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Article

*3 STEINBECK'S HOLISM: SCIENCE, LITERATURE, AND ENVIRONMENTAL LAW

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Advances in science, resource economics, global trade, and information exchange challenge environmental policymaking as never before. Only a few decades ago, an environmental ethic based on human stewardship and the "balance of nature" provided a lodestar toward which much environmental law aimed. Today's science increasingly questions these norms, leaving some experts to search for environmental objectives in science only. But because science does not endorse a normative social goal, its vision will always be incomplete.

One hundred years after his birth, John Steinbeck--the celebrated writer and amateur biologist--can enlighten today's ecological struggles. Steinbeck was deeply influenced by ecological principles and developed a holistic methodology in his writing to describe and evaluate the relationships among humans, social institutions, and the non-human world. He appropriated values from both the natural sciences and the humanities to inform his methods. From the sciences, he borrowed the concepts of connection and complexity. From the humanities, he borrowed the ethic of compassion. Steinbeck's holism holds promise for today's environmental policymakers because it bridges the gap between what some might call laws of the head and laws of the heart. In doing so, his method illuminates such issues as wetlands mitigation, risk assessment, and even statutory interpretation.

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***4** I. Introduction

[S]cience is taking our ideas to a new stage, where the separations between the organic and the machine and between the cosmos and the Earth . . . are disintegrating.

-- Daniel B. Botkin, Discordant Harmonies[FN1] It is advisable to look from the tide pool to the stars and then back to the tide pool again.

--John Steinbeck, The Log from the Sea of Cortez [FN2]

At Stanford University's Hopkins Marine Station on Monterey Bay, biologists have been counting turban snails. The bay and its tide pools have warmed over the years, and scientists are studying populations of snails, crabs, slugs, and other creatures to understand ***5** the effects of global warming. [FN3] The changing reproductive lives of these invertebrates may influence national and international environmental law, including implementation of the Kyoto Protocol on climate change. [FN4] Over fifty years ago in his novel Cannery Row, John Steinbeck, who once studied at the Hopkins Marine Station, [FN5] introduced Monterey's "tide-pool Johnnie[s]" to mainstream America. [FN6] His artistic purpose in 1945 resembles a scientific goal today: to show that the lives of even the most inconspicuous individuals matter, and that those lives are intimately connected to our own.

Today, advances in science, resource economics, global trade, and information exchange challenge environmental policymaking as never before. Increasingly, scientists have urged humans to see themselves as intricately connected to nature and as having an important role as restorers and managers of nature, rather than passive observers. [FN7] The Monterey Aquarium's sea otter recovery program is putting humans' restorative role into practice. To rebuild sea otter populations, scientists have imported otters from Alaska. While the program encourages a diverse and healthy species population and might be the only solution to the sea otters' decline, is it "natural" or justified that otter populations be nurtured so? The natural and social sciences have yet to provide all the answers.

Scientists also tell us that even the smallest changes to ecosystems can send the dominoes tumbling and lead to new dynamic ***6** cycles in the natural world. [FN8] A large gray rock juts out of the slapping tides at Hopkins Marine Station. When Steinbeck was a young man, that rock was barren above middle tide; today it is mottled with green turf. [FN9] Scientists debate whether such vegetation is a product of nature's ineluctable transformation or a

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symptom of "unnatural" anthropogenic climate change. [FN10] As long as we don't know, what action should we take?

Science ultimately cannot answer many of the questions it poses. Given human connectedness with other elements of nature, it is fruitless to speak of what is "natural" and what is not; we may never plot the boundary between these ideas. The complexity and unpredictability of ecosystems creates blind spots in environmental policy-making. We therefore must rely on another discipline to illuminate environmentalism's most pressing problems and to provide solutions. This complementary tradition resides in the humanities, and especially in literature. Literature can provide policymakers with the moral direction to identify environmental objectives and elicit the sense of urgency to fulfill them. Indeed, legal scholars already have a tradition of seeking insight in literature, from the works of Shakespeare and Dickens to the poetry of the moonlighting insurance lawyer, Wallace Stevens. [FN11] Literature may or may not provide answers to our environmental conundrums, but it may provide instruction to reframe the issues and perhaps to guide us toward new solutions.

Steinbeck never wrote directly about the legal system, unless you count the complaints about divorce law that he voiced in his private letters. [FN12] But the way he attempted to fuse science and ethics ***7** in his art provides important lessons for today's environmental policy experts. Steinbeck imbued his work with a love and understanding of the natural sciences, [FN13] gained in part from working short stints as a chemist in a sugar refinery while a student at Hopkins. [FN14] Later, his close friendship with biologist Ed Ricketts led to a serious hobby in marine biology. [FN15] Indeed, Steinbeck is one of only a few American fiction writers (Edgar Allen Poe was another) to have authored a serious work of biological science, the Sea of Cortez. [FN16]

In spite of his scientific knowledge, however, Steinbeck's contributions to ecological understanding have only recently gained attention among literature scholars, [FN17] and they have yet to break into legal or policy analysis. As we mark his centenary, it is time to give Steinbeck the attention he deserves. Steinbeck developed a view of intellectual holism that can help environmentalists better integrate science and ethics into their practice. Through holistic thinking, he was able to see global environment, local environment, human community, and even the coastal tide pool as objects of scientific and artistic study. Specifically, Steinbeck developed three concepts with the potential to enlighten environmental decision-making: connection, complexity, and compassion. The first two derive from his study of science and are today finding fresh support in environmental studies. The last follows from his emphasis on aesthetics and humanism.

Connection and complexity are common themes that run through modern science. We now know that all species, humans included, are subject to the same biological and physical laws. ***8** These laws are not yet fully understood by humans and dictate events that we still cannot predict. But while these laws describe nature, they do not provide answers to our questions about how to manage our rapidly changing environment.

Thus, the concepts of connection and complexity alone cannot guide appropriate action. What keeps us humans grounded, what reminds us of what human beings are, involves, as Steinbeck often suggested, the ballast of compassion. We need compassion to direct us toward collective survival. Although sometimes ignored or derided by rationalists, the ethic of compassion, of human love and humility, is just as essential as empiricism is to shaping environmental law, and to guiding our interactions with the natural world.

In this article, I argue that science--with its concepts of connection and complexity--and literature--with its principle of compassion--must both guide the design of environmental law. All of these elements are found in the philosophy of environmental holism, and specifically in the literature of John Steinbeck. The article contains five parts after the Introduction. Part II introduces Steinbeck's general theory of holism and connects it to ecology and environmental policy. Part III introduces his scientific concepts of connection and complexity, linking them to unanswered questions in modern ecology and mathematics. Part IV suggests that Steinbeck's faith in human compassion, a distinctly literary concept, offers a tool that can help answer normative questions that science cannot, thus providing necessary guidance to environmental policy. Part V illustrates the potential utility of holistic thinking in legal judgment by contrasting two well-known cases involving wetlands protection: United States v. Riverside Bayview Homes, Inc. [FN18] and Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers. [FN19] Part VI concludes by reemphasizing that any approach to environmental regulation must include both the rational and the emotional sides of the human intellect.

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II. In Search of Holism

The principle of holism, a mainstay of ecological science, says that a part is understandable only in relation to the whole, and that one must understand all parts of an ecosystem--predators and prey, land, water and air, habitats and external forces--to comprehend ***9** any individual part. [FN20] The field of environmental studies in extending the teachings of holism to political decision-making must include not only the natural and social sciences, but also the humanities. For this reason, environmental law survey courses often supplement discussions of economics and natural science with discourses on ethics, religion, and aesthetics. [FN21] Anyone who aspires to learn the whole of environmental law must commit to knowing something about each constituent discipline.

Because it requires such comprehensive knowledge, holism is difficult to sustain when making policy. Often one side of the balance, science or humanities, takes priority. As a consequence, in the 1970s such laws as the National Environmental Policy Act, the Clean Water Act, and the Endangered Species Act plainly put folk-song philosophy ahead of rational scientific goals. [FN22] Now the balance seems to have shifted in favor of hard science. For many environmentalists, an impressive body of mathematical and scientific thought is beginning to shape an agenda that presents science as the primary, or perhaps the only, compass for environmental decision making. Specifically, functional ecologists of the "ecosystem services" camp are attempting to measure ecosystems in terms of the services they provide to the human community. [FN23] Armed with field guides and laptop computers, they believe they can beat anti-environmentalists using their own economics-based analysis. While the study of ecosystem services strengthens the case for some types of environmental initiatives, including water purification and flood control, [FN24] its independence from ethics makes it a poor tool for confronting environmental policy's normative problems, such as distributional fairness concerns and the need to protect future generations.

The ethical underpinnings of environmentalism have also been ***10** challenged by the "New Ecology" movement, which has rejected such fundamental concepts as an "untouched" wilderness and a "balance of nature." [FN25] But this movement, in replacing the old notions with a dynamic model that questions the very concepts of normative ethics and infinitely sustainable ecosystems, may have gone too far, leaving us with no guiding principles at all. [FN26] If the romantic ideal of a pristine and self-regulating nature never existed, how can we continue to follow an ethic based on this view? English professors may still swoon over Emerson's "Over-Soul," [FN27] but the new generation of environmental lawyers does not.

Yet, it is a mistake to peel the humanities strand from environmentalism's double helix. It is when science erodes the foundations of normative beliefs like the "balance of nature" [FN28] that we should look to philosophy and art to give shape to the world. This is why environmental holism should guide us today.

Steinbeck instinctively believed in the force of literature. He was adept at combining the lessons of science and art in his writing; in search of a comprehensive understanding of his world and its inhabitants, he consorted with biology, physics, philosophy, economics, art, music, history, and mythology. [FN29] His method of processing and communicating his research was just as eclectic. While parodies of Hemingway's style are common enough, one can hardly imagine a full imitation of Steinbeck's style. His voice was too varied--he wrote short stories, epic novels, plays, screenplays, ***11** essays, field studies, journalistic reports, travel logs, tragedies, comedies, satires, melodramas, and even poetry.

Steinbeck wanted to explore everything at the same time: science, history, and morality. His drive reflects not just intellectual restlessness, but his belief that an essential, comprehensive understanding of the world requires a comprehensive methodology. In his enterprise, Steinbeck is not unlike other intellectuals of his day--John Dewey and John Maynard Keynes among them--who struggled to build practical theories of human behavior capable of adapting to historical and scientific trends. But Steinbeck's holism is unique in its emphasis on ecological science and in its depth of emotional understanding. Parts III and IV examine in detail Steinbeck's synthesis of scientific plenitude and literary imagination, guided by his famous dictum that "ecology has a synonym which is ALL." [FN30]

III. Scientific Imagination

"Life does not go year to year but by jumps." [FN31]

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Connection and complexity are two major scientific concepts that have taken root among contemporary theorists, particularly ecologists. Steinbeck's holism, as expressed in his fiction, included them. But his notion of holism also recognized, as we should today, that these scientific insights are not sufficient to prescribe the proper relationship between humans and their environment. This Part examines the role of connection and complexity in Steinbeck's holism. The following Part IV fills in the conceptual holes left by science with the insights of literature.

