. 123, 129 (8th Cir. 1913) (holding that the owner of a tourist resort was "not entitled to a continuance of [certain waterfalls] solely for their scenic beauty" but observing that "if the attention of the lawmakers had been directed to such natural objects of great beauty [it may be that] they would have sought to preserve them, but we think the dominant idea was utility, liberally and not narrowly regarded, and we are constrained to follow it").

265. 438 U.S. 696 (1978).

266. *Id.* at 697-98.

267. *Id.* at 697.

268. *Id.* at 698.

269. *Id.* at 700.

270. *Id.* at 707-08. The Court based its conclusion on the following statutory language:

> No national forest shall be established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States; but it is not the purpose or intent of these provisions . . . to authorize the inclusion therein of lands more valuable for the mineral therein, or for agricultural purposes, than for forest purposes.

Id. (interpreting the Organic Administration Act of June 4, 1897, 30 Stat. 35 (*codified as amended at* 16 U.S.C. § 475) (2000)).

271. *Id.* at 708 n.14.

272. *Id.* at 707-08.

for wildlife purposes and to maintain a minimum stream flow to preserve fish.[273]

In rendering its decision, the Court explicitly acknowledged the competing values at stake, but chose not to promote ecosystem integrity. The Court observed that federal reserved water rights "will frequently require a gallon-for-gallon reduction in the amount of water available for water-needy state and private appropriators. This reality has not escaped the attention of Congress and must be weighed in determining what, if any, water Congress reserved for use in the national forests."[274] It was only Justice Powell's dissent that mourned the ecological loss that might follow from the Court's separation of water from the land:

> I do not agree . . . that the forests which Congress intended to "improve and protect" are the still, silent, lifeless places envisioned by the Court. In my view, the forests consist of the birds, animals, and fish—the wildlife—that inhabit them, as well as the trees, flowers, shrubs, and grasses. I therefore would hold that the United States is entitled to so much water as is necessary to sustain the wildlife of the forests, as well as the plants.[275]

Justice Powell cited to ecological treatises for the proposition that forest and wildlife are intimately linked in an interdependent, dynamic community.[276] He concluded with a plea for recognition of the legal and ecological integrity of water and land: "It is inconceivable that Congress envisioned the forests it sought to preserve as including only inanimate components such as the timber and flora. Insofar as the Court holds otherwise, the 55th Congress is maligned and the Nation is the poorer, and I dissent."[277]

C. The Opportunity: Regulating Transbasin Diversions in Florida

Florida has been presented with the opportunity to fashion a statewide water transfer policy that advances integrity, writing on a clean slate unencumbered by the weight of legal precedent or detrimental reliance. As with many endeavors, asking the right questions may pose a challenge as great as determining the correct response. This subsection will highlight briefly the relevant considerations that might form the basis of a policy that allocates a scarce resource in accordance with principles of scientific, ecological, social, and historical integrity. Although the context is specific to Florida, the broad concept of advancing the integrity of water transfer policy is equally applicable to all of the states.

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273. *Id.* at 715-17.
274. *Id.* at 705.
275. *Id.* at 719 (Powell, J., dissenting in part); *see also* Adler, *supra* note 5.
276. *New Mexico*, 438 U.S. at 723-24.
277. *Id.*

Despite their diverse histories, both riparian and appropriation jurisdictions today have incorporated a variety of measures to protect the integrity of aquatic ecosystems. Most western states protect "minimum stream flows" (or "instream flows"), by determining flow levels of particular stream segments below which new appropriations will not be permitted. In the West, all but three states had adopted such programs by 1988.[278] The programs are relatively modest in scope—at times, deliberately so—in order to avoid triggering a backlash by diversionary users. Three primary limitations are apparent. First, as their name implies, minimum stream flows generally maintain only the minimum volume of water necessary to accomplish specific, environmental purposes.[279] In addition, most instream flow programs are of relatively recent vintage, and can only guard against diversions by subsequent users with more recent priority dates. Moreover, the authority to protect stream flows may be reserved to specific governmental entities, rather than to individuals or public interest groups. Despite these limitations, minimum stream flow programs have made a significant contribution to the maintenance of aquatic habitats. For example, Colorado's governor issued an "honorary proclamation" in 2004, recognizing the thirtieth anniversary of the state's stream and lake protection program. As noted by the proclamation, the state has "secured water rights for more than 475 natural lakes and over 8,000 miles of Colorado stream."[280] Riparian states also incorporate stream flow protections into their legal regimes. As of 1998, at least 26 of the 31 eastern states had adopted such measures.[281]

Ecosystem integrity can also be promoted by "basin of origin" legislation that imposes some limits on the transfer of water from its natural source to distant regions or watersheds within the state.[282] From a tactical standpoint, it may be difficult to muster the political will to protect water-rich, lightly populated areas from the aggressive behavior of water-poor regions with greater populations, and hence greater voting power. The relative unlikelihood of reaching a sympathetic ear may not stop source regions from uttering a predictable series of complaints in opposition to proposed diversions. Likewise, the area that will benefit from the potential water

278. *See* GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 21:30 (1990).

279. In Colorado, for example, instream flow water rights are authorized for the protection of "the natural environment to a reasonable degree." COLO. REV. STAT. § 37-92-102(3) (West 2003). In practice, the required flows are usually correlated to fishery preservation.

280. Governor Bill Owens, *Honorary Proclamation, 30th Anniversary of the Stream and Lake Protection Program*, June 2004 (on file with author). The proclamation observes that "the number of stream miles and lakes protected in Colorado exceeds that of all other western states combined." *Id.*

281. Patricia K. Flood & Kenneth R. Wright, *Summary of Water Rights Law in the 31 Eastern States*, *in* AWWA, *supra* note 255, at 105, 108-09. Among common-law jurisdictions, states with instream flow protection include Illinois, Ohio, Pennsylvania, Rhode Island, Tennessee, Vermont, and West Virginia; regulated riparian states with such protection include Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Mississippi, New Jersey, New York, North Carolina, Virginia, and Wisconsin.

282. Without congressional approval, such state limitations on the *interstate* transfer of water risk running afoul of the dormant Commerce Clause. Sporhase v. Nebraska, 458 U.S. 941, 942 (1982).

transfer may not hesitate to advance its cause as an ethical imperative, even if it has not been diligent in exploring conservation and other alternatives to the transfer:

> Political pressures will build to protect the source area even if the public water system [of the destination area] has to pay compensation for any water taken. Cries will arise that the service area is stealing the source area's future. People in the service area will counter with arguments that it should not have to sacrifice present needs for the supposed benefit of a remote future need in the source area, a need that might never be realized. Representatives from service areas will also argue simple economics: Let the water flow to those willing to pay the price, even if the water must flow uphill.[283]

Despite the difficulty of imposing limits on thirsty regions, a few states have done so. In some cases, source area protection takes the form of financial compensation.[284] In other states—most notably California—statutes provide the source area with the ability to prevent the transfer itself.[285] Such basin of origin protection has the potential to promote ecological integrity, but it may just as easily preserve the source area's potential for future growth, simply deferring to some future date the threat to aquatic resources.

Florida law has established an institutional framework well-suited to promoting integrity, depending upon how its provisions are interpreted and implemented. In 1972, the state adopted comprehensive legislation to supplant its former regime of common-law ripiarianism.[286] The Water Resources Act of 1972 represents an early effort at watershed management, creating five "water management districts" based upon surface watersheds.[287] Each district is authorized to perform a variety of tasks, including the issuance of permits for consumptive use,[288] the establishment of minimum flows for surface watercourses and minimum water levels for groundwater aquifers levels to protect water resources and ecology,[289] the reservation of water from use to protect natural systems and the public health,[290] and water supply planning and water resource development.[291]

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283. WATER & WATER RIGHTS § 7.05(c)(2) (Robert E. Beck ed., 2001 repl. vol.); Dellapenna, *supra* note 242, § 7.05(c)(2). This description proved to be remarkably accurate with respect to a 2003 Florida proposal generally supportive of transbasin diversions. *See supra* Part III.B.

284. Dellapenna, *supra* note 242, § 7.05(c)(2).

285. *Id.*; *see also* Andrew P. Tauriainen, *California's Evolving Water Law: The Water Rights Protection and Expedited Short-Term Water Transfer Act of 1999*, 31 MCGEORGE L. REV. 411, 415 (2000); Robert L. Harris, *Narrowing the Local Public Interest Criterion in Idaho Water Right Transfers*, 39 IDAHO L. REV. 713, 714 (2003).

286. Florida Water Resources Act of 1972, FLA. STAT. chs. 373.012-.71 (2004).

287. *Id.* at ch. 373.069 (creating and defining the boundaries of the Northwest Florida Water Management District, Suwannee River Water Management District, St. Johns River Water Management District, Southwest Florida Water Management District, and South Florida Water Management District).

288. *Id.* at ch. 373.223.

289. *Id.* at ch. 373.042(1)-(2).

290. *See, e.g.*, *id.* at chs. 373.0831, 373.1961, 373.223(4); *see* Robert P. King, *Water Managers Take*

Notably, the statute provides a unified scheme for the consumptive use of surface or groundwater,[292] subjecting applications for either to the same general permit requirements.[293]

Florida's water code addresses generally the question of water transfers. As an initial premise, the law provides that water regulators may authorize transbasin and trans-county diversions.[294] Indeed, the water code specifically prohibits any local ordinances or rules to the contrary.[295] However, the statute also has a number of provisions which serve to restrict the approval of certain water transfers. Taken together, these restrictions have been dubbed the "local sources first"[296] policy. Although opponents of water transfers construe the policy strictly to limit water transfers,[297] a close examination suggests that it is simply advisory in nature. The restrictions appear in at least three statutory sections, providing overlapping and potentially contradictory requirements: (1) water regulators are directed to "encourage the use of water from sources nearest the area of use or application whenever practicable";[298] (2) for trans-county transfers of both surface and ground water, regulators "shall consider" a variety of factors, including the proximity of source to area of use, alternative water sources, potential environmental impacts of the transfer, and the present and reasonably anticipated future needs of the source region;[299] and (3) for groundwater transfers

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Steps to Shield Loxahatchee River, PALM BEACH POST, Apr. 15, 2004, at 2B.

291. FLA. STAT. ch. 373.0831 (2004).

292. The Districts may require permits for the consumptive use of water. *Id.* at ch. 373.219(1). The term "water" is defined broadly to include "any and all water on or beneath the surface of the ground or in the atmosphere." *Id.* at ch. 373.019(17).

293. To obtain a permit, applicants must demonstrate that the proposed use is reasonable-beneficial, "[w]ill not interfere with any presently existing legal use[s] of water[,] and [i]s consistent with the public interest." *Id.* at ch. 373.223(1). The specific details of permitting may vary from district to district, and appear as rules in the Florida Administrative Code. *See, e.g.*, FLA. ADMIN. CODE ANN. R. 40A-2.301, 40B-2.301, 40C-2.301, 40D-2.301, 40E-2.301 (2004).

294. FLA. STAT. ch. 373.223(2) (2004).

295. The law places slightly different limitations upon the authority of local governments and the authority of the water management districts. Local governments are specifically precluded from "adopt[ing] or enforce[ing] any law, ordinance, rule, regulation, or order" that prohibits the "transport and use [of] ground or surface water beyond overlying land, across county boundaries, or outside the watershed from which it is taken." *Id.* at ch. 373.223(2). In slightly different language addressing groundwater only, the water management districts and the state Department of Environmental Protection are specifically admonished against "adopt[ing] special rules which prohibit or restrict interdistrict transfer and use of groundwater in a manner inconsistent with this section." *Id.* at ch. 373.2295(10).

296. *See* ROY R. CARRIKER, INST. OF FOOD & AGRIC. SCI., *Florida's Council of 100 and the Future of Water Supply Management of Florida*, *at* http://edis.ifas.ufl.edu/FE470 (Dec. 2003).

297. *See id.*

298. FLA. STAT. ch. 373.016(4)(a) (2004) (listing preferred sources as including desalination, conservation, reuse of nonpotable reclaimed water and stormwater, and aquifer storage and recovery). The following subsection, however, diminishes the force of this preference for local sources, stating that "[i]n establishing the policy outlined in paragraph (a), the Legislature realizes that under certain circumstances the need to transport water from distant sources may be necessary for environmental, technical, or economic reasons." *Id.* at ch. 373.016(4)(b).

299. *Id.* at ch. 373.223(3). The "local sources first" policy is weakened by exceptions and qualifying phrases. In greater detail, chapter 373.223(3) provides:

> (3) Except for [water use by the Central and Southern Florida Flood Control Project, bottled water suppliers, certain applications with the Northwest Florida Water Management District, and certain self-suppliers of water], when evaluating whether a potential transport and use of

across district lines, water regulators shall consider the projected populations and future needs of both withdrawal and use areas,[300] and *must* issue a permit for such interdistrict transfer if the needs can be satisfied.[301] If integrity is to be the touchstone of Florida's water transfer policy, then the statutory "future needs" assessment must be applied broadly enough to consider the requirements of a sustainable ecosystem as the very heart of future human needs.

Florida's statutory scheme also contains a little-used "reservation" provision that may be essential to an integral water transfer policy.[302] Under that section, water regulators, "may reserve [water] from use by permit applicants, . . . as in its judgment may be required for the protection of fish and wildlife or the public health and safety."[303] The statute imposes three critical limitations on the effectiveness of reservations. First, the establish-

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ground or surface water across county boundaries is consistent with the public interest, . . . the governing board or department shall consider:

(a) The proximity of the proposed water source to the area of use or application.

(b) All impoundments, streams, groundwater sources, or watercourses that are geographically closer to the area of use or application than the proposed source, and that are technically and economically feasible for the proposed transport and use.

(c) All economically and technically feasible alternatives to the proposed source, including, but not limited to, desalination, conservation, reuse of nonpotable reclaimed water and stormwater, and aquifer storage and recovery.

(d) The potential environmental impacts that may result from the transport and use of water from the proposed source, and the potential environmental impacts that may result from use of the other water sources identified in paragraphs (b) and (c).

(e) Whether existing and reasonably anticipated sources of water and conservation efforts are adequate to supply water for existing legal uses and reasonably anticipated future needs of the water supply planning region in which the proposed water source is located.

(f) Consultations with local governments affected by the proposed transport and use.

(g) The value of the existing capital investment in water-related infrastructure made by the applicant.

Id.

300. *Id.* at ch. 373.2295(1), (4), (11), (13). These requirements apply only where water does not cross county lines. *Id.* at ch. 373.2295(1).

301. *Id.* at ch. 373.2295(4). In its entirety, subsection (4) provides:

(4) In determining if an application is consistent with the public interest . . . , the projected populations, as contained in the future land use elements of the comprehensive plans adopted . . . by the local governments . . . will be considered together with other evidence presented on future needs of [the withdrawal areas and the proposed use] areas. If the proposed interdistrict transfer of groundwater meets the requirements of this chapter, and if the needs of the area where the use will occur and the specific area from which the groundwater will be withdrawn can be satisfied, the permit for the interdistrict transfer and use *shall* be issued.

Id. (emphasis supplied). Additional procedural requirements apply if the proposed transfer will cross both hydrological (water management district) and political (county) lines. *Id.* at ch. 373.2295(5).

302. *Id.* at ch. 373.223(4).

303. *Id.* Florida law also requires the establishment of minimum flows for all surface watercourses and minimum water levels for aquifers, representing the limit "[beyond] which further withdrawals would be significantly harmful to the water resources [or ecology] of the area." *Id.* at ch. 373.042(1). In contrast to most western "minimum stream flow" programs, see *supra* notes 278-81 and accompanying text. Florida's minimum flows and levels ("MFLs") are a water-shortage planning and prevention mechanism, rather than an absolute protection against additional withdrawals. *See* FLA. STAT. ch. 373.0421(2) (2004) (requiring regulators to respond to actual or projected violations of MFLs by "expeditiously implement[ing] a recovery or prevention strategy" to recover levels "as soon as practicable" or to prevent flows or levels from dropping below established MFLs).

ment of reservations is discretionary and sporadic, not mandatory and comprehensive.[304] Second—like other water uses in Florida—reservations from use are something less than a property right (or a public right), and are therefore vulnerable to periodic review.[305] Finally, reservations are explicitly inferior to pre-existing uses of water.[306] The inclusion of this final limitation is generally incongruous with the riparian practice of granting water rights in accordance with the public interest, rather than temporal priority.[307]

As a final critical component of ecosystem integrity, the relationship between water management and land use planning must be recognized. Although Florida acknowledged this relationship in theory by the early 1970s, it allowed decades to pass without implementing the link through enforceable legislation. In fact, a 1991 report found that the connection was still a "missing link," and that "[e]xcept for limited provisions, Florida law does not establish a formal link between land planning and water planning."[308] State lawmakers took a step toward forging that link in 2002 with the passage of legislation requiring integration of local government comprehensive land use plans with the regional water supply plans of water regulators.[309]

IV. SOCIAL AND LEGAL INTEGRITY

Moving beyond the three aspects of integrity highlighted by the Clean Water Act—chemical, physical, and biological (or more broadly, ecological)—Part IV will examine the implications for water law of social and legal integrity. As an indispensable, life-sustaining resource, water is perhaps the fundamental measure of a community's wealth. Water allocation policy, therefore, is all about the allocation of a unique and critical form of wealth. As such, arguably, it should be subject to the same sort of scrutiny that we give to any government program involving the distribution of wealth and baseline safety nets, including taxation, social security, and welfare. Under the rubric of "social integrity," Part IV.B will suggest essential considerations to ensure that water is distributed fairly on a geographic and temporal basis, arguing for recognition of the value judgments embedded in allocation mechanisms and tools.