A. Pools of Connection

The connection thesis describes the interpenetrating relationship between the human world and the non-human world. In many ways, the history of science represents the narrowing gap between these two domains, from Darwin's theory of a humanity descended from apes to Freud's speculations on an animalistic, instinct-driven subconscious. Recognizing the physical and biological links between ***12** humans and non-humans challenges traditional environmental ethics because environmentalism's central ideal, a "natural world" independent of human beings, is shown to be a meaningless construct. Steinbeck often examined this contradiction in his fiction.

1. Connection and Steinbeck.

In the early pages of Cannery Row, Steinbeck introduces a peninsular tide pool on Monterey Bay:

> It is a fabulous place. . . . Crabs rush from frond to frond of the waving algae. Starfish squat over mussels and limpets, attach their million little suckers and then slowly lift with incredible power until the prey is broken from the rock. . . . Hermit crabs like frantic children scamper on the bottom sand. And now one, finding an empty snail shell he likes better than his own, creeps out, exposing his soft body to the enemy for a moment, and then pops into the new shell. . . . The anemones expand like soft and brilliant flowers, inviting any tired and perplexed animal to lie for a moment in their arms, and when some small crab or little tide-pool Johnnie accepts the green and purple invitation, the petals whip in, the stinging cells shoot tiny narcotic needles into the prey and it grows weak and perhaps sleepy while the searing caustic digestive acids melt its body down. . . . On the exposed rocks the starfish emit semen and eggs from between their rays. The smells of life and richness, of death and digestion, of decay and birth, burden the air. [FN32]

For Steinbeck, the tide pool represents the interrelationships of nature. In simple biology, the tide pool is an ecosystem. Each individual member-- starfish, crab, or seductive anemone--serves a role essential to the community. "[I]t seems apparent," wrote Steinbeck in The Log, "that species are only commas in a sentence, that each species is at once the point and the base of a pyramid, that all life is relational to the point where an Einsteinian relativity seems to emerge." [FN33]

Steinbeck found similar connections on dry land. In Chapter 3 of The Grapes of Wrath, he swings his camera from Dust Bowl refugees Tom Joad and Reverend Casey to the anguished scene of a "land turtle" struggling to cross a highway. [FN34] Revealing "fierce and humorous eyes," the tortoise drags its "high- domed shell" from the ***13** road's shoulder to the burning pavement, where it is immediately hit by a truck and flipped "like a tiddly-wink" back onto the roadside. [FN35] After a pause, the tortoise pokes its head out of its shell and starts again. In less than three pages, Steinbeck has told the Joads' entire story. Perhaps he has told the history of the world. [FN36]

For Steinbeck, narratives of the human and natural worlds are the same. Like land turtles or untamed ponies, humans are just another species seeking to find a satisfactory life amidst scarcity and violence. In Steinbeck country, homo sapiens, "wise man," is better understood as homo naturalis, "man of nature."

Steinbeck imagined a vantage point from which to study humans with dispassion, or, as he suggested in America and Americans, "to inspect mankind as a species, not with our usual awe at how wonderful we are, but with the cool and neutral attitude we reserve for all things save ourselves." [FN37] He frequently used a "cool and neutral tone" to convey his stories, constructing literary terrariums in which he could watch his imagined characters interact. Both Cannery Row, which relays the adventures of Monterey's "whores, pimps, gamblers, and sons of bitches," [FN38] and Of Mice and Men, which introduces two mismatched bindlestiffs to an isolated ranch in the Salinas Valley, function as such experiments in human interaction. Elsewhere, in The Grapes of Wrath, Steinbeck widens his cinematic lens to document each step of an important historical movement.

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In addition to creating an impartial narrative structure and tone, Steinbeck reminds readers of their "species" status by frequently describing his human characters as animals. [FN39] The Joads-as-tortoise metaphor is but one example. Humans figuratively become other species in, for example, To a God Unknown, where the main character Wayne believes that his dead father's spirit inhabits the ranch's oak tree. [FN40] Similarly, Lenny in Of Mice and Men, and ***14** Johnny of "Johnny Bear," [FN41] both slow-witted men with big hearts, exhibit ursine characteristics, [FN42] while in the short story, "Flight," the young hunter Pepé metamorphoses into a bird. [FN43] The list goes on. [FN44] In addition, the tide pool described in Cannery Row [FN45] suggests the novel's complex human population, with many of the creatures analogous to human social types.

Why the zoology? One purpose is to break the "great chain of being," the classical notion of life as a hierarchical chain with human beings at its top. [FN46] Steinbeck often railed against such conceit. In The Log from The Sea of Cortez, he does not mince words:

> We have made our mark on the world, but we have really done nothing that the trees and creeping plants, ice and erosion, cannot remove in a fairly short time. And it is strange . . . that it is a treason to our species so to speculate. For in spite of overwhelming evidence to the contrary, the trait of hope still controls the future, and man, not a species, but a triumphant race, will approach perfection, and, finally, tearing himself free, will march up the stars and take his place where, because of his power and virtue, he belongs: on the right hand of the p<<SqRoot>>-1. From which majestic seat he will direct with pure intelligence the ordering of the universe. [FN47]

For Steinbeck, any philosophy assigning purpose and glory to humans was a delusion. Indeed, "should be" beliefs of any kind proved false. In the famous "Easter Sermon" chapter of The Log, he argues against "teleological thinking," which:

> considers changes and cures--what "should be" in the terms of an end pattern (which is often a subjective or an anthropomorphic projection); it presumes the bettering of conditions, often, unfortunately, without achieving more than a most superficial understanding of those conditions. In their sometimes intolerant refusal to face facts as they are, teleological notions may substitute a ***15** fierce but ineffectual attempt to change conditions which are assumed to be undesirable, in place of the understanding-acceptance which would pave the way for a more sensible attempt at any change which might still be indicated. [FN48]

Many critics consider this chapter too long and muddled, and I will not disagree. But two points emerge clearly from the passage quoted above. First, normative views about how the world should be often conflict with observations about how the world actually is. Second, when such conflicts arise, one must seek to understand how things are and accept these limitations, to the degree practically necessary. What troubled Steinbeck the most was that people refused to accept humans' connection to the biological world.

2. Connection and environmental law.

Steinbeck's connection thesis suggests that the law relies on a false premise: the barbed-wire distinction between human society and the natural world. This supposed distinction, sometimes called the "separation thesis," takes two forms. The first sees humans as separate from and morally superior to nature. Nature may be, therefore, proudly dominated--drilled, dammed, and domesticated as human needs demand. A softer version would endorse responsible consumption, in which humans use their superior reason and strength to protect and sometimes "improve" nature. The Superfund law's ambitious clean-up goals and the federal wetlands protection program are two examples of such statutory stewardship.

The second form of the separation thesis sees humans as morally inferior to nature. The Deep Ecology movement, depicting humans as an alien and malevolent force on the planet, offers an example. Riffing on Rousseau's state-of-nature theory, [FN49] Deep Ecology teaches that human beings live best when they tread lightly on the land--and use effective birth control. This philosophy respects the basic needs of human society but dictates protections for natural areas that harbor remarkable beauty, species diversity, or scientific***16** mystery. [FN50] Such a hands-off ethic is reflected in laws like the National Environmental Policy Act, the Endangered Species Act, the Marine Mammal Protection Act, and the Wilderness Act. [FN51]

The most obvious problem with the separation thesis (whether inspired by pride or shame) is that it is simply not true. Charles Darwin kicked a hole through the separation thesis in The Descent of Man. [FN52] We are not only in

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nature, but of it. Laws of natural selection apply as much to us as to the finch and mite. Besides, every ecological system on the planet has been touched by human conduct, directly or indirectly, whether by genetic manipulation, air and water pollution, climate change, or farming. [FN53] There is nothing truly pristine left to protect.

Nevertheless, within the law, some actions are based on this false distinction between humans and nature. Serious damage can result when the law allows our cultural norms to trump ecological reality in this way. Consider North American fisheries. In Sweet Thursday, the sequel to Cannery Row, Steinbeck laments the collapse of Monterey's sardine fishery, when the last "pilchards were caught and canned and eaten." [FN54] Biologist Daniel Botkin links the decline of Pacific sardines in the 1950s to the fishery's use of a population-growth curve designed by Pierre-François Verhulst in 1849. [FN55] This curve was not designed to predict changes in fish population, but the maximum sustainable population of insects under controlled laboratory conditions. [FN56] The curve worked well for fruit flies in the laboratory, but not, as it turns out, for fish in the ocean. The ocean is a vast interdependent habitat. In such a world, future sardine populations cannot be predicted without careful consideration of a variety of environmental factors: past population levels, quality of habitat, food abundance, presence of underwater predators, and, ***17** most significantly, the behavior of fishermen. By failing to take into account the effects of fishermen on fish populations, the curve's predictions failed, and population crashes became unavoidable. [FN57]

Controlling human behavior in a more considered and holistic manner might not be easy. Otherwise effective and well-meaning strategies could run into serious economic and political obstacles if they upset the balance of resources among stakeholders. As a result, comfortable, "should be" thinking would substitute for realistic, though admittedly complex, solutions. [FN58] In the case of Monterey's sardine fisheries, even generous catch limits based on the faulty Verhulst curve gave way to the canneries' strident demands for greater catches. "It was done for patriotic reasons," writes Steinbeck, "but that didn't bring the fish back." [FN59]

It is tempting to see the collapse of Monterey's fisheries as the product of scientific ignorance, a misunderstanding as to just how sensitive population curves are to outside forces. But the failure to investigate interconnections is sometimes willful. In wetlands protection, regulators experiment with mitigation strategies that allow a developer to fill a wetlands area in exchange for his commitment to preserve another area elsewhere. [FN60] Such a trade-off may make regulatory enforcement more efficient, while affording developers and private landowners greater flexibility. [FN61] But, unfortunately, all wetlands are not created equal. Wetlands' functional value to the ecosystem depends on their physical connection to other parts of the ecosystem. Some provide significant flood protection or water filtration services, while others do not. To ensure that a developer is trading "apples for apples," wetlands must be carefully studied, inventoried, and compared, so that a developer is made to protect an area roughly comparable to the one he destroys. [FN62]

Most state-run wetlands programs choose not to conduct such a careful analysis. Many programs require no more than a "relatively crude" acre-based exchange ratio among gross classes of wetlands. ***18**[FN63] One reason is cost: given the expense of ecosystem inventories, there is a limit to the amount of information a state is willing to buy. A second reason is conceptual. The more a regulator knows about the roles of individual wetlands in an ecosystem, the less fungible they become; and the less fungible wetlands become, the less robust the trading market can be. This weakening of the market jeopardizes efficient enforcement and flexible land use. However, the example of the sardine fishery reveals the consequences of ignoring connections.

B. Tides of Complexity

The complexity thesis describes the tendency of human and non-human systems to proceed in elaborate, interactive, and dynamic patterns that defy prediction. [FN64] Such patterns are often influenced or characterized by "feedback loops," episodes in which one activity (say, the use of antibiotics) will influence another activity (the evolution of immune bacteria), which in turn will influence the first activity (the use of more antibiotics). [FN65] When such interactive patterns are layered, non-linear progressions are possible. Complex systems are not completely random; they are not "chaotic." [FN66] However, their underlying order cannot always be explained through a single disciplinary lens.

Steinbeck's observations of biology and of human nature gave him keen awareness of the complex currents flowing beneath human and non-human activities. His insights resonate with many modern developments in ecological and

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environmental thinking.