Part IV.C will consider the extent to which water law is a discipline of integrity. In particular, the "legal integrity" of water law will be measured by the extent to which it accurately reflects hydrologic reality and the laws

304. *See* FLA. STAT. ch. 373.223(4) (2004).
305. *See id.*
306. *Id.*
307. Despite this often-recited premise, priority seems to make an inexplicable appearance in many riparian jurisdictions. In Florida, for example, permit conditions include reasonable-beneficial use, consistency with the public interest, and a demonstration that the proposed use of water "[w]ill not interfere with any presently existing legal use of water." *Id.* at ch. 373.223(1).
308. ENVT. LAND MGMT. STUDY COMM., BUILDING SUCCESSFUL COMMUNITIES 6 (1992); *see also* Mary Jane Angelo, *Integrating Water Management and Land Use Planning: Uncovering the Missing Link in the Protection of Florida's Water Resources?*, 12 U. FLA. J.L. & PUB. POL'Y 223, 223 (2001).
309. *See* CS/SB 1906 & 550, 2002 Leg., Reg. Sess., 2002 Fla. Sess. Law Serv. 296 (West 2002).

of science. Tapping into the rich and developing literature on law and science, two opposing problems will be noted.[310] In some instances, the law relies too little upon science, as exemplified by water law's reluctance to regulate groundwater long after science furnished the tools to do so. In other instances, the law relies too much upon science, blindly depending upon it to resolve conflicts that are matters of subjective social policy, rather than objective scientific judgment.

To provide a practical context for the philosophical concepts of social and legal integrity, the next section offers a case study of an ongoing dispute between Alabama, Florida, and Georgia over the allocation of the Apalachicola, Chattahoochee, and Flint Rivers (collectively, the "ACF"). In conclusion, Part IV.D frames the ACF dispute in terms of social and legal integrity.

A. Case Study: Dividing a River Among Alabama, Florida, and Georgia

In the Southeast, a network of rivers connect Atlanta, Georgia to Apalachicola, Florida—two cities that are about 350 miles apart in river miles, but worlds apart in culture. Both cities are located in the 20,000 square mile basin of the Apalachicola, Chattahoochee, and Flint Rivers (the "ACF Basin") of Alabama, Florida, and Georgia.[311] The rivers drain into the Gulf of Mexico at the tiny fishing village of Apalachicola, Florida—boasting a population of 2,334, according to the 2000 census.[312] Established in 1831, Apalachicola was prominent in the cotton shipping industry, and became the third largest port on the Gulf of Mexico.[313] Later in the nineteenth century, the city's industrial focus shifted toward the milling of native cypress logs and commercial fishing.[314] Today, the Apalachicola Bay provides over 90% of the oysters consumed in Florida and 10% of the nation's supply, supporting a regional commercial fishing industry worth $100 million annually.[315] As one writer has observed, "Oysters occupy such a central place in the economy of the town that the local radio station has the call letters WOYS and bills itself as 'Oyster Radio, 100.5.'"[316] A successful tourist industry has

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310. *See, e.g.*, Robert W. Adler, *The Supreme Court and Ecosystems: Environmental Science in Environmental Law*, 27 VT. L. REV. 249, 250 (2003).

311. As described by the U.S. District Court for the District of Columbia, "The Chattahoochee River originates in the mountains of northern Georgia, runs along the Alabama-Georgia border, joins the Flint River at the Florida-Georgia border (becoming the Apalachicola River), and eventually flows into the Gulf of Mexico [at Apalachicola Bay, near Apalachicola, Florida]." S. Fed. Power Customers, Inc. v. Caldera, 301 F. Supp. 2d 26, 28 (D.D.C. 2004).

312. *Apalachicola, Florida, Fact-Index, at* http://www.fact-index.com/a/ap/apalachicola_ florida.html (2000).

313. APALACHICOLA BAY CHAMBER OF COMMERCE, *Official Website: Apalachicola, available at* htt p://www.apalachicolabay.org/apalachicolahome.htm.

314. *Id.*

315. *Id.*

316. ROBERT GLENNON, WATER FOLLIES, GROUNDWATER PUMPING AND THE FATE OF AMERICA'S FRESH WATERS 185 (2002).

also developed along this so-called "forgotten coast" of Florida, emphasizing the slow, old-south atmosphere that still permeates the area.[317] As noted by one contributor to the online newspaper, the *Forgotten Coast Line*, "One problem with Apalachicola is it's way too easy to get comfortable. Indolence lurks seductively about every corner, waiting to snare the unwary soul."[318] But the very environmental and cultural resources that attract tourists are at risk of impairment. In 1999, the American Rivers organization listed the Apalachicola River at Apalachicola, Florida as its eleventh most endangered river in the country.[319] The report blamed river dredging by the Army Corps of Engineers as the principal factor in the river's decline, describing it as "a futile effort to maintain a commercial shipping channel that is barely used."[320] Furthermore, the area may experience unprecedented growth if the plans of a former paper company and the largest private landowner in Florida come to fruition.[321]

Hundreds of miles upstream, Atlanta is culturally a world apart from Apalachicola. Consistently named one of America's best cities,[322] Atlanta is also one of its fastest-growing cities: the metropolitan population increased 27% between 1970 and 1980, and 33% between 1980 and 1990.[323] With this growth comes an ever-increasing demand for critical resources, including land and water. In 1998, for example, the Sierra Club listed Atlanta as first on its list of the thirty "most sprawl-threatened cities."[324] The ranking was based, in part, upon the observations that the Atlanta metropolitan area developed 500 acres of open land every week, and that its urban land area expanded 47% between 1990 and 1996.[325] With respect to increasing water demands, usage is expected to increase by over 40% by 2050.[326] The Upper

317. *See generally* APALACHICOLA BAY CHAMBER OF COMMERCE, *supra* note 313.

318. Robert Goad, *Rowing Scipio Creek—The Old Folk's Primer*, FORGOTTEN COAST LINE ONLINE NEWSPAPER, *at* http://www.forgottencoastline.com/archiveshow.asp?articleID=1500 (June 10, 2004).

319. Press Release, American Rivers, Most Endangered Rivers of 2002 Announced, (Apr. 4, 2002), *available at* http://www.prweb.com/releases/2004/4/prweb36216.htm.

320. *Id.*

321. *See, e.g.*, PBS, *Now With Bill Moyers, The Future of the Florida Panhandle*, *at* http://www.pbs.org/now/society/panhandle.html (June 5, 2003) (reporting that the St. Joe Company is undertaking an "unprecedented development project that will forever change an area that experts say is one of the most environmentally sensitive in the nation").

322. Forbes Magazine picked Atlanta as fourth among its "best cities for singles in 2004." *See* David E. Dukerich, *Best Cities for Singles*, FORBES.COM, *at* http://www.forbes.com/2004/06/23/04singleand (June 25, 2004). That same year, Atlanta was rated as the nation's seventh best city in terms of economy, jobs, cost of living, climate, education, arts, and culture. *See Think Your City is Best? See the Latest Rankings*, MSNBC TODAY SHOW, Mar. 30, 2004, *available at* http://msnbc.msn.com/id/4624179/ (interviewing Bert Sperling and Peter Sander, authors of *Cities Ranked & Rated*).

323. *Satellite Images Show Effects of Urban Sprawl*, CNN.COM, *at* http://www.cnn.com/2000/NATURE/02/21/sprawl.space.01/ (Feb. 21, 2000).

324. Sierra Club, *1998 Sierra Club Sprawl Report: 30 Most Sprawl-Threatened Cities*, *available at* http://www.sierraclub.org/sprawl/report98/Atlanta.asp (last visited Aug. 28, 2004).

325. *Id.* ("Some experts believe that the region's population could double in the next 50 years. With no natural barriers, few cities are growing as fast as Atlanta.").

326. GLENNON, *supra* note 316, at 188 (citing an increase in projected municipal and industrial water usage from 618 million gallons per day in 1995 to 872 million gallons per day by 2050).

Chattahoochee River was named among the country's most endangered rivers in 1998, due primarily to explosive suburban growth in Atlanta.[327]

The needs of oyster fishers and urban dwellers are not the only demands placed upon the ACF river basin. Georgia farmers also consume a significant amount of water. Despite an average annual rainfall of fifty inches in southern Georgia, the area's agricultural industry is increasing its reliance upon artificial irrigation, including the usage of wells tributary to the ACF Basin surface flows.[328] The farmers have been largely successful in their efforts to avoid comprehensive state legislation governing the use of groundwater wells.[329]

Perhaps not surprisingly, the resources of the Apalachicola, Chattahoochee, and Flint Rivers simply cannot support such a diverse range of lifestyles and needs without conflict. The resultant legal fight has been slow-moving and procedurally-complex, with a substantive resolution not expected in the reasonably foreseeable future. In 1990, prompted by Atlanta's threat to increase its diversion and storage of Chattahoochee River water, Alabama (later joined by Florida) filed suit against Georgia seeking a judicial apportionment of the ACF Basin waters.[330] The litigation was stayed by court order in September 1990, remaining in effect for almost a decade as the three states pursued a negotiated settlement of the litigation.[331] In 1997, Congress approved the Apalachicola-Chattahoochee-Flint Interstate Compact negotiated by the three states,[332] providing simply a procedural framework for additional negotiations.[333] When the Compact expired on August 31, 2003,[334] no settlement had been reached and the original lawsuit was reactivated.[335] Observers believe that the dispute will reach the U.S. Supreme Court for ultimate resolution.

A second sequence of litigation, this time initiated by Georgia, contributed to the procedural complexity of the matter. During the pendency of tri-

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327. *Id.*; *see also American Rivers' 10 Most Endangered Rivers for 1999*, PADDLER MAG., July-Aug. 1999, *available at* http://www.paddlermagazine.com/issues/1999_4/EcoRiver.htm ("Atlanta, the most sprawling city in the country, is growing so fast it threatens the health of nearby water-sources. The city's rate of land consumption is eight times greater than its population growth.").

328. For a fascinating account of the non-hydrological factors that have precipitated that transition from dryland to irrigated agriculture, see GLENNON, *supra* note 316, at 188-90.

329. *See* GA. CODE ANN. §§ 12-5-96(a)(1), 12-5-96(a)(2) (1995) (requiring consumptive use permits only for surface or groundwater withdrawals exceeding 100,000 gallons per day); GA. CODE ANN. § 12-5-31(a) (2003) (exempting agricultural uses from the permitting requirement); GLENNON, *supra* note 316, at 185.

330. *See* Alabama v. Army Corps of Eng'rs, No. CV-90-BE-1331-E, 2005 WL 457415 (N.D. Ala. 2005). The State of Florida successfully moved to invervene on behalf of the plaintiff, Alabama. *Id.* at *1.

331. *Id.*

332. Pub. L. No. 105-104, 111 Stat. 2219 (1997).

333. *See* Southeastern Fed. Power Customers, Inc. v. Caldera, 301 F. Supp. 2d 26, 29 (D.D.C. 2004) (describing the ACF Compact as "an agreement to agree").

334. *Id.* By that time, the initial deadline had been extended 12 times. Georgia v. Army Corps of Eng'rs, 302 F.3d 1242, 1248 (11th Cir. 2002).

335. Preliminary Injunction, Alabama v. Army Corps of Eng'rs, 2005 WL 457415, at *1 (enjoining the Corps and Georgia from executing or implementing storage or withdrawal contracts without the court's permission).

state negotiations under the ACF Compact, Georgia took unilateral action to increase its diversions from the Chattahoochee River upstream of Atlanta, seeking to use water impounded behind the Buford Dam in Lake Lanier.[336] To realize this plan, Georgia sued the Army Corps of Engineers, as the operator of Lake Lanier, to compel it to execute Georgia's requested water supply contract.[337] Subsequently, in a related action, a nonprofit consortium of electric suppliers sued the Army Corps of Engineers to challenge its distribution of Lake Lanier water.[338] The lawsuits were resolved through a settlement agreement, but stayed by the federal district court in Alabama pending resolution of the judicial apportionment action.

B. The Historical Context: Social Integrity

1. Geographical Equity

Water is arguably the most vital of all natural resources, supporting ecosystems and human systems alike. Accordingly, the engineered movement of water from one area to another involves, at its core, the redistribution of wealth, with readily identifiable winners and losers. Given the significance of the resource, it is no accident that disputes over water have been described as water *wars*.

The western states provide a particularly vivid illustration of the wealth-transfer implications of water policy. The Colorado River Basin is illustrative of impending water shortages. According to the U.S. Geological Survey, parts of the Colorado River Basin—serving seven states and rapidly growing metropolitan regions such as Las Vegas, Los Angeles, and Phoenix—are currently experiencing the worst drought in over four hundred years.[339] A report issued by the Department of the Interior in 2003 acknowledged the social implications of such water shortages, ominously concluding, "Today, in some areas of the West, existing water supplies are, or will be, inadequate to meet the water demands of people, cities, farms, and the environment even under normal water supply conditions."[340] The report cited to the Klamath River Basin of the Pacific Northwest and the Middle Rio Grande River Basin as illustrations of how thinly-stretched water supplies can lead to the eruption of crisis and conflict.[341] Those areas experienced bitter conflicts, demonstrations, and even isolated instances of vio-

336. Georgia v. Army Corps of Eng'rs, 302 F.3d at 1247-48.
337. *Id.* at 1248.
338. *See* Southeastern Fed. Power Customers, Inc. v. Caldera, 301 F. Supp. 2d 26, 34 (D.C. Cir. 2004) (approving a settlement agreement allocating Lake Lanier water, but restraining the execution of the settlement agreement until related litigation in Alabama has been resolved).
339. Patrick O'Driscoll, *Western States Kick Off Summer Under Threat of Crippling Drought*, USA TODAY, June 21, 2004, *available at* 2004 WLNR 6659203.
340. U.S. DEP'T OF THE INTERIOR, WATER 2025: PREVENTING CRISES AND CONFLICT IN THE WEST 2 (May 2, 2003), *available at* http://www.doi.gov/water2025/water.pdf (last visited Jun. 22, 2004).
341. *Id.* at 10 ("*Reality number 3:* over-allocated water supplies can cause crisis and conflict").

lence, as farmers, cities, Native Americans, and environmental advocates fought desperately to protect their values and ways of life.[342]

To address impending water crises, many commentators predict an increased reliance on economic principles to facilitate market transfers of water.[343] The inevitable losers under such an approach will be poor, rural, and agricultural communities. This approach is not necessarily inconsistent with social integrity, to the extent that it discourages wasteful and inefficient practices by agriculture and other users.[344] But markets, if not carefully devised and regulated, may place an inequitable burden upon the poor and people of color. A landmark study published in 1987, observed that water "flows away from the poor."[345] In particular, the study documented how "the Southwest is on a historical trajectory from community to commodity values . . . [that] disproportionately affects communities of color in the Southwest."[346]

2. *Intergenerational Equity*

In many instances, water law elevates present over future water users, allowing present society to enjoy the legal right to exhaust non-renewable water sources at the expense of future generations. In Colorado, for example, the 1965 Ground Water Management Act created four legal categories of groundwater: designated, tributary, non-tributary, and not non-tributary.[347] Colorado law allows for the use of the latter two categories by overlying landowners at a rate that will deplete the aquifer within one hundred years.[348] This legal provision may provide an overly-optimistic view of the aquifer's longevity, however, and the Colorado Geological Survey has estimated that it may be economically feasible to recover only one-third of the underground water supply.[349] In the meantime, some of the nation's fastest-growing counties—located just south of Denver—have attracted "[n]ew communities, homeowners, and other landowners . . . [who] have begun to depend heavily on this finite resource."[350] In light of unsustainable

342. *Id.* ("The Nation cannot afford repeated water crises. The social, economic, and environmental consequences of water supply crises are too severe.").
343. *Id.* at 14 (listing market-based approaches as a key tool for crisis prevention).
344. *Id.* ("Most irrigation delivery systems were built in the early 1900s and remain virtually unchanged today.").
345. James L. Wescoat, Jr. et al., *Water, Poverty, Equity, and Justice in Colorado: A Pragmatic Approach*, *in* JUSTICE AND NATURAL RESOURCES: CONCEPTS, STRATEGIES, AND APPLICATIONS 57, 59 (Kathryn M. Mutz et al. eds., 2002) (reviewing F. LEE BROWN & HELEN INGRAM, WATER AND POVERTY IN THE SOUTHWEST (1987)).
346. *Id.* at 60.
347. COLO. REV. STAT. § 37-90-137 (West 2003).
348. JUSTICE GREGORY J. HOBBS, JR., COLORADO FOUNDATION FOR WATER EDUCATION, CITIZEN'S GUIDE TO COLORADO WATER LAW 11 (2004).
349. *Id.* (describing the 6,7000 square-mile Denver Basin aquifers).
350. *Id.*

aquifer pumping by present users, regulators have begun to scramble to find surface water sources to satisfy users in the not-so-distant future.[351]

Other states have had similar experiences. Decades of virtually unrestricted groundwater extraction have taken their toll upon numerous aquifers. The 173,000 square-mile Ogallala High Plains aquifer underlies all or part of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming.[352] Beginning in the 1940s, significant rates of groundwater pumping have caused an average water-level decline of 11.9 feet, representing an average 6% reduction in the volume of water stored in the aquifer.[353] Although these declines may appear to be quite modest, they represent averages for the entire eight-state region and may mask critical changes in individual states or areas. In Texas, for example, water levels have declined an average of 34.5 feet, representing a 27% decrease in the volume of water stored in the aquifer.[354] Many warn that the current rate of pumping is unsustainable. As one commentator explains,

> The Ogallala once held 3 billion acre-feet of water, but High Plains farmers pumped more than a half-billion acre-feet between 1960 and 1990. As much as half of the remaining water is too deep in the aquifer to justify the costs of recovery or is of poor quality. As the water table has plunged, some High Plains farms have already returned to dryland farming, and conservation districts have undertaken massive water conservation programs.[355]

As a result, current farmers may be preventing their children from enjoying the same benefits of irrigation that they have enjoyed.