1. Complexity and Steinbeck.

In an unpublished short story, "The Kittens and the Curtain,"[FN67] ***19** Steinbeck examines a tidy but misanthropic blacksmith. In the opening pages, the narrator describes the blacksmith's shop:

I walked over and looked into the dark shop. The sinking sun was sending shafts through the cracks in the wall, and millions of particles of dust made them seem sticks of light. The dust moved in whorls but the sticks were rigid and immovable. Here too was the damnable order. [FN68]

The "sticks of light" image becomes a metaphor for the blacksmith, a stoic man who experiences a tide of violent emotions when he discovers his pet kittens murdered. To a biologist, the sticks of light might represent the patterns of organic activity, sometimes unpredictable in statistical analysis, but nonetheless given structure by philosophical or religious illumination. The physicist might be reminded of the protean behavior of light itself, which acts both as a continuous wave and as a cloud of weightless particles. [FN69] Whatever the reader's perspective, the bottom line is clear: actions--whether private or social, organic or inorganic--can spin off in patterns that defy expectation. The notion of an unchanging order, exemplified here as "sticks of light," is both damning and false.

In Between Pacific Tides,[FN70] authors Ed Ricketts and John Calvin warn that while broad patterns can be deduced from observation, in the end, anything is possible: "It must be understood that infinite variations exist, that few regions belong purely to one or the other of our [topographical] divisions, and that any animal, even the most characteristic 'horizon marker,' may occasionally be found in totally unexpected associations." [FN71]

In studying the tide pool, Steinbeck appreciated the complex habitats created by the ever-changing variables of wave shock, bottom soils, and tidal exposure. For Steinbeck, the Pacific's dynamic coastal waters ensphered an almost religious secret. The mythologist ***20** Joseph Campbell, a close friend of Steinbeck's from the Cannery Row days, would later recall that Steinbeck possessed "a sense of awe before the mysteries of the world, and the world as an organic unit--everything influencing everything else, back and forth." [FN72]

Steinbeck developed these mysteries of infinite variation and unexpected association in his fiction. Cannery Row presents the ebb and flow of human activity as a series of burlesques, involving comic reversals, enlightened fools, and corkscrew plot turns. [FN73] In an ill-advised frog hunt under the cloak of night, Mack and the boys--voices squealing and flashlights bouncing--crash into a pool of unsuspecting amphibians, breaking every rhythm of the quiet "hunt and parry" ritual, which Steinbeck imagines had for millennia governed the relations between man and frog. [FN74] Likewise, the novel ends with an elaborate party erupting into a drunken confusion of fistfights, police calls, and popping firecrackers. [FN75] Steinbeck, the clinician, reports:

The nature of parties has been imperfectly studied. It is, however, generally understood that a party has a pathology, that it is a kind of an individual and that it is likely to be a very perverse individual. And it is also generally understood that a party hardly ever goes the way it is planned or intended. [FN76]

We expect chaos in comedy, but Steinbeck examined themes of disorder in serious works, too. In The Red Pony, [FN77] an unexpected rainstorm leads to a pony's distemper and death. This event forces Billy Buck, an experienced cowhand who prides himself in his studied ability to anticipate weather shifts, diagnose animal illness, and apply effective veterinary care, to confront his limitations. [FN78] With the red pony, Billy fails in every category, and by way of his failings, Billy finally accepts that reason is insufficient to understand the erratic will of nature.

Scientists tell us that even with today's mathematics, it is impossible ***21** to predict the motions of three coupled pendulums. [FN79] In The Grapes of Wrath, the arid plains are swept by a series of pendulums-- ecological, political, and economic--swinging in an elaborate dance of unsympathetic motion. First come the oppressive drought, the flaring sun, and the crusted soil--the awesome force of nature's unpredictable processes. [FN80]

Collective human forces are also at work, creating a feedback loop that intensifies the Dust Bowl tragedy. In the decades following the drought, the federal government and East Coast banks encouraged farmers to settle and cultivate the Great Plains, which only fifty years before had been known as the "Great American Desert." [FN81] Once established, midwestern farmers were encouraged to grow water-intensive crops, such as corn and Russian wheat, [FN82] and to engage in "sod busting." They converted wetlands and tall- grass forests into farms,

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eradicating thousands of plant and animal species in the process. [FN83] The sod-busting policy coupled with single-crop agriculture led to the loss of millions of tons of topsoil in the span of a few years. Resulting dust storms led to thousands of cases of respiratory illness, "Dust Bowl pneumoni'." [FN84] Meanwhile, leasehold farmers, desperate to squeeze out short-term profits in a collapsing real estate market, depleted their resources at a rapid rate. Eventually the farms failed, the banks foreclosed, and thousands of refugees set out for California and other western states, where landowners aggressively advertised jobs for migrant workers (even after the jobs were gone) in an effort to saturate the labor market and drive wages down.

What is impressive about the Dust Bowl saga is that almost everything that could go wrong for Dust Bowl farmers did go wrong. In retrospect, this series of events may seem inevitable, but if we imagine it in the present, as Steinbeck's narrative encourages us to do, we see the forces of history-- weather patterns, pioneer migrations, land speculations, sod-busting, widespread illness, and pursuit of jobs in the west--careening haphazardly. It seems fitting that Steinbeck wrote his saga with the irregular rhythms of his contemporary, ***22** Igor Stravinsky, playing in the background. (He favored the fugue-like Symphony of Psalms.) [FN85]

Catastrophe and apparent randomness are such pervasive elements of The Grapes of Wrath that at the time of publication, many critics had trouble appreciating the novel's literary value. [FN86] For some, the book advanced a brutish and meandering plot for simple sentimental effect, titillating with "filthy" details. [FN87] Steinbeck addressed such criticism by asserting that in reality the Dust Bowl migration was exactly that--aimless and uncouth. [FN88]

Other critics accused Steinbeck of peddling Marxist revolution, citing as evidence his interest in social upheaval. [FN89] But, although the book dwells on class conflict, one cannot call The Grapes of Wrath Marxist in any formal sense, for Karl Marx and his mentor G.W.F. Hegel believed that civilization was going somewhere. Marx's teleological endpoint was the union of labor and product and the dissolution of the state, [FN90] while Hegel believed that civilization evolved toward increased liberty and development of the human spirit. [FN91] Such a progression carries drama: there is thrust, parry, and resolution or, in Hegel's terms, "thesis," "antithesis," and "synthesis." [FN92]

Steinbeck buys none of this. The Joads' odyssey is not a progression toward any particular goal. The Grapes of Wrath is, rather, a ***23** series of wandering events roped together by character and geography. Toward what end have the Joads traveled? Like the evolutionary paths of snails in a tide pool, the Joads are moving away from rather than toward something. They are trying to escape annihilation and death. While their trajectory may be hard to predict, the Joads are not chaotic, for below the narrative run all the crosscurrents of economics, ecology, and human culture that influence their journey. Instead, they are complex and, as Steinbeck insists, non-teleological, or without a clear purpose in mind. In this way, the Joads symbolize the complexity of human systems and their interaction with the natural world.

2. Complexity and environmental law.

Ironically, the dynamism that Steinbeck found in tide pools and environmental catastrophes was often overlooked by ecologists of the twentieth century. [FN93] Instead, many ecologists adhered to a more static and orderly thesis based on "the balance of nature." [FN94] This notion, called "homeostasis," [FN95] holds that natural systems have a tendency to resist change and to maintain states of equilibrium. [FN96] When systems fail to maintain balanced nutrients or stable populations, their instability is attributed to human intervention and deemed unnatural and undesirable. [FN97] Aldo Leopold's famous dictum encapsulates this thesis: "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." [FN98] This approach captured the public imagination and inspired many of the achievements of the environmental movement.

But it was wrong. States of disequilibrium--erratic patterns and unpredictable landscapes--are the norm. The state of equilibrium in the form of linear progressions and predictable landscapes is itself "unnatural," or at least unusual. Daniel Botkin, a New Ecology advocate, [FN99] has likened the course of nature to that of the Missouri ***24** River when it tumbled widely across the Great Plains, shifting course, carving oxbows, and creating new lakes. [FN100] Like Jody's pony or the midwestern droughts, the river defied prediction, stabilizing only after humans dammed its course. Recent studies documenting the non-linear patterns of historical climate change provide further support for

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nature's dynamism. [FN101] Discussions of "hard-wired" dynamism have recently popped up in other disciplines: mathematics, chemistry, biology, economics, history, and political science. [FN102]

The complexity thesis has important implications for environmental law. First, it suggests the importance of the "precautionary principle," which holds that where there is a danger of serious or irreversible damage, a lack of scientific certainty should not postpone reasonable measures to prevent environmental harm. [FN103] Second, on a more specific level, the complexity thesis suggests that attention should be given to the synergistic effects that combinations of environmental toxins can have on human health. One prominent study found, for instance, that combinations of two or three pesticides can be up to 1,600 times as powerful as any one of the pesticides on its own. [FN104] An effort to regulate toxic mixes began in the Clinton Administration, but it has not moved forward. [FN105]

Finally, the complexity thesis recommends that regulatory programs be designed to accommodate changes as scientists learn more about ecological systems. Often described as "adaptive management" systems, such programs employ the concepts of dynamism and feedback loops to produce regulatory structures that learn and evolve as regulators test strategies, observe responses, ***25** and then modify their strategies accordingly. [FN106] Adaptive management is usually discussed as a method of managing natural resources, such as species diversity [FN107] or water supplies, [FN108] but one might also imagine adaptive management as a means of reducing pollution as new detrimental effects become known.

The complexity thesis also has important implications for the philosophical underpinnings of law. Noting a similarity in the development of both science and philosophy, Ernst Mayr writes: "The essence of the evolutionary process is variability and change, and ethical norms must be sufficiently flexible and versatile to be able to cope with a change of conditions." [FN109] If disequilibrium is a common state, then the balance of nature is not the only metaphor threatened. Traditional notions of balances between economic supply and demand [FN110] or between state and federal political powers [FN111] also must be questioned.

Steinbeck believed that science and human institutions were forever evolving in stutters and spurts. Grand architectures of thought were built, razed, and reconstructed according to new designs. In his words:

> [That] building would be complete again and no one would look beyond it-- until one day a young, inquisitive, and original man might find a fissure in the pattern and look through it and find a new world. This seems to have happened again and again in the slow history of human thought and knowledge. [FN112]

Like biological evolution, this process marched not toward any metaphysical end, but toward practicality and survival. "Aristotle ***26** built a world, and we are building one," wrote Steinbeck. "His was a true world, and ours is. And the two need not meet and quarrel. His world worked for him and for his people and ours works for us." [FN113] By questioning human dominance and the static balance of nature, the ideas of connection and complexity clear the ground for a new architecture of thought.

C. The Existential Question

But what kind of architecture should we prefer? On this question, connection and complexity are mute. If humans are not exceptional and merit no special entitlement, if we live as part of nature but cannot define it normatively or predict it accurately, then how should we set environmental goals? Surely humans are of nature--homo naturalis--but, to a degree unmatched by any other species, humans can change nature, too, and themselves. Homo naturalis is simultaneously homo proteus. [FN114] The problem is in choosing how to use this power. Since science is not enough to guide us, we need an ethic outside the bounds of science.