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351. *See, e.g.*, COLORADO GEOLOGICAL SURVEY, SPEC. PUBLICATION 53, GROUND WATER ATLAS OF COLORADO 87 (2003). In 1985, the Colorado legislature limited groundwater withdrawals from designated aquifers of the Denver Basin to 1% of "in-place water." *Id.* About a decade later, deep test wells drilled into the aquifer "resulted in specific yield values significantly lower than the values assumed in [the 1985 legislation]. This more recent set of data indicates that the quantity of recoverable water stored in the basin may be two-thirds what was previously thought." *Id.*

352. V.L. MCGUIRE ET AL., U.S. GEOLOGICAL SURVEY, CIRCULAR 1243, WATER IN STORAGE AND APPROACHES TO GROUND WATER MANAGEMENT, HIGH PLAINS AQUIFER 29, 32 (2000) (describing declines from predevelopment to 2000).

353. *Id.*

354. *Id.*; *see also* Press Release, U.S. Geological Survey, USGS Study Documents Water-Level Changes in High Plains Aquifer (Feb. 9, 2004) (citing water level storage changes over the past fifty years).

355. GLENNON, *supra* note 316, at 32. The U.S. Geological Survey observes that "[t]here are some areas within the High Plains where water is being withdrawn from the aquifer at rates greater than the aquifer is being replenished. In these areas, the aquifer will not be able to sustain withdrawals at current rates in future decades. These declines will have a significant impact on the agricultural economy in the region." U.S. Geological Survey, *supra* note 352 (quoting Dr. Robert Hirsch, USGS Associate Director for Water).

C. *The Historical Context: Separating the Law of Surface and Groundwater*

> [Legal classifications such as] "*[u]nderflow*," "*subterranean streams*," and "*percolating groundwater*," bear little, if any, relationship to geological realities. . . . From a hydrogeological perspective, . . . efforts to fit water into the law's categories by using these technical-sounding classifications give the enterprise a somewhat *daffy* air.
>
> Joseph L. Sax[356]

The relationship of scientific principles to water policy poses two opposing challenges for integrity. At times, lawmakers pay too little attention to science. This may be an innocent mistake, involving an erroneous application of scientific principles or data.[357] A few cases may be more insidious. For example, the current rallying cry that controversial environmental decisions must be consonant with "sound science" invites abuse. Undoubtedly, "sound" is in the eye of the beholder, and may reflect policy preferences as much as immutable laws of nature.

The opposite problem occurs when lawmakers rely overmuch upon science to determine legal policy.[358] In some cases, this excessive faith in science may stem from a failure to appreciate its limits and the uncertainty inherent in a particular scientific determination. As one commentator describes the zigs and zags of scientific uncertainty, "A series of scientific findings and nonscientific assumptions must be linked together to answer a larger policy question. . . . [T]he gaps in knowledge are not clumped at the beginning or end of the inquiry, but tend to weave in and out, or *zigzag*, with subquestions that science can answer."[359] In other cases, this excessive reliance upon science may be prompted by a lack of political courage. Legislators may hide behind purportedly unquestionable scientific truths to avoid the political consequences of a potentially unpopular decision. In this respect, "[p]ositive scientific knowledge is politically appealing" because "scientific findings inform the resolution of environmental problems in seemingly objective and respected ways."[360] In the case of both the naïve

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356. Joseph L. Sax, *We Don't Do Groundwater: A Morsel of California Legal History*, 6 U. DEN. WATER L. REV. 269, 272-73 (2003) (emphasis added).

357. A notorious example of this type of mistake is the 1920 allocation of the Colorado River among the states through which it flowed. Unfortunately, the negotiators divided a more voluminous river than nature actually supplied. *See generally* Eric L. Garner & Michelle Ouellette, *Future Shock? The Law of the Colorado River in the Twenty-first Century*, 27 ARIZ. ST. L.J. 469, 470 (1995).

358. *See generally* Wendy E. Wagner, *Congress, Science, and Environmental Policy*, 1999 U. ILL. L. REV. 181 (1999).

359. *Id.* at 191 (emphasis added) (concluding that "it is difficult to summarize the varied scientific uncertainties that arise in a policymaking exercise as simply the error around a mean").

360. *Id.* at 221.

and the fearful legislator, the resultant water policy is weakened. The cool, objective, and value-neutral language of science may in fact mask subjective, value-laden decisions. Thus, debatable policy determinations may hide behind a thin veneer of scientific authority.

Both problems—relying too little upon science, and disguising value choices as science—produce a bifurcated, non-integrated conceptual approach to water law.[361] The traditional separation of surface and groundwater serves as an example, demonstrating the very real importance of scientific integrity. Largely unimpeded by legal constraints, groundwater usage has increased dramatically in the United States.[362] By the late nineteenth century, oil supplanted human power, horsepower, and steam engines as the energy source for well-drilling.[363] Beginning during the New Deal, rural electrification projects permitted the extraction of groundwater by electric pumps.[364] Other technical advancements, including high-lift turbine pumps, center-pivot irrigation systems, and gear-driven pump heads made large-scale agricultural irrigation possible.[365] Overall, groundwater provides about 22% of the nation's freshwater needs, and over half of its population's drinking water requirements.[366] In at least four states—Florida, Kansas, Nebraska, and Mississippi—groundwater withdrawals exceed those of surface water.[367]

As a time-honored tradition, water law has long accorded separate treatment to surface water and groundwater. This dichotomy has been supported by various rationalizations, each surrounded by an impressive but misleading scientific aura, and each masking important social policy choices that in fact have little to do with science.

Initially, this legal separation of surface and groundwater was rationalized, at least in part, by the lack of scientific understanding of groundwater movement, and an inability to define the connection with surface water. Turning the traditional maxim on its head, this ignorance has in fact been an excuse for the law. Waiting for science to lead the way, the law of numerous states steadfastly refused to regulate groundwater, even as conflicts became apparent. Judges and legislators were loath to constrain groundwater usage, which they perceived as an essential aspect of land ownership. In 1850, for example, the Connecticut Supreme Court unapologetically rooted its laissez-faire approach in scientific ignorance:

> Water, whether moving or motionless *in the earth*, is not, in the eye of the law, distinct from the earth. The laws of its existence and

361. *See generally*, LEOPOLD, *supra* note 212, at 260-61 (noting the paradox of "science the sharpener of [man]'s] sword *versus* science the searchlight on his universe").
362. GLENNON, *supra* note 316, at 24-26.
363. *Id.*
364. *Id.* at 26.
365. *Id.*
366. *Id.* at 31 (citing 1995 data).
367. *Id.*

> progress, while there, are not uniform, and cannot be known or regulated. It rises to great heights, and moves collaterally, by influences beyond our apprehension. These influences are so secret, changeable and uncontroulable, we cannot subject them to the regulations of law, nor build upon them a system of rules, as has been done with streams upon the surface. Priority of enjoyment does not, in like cases, abridge the natural rights of adjoining proprietors.[368]

The Connecticut court concluded that existing wells had no legal right to the maintenance of present pumping levels as against subsequent wells that tapped into the same groundwater supply, even though the trial court had determined that the defendant's pumping caused the water level in plaintiff's well to fall below usable levels.[369] The court simply stated: "Now, although this effect is found to result from the defendant's acts, yet it is not found, *how* this is the result."[370] This approach is representative of the "English rule" (or "absolute ownership" doctrine), which "allows an overlying landowner to withdraw an unlimited amount of water, unconstrained (in its purest form) by injury to another landowner."[371] At least by the beginning of the twentieth century, this scientific-unknowability rationale for the nonregulation of groundwater had begun to lose its underlying justification. As the Supreme Court of Wisconsin observed, "Even in 1903 . . . the awe of mysterious, unknowable forces beneath the earth was fast becoming an outmoded basis for [the English] rule of law."[372] Nevertheless, the tradition of unregulated groundwater usage ran deep, and lawmakers persisted in asserting the rationale well into the twentieth century. In its modern incarnation, the rationale has been recast as a burden-of-proof rule in the face of scientific uncertainty, rather than unknowability. As such, plaintiffs bear a sometimes insurmountable burden of demonstrating the harm they will suffer as a result of unconstrained groundwater pumping by specific wells.[373]

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368. Roath v. Driscoll, 20 Conn. 533, 540 (1850); *see also* Haldeman v. Bruckhart, 45 Pa. 514, 519 (1863) (declining to regulate groundwater pumping on the basis that "[o]ne can hardly have rights upon another's land which are imperceptible, of which neither himself or that other can have any knowledge").

369. *Roath*, 20 Conn. at 539.

370. *Id.*

371. Dellapenna, *supra* note 242, § 7.02; *see* Wisconsin v. Michels Pipeline Constr., Inc., 217 N.W.2d 339, 344 (Wis. 1974) (describing the basis of the English rule of absolute ownership of percolating groundwater as "a feeling that the ways of underground water were too mysterious and unpredictable to allow the establishment of adequate and fair rules for regulation of competing rights to such water").

372. *Michels Pipeline Constr.*, 217 N.W.2d at 345 (overruling Huber v. Merkel, 94 N.W. 354 (Wis. 1903)); *see also* Sax, *supra* note 356, at 291. Professor Sax argues that at least by 1913, water experts "did not believe groundwater was too mysterious in its ways to be subject to legal control." *Id.* Rather, Professor Sax cites the legislative history of a California statute in support of the proposition that "the legislative reluctance [in 1913 California] to institute integrated management was fundamentally based on legal reservations, not technical or managerial ones." *Id.*

373. *See, e.g.*, *Huber*, 94 N.W. at 359 (establishing that there is no cause of action for interference with groundwater, even where the defendant's uncapped artesian wells flowed continuously and spilled excess water onto the ground); City of Fond du Lac v. Town of Empire, 77 N.W.2d 699, 702 (Wis. 1956) (citing *Huber* as controlling precedent in holding invalid a town ordinance requiring new well owners to prove there would be no adverse impact upon existing wells prior to drilling); Hartford Rayon

As hydrologists learned more about the interaction of surface water and groundwater, one might expect that legal regulation of groundwater would follow, accompanied by a rejection of the free-for-all promoted by the English rule. This occurred to some extent, with the increased prominence of the reasonable use and correlative rights doctrines. Under the former, groundwater use was restricted to so-called "reasonable" uses only, often limited to application on the land immediately overlying the aquifer. This restriction was relatively minor, however, still tolerating a considerable degree of interference with other water users. Under the latter doctrine of correlative rights, even reasonable groundwater uses were restricted further to the user's fair share of the underlying aquifer, often determined on the basis of the amount of acreage owned. Although these two doctrines represent an increased judicial willingness to subject groundwater to the regulation of law, they generally fall short of a comprehensive scheme of groundwater management.

A second quasi-scientific rationalization limiting the regulation of groundwater purports to establish a geologic typology. Whereas the scientific unknowability theory asked too little of science, the geologic typology asked too much, purporting to use science to draw precise, legal lines between surface water and groundwater, where no such lines existed in reality. Under this approach, state law may acknowledge that surface water is connected to only a limited range of groundwater sources—those that flow in defined underground channels. All other groundwater, however, is assumed to have no legally-cognizable impact upon other water users. To implement this approach, the states have used a bewildering array of scientific-sounding terminology. The first type of groundwater is called, variously, "subterranean water,"[374] "underflow,"[375] "subflow,"[376] and "underground

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Corp. v. Cromwell Water Co., 10 A.2d 587, 588 (Conn. 1940) (refusing to enjoin the defendant from sinking a well 95-180 feet from a brook to pump 150,000 gallons per day based upon the mere possibility of injury to surface users, and refusing to assume an injury "in view of the difficulty and uncertainty attending an attempt to determine the course and amount of water percolating beneath the surface"). Even when courts have found evidence of injury sufficient to constrain groundwater pumping, litigants have continued to assert the scientific uncertainty rationale. *See, e.g.*, Colorado's Exceptions to the Third Report of the Special Master, Kansas v. Colorado, No. 105, 2000 WL 1838225, at *37 (Nov. 24, 2000) (arguing on behalf of Colorado that the adverse impact of Colorado well-pumping upon flows of the Arkansas River at the Kansas state line was not generally known or understood until at least 1968, and that "determining the impact of such pumping on usable Stateline flows after 1968 was extremely difficult").

374. California law, for example, extends its surface water licensing regime to "subterranean streams flowing through known and definite channels." CAL. WATER CODE § 1200 (West 1971).

375. *See, e.g.*, Los Angeles v. Pomeroy, 57 P. 585, 597 (1899).

376. Arizona's doctrine of prior appropriation, for example, applies to "waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, flood, waste or surplus water, and of lakes, ponds and springs on the surface." ARIZ. REV. STAT. § 45-141(A) (West 2003). The state supreme court approved the trial court's interpretation that the statute applied to "subflow," which the court defined as the "saturated floodplain Holocene alluvium." *In re* Gila River System, 9 P.3d 1069, 1073 (Ariz. 2000) (*Gila River III*); *see also* WELLS A. HUTCHINS, THE CALIFORNIA LAW OF WATER RIGHTS 422 (1956) (defining terms "underflow" and "subflow").

channels,"[377] whereas the second type of groundwater is often referred to as "percolating groundwater."[378] The first kind has been subdivided further into "independent known," "dependent known," and "unknown" subterranean water courses.[379] Of all the states, Colorado uses perhaps the most noteworthy terminology. Logically enough, the state distinguishes between water that is tributary to surface water supplies and therefore subject to the appropriation system, and water that is nontributary and allocated according to a modified English rule of capture.[380] But in an interesting turn of phrase, the Colorado legislature created a third class of groundwater—not nontributary—which is defined as groundwater in a specified aquifer, "the withdrawal of which will . . . deplete the flow of a natural stream . . . at an annual rate of greater than one-tenth of one percent of the annual rate of withdrawal."[381] Groundwater within this third typology is subject to a level of regulation less rigorous than that applied to surface streams, but more rigorous than that applied to nontributary groundwater.

Several important consequences have followed from the longstanding failure to recognize the integrity and connectedness of surface and underground water. On perhaps the most superficial level, the simultaneous evolution of two distinct bodies of law—one for surface water and one for groundwater—has resulted in two confusingly overlapping sets of vocabulary. For example, the English rule of groundwater is essentially a rule of capture that allows considerable injury to one's neighbor without legal liability, whereas the English rule of surface water (also called the "natural flow theory") is essentially a rule of nonuse that permits very little interference with the natural water supply. Likewise, both surface and groundwater law recognize a reasonable use doctrine, but the two doctrines are not the same. Rather, it is the "correlative rights" doctrine of groundwater that most closely resembles the reasonable use doctrine of surface water. In fact, the former has been called "reasonable use on its side."[382] Moreover, even in so-called "prior appropriation states" of the West, long-established senior surface water users may be curtailed in times of shortage, while certain neighboring junior wells may be allowed to continue pumping from underground aquifers. Ironically, the very states that have emphatically rejected riparianism may still follow a modified version of the doctrine with respect to their groundwater resources.

As a second consequence of the scientifically-rationalized divide between surface and groundwater, judges have been asked to perform virtually impossible feats. Arizona, for example, adhered to a bifurcated system well

377. ARIZ. REV. STAT. § 45-141(A).
378. *See, e.g., Michels Pipeline Constr.*, 217 N.W.2d at 345.
379. *See, e.g., In re* Gila River System, 857 P.2d 1236, 1243-44 (Ariz. 1993) (*Gila River II*) (discussing the classification scheme in 2 CLESSON S. KINNEY, THE LAW OF IRRIGATION AND WATER RIGHTS § 1161 (2d ed. 1912)).
380. *See* COLO. REV. STAT. §§ 37-90-101 to -143 (West 2000).
381. § 37-90-103 (10.7).
382. JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 941 (3d ed. 2000).

into the 1980s, under which surface rights were allocated under the prior appropriation doctrine, and groundwater rights were awarded to the overlying landowner, limited only by the relatively lenient doctrine of reasonable use.[383] As the legislature provided,

> The waters of all sources, flowing in streams, canyons, ravines or other natural channels, or in definite underground channels, whether perennial or intermittent, flood, waste or surplus water, and of lakes, ponds and springs on the surface, belong to the public and are subject to appropriation and beneficial use as provided in this chapter.[384]

In the face of this legislative mandate, an Arizona trial court struggled mightily throughout a five-day trial to answer an essentially unanswerable question: "Is ground water included within the phrase 'river system and source' as it is used in [Arizona statutes], and if so, to what extent is it included?"[385] The court came up with an impressively scientific-sounding response, extending the priority system to underground water if it constituted subflow and "if the volume of stream depletion would reach 50% or more of the total volume pumped during . . . [a] period of withdrawal . . . equivalent to 90 days of continuous pumping."[386] The court was immediately rebuked for its labors. A group of groundwater users complained that "the 50 % / 90 day rule is too broad, because it includes wells that pump underground water not appropriable under [Arizona law]," whereas a competing group of water users contended that "the 50 % / 90 [day] rule is too narrow, because it fails to include all wells that pump appropriable subflow."[387] The Arizona Supreme Court weighed in with the first group, remanding the matter to the trial court to once again "determine the criteria for separating appropriable subflow from percolating groundwater" in a manner that would not sweep all tributary groundwater into the appropriation system.[388] The court acknowledged that its focus upon the concept of

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383. As the Arizona Supreme Court explained,

> This bifurcated system of water rights was not unique to Arizona. It was typical of western states until around the turn of the twentieth century. At that time, scientific investigation was revealing that most underground water is hydraulically connected to surface water. As scientific knowledge progressed, most states revised their water laws to provide for unitary management of hydraulically connected underground and surface water. Arizona, however, did not, and continues to adhere to a bifurcated system of water rights, with compelling implications for general stream adjudications.