In the context of scientific uncertainty, politicians and intellectuals are rushing to fill the void with their own answers. The lack of consensus on a comprehensive approach to managing the environment has led to diverse and sometimes contradictory approaches in environmental law. Some commentators have invoked the teachings of connection and complexity to propose interventionist projects that most observers would consider pro-environmental. Naturalist Alston Chase, for instance, severely criticized the "hands off" preservation ethic in Yellowstone Park as insufficient to achieve long-term protection, [FN115] arguing that because the park contains a truncated ecosystem, Yellowstone could never function "properly" on its own. [FN116] Chase, therefore, advocates

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restoring the area to its pre-Columbian state and maintaining it that way. [FN117] Given the number of degraded and incomplete ecosystems in the United States, arguments over whether to preserve will give way to arguments over whether to restore and maintain, and, more controversially, according to what baseline: pre-human, pre-Columbian, ***27** or pre-industrial. [FN118]

On the other hand, some commentators have seized on the same concepts, connection and complexity, to support arguments most would consider anti- environmental. Journalist Gregg Easterbrook cites evidence of Indian field-burning in pre-Columbian North America to deflect concern over the wholesale eradication of tallgrass prairies in the nineteenth and twentieth centuries. [FN119] If ancient peoples modified nature to suit their needs, he implicitly asks, why can't we? In the field of anthropology, a theory gaining popularity is that the Amazon rain forests--sometimes called the world's largest natural pharmacy--were cultivated by ancient indigenous tribes. [FN120] Some preservationists fear that recognizing a prior human role in prairie and forest development might make them seem less "natural," and therefore less worthy of protection in the eyes of the global community. [FN121]

Most people would see a difference between a human-made parking lot and a human-made rainforest. But that difference must at least partially depend on principles outside the scientific realm. Values that inform environmental science include aesthetics, inspirational needs, and the altruistic desire to protect distant people and future generations. Annie Dillard aptly captured this sentiment when she wrote, "I think science works the way a tightrope walker works: by not looking at its feet. As soon as it looks at its feet, it realizes it is operating in midair." [FN122] Without values, scientific inquiry as a guide to determining our environmental agenda leaves us hanging.

It is not overly dramatic to say that today's environmentalism has reached an existential moment. We cannot step back and let nature take care of itself, regardless of whether such passivity is justified by traditional ecology or economics. Steinbeck noted the deep unease one feels in the absence of universal norms, as if one has been:

***28** left dangling out in space, deprived of such emotional support as had been afforded [her] by an unthinking belief in the proved value of pest control in the conservation of game birds; in the institutions of tradition; religion; science; in the security of the home or the family; or in a comfortable bank account. [FN123]

Literature, informed by scientific understanding, can clarify our ecological objectives by encouraging us to identify important human values and by inspiring us to pursue those values in the real, nonfictional world. Science, infused with literary attentiveness, can direct us toward a more desirable future.

IV. Literary Imagination

Intelligence without the soul to balance it must of necessity be evil. [FN124]

Can literature alter the imagination of government? It has happened. Former U.S. Poet Laureate Robert Hass traces the genesis of our national parks system to the romantic poetry of William Wordsworth. In 1852, Harriet Beecher Stowe's Uncle Tom's Cabin [FN125] revealed to white northerners the tragic lives of enslaved blacks, focusing the North's outrage and propelling the nation toward civil war. And in 1939, Steinbeck's The Grapes of Wrath exposed the plight of battered Dust Bowlers in California, winning the attention of Eleanor Roosevelt and Senator Robert M. La Follette, Jr. Under La Follette's chairmanship, the Senate Committee on Education and Labor protested the "shocking degree of human misery" documented in Steinbeck's book. [FN126]

Powerful literature derives from a writer's command of observation, logic, and coherence, but also from his compassion. The first three ingredients share a commonality with science, perhaps allowing ***29** the two disciplines to reinforce each other. The last ingredient, compassion, takes human reasoning beyond understanding and toward action. In this Part, I first review the similarities between science and literature, and then examine how Steinbeck's ethic of compassion clarifies the underpinnings of environmental law.

A. The Union of Science and Literature

Reminiscing on his friendship with Steinbeck in Monterey and Pacific Grove, Joseph Campbell observed that Ed Ricketts' scientific perspective "played against John's rather romantic philosophy," enabling them to form an

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impressive scholarly team. [FN127] Geneticists Paul Ehrlich and Edward Wilson have encouraged merging the humanities and sciences to form a more comprehensive picture of our world. [FN128] Science and literature are similar enough to make their integration possible. Both seek to shed light on human experience and to improve the quality of life in fundamental ways. Success in both realms is judged by the final product. Likening scientific research to an "art form," Edward Wilson observes that "[i]t does not matter how you make a discovery, only that your claim is true and convincingly validated." [FN129]

In science, theories are evaluated according to their explanatory power (their ability to describe elements and relationships in the physical world) and their exploratory power (their ability to suggest new paths of inquiry in the same or related fields). [FN130] The process of validating scientific theories is continual and dynamic: it is never too late to question Aristotle, Newton, or Einstein.

In literature, the evaluative criteria are similar. Great literature identifies the deep patterns and complexities of human experience. It builds on past insights and provides new perspectives. Like science, literature can have substantial spillover effects on politics, culture, economics, and law.

In their desire to represent "truth," science and literature emphasize ***30** observation. The role of observation in science may be obvious, with its emphasis on experimentation and empirical research. But observation is equally important in literature. From Homer to Woolf, literature's intellectual and emotional force derives from its ability to capture the momentary image--a broken spear "stuck fast" in a beating heart, [FN131] the uninspired Lily Briscoe gazing past her easel at "an almost invisible" lighthouse. [FN132]

Steinbeck was an exceptional observer of people and landscapes. He documented marine expeditions,[FN133] interviewed and reported on Dust Bowl migrants, [FN134] and served as a correspondent in two wars. [FN135] His documentary eye informed all of his fiction, as exemplified by The Grapes of Wrath, where the reader learns how to patch a truck tire, [FN136] fry potatoes, [FN137] and slaughter a pig [FN138]--and where images of rotting oranges and starving children do not fade. [FN139]

Science and literature are also both concerned with history. For scientists, history takes the form of rock patterns, core samples, or cosmic radiation. For writers like Steinbeck, the strata of human experience lie buried in narrative myth. Steinbeck continually experimented with myth in his fiction, reworking the stories of Exodus in The Grapes of Wrath, [FN140] Cain and Abel in East of Eden, [FN141] and King Arthur's Court in Tortilla Flat. [FN142] He subscribed to a Darwinian model of sorts, believing that the human values that expressed themselves most insistently through time and space--that secured ***31** cultural "survival niches"--were most worthy of examination and emulation. [FN143]

Compassion denotes the ability to suffer with another. Human capacity to empathize drives both literary art and republican governance. The writer employs empathy to animate literary characters and to move the reader intellectually and emotionally. Similarly, the government official--senator, agency staffer, or judge--employs empathy to better understand the public will and to imagine ways of implementing it. [FN144] Compassion is the key to both Steinbeck's art and to a successful environmental policy.

But before moving to compassion, it is important to recognize the great difference between science and literature. Scientific insights are falsifiable and object-centered, in other words, "objective." [FN145] Literary insights are non-falsifiable and human-centered, in other words, "subjective." Literature's subjective and often idiosyncratic view of the world is often seen as a source of trouble for policy analysts. But, as we will see, it is this very subjectivity that allows literature to locate and argue for values that will enrich the human experience. As long as the literary imagination is held accountable to scientific reality and offers explanatory and exploratory insights, it should not be jettisoned. Specifically, Steinbeck's subjective ethic of compassion may be our best tool in approaching environmentalism's existential questions.

B. Compassion and Steinbeck

Biologist Rachel Carson and John Steinbeck were similar in this way: both made sizable reputations by rendering the invisible visible. Carson's unseen subjects were microscopic mites, aerating earthworms, and other "ceaselessly

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toiling creatures" [FN146] in the earth and the sea. [FN147] Steinbeck's subjects were displaced migrants and homeless laborers, the driftwood of human society. Carson ***32** and Steinbeck used their observations to reveal how our proud and affluent society rested on the strength and complicity of individuals struggling at the bottom of the food chain.

For Carson, those at the bottom inspired wonder and respect. For Steinbeck, whose bottom dwellers were human beings, his subjects inspired empathy. In his many novels, stories, and essays, Steinbeck celebrated (as so many artists do) what he called "man's proven capacity for greatness of heart and spirit." [FN148] Such greatness was rooted in compassion, the ability to suffer with and to care for another individual. Consider Doc Burton, risking his life and career to help organize destitute strikers in In Dubious Battle. [FN149] Or Samuel Hamilton in East of Eden, who is forever reassuring animals, forgiving loans, and delivering babies. [FN150] Or recall the brilliant image from The Grapes of Wrath, where Rose of Sharon, mourning her lost child, offers her naked breast to a starving man. [FN151]

Such empathy is in tension with Steinbeck's scientific approach. Steinbeck, the amateur scientist who set out "to inspect mankind as a species . . . with a cool and neutral attitude," ends up falling in love with his subject. [FN152] Trying so hard to convince us that in our biology and understanding we are really nothing special, he instead shows us how special we really are. All species may evolve toward survival, but only humans (as far as we know) consciously seek it. If that choice represents teleological thinking, Steinbeck seems happy to accept it.

Steinbeck shows poignantly what can happen when compassion is lacking. Injustice often results when institutions become so removed from individual lives that the governor and the governed can no longer empathize with each other. In Chapter Five of The Grapes of Wrath, Steinbeck dramatizes this effect. [FN153] A crowd of ragged tenant farmers and children congregate around a goggle-eyed man on a tractor who has come to raze their homes. The smell of diesel hangs in the air. They recognize the tractor driver as a local boy who is willing to terrorize his "own people" for a small wage. [FN154] The farmers are filthy, their kids starving, but one man ***33** stands up to the driver. He's got his rifle, and he's ready to kill.

The driver responds:

"[L]ook--suppose you kill me? They'll just hang you, but long before you're hung there'll be another guy on the tractor, and he'll bump the house down. You're not killing the right guy."

"That's so," the tenant said. "Who gave you orders? I'll go after him. He's the one to kill."

"You're wrong. He got his orders from the bank. The bank told him, 'Clear those people out or it's your job."'

"Well, there's a president of the bank. There's a board of directors. I'll fill up the magazine of the rifle and go into the bank."

The driver said, "Fellow was telling me the bank gets orders from the East. The orders were, 'Make the land show profit or we'll close you up."'

"But where does it stop? Who can we shoot? I don't aim to starve to death before I kill the man that's starving me."

"I don't know. Maybe there's nobody to shoot. Maybe the thing isn't men at all. . . ."

"I got to figure," the tenant said. "We all got to figure. There's some way to stop this. It's not like lightning or earthquakes. We've got a bad thing made by men, and by God that's something we can change." [FN155]

The farmers' situation is frustrating because the brazen capitalism causing these foreclosures appears to operate independently of human influence. Steinbeck never blames the landowners or the fat-cat East Coast bankers. Some of the owners, he writes, were "kind" and "hated the mathematics that drove them." [FN156] Others "worshiped the mathematics because it provided a refuge from thought and from feeling." [FN157] The devil here is not a physical thing, but rather the absence of a thing, the absence of human connection. The devil here is loneliness.

If all this seems a little homespun, compare Hannah Arendt's strikingly similar observation linking human

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disconnectedness (loneliness) to totalitarianism:

What makes loneliness so unbearable is the loss of one's own self. . . . In this situation, man loses trust in himself as the partner of his thoughts and that elementary confidence in the world which is necessary to make experiences at all. Self and world, capacity for thought and experience are lost at the same time. [FN158]

***34** Without human interaction, the mind is left only with rote mathematical formulas. Extremism ensues and heads toward "the worst possible conclusions." [FN159] "Organized loneliness," Arendt writes, "is considerably more dangerous than the unorganized impotence of all those who are ruled by the tyrannical and arbitrary will of a single man." [FN160] Both Arendt and Steinbeck seek to connect compassion and practical reason, so that experience might guide thoughts to empathy. If one takes away the moral dimension, the ability to "suffer with," one is left with a logic of form rather than substance, and ideologies divorced from thought and feeling. [FN161]

The potential for social reform in The Grapes of Wrath stems from migrants' ability to act collectively to oppose the lonely, self-interested eastern bankers and California landowners. Change lies in the migrants' collective will to effect a compassionate good. Picture two men squatting in a ditch discussing their plight. "This is the zygote," writes Steinbeck, "[f]or here 'I lost my land' is changed; a cell is split and from its splitting grows . . . 'We lost our land."' [FN162] Steinbeck deftly manipulates emotion and metaphor to render the farmers sympathetic to the reader, who imagines their tragedy as his own. This literary effect prompts our contemplation of justice.

Scientific sources also suggest that compassion is necessary to guide proper decision-making. Drawing from studies of patients with brain damage, Paul Ehrlich finds that without functioning emotional systems to establish priorities in the brain, "critical decision-making becomes impossible." [FN163] Recent brain research has emphasized the biological connection between emotional responses and moral reasoning. [FN164] Linguist George Lakoff and literary scholar Mark Turner employ psychology to show that ***35** metaphor, a distinctly literary tool, serves mental cognition in the most basic ways and allows human beings to imagine ways of living and acting that are different from the past. [FN165]

Martha Nussbaum believes that the highest calling of literature is to foster "the ability to think what it might be like to be in the shoes of a person different from oneself." [FN166] This ability, she argues, is essential to good citizenship, and in particular to good judging and lawyering. Speaking of her own law students at the University of Chicago, Nussbaum writes:

If they are going to become good citizens in their future roles, they need not only logical ability and knowledge. . . . They also need to be able to participate imaginatively in a life such as that of Bigger Thomas [of the novel Native Son [FN167]] seeing how aspiration and emotion are shaped by their social setting. [FN168]

Such participation leads to a greater feeling of common interest among individuals. [FN169] We cannot care about poverty or racism unless we empathize with the people affected by them. We cannot care for human victims of pollution, unborn generations, or caged chimps unless we see ourselves in those entities. This idea finds support not only in what Arendt would call "common- sense" experience, but also in genetic research. While human nature is remarkably flexible, geneticists seem to agree that empathy toward kin is rooted in our genes. [FN170] Similarly, the tendency to infer a ***36** cause-and-effect relationship between two visual observations is a genetic predisposition. [FN171] Perhaps this suggests why human concern for distant people and distant consequences does not come naturally. [FN172] This skill, now necessary for global survival, must be learned. A "cultural evolution" [FN173] toward regional or global compassion should begin with local connections, which can be physically, or as in literature, psychologically proximate. [FN174] The genius of The Grapes of Wrath lies in its continuing ability to reinscribe feeling in its readers, preparing them for more demanding acts of empathy in the real world. [FN175]

C. Compassion and Environmental Law

Environmental law seeks to protect "nature." But the ideas of connection and complexity obscure the path. Connection challenges the normative idea of a "pristine," unadulterated place. [FN176] Complexity teaches that natural states (however we define them) are always changing. [FN177] We cannot know the type of environment the world should have, but we can begin to think about the type of environment we want to have. [FN178]

Science, in its objectivity, cannot tell us what to want. Literature, in its subjectivity, can give us direction. Using

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the explanatory and exploratory powers of both science and literature, we are ready to take a first stab at some existential issues. Steinbeck's ethic of compassion describes, in writer Don DeLillo's words, "a geography of conscience" [FN179] that can suggest how to protect human health, future generations, and the nonhuman world.

1. Protecting public health.

A central aim of environmental law is to protect humans from anthropogenic environmental harms. Scientific uncertainty and the large scale of environmental problems force regulators to use ***37** statistical models to identify environmental threats, assess risks, and plot courses of action. As with the machine-like capitalism of the Dust Bowl, such regulatory models have a tendency to dehumanize real people, rendering them unworthy of compassion.

Consider the "statistical life," a numeric placeholder that allows regulators to "optimize" social benefits by pricing and comparing the lives a proposed rule is expected to save. [FN180] Depending on the agency and its mandate, a statistical human life can be valued at anywhere from $2.5 million to $5.8 million. [FN181] John Graham, Director of the Office Information and Regulatory Affairs at the U.S. Office of Management and Budget (OMB), is now advocating a uniform "league table" to assess all public health rules. [FN182] Under this system, regulators would go beyond predicting the number of lives a regulation might save and evaluate regulations in terms of the number and quality of predicted years left in those saved lives. [FN183]

Readers of literature should be alert to the danger inherent in objectifying the masses through such bureaucratic, mathematical systems. Recommending literature to lawyers, Nussbaum writes: "When simplified conceptions of the human being are in widespread use for predictive purposes, it is all the more important to keep reminding ourselves of the richer picture of human life to which such simplified models are ultimately accountable." [FN184]

To imagine a "richer picture of human life," one might assign characteristics to the lives whose "quality-adjusted years" hang in the balance. Consider an environmental rule predicted to save the lives of a hundred healthy children. Is this rule superior to a rule of equal cost predicted to save a hundred disabled children? To a rule expected to save a hundred healthy grandparents? Or consider a rule predicted to save a hundred African-Americans, who have statistically ***38** shorter lives than the population as a whole. Are our efforts, dollar for dollar, better spent saving the lives of other racial groups? One could replay this test substituting class, gender, geography, or other characteristics associated with statistical longevity.

Decisions based on actuarial tables and other statistics must be tempered by notions of distributional fairness. [FN185] Injection of these principles depends on public participation in decision-making. Most people would not desire a regulatory system that effectively advantaged the longest-lived over those of the shortest. Nor would most people want a system that assumes that the sick do not value life as much as the healthy. [FN186] Decisions about who dies in statistical terms affect who dies in actual terms, and the characteristics of those predicted lost lives implicate some of the central moral issues of our time: racism, sexism, and poverty. Yet, without vigorous public debate on these issues, undesirable assumptions may well be incorporated into our laws. Decisions about statistical lives belong not just to Washington economists, but to all of us.

2. Protecting future generations.

The duty to protect the environment for future generations is a notion shared by many cultures.[FN187] While both American and international environmental policy acknowledge this responsibility, [FN188] ***39** our commitment is ambivalent, as demonstrated by the regulatory practice of "discounting" future environmental benefits to satisfy today's material needs. [FN189]

This practice reflects a value choice. Economics teaches that a dollar saved today is more valuable than one saved tomorrow. [FN190] On empirical observation, consumers of market goods and services act in ways that suggest this preference, yet there is little empirical evidence to suggest that people favor today's avoidance of physical harm over tomorrow's. Indeed, some research suggests the opposite: people would prefer to experience harm now rather than anticipate future harm. [FN191] Certainly, it is unlikely that future generations would prefer to experience harm in our place. [FN192] Yet, the discounting of benefits to future generations depends on this illogical premise.

There are two reasons that it is difficult to commit our resources to future generations. First, we do not know the

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people of the future. They are not merely statistical lives; at this point, "future people" are truly invisible. [FN193] Second, the duty toward future people offers no material reward for those making sacrifices now. As Groucho Marx reportedly said, "Why should we bother about the next generation? They have never done anything for us!" [FN194] A duty toward future generations cannot be justified by material self-interest. It can only be justified by compassion.

Writers like Steinbeck forge an emotional connection to distant generations through mythic narratives.[FN195] Understanding The Grapes of Wrath or East of Eden as part of an evolving cycle of human experience allows us to empathize with different generations. In ***40** Umberto Eco's elegant words, "[the] tangle of individual and collective memory prolongs our life, by extending it back through time, and appears to us a promise of immortality." [FN196] If we can see ourselves in Ma Joad or Reverend Casey, perhaps those in the future will see themselves in us. In a psychological and a spiritual sense, we are "one"--in Steinbeck's view, a "group species" connected across space and time. [FN197] That we discount future generations suggests that we prefer our own welfare to that of our progeny. That we do not discount future generations to zero, however, suggests that on some emotional or ethical level, we do see ourselves as a group species, a collective life. Maintaining this awareness through literature ensures that we confront the value judgments inherent in discounting. Consider that "at a discount rate of 5 percent, the death of a billion people 500 years from now becomes less serious than the death of one person today." [FN198] Significant moral choices should not be hidden in economic or scientific models; they belong on the agenda of public debate. Compassion encourages us to negate the "organized loneliness" [FN199] of bloodless mathematics, in favor of the organized political debate of democratic governance.

3. Protecting the nonhuman world.

Just as Steinbeck's compassion ethic clarifies environmental law's duty to disadvantaged people, it also clarifies the law's obligation to protect the non-human world. Reasons to protect nature include utility, ecological function, aesthetics, cultural heritage, and morality. [FN200] The first two are the most tangible and receive the most serious political attention. Cost- benefit analysis, which balances the material costs against the benefits of protective regulation, [FN201] is ubiquitous in regulatory design. The trend toward ***41** functional ecology has enriched the cost-benefit model by detailing the significant ecological functions that nature provides, services such as air and water filtration, which we would otherwise have to pay to obtain. [FN202] The degree to which such calculations increase the perceived utility of protecting nature has led many environmentalists to focus exclusively on materialistic arguments, which they believe play better in politics, and to leave their more spiritual views for the campfire.

This is a mistake for both tactical and substantive reasons. It is a tactical mistake because the environmental movement relies on the energy and creativity of volunteers and activists, who are not driven by materialistic arguments. Only articulate calls for justice spur such action. Furthermore, the materialist strategy is a mistake because justifications we use today influence which natural areas we choose to protect for tomorrow. If we want an environment that provides not only utility and ecosystem services, but other benefits as well, we must incorporate these other values into our environmental strategy today.

Steinbeck's ethic of compassion encourages incorporating these environmental objectives into social policies. Using both scientific and emotional insight, Steinbeck embraced a range of conservationist justifications. He saw nature in material terms, as a provider both of goods and important "services." In The Log from the Sea of Cortez, Steinbeck repeatedly complains about a Japanese fishing fleet over-harvesting gulf shrimp: "The waste of this good food supply was appalling. . . . [The fishermen] were committing a true crime against nature and against the immediate welfare of Mexico and the eventual welfare of the whole human species." [FN203] The tone of moral outrage ties his economic argument to his compassion for hungry people, persuading on two levels at once.

Steinbeck believed that nature builds human character, too, by reminding us of our place in the world. In Travels with Charley, he revisits California's Redwood Forest, which he knew as a boy:

The redwoods, once seen, leave a mark or create a vision that ***42** stays with you always. . . . The feeling they produce is not transferable. From them comes silence and awe. It's not only their unbelievable stature, nor the color which seems to shift and vary under your eyes, no, they are not like any trees we know, they are ambassadors from another time. . . . The vainest, most slap-happy and irreverent of men, in the presence of redwoods, goes under a spell of wonder and respect. Respect--that's the word. One feels the need to bow to unquestioned sovereigns. [FN204]

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In an era marked by cynicism, an occasional dose of reverence and awe is important. Recognition of one's smallness prepares the mind for acts of compassion toward others, diminishing self-flattery and illusions of human superiority--ideas that science also argues against. [FN205]

As the quintessential writer of "place," Steinbeck also understood the power of nature to connect us to our cultural heritage. George and Lenny, in Of Mice and Men, have more than nutrition in mind when they dream of that "little house and a couple of acres an' a cow and some pigs" and living off "the fatta the lan." [FN206] They are describing the American Dream.

For Daniel Botkin, it is the pre-Columbian plains and the spirit of Lewis and Clark that link Americans to their culture. Botkin writes:

> The great prairie ocean with its patterns in space and time is gone; only puddles, meanders, and small backwaters remain. One of the great heritages of America has almost disappeared. . . .
>
> It wasn't that we were being sentimental about the disappearance of a single species; it wasn't that we were lamenting the rise of people against the spread of the prairie. It was the loss to our own humanity, our sense of ourselves, that seemed sad. [FN207]

To devise a plan for protecting nature, we must know what to protect and why we want to protect it. Our material need for ecosystem services might lead us to preserve some areas (a watershed, a fish habitat) that prove necessary to a healthy economy. Our spiritual need for wilderness that appears "natural" might require restoration of a forest or river to its pre-Columbian state. Sometimes these interests will overlap. Sometimes we will be able to balance competing interests in the same territory. But perhaps just as often, our competing needs will prove mutually exclusive in the same space. A broader balance across multiple spaces, each ***43** with a different use, will be necessary. Such balancing can be honestly achieved only through serious consideration of people's material and moral imperatives.

Before examining holistic methodology in two sample Supreme Court cases, a summary is in order. Holism, the principle that a part is understandable only in relation to the whole, animates the study of ecology. Steinbeck was deeply influenced by ecological principles and developed a holistic methodology in his writing to comprehensively describe and evaluate the relationships among humans, social institutions, and the non-human world. Steinbeck appropriated values from both the natural sciences and the humanities to inform his methods. From the sciences, he borrowed the concepts of connection and complexity to examine the relativity and dynamism he observed in human and non-human behavior. From the humanities, particularly literature, he borrowed the ethic of compassion and empathy to provide a practical and normative goal for human endeavor.

Steinbeck did not assign weights or rankings to the values of connection, complexity, and compassion. But he did believe that to accurately understand or evaluate an event one must consider each of these values and its relationship to the others. This article has argued that such integrated thinking would improve environmental policy and legal analysis. Part III argued that the scientific notions of connection and complexity recommend an incremental, adaptive approach to environmental policy, guided by norms from outside science. Part IV argued that these norms should derive from an ethic of compassion, which seeks to understand the interests of diverse, even non-human, constituencies.

The failure of environmental law to incorporate holistic thinking has led to individual disappointments in environmental protection, including the crash of California's sardine fisheries (caused by the failure to see connection and complexity in the ecosystem) [FN208] and the trend toward using oversimplified statistics in assessing public health (caused by the failure to adopt compassion). [FN209] Part V offers a detailed example of applying environmental holism in judicial analysis; it suggests that courts can reach more satisfying and comprehensive results when considering disputes from many angles at once.

***44** V. Applying Holism to Environmental Law: Riverside Meets SWANCC

Environmental protection often lacks holistic methods and goals. Some rules, like acre-based trading ratios in

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wetlands mitigation, are based on aspirational goals without regard to ecological reality. [FN210] Other rules, like the new risk assessment proposals under review at the United States Office of Management and Budget, are based on mathematical models without regard to any real understanding of the public will. [FN211]

This variability is evident in two contrasting Supreme Court decisions interpreting a single statutory provision. United States v. Riverside Bayview Homes, Inc. [FN212] (Riverside) and Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers [FN213] (SWANCC) both focus on the scope of federal jurisdiction over intrastate waters under the Clean Water Act (CWA or Act). [FN214] Applying very different approaches to environmentalism, they reach different results. These cases demonstrate two things. First, they illustrate the dramatic differences that can result if a court integrates holistic principles into its deliberation. Second, they provide an example for judges and lawyers of how they might apply holistic methods to future environmental litigation.

Both Riverside and SWANCC consider whether the Army Corps of Engineers may regulate dumping in intrastate waters. [FN215] According to the CWA, the Army Corps may regulate discharges into "navigable waters," [FN216] which the Act defines simply as "waters of the United States." [FN217] In Riverside, a developer sought a declaration that its intended filling of wetlands was not subject to regulation under the CWA, urging a narrow interpretation of the term "navigable waters." The wetlands at issue in Riverside were adjacent to, but not flooded by, waters that could actually be "navigated." [FN218] Similarly, in SWANCC, an Illinois agency challenged the Corps' jurisdiction over a proposal to fill "isolated" freshwater ponds in an abandoned ***45** gravel pit. [FN219] The plaintiffs here also sought a narrow definition of "navigable waters."

The Court rejected the narrow interpretation urged by the developer in Riverside but accepted the one in SWANCC. In other words, the Court found that wetlands adjacent to but not flooded by navigable waters are "navigable waters" under the statute, but that freshwater ponds in an abandoned gravel pit are not. The conclusion in each case depends, as we will see, on the degree to which holistic principles were used in determining the law.

A. Riverside

The Court in Riverside invokes analysis reminiscent of the natural scientist. Justice White, writing for a unanimous Court, first acknowledges the uncertainty involved in locating absolute truth, in this case, an unimpeachable meaning of the CWA's jurisdictional provision. [FN220] He then establishes a Chevron-inspired presumption [FN221] in favor of the Corps' reading (which favored jurisdiction), recognizing its multidisciplinary expertise in the area. Next, to assess the reasonableness of the Corps' interpretation, [FN222] Justice White opens a field bag of heuristic tools intended to capture meaning "in light of the language, policies, and legislative history of the Act." [FN223]

The developer urged the Court to view wet lands as linguistically inconsistent with "waters of the United States." [FN224] The Court calls that response "simplistic" and inconsistent with the "realities of the problem of water pollution." [FN225] Scientifically speaking, it is sometimes difficult to draw a line between land and water:

> The transition from water to solid ground is not necessarily or even typically an abrupt one. Rather, between open waters and dry land may lie shallows, marshes, mudflats, swamps, bogs--in short, a huge array of areas that are not wholly aquatic but nevertheless fall far short of being dry land. Where on this continuum to find the limit of "waters" is far from obvious. [FN226]

Marine biologist Ed Ricketts? No, the level-headed Justice White, employing the concepts of ecological science (specifically, connection ***46** and complexity) to show that "waters" can indeed include land.

White then turns to legislative policy, identifying the CWA's stated objective, "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." [FN227] White construes "integrity" as "a condition in which the natural structure and function of ecosystems [are] maintained." [FN228] This reading is, in fact, consistent with that of an amicus curiae brief filed by the National Wildlife Federation. [FN229] With this move, White can argue that even pollution sources that are indirectly connected may, structurally and functionally, affect the integrity of an ecosystem. Or as White writes, "[p]rotection of aquatic ecosystems, Congress recognized, demanded broad federal authority to control pollution, for '[w]ater moves in hydrological cycles and it is essential

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that discharge of pollutants be controlled at the source."' [FN230] In other words, one part (the wetlands) is expected to affect the other parts (the navigable waters).

Finally, the Court concludes with a discussion of the origins of the Act's jurisdictional provision. As similarly occurs in nature, the lineage is obscure. The CWA is the legislative progeny of the Rivers and Harbors Acts of 1899 [FN231] and the Federal Water Pollution Control Act of 1948, [FN232] two lumbering giants whose pollution-fighting power proved inadequate in the modern era. The first was designed to free up transport by keeping "navigable waters" free of garbage; [FN233] the second placed primitive controls on the discharge of materials into "interstate waters." [FN234] In 1972 both were overtaken by what is now called the Clean Water Act. [FN235] This new act retained ***47** the 19th-century term, "navigable waters," abandoned the term "interstate waters," but added the Plasticine phrase "waters of the United States." What on earth did all this mean? In response to these complexities, White emphasizes the broad objective of the CWA. He concludes that "Congress evidently intended to repudiate limits that had been placed on federal regulation by earlier water pollution control statutes and to exercise its powers under the Commerce Clause to regulate at least some waters that would not be deemed 'navigable' under the classical understanding of that term." [FN236] White corroborates this view with more history of Congressional conduct. He notes that the Army Corps had asserted authority over non-navigable waters since 1975, that Congress had debated the desirability of such jurisdiction in both houses before the 1977 amendments, but that Congress had ultimately rejected a narrowing of the Corps' asserted jurisdiction. [FN237] White concludes:

> Although we are chary of attributing significance to Congress' failure to act, a refusal by Congress to overrule an agency's construction of legislation is at least some evidence of the reasonableness of that construction, particularly where the administrative construction has been brought to Congress' attention through legislation specifically designed to supplant it. [FN238]

While not immediately obvious, the Riverside opinion also shows glimmers of empathy in an otherwise objective analysis. In questioning a rigid line between land and water, Justice White notes that "our common experience" exposes such oversimplification. [FN239] The phrase refers not to Justice White's experience alone, or even to that of his fellow Justices, but to the shared experience of most Americans. With this simple phrase, Justice White steps into the boots of the citizenry. The opinion's repeated allusions to wetlands' diverse beneficiaries--humans, aquatic species, and ecosystems--similarly suggest an awareness of what wetlands protection ***48** means for other people and entities. [FN240]

The Riverside opinion treats law as an organic process,[FN241] a tide pool of linguistic principles, scientific findings, legislative events, and empathetic responses all prodding and feeding off of one another. In the face of many uncertainties, the Court is guided by holistic principles-- specifically, the protective objective behind the CWA.

B. SWANCC

In SWANCC, the notion of law as tide pool dries up. In this later case the Court dismisses ecological complexities when asked to decide whether the Army Corps had authority to regulate a collection of gravel pits that after decades of abandonment had become "a scattering of permanent and seasonal ponds of varying size." [FN242]

It is true that the facts in SWANCC differ from those in Riverside in arguably important ways. The wetlands in Riverside were adjacent to a "navigable" creek; [FN243] the ponds in SWANCC were not adjacent to navigable waters. [FN244] While the relevant property in Riverside involved only wetlands, the geologic features in SWANCC represented mainly permanent ponds. [FN245] And while in Riverside the Army Corps relied on a regulation extending jurisdiction to wetlands adjacent to navigable waters, [FN246] in SWANCC the Army Corps relied on the so-called "Migratory Bird Rule," a regulation that extended jurisdiction to all intrastate waters used by migratory birds. [FN247] From a practical standpoint, upholding the Migratory Bird Rule would have extended the Corps' powers over tens of thousands of additional lakes, ponds, and prairie potholes.

While these factual differences surely contributed to the Court's rejection of agency jurisdiction in SWANCC, it is also evident that the Court was guided by different approaches to environmental ***49** issues. Writing for a 5-4 majority in SWANCC, Chief Justice Rehnquist dwells almost exclusively on a text-based syllogism: the Act's protection applies to "navigable waters;" [FN248] the ponds at issue are not "navigable waters;" [FN249] therefore,

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the Act's protection does not apply to the ponds. [FN250] The logic almost runs aground on the Act's broad definition of navigable waters as "waters of the United States," [FN251] but the Court avoids this hazard by arguing that the terms, "navigable waters" and "waters of the United States," must be read together, as if each term shaped the other, rather than as if the latter term completely defined the former. [FN252] In the face of complexity, the Court simplifies. Endowing the word navigable with a "limited" power to shape its definitional phrase, "waters of the United States," [FN253] it concludes that while "waters of the United States" need not be actually navigable, they must at least be adjacent to waters that are, thereby distinguishing Riverside. [FN254] The linguistic stagecraft here is evident: to use a term to define its own definition turns a mirror on the traditional method of interpretation; and to insist that Section 404(a) (or, for that matter, Riverside) imposes a concrete distinction between adjacent and non-adjacent waters challenges credulity.

Rehnquist refuses to dip even a toe into the tide pool of science, policy, or history. For instance, an amicus curiae brief from several "distinguished scientists with broad expertise in America's aquatic systems" [FN255] urged the Court to consider science in reading the jurisdictional provision. The scientists argued that no water body is hydrologically "isolated" from other water sources and that non-adjacent ponds serve the same ecological functions as adjacent ones. [FN256] But the Court that had unanimously accepted the "ecological judgment" of Corps' scientists in Riverside, this time declines any help in determining the law.

And what of Congress's 1977 acquiescence to the Corps' assertion of authority over "non-navigable waters," a concession that led the unanimous Riverside Court, including then-Associate Justice ***50** Rehnquist, [FN257] to accept a broader reading of the Clean Water Act? Ancient history. As Rehnquist explains, "[b]ecause 'subsequent history is less illuminating than the contemporaneous evidence,'[the Corps] face[s] a difficult task in overcoming the plain text and import of [the provision]." [FN258] Complexity, this time in the form of legislative history, is again simplified.

Furthermore, the Chief Justice is uninterested in the Act's purpose of protecting the "chemical, physical, and biological integrity of the Nation's waters." [FN259] In their amicus brief, the wetlands scientists warned that an unprincipled distinction between adjacent and non-adjacent bodies of water could result in loss of fish and waterfowl, as well as increased flooding, contaminated livestock, and poisoned drinking wells. [FN260] But this information goes unnoticed.

The next stage of the Court's analysis is most unusual. The federal government argued that even if the statute did not require federal authority over "isolated" ponds, its language was capacious enough to allow the Corps to protect ponds and wetlands that served as habitat for migratory birds. Under the Chevron doctrine, the government argued, the Court should defer to the expert agency. [FN261] The Court rejects this argument with two responses, one predictable, the other surprising. First, the Court repeats that the statute clearly excludes non-adjacent water bodies and thus cannot permit the extension of the Migratory Bird Rule to this case. [FN262] This ruling alone would silence the government's argument. But the Court goes one step further. It argues that even if the statutory language permitted the Corps' broader view, the Court would still not concede deference under Chevron. [FN263] Rehnquist writes: "Permitting [***51** the Corps] to claim federal jurisdiction over ponds and mudflats falling within the 'Migratory Bird Rule' would result in significant impingement of the States' traditional and primary power over land and water use." [FN264] The threat of such impingement triggers a "heightened" federalism concern, we are told, which leads the Court to abandon Chevron deference to avoid "readjust[ing] the federal-state balance in this manner." [FN265]

Stirring below the surface, of course, is the suggestion that Section 404(a), as construed by the Migratory Bird Rule, might prove beyond Congress's constitutional powers under the Commerce Clause. The Petitioners had argued this position in their brief, and Justice Stevens takes time in his dissent to counter it. [FN266] But Rehnquist, motivated either by institutional prudence or a lack of votes, refuses to clarify whether the Corps' readjustment of the "federal-state balance" actually violates the Constitution. Instead, he chooses to stick to an approach of simplification in the face of complexity, and to ignore Congress's express pragmatic principle in favor of formalisms.

The contrast in these cases illustrates a fundamental tension between two views of law. Justice White, in Riverside, follows a philosophy similar to Steinbeck's: humans live in a physical world; their needs are united with those of other animals and plants, and, because all life forms are connected, our goals should recognize that human desires

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will sometimes be limited by ecological limitations. Riverside also acknowledges evolution and complexity, suggesting that our knowledge of ecological relationships changes over time and that our learning cycle progresses in fits and starts. White believes that statutory language can evolve with our understanding of the natural world. Perhaps even Congress's power to regulate water bodies within state boundaries might expand with our knowledge of ecological connection.

In SWANCC, by contrast, Rehnquist sees the world more like a pocket watch. The cogs are set, the spring is wound, and a predictable course of activity is launched. If a phrase in the Clean Water Act is worn or needs repair, it cannot be fixed or oiled on the fly. The watch must stop, the works must be re-opened and Congress, ***52** the master watchmaker, must execute the repairs. Of course, we have already caught the Chief Justice tapping on the watch case hoping to slip the cogs of statutory meaning into a "state's rights" position. This motivation is prompted by his faith in a nearly static federal-state balance, reminiscent of Steinbeck's holy "p<<SqRoot>>-1." [FN267]

Rehnquist may believe that such absolutes are essential to fair representation and just rule, but he does not make this case in practical or persuasive terms. To note that "power over land and water use" [FN268] is traditionally a local responsibility does not prove its wisdom; for wetlands protection is also, quite obviously, a matter of environmental protection, an accepted area of federal concern. In the end, the SWANCC Court is left only with the talisman of "should be" thinking.

The difference between Riverside and SWANCC is the difference between environmental holism and rote ideology, between the search for a comprehensive method of understanding and the faith in static political balances and old ideas. The success of Riverside lies not its holding, although many environmentalists welcomed it, but its reasoning, which incorporates textual reading, legislative intent, scientific information about the functioning of ecosystems, and a tacit understanding of the moral dimensions of preservation. Such reasoning invites future parties to identify and utilize these tools in future disputes. It also invites non-parties with scientific expertise to bring forward ecological and health information.

A faith in rote ideology, as exemplified in SWANCC, starves courts of this real-world information, creating two potential problems. First, a lack of historical and scientific information makes it unlikely that courts will interpret a protective statute to do what it is supposed to do, thus defeating the public's will. Second, loyalty to particular political roles can lead to decisions so motivated by outcome that they fall prey to fairly obvious logical inconsistencies. In SWANCC, the Court's reversal on the importance of past legislative action and its dismissal of Chevron deference represent such inconsistencies.

VI. Conclusion

In his early novel, To a God Unknown,[FN269] Steinbeck explores the ***53** material, cultural, and spiritual connections of a ranch family struggling against the mysterious and unpredictable forces of nature. The book opens with a Vedic hymn, in which the poet yearns to know the identity of the supreme power, the One. [FN270] Known to Hindus as Brahman, this "manifestation of self-giving power" [FN271] is thought to transcend, yet live within, all things and all beings in the universe. [FN272] We are in nature and of it. It is our fate, as part of this whole, to forever lack the capacity to define it and completely predict its course. Nevertheless, with a sense of how we relate to other parts of the whole and with empathy for those not like us, we can chart a course toward our own flourishing.

Compare this view with the traditionally Western idea of nature as pocket watch. In an unpublished poem, "The Dirge of Success," Steinbeck captures the notion:

I searched without rest

Until I found it;

And having found it

I probed it to the bottom,

Took it to pieces and found what made it run.

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After that the joy of possession was gone,

I was tired of it

And loathed it,

But it was mine. [FN273]

If environmental protection involved only applying a static view of nature, without regard to scientific reality, or maximizing aggregated statistical lives on paper, without regard to fairness, we might more easily achieve "success," but we would come to loathe it. Neither system would work in the real world: laws that ignore science are not sustainable physically; laws that ignore compassion are not sustainable morally, nor, as a result, politically. Steinbeck once contrasted the indifferent, "dry-ball" biologist who embalms specimens with no appreciation for their lives to the "true" biologist--"tenor [ ] of the scientific world" [FN274]--who "deals with life, with teeming boisterous life, and learns something from it, learns that ***54** the first rule of life is living." [FN275] Living means choosing survival--survival of one's body, species, and supporting ecosystem. Surprisingly, much of current environmental law is not really about survival. It is about teleological abstraction: insisting on human exceptionalism, expanding consumer choice, and shrinking federal government. It may be that such objectives facilitate human survival. But this is far from certain.

Approaching his vocation with passion and sometimes manic ambition, Steinbeck wrote as if he could save the world--or at least as if his readers could. That is why the lessons of connection, complexity, and compassion are so important, not only to intellectuals and scientists, but to politicians and lawyers. As Steinbeck observed in his Nobel Address, modern technology has put in our hands "[t]he danger and the glory and the choice." [FN276] The legacy of environmental law will depend on what we do with that choice.

[FNa1]. Marvin Rich Scholar & Professor of Law, University of Missouri, Kansas City. A.B. 1986, Stanford University; J.D. 1989, Harvard Law School. A shorter paper based on this article was presented as part of "John Steinbeck's Americas: A Centennial Conference," held at Hofstra University, Hempstead, NY (Mar. 21-23, 2002). For many helpful insights, I thank Erik Christensen, Tom Grey, Heidi Molbak, Irma Russell, Susan Shillinglaw, Raphael Sagarin, the editors of the Stanford Environmental Law Journal, and especially my colleague Nancy Levit. For excellent research assistance in many fields, I thank Janine DeManda, Shawn Henessee, and Angela Williams. The following institutions and individuals provided resources important to my research: The Department of Special Collections, Stanford University Libraries, Stanford, CA; The National Steinbeck Center, Salinas, CA; The Hopkins Marine Station of Stanford University, Pacific Grove, CA; Bloomsday Books, Kansas City, MO; and Shawn Henessee. The UMKC Law Foundation provided generous financial support.

I dedicate this article to my grandparents, Reed and Gladys Ericksten, who, in the 1930s, left Oklahoma's Dust Bowl for the western promised land.

[FN1]. Daniel B. Botkin, Discordant Harmonies: A New Ecology for the Twenty- First Century 188 (1990).

[FN2]. John Steinbeck, The Log from the Sea of Cortez 217 (Viking 1951) (1941) [hereinafter The Log].

[FN3]. See Raphael D. Sagarin et al., Climate-Related Change in an Intertidal Community over Short and Long Time Scales, 69 Ecological Monographs 465, 472 (1999) (documenting changes in the abundance of forty-six invertebrate species, including black turban snails, since the 1930s); Shannon Taylor, The Effects of Heat Stress on the Intertidal Size Gradient of Tegula funebralis, June 2, 2000 (unpublished manuscript on file at the Harold A. Miller Library, The Hopkins Marine Station of Stanford University, Pacific Grove, CA) (examining the effects of heat stress on the distribution patterns of black turban snails).

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[FN4]. Kyoto Protocol to the United Nations Framework Convention on Climate Change, agreed to by the Parties at the Third Conference of the Parties, Kyoto, Dec. 11, 1997, U.N. Doc. FCCC/CP/197/L.7/Add. 1 (1997), available at http:// unfccc.int/resource/docs/convkp/kpeng.pdf (last visited Nov. 6, 2002) (not in force).

[FN5]. Jackson J. Benson, The True Adventures of John Steinbeck, Writer 63 (1984).

[FN6]. John Steinbeck, Cannery Row 31 (1945) [hereinafter Cannery Row].

[FN7]. See generally Holly Doremus, Adaptive Management, the Endangered Species Act, and the Institutional Challenges of "New Age" Environmental Protection, 41 Washburn L.J. 50, 50-51 (2001) (arguing that adaptive management systems, which depend on the active management of nature, are necessary to "successfully conserve nature over meaningful lengths of time."). See also infra note 106 and accompanying text (discussing adaptive management systems).

[FN8]. See generally Stuart Kauffman, At Home in the Universe: The Search for the Laws of Self-Organization and Complexity 302 (1995). See also infra notes 64-66 and accompanying text.

[FN9]. Interview with Raphael Sagarin, Ph.D., Hopkins Marine Station of Stanford University, in Pacific Grove, Cal. (Oct. 15, 2001) (describing change in rock's appearance over time).

[FN10]. Id.

[FN11]. See generally Thomas C. Grey, The Wallace Stevens Case: Law and the Practice of Poetry (1991); Martha C. Nussbaum, Poetic Justice: The Literary Imagination and Public Life (1995); Richard A. Posner, Law and Literature (2d ed. 2000).

[FN12]. See, e.g., Letter from John Steinbeck to Bo Beskow (Nov. 19, 1948), in Steinbeck: A Life in Letters 341 (Elaine Steinbeck & Robert Wallsten eds., 1975) (describing divorce from Gwyndolyn Steinbeck) [hereinafter A Life in Letters]; Letter from John Steinbeck to Pascal Covici (Feb. 22, 1949), in id. at 349 (describing the same). Copies of more detailed (and more bitter) letters describing Steinbeck's divorce from Gwyndolyn Steinbeck are contained in the Wells Fargo Steinbeck Collection, Department of Special Collections, Stanford University Libraries.

[FN13]. Jackson J. Benson, John Steinbeck: Novelist as Scientist, in John Steinbeck 103 (Harold Bloom ed., 1987).

[FN14]. Benson, supra note 5, at 38-39, 63.

[FN15]. Benson, supra note 13, at 103-04.

[FN16]. John Steinbeck & E.F. Ricketts, Sea of Cortez (1941). This work should not be confused with The Log, supra note 2, which is Steinbeck's narrative companion to the 1941 book.

Edgar Allen Poe's primary contribution to the sciences was a textbook, The Conchologist's First Book: Or, A System of Testaceous Malacology, Arranged Expressly for the Use of Schools (1839). Like Sea of Cortez, Poe's

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book also benefited from outside help. Soon after the debut of The Conchologist's First Book, Poe was accused (justifiably, as it turns out) of having plagiarized a work penned by Captain Thomas Brown. See Stephen Jay Gould, Poe's Greatest Hit, in Dinosaur in a Haystack: Reflections in Natural History 173, 177-78 (1995).

[FN17]. See, e.g., Brian Railsback, Parallel Expeditions: Charles Darwin and the Art of John Steinbeck (1995); Steinbeck and the Environment: Interdisciplinary Approaches (Susan F. Beegel et al. eds., 1997).

[FN18]. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121 (1985).

[FN19]. Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001).

[FN20]. See The Dictionary of Ecology 200 (Michael Allaby ed., 2d ed. 1998) (discussing the term "holistic").

[FN21]. See, e.g., Robert V. Percival et al., Environmental Regulation: Law, Science, and Policy 11-21 (3d ed. 2000) (discussing ethics). Economic and scientific approaches are discussed in id. at 30-64.

[FN22]. William H. Rodgers, The Seven Statutory Wonders of U.S. Environmental Law: Origins and Morphology, 27 Loy. L.A. L. Rev. 1009, 1014-15 (1994) (characterizing these statutes as having an "inspirational and radical message").

[FN23]. See, e.g., Nature's Services: Societal Dependence on Natural Ecosystems 177 (Gretchen C. Daily ed., 1997); Symposium on Ecosystem Services, 20 Stan. Envtl. L. J. (2001).

[FN24]. James Salzman et al., Protecting Ecosystem Services: Science, Economics, and Law, 20 Stan. Envtl. L.J. 309, 317-20 (2001).

[FN25]. Notable works on New Ecology include Botkin, supra note 1; Daniel B. Botkin, No Man's Garden: Thoreau and a New Vision for Civilization and Nature (2001); Daniel Botkin, Adjusting Law to Nature's Discordant Harmonies, 7 Duke Envtl. L. & Pol'y F. 25 (1996); Judy L. Meyer, The Dance of Nature: New Concepts in Ecology, 69 Chi.-Kent L. Rev. 875 (1994); Bryan Norton, Change, Constancy, and Creativity: The New Ecology and Some Old Problems, Duke Envtl. L. & Pol'y F. 49 (1996); A. Dan Tarlock, The Nonequilibrium Paradigm in Ecology and the Partial Unraveling of Environmental Law, 27 Loy. L.A. L. Rev. 1121 (1994); Jonathan Baert Wiener, Law and the New Ecology: Evolution, Categories, and Consequences, 22 Ecology L.Q. 325 (1995) (reviewing Jonathan Weiner, The Beak of the Finch: A Story of Evolution in Our Time (1994)). New Ecology is introduced to law students in at least one leading environmental law casebook. See Percival et al., supra note 21, at 50-58 (excerpting Botkin, supra, and discussing the implications of New Ecology).

[FN26]. See A. Dan Tarlock, Environmental Law: Ethics or Science?, Duke Envtl. L. & Pol'y F. 193, 194 (1996) (arguing for an environmentalism based on science rather than ethics, because of the indeterminacy and mutability of ethical principles).

[FN27]. See Ralph Waldo Emerson, The Over-Soul, in The Best of Ralph Waldo Emerson: Essays, Poems, Addresses 205 (1941) (introducing the idea of a collective force, called the "Over-Soul," which draws from the energy of all living things).

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[FN28]. See supra note 25 and accompanying text.

[FN29]. See generally Robert J. DeMott, Steinbeck's Reading: A Catalogue of Books Owned and Borrowed (1984).

[FN30]. The Log, supra note 2, at 85 (emphasis in original).

[FN31]. Letter from John Steinbeck to Thom Steinbeck (Aug. 2, 1956) (photocopy on file with the John Steinbeck Center, Salinas, CA, coll: John Steinbeck, folder: D11; series: 1 John Steinbeck Correspondence; fol. title: Steinbeck - Thom) (on the occasion of his son, Thom's, twelfth birthday).

[FN32]. Cannery Row, supra note 6, at 30-31.

[FN33]. The Log, supra note 2, at 216.

[FN34]. John Steinbeck, The Grapes of Wrath 20-22 (1939) [hereinafter The Grapes of Wrath].

[FN35]. Id.

[FN36]. The tortoise's challenge resembles that of Sisyphus, who according to Greek mythology is condemned in the afterlife to push a boulder uphill, only to have it roll back down so that he must repeat the motion interminably. Albert Camus would later offer the myth of Sisyphus as a metaphor for human existence. See generally Albert Camus, The Myth of Sisyphus, in The Myth of Sisyphus and other Essays 88-91 (Justin O'Brien trans., Vintage Books 1955) (1942).

[FN37]. John Steinbeck, America and Americans 137 (1966).

[FN38]. Cannery Row, supra note 6, at 1.

[FN39]. See Railsback, supra note 17, at 54.

[FN40]. John Steinbeck, To a God Unknown 19 (1933) [hereinafter To a God Unknown].

[FN41]. John Steinbeck, Of Mice and Men (Penguin Books 1993) (1937) [hereinafter Of Mice and Men]; John Steinbeck, Johnny Bear, in The Long Valley 145-85 (1938) [hereinafter Johnny Bear].

[FN42]. Of Mice and Men, supra note 41, at 2 (noting that Lenny "walked heavily, dragging his feet a little, the way a bear drags his paws"); Johnny Bear, supra note 41, at 148 (describing the character Johnny as looking like "a great, stupid, smiling bear," with "long arms as though he should have been on all fours and was only standing upright as a trick").

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[FN43]. John Steinbeck, Flight, in The Long Valley, supra note 41, at 45, 68-70.

[FN44]. Critic Brian Railsback offers a lengthy catalog of anthropomorphic comparisons in Railsback, supra note 17, at 41-76.

[FN45]. See Cannery Row, supra note 6, at 17-18.

[FN46]. See generally Arthur O. Lovejoy, The Great Chain of Being: A Study of the History of an Idea (1957) (examining, through an interdisciplinary approach, the notion of natural hierarchies in human history).

[FN47]. The Log, supra note 2, at 88-89.

[FN48]. Id. at 134-35. Non-teleological thinking, which posits that natural systems do not move toward particular goals or preconceived functions, has been widely embraced by biologists and other scientists. Nonetheless, there exists considerable disagreement about how to define the concept. For a brief and insightful introduction to non-teleological thought, see Ernst Mayr, Toward a New Philosophy of Biology: Observations of an Evolutionist 38-66 (1988).

[FN49]. See generally Jean-Jacques Rousseau, Discourse on the Origin of Inequality (anon. trans., 1761) (1755), in Jean-Jacques Rousseau, The Social Contract and Discourse on the Origin of Inequality (Lester G. Crocker ed., 1967).

[FN50]. Bill DeVall, The Deep Ecology Movement, 20 Nat. Resources J. 299 (1980), reprinted in Ecology 125, 135 (Carolyn Merchant ed., 1994).

[FN51]. See Tarlock, supra note 25, at 1211.

[FN52]. Charles Darwin, The Descent of Man, in Darwin 132 (Philip Appleman ed., W.W. Norton & Co. 2d ed. 1979) (1871).

[FN53]. See Botkin, supra note 1, at 194 ("Since there is no longer any part of the Earth that is untouched by our actions in some way, either directly or indirectly, there are no wildernesses in the sense of places completely unaffected by people.").

[FN54]. John Steinbeck, Sweet Thursday 1 (1954) [hereinafter Sweet Thursday]. The California pilchard (Sardinops sagax caerulea) is also known as the Pacific sardine. See Ocean Oasis Field Guide, at http://www.oceanoasis.org/fieldguide/sard-cae.html (last visited Nov. 9, 2002).

[FN55]. Botkin, supra note 1, at 20.

[FN56]. Id. at 20-21.

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[FN57]. Id. at 20-22.

[FN58]. See The Log, supra note 2, at 134-35 (contrasting "is" thinking to "should be" thinking).

[FN59]. Sweet Thursday, supra note 54, at 1.

[FN60]. See James Salzman & J.B. Ruhl, Currencies and the Commodification of Environmental Law, 53 Stan. L. Rev. 607, 611-12 (2000). Specifically, "the [se] regulations mandate trades that ensure