Gila River II, 857 P.2d at 1240; *see also* John D. Leshy & James Belanger, *Arizona Law Where Ground and Surface Water Meet*, 20 ARIZ. ST. L.J. 657, 657 (1988).

384. ARIZ. REV. STAT. ANN. § 45-141(A) (West 2003).

385. *See Gila River II*, 857 P.2d at 1239.

386. *See Gila River III*, 9 P.3d at 1074, *cert. denied sub nom* Phelps Dodge Corp. v. United States, 533 U.S. 941 (2001); *Gila River II*, 857 P.2d at 1239.

387. *Gila River II*, 857 P.2d at 1242.

388. *Id.* at 1248; *see also id.* at 1245 (criticizing the 50 % / 90 day rule as "broad enough to include all underground water hydraulically connected to a surface stream").

subflow found no support in science or hydrology, but nevertheless chose to adhere to what it described as seventy years of judicial precedent.[389]

The seemingly objective, technical language of hydrology may in fact mask important social policy choices. The failure to legally integrate all water uses ultimately creates human winners and losers. In many instances, groundwater users obtain an advantage over surface water users. As the Gila River saga illustrates, courts and legislatures may use the language of science to describe decisions that are purely practical and political in nature. The *Gila River* court freely acknowledged its bias against placing overly onerous restrictions upon groundwater use, even at the expense of surface water users.[390] Similarly, the early courts' professed ignorance of the mechanics of groundwater movement allowed new well pumpers to extract groundwater with impunity, even to the detriment of existing surface water users who had supposedly secured legal protection for their water rights against subsequent users. As a result of this judicial reluctance to extend the rule of law into the murky realm of groundwater—particularly in the context of predicting its relationship with surface water—existing surface water users were forced to bear the virtually impossible burden of proving a causal relationship between groundwater pumping and reduced surface water supplies in a particular stream or lake.

As a final consequence, the legal separation of surface and groundwater has important ramifications for environmental policy. As aquifers experience unsustainable rates of decline, environmental consequences follow.

D. The Opportunity: Sharing the Apalachicola-Chattahoochee-Flint River System

The Apalachicola-Chattahoochee-Flint dispute presents yet a third opportunity to advance the integrity of water law, this time on a far-reaching, interstate scale. At least three considerations are particularly relevant: the integration of surface and ground water, the maintenance of ecological integrity, and the protection of social integrity. Depending upon the forum in which the ACF controversy is resolved,[391] these considerations may invite

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389. The court stated:

> The boundary between surface water and groundwater is not at all clear. Most surface streams not only flow above the ground but also have "subflow." As the parties correctly point out, "subflow" is not a scientific, hydrological term. But for almost seventy years, this court has defined "subflow," for legal purposes, as "those waters which slowly find their way through the sand and gravel constituting the bed of the stream, or the lands under or immediately adjacent to the stream, and are themselves a part of the surface stream."

Gila River III, 9 P.3d at 1073. On remand, the lower court narrowed its definition of regulated subflow to include only the saturated floodplain of the Holocene alluvium. *Id.* at 1080.

390. *Id.* at 1073-74 ("Under Arizona's bifurcated system . . . , the concept of subflow serves to protect appropriable surface water rights against interference caused by the pumping of groundwater. Because water is a very precious and limited commodity in Arizona, much turns on how 'subflow' is determined."). The court expressed its desire to refrain from "improperly shift[ing] the burden to the groundwater user to show that its well is not pumping subflow." *Id.* at 1074.

391. Robert H. Abrams, *Compacts and Other Interstate Allocative Devices: The ACF as a Case in*

the attention of the states themselves,[392] the Supreme Court,[393] or Congress.[394]

First, from the perspective of legal integrity, the usage of groundwater must figure prominently in any allocation of water resources among the three states. The ACF Compact violates this initial premise, seeking only "to establish and modify an allocation formula for apportioning the *surface* waters of the ACF Basin among the states of Alabama, Florida and Georgia."[395] This limited aspiration is inconsistent with hydrologic reality and hearkens back to the time when groundwater was deemed a mysterious and wily resource incapable of legal control.[396] As groundwater modeling techniques become increasingly sophisticated, albeit still imperfect, the exemption of groundwater from the ACF Compact makes sense only in the context of political expediency. By definition, solving the easier part of the problem now—leaving the more intractable matter of groundwater allocation for later—is an approach lacking in both hydrologic and temporal integrity.

From the perspective of social integrity, the fairness and equity of any *interstate* apportionment may be suspect if not supported by good-faith *intrastate* efforts to manage consumption of groundwater, as well as surface supplies. Just as the national accounting scandals have spurred a renewed societal appreciation for an honestly-balanced budget,[397] so also it would seem disingenuous for a state to seek more water from its neighbors without also attempting to balance its internal water budget.[398] In the context of the ACF Basin, the acts and omissions of Georgia make it an easy target for criticism. With respect to omissions, Georgia has steadfastly failed to enact any legislation to meaningfully regulate the use of groundwater.[399] As one commentator explained,

> In 1998, [Georgia] legislation purported to regulate agricultural wells that produced more than 100,000 gallons per day, but it had enormous loopholes. The law grandfathered all existing users, granted permits in perpetuity, and regulated only the pumping rate

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Point, *in* AMERICAN BAR ASS'N, EASTERN WATER RESOURCES: LAW, POLICY, AND TECHNOLOGY 191 (1994) (containing documents from a conference in Hollywood, Florida, sponsored by the Section of Environment, Energy, and Resources).

392. The states may enter into an interstate compact, subject to ratification by Congress. U.S. CONST. art. I, § 10.

393. The U.S. Supreme Court has original jurisdiction over lawsuits between two or more states. U.S. CONST. art. III.

394. Pursuant to the Commerce Clause, Congress can apportion water among the states. *See, e.g.*, Boulder Canyon Project Act of 1928, 43 U.S.C. § 617 (1994); Truckee and Carson River Apportionment, Pub. L. No. 101-618, 104 Stat. 3289 (1990).

395. Pub. L. No. 105-104, 111 Stat. 2222, art. VI(G)(12) (1992) (emphasis added).

396. *See supra* note 368 and accompanying text.

397. *See supra* notes 1-3 and accompanying text.

398. *See* Idaho v. Oregon, 462 U.S. 1017, 1025 (1983) (establishing the state's duty to conserve future water use as a prerequisite to claiming interstate water).

399. For a fascinating account of the expansion of irrigation in a naturally wet state, see GLENNON, *supra* note 316, at 188-90.

> and the maximum number of acres, rather than a specific volume of water per year. Between 1970 and 1990, groundwater withdrawals in the ACF basin increased by 240 percent. In 1995, Georgia farmers used 350 [million gallons per day] of ACF basin water, most of it groundwater. Agricultural water use in Georgia is expected to increase to 569 [million gallons per day] by 2050.[400]

Georgia has also committed sins of omission with respect to its sister states. As ACF settlement negotiations lagged and as Atlanta continued to grow, Georgia attempted to negotiate a side-agreement with an alternative water supplier—the Army Corps of Engineers. Florida and Alabama claimed that they had been improperly excluded from such allegedly secret negotiations that were intimately related to the very water supply the ACF Compact sought to allocate, and cited Georgia's failure to include them in such talks as one factor leading to the collapse of the broader ACF negotiations.[401] The foregoing critique of Georgia is simply illustrative of the kinds of temptations states face in the search for a secure water supply. Georgia's water-grabbing strategies are undoubtedly followed in numerous other states; in the context of the ACF allocation, any reforms demanded of Georgia must be just as stringently imposed against Alabama and Florida.[402]

An additional question of social integrity arises from the downstream perspective of Florida's Apalachicola Bay. There, protection of the extraordinary aquatic ecosystem of Apalachicola will also protect an oystering village that has sustained its way of life for at least four generations.[403] Inadequate freshwater supplies from the Apalachicola River, as well as other factors, have contributed to the decline of the oystery. As one observer wryly noted, "Fewer than 500 fishermen remain [in Apalachicola Bay]. Many oystermen have begun working at a new jail nearby. The new prison jobs offer steady hours and decent pay, but the town of Apalachicola's way of life may change forever."[404] Honoring ecological and social integrity, in the ACF Basin and beyond, would require a reversal of the traditional wis-

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400. *Id.* at 189. According to Professor Glennon, even after Georgia regulators stopped issuing new well permits following droughts in 1998 and 1999, "farmers ignored the law and installed hundreds of new wells and irrigation systems." *Id.*; *see also* Joseph W. Dellapenna, *The Law of Water Allocation in the Southeastern States at the Opening of the Twenty-First Century*, 25 U. ARK. LITTLE ROCK L. REV. 9, 65 (2002) [hereinafter *The Law of Water Allocation*]; Abrams, *supra* note 391, at 206 (noting that Georgia law requires surface or ground water withdrawals exceeding 100,000 gallons per day to obtain a permit, but exempts agricultural use from this requirement).

401. *See* Stacy Shelton, *Georgia, Florida Try to Avoid Court Fight Over Water*, ATLANTA J.–CONST., July 26, 2004, at E1, *available at* 2004 WLNR 6345068 (describing a pending "settlement agreement signed [in 2003] that will allow metro Atlanta to take enough water out of Lake Lanier for 10 to 20 years' worth of new subdivisions, office complexes and shopping malls").

402. Florida water regulation has also been subject to criticism. *See The Law of Water Allocation*, *supra* note 400, at 61 (asserting that "one empirical study of the Florida permit system found that at least one water district, in order to avoid conflict, routinely granted irrigators' requests for more water than they actually needed").

403. *See* GLENNON, *supra* note 316, at 186.

404. *Id.*

dom that projected urban growth must be supported at any cost and often at the expense of ecosystems. In response to the Sierra Club's 1998 citation of Atlanta has the urban area most threatened by sprawl,[405] for example, an editorial in the *Atlanta Constitution* vigorously defended the city's policies.[406] The writer's self-proclaimed stance was "*pro-choice* with respect to urban development," concluding that "[p]eople should have the freedom to live and work where they like."[407] As a corollary to this view, city managers must find sufficient water supply to meet the ever-increasing market demand.

At least in theory, the ACF Compact states have asserted the willingness to expand the scope of values deserving of protection. Article VII of the Compact sets forth the goal of "equitably apportioning the surface waters of the ACF Basin among the states while protecting the water quality, ecology and biodiversity of the ACF, as provided in the Clean Water Act . . . the Endangered Species Act . . . and other applicable federal laws."[408] Although the states may have agreed to this provision, they do not agree in practice. Although Georgia was willing to assure "minimum flows" of the rivers, Florida insisted upon a "natural flow" regime designed to protect the ecological integrity of oysters and other fishery resources—as well as the fishing villages—of the Apalachicola Bay.[409] However, the advancement of ecosystem and social integrity does not require a blind acceptance of all water demands that happen to be cloaked in the noble language of protecting vanishing ecosystems and lifestyle. Skilled advocates no doubt recognize the felicitous alignment of interest between maintaining instream flows now, and the protection of growth potential for the future. Nevertheless, the implicit assumption that water should inevitably flow uphill toward money (and votes) must be rejected as a short term, unsustainable strategy devoid of integrity.

V. CONCLUSION—ETHICAL INTEGRITY AND BOUNDARIES

> *Holism.* The theory that certain wholes are greater than the sum of their parts.
>
> Oxford English Dictionary[410]

405. *See supra* note 324 and accompanying text.
406. Wendell Cox, *op-ed, Portland Not Sprawl Free,* ATLANTA J.-CONST., June 23, 1999, *available at* http://www.demographia.com/db-atlconst.htm (last visited Aug. 28, 2004).
407. Wendell Cox, *Demographia: Pro-Choice with Respect to Urban Development, at* http://www.demographia.com/dm-prochoice.htm (last visited Mar. 22, 2005) (emphasis added).
408. Pub. L. No. 105-104, 111 Stat. 2222-23, art. VII(a) (1997) (citations omitted).
409. *See* J.B. Ruhl, *Equitable Apportionment of Ecosystem Services: New Water Law for a New Water Age,* 19 J. LAND USE & ENVTL. L. 47, 51-52 (2003).
410. CONCISE OXFORD ENGLISH DICTIONARY (rev. 10th ed. 2002).

Any legal system of integrity must find its roots in pragmatic reality, as well as in idealistic possibility. Water law has accommodated one reality quite successfully: the ever-growing demand for water. But it has ignored another reality: the finite nature of the earth's water supply. Although the disconnect between supply and demand has been addressed in the past through marvelous engineering works that move water to the time and place of its need, an increasing demand cannot be satisfied indefinitely. Water supply is a zero-sum game that is played out daily at the watershed, state, and interstate levels. Every drop acquired by one user is a drop taken away from another user, either now or in the foreseeable future.

The core challenge for water policy makers may be to draw boundary lines with integrity. Some lines will be physical, involving the mapping of aquifers, the identification of stream-aquifer interfaces, or the delineation of watersheds. Other boundaries will be philosophical, carving out the respective realms of federal and state law, human and ecosystem demands, present and future needs, or water allocation and pollution control. In all cases, boundary lines will reflect the tension between water as a commodity and water as an asset that somehow belongs to the biological and human communities in which it arises. In many cases, boundary lines should be drawn generously and broadly, freely providing water to promote the well-being of states and the nation as a whole. In other cases, boundary lines should be drawn stingily and narrowly, encircling special spheres to be protected and sustained as unique enclaves of cultural or biological wealth. In most cases, the line should be drawn somewhere in between, a task that will no doubt challenge and frustrate policymakers for generations to come.

This Article has illustrated some of the consequences of hydrologic boundaries—both physical and philosophical—recognized by water law. Often, there is a direct relationship between hydrologic integrity and the size of hydrologic units. That is, integrity may suffer when water policy gives legal significance to unnecessarily small, compartmentalized units. Recall groundwater users, who historically avoided regulatory limits by advocating for separate treatment of surface and ground water sources, or water polluters who sought to avoid federal regulation by claiming that federal intervention would infringe upon state allocation authority.[411] Similarly, most jurisdictions distinguish between present and future users of groundwater, allowing the former to deplete aquifers at unsustainable rates, to the detriment of the latter.[412]

Conversely, in a few cases worthy of greater attention, integrity can be promoted by drawing boundaries that encompass physical or philosophical terrain of relatively modest proportions. Transbasin diversions—such as those contemplated from North to South Florida—may destroy ecosystem integrity unless the biological needs of the basins of origin are protected.[413]

411. *See supra* Part IV.C.
412. *See supra* Part IV.B.2.
413. *See supra* Part III.B.

Interstate water allocations—such as the Apalachicola-Chattahoochee-Flint dispute—may impair social integrity unless decisionmakers find a way to protect lifestyles as diverse as urban dwellers and oyster fishers.[414] And in perhaps the boldest example of all, the integrity of aquatic ecosystems—such as the Everglades—may be destroyed unless courts reject the staggeringly sweeping argument that all of the navigable waters of the United States are fungible components of the same unitary water body.[415]

These are daunting challenges for those who formulate water policy. But these issues are not unique to water, and other contexts may provide useful comparisons. The growing field of environmental ethics, for example, may provide some insights. As one commentator has reported,

> [One] very interesting and useful investigation looked to see if environmental ethics had influenced or motivated key decisionmakers—legislators and judges—in shaping our laws. In other words, [the investigation] was looking to see if environmental ethics had entered the legal system from the top down. As [the study] reported, there was very little sign that it had. In contrast, my inquiry focuses on how ideas from environmental philosophy may start to inform thinking about environmental issues from the ground up, among the public. This is a slow process at best, but one that is important to a fully informed debate about our future.[416]

The commentator suggested that the concept of sustainability might serve as a "stepping stone" to guide environmental ethics in a new direction, away from the constraints imposed by traditional utilitarian ethics.[417]

Moving farther afield from water law, the national debate over free trade has also explored the tension between economic expansion and the sustainability of the middle-class workforce in the United States.[418] Even more broadly, the very question of how we define ourselves as Americans raises a tension between traditional assimilative melting-pot images and the sustainability of a diverse range of cultures and backgrounds.[419] If we draw the philosophical line around "Americans" too narrowly, we risk emphasizing our differences and invite discrimination by one group against another. But if we draw the line too broadly, we lose our diversity and all that makes our nation unique and special.

Even popular culture has been infused by notions of sustainability and social integrity. In announcing its commitment to encourage "coffee sus-

414. *See supra* Part IV.A.
415. *See supra* Part II.D.
416. Alyson C. Flournoy, *Building an Environmental Ethic from the Ground Up*, 37 U.C. DAVIS L. REV. 53, 67 (2003).
417. *Id.*
418. *See* Bob Herbert, *Op-Ed: Dark Side of Free Trade*, N.Y. TIMES, Feb. 20, 2004, at A6.
419. *See, e.g.*, Helen Russon, *Diversity Is Here to Stay: How Do We Make It Work for Everyone?*, ORE. ST. B. BULL., Dec. 1994, at 9.

tainability and environmental conservation," the popular coffee company Starbucks has used "Commitment to Origins" as its trademark program to protect the environment and economies of coffee-producing countries.[420] Taken together, these diverse fields of water law, business, international trade, and environmental philosophy offer a wide range of opportunities to advance the notions of integrity and sustainability—if only we can draw the boundary lines correctly. Perhaps we should contemplate these opportunities while enjoying a cup of sustainably-grown, organic coffee.

420. *See Coffee Sourcing in Origin Countries, at* http://starbucks.co.uk/en-GB/_Social+Responsibility/Commitment+to+Origins.htm (last visited Sept. 2, 2004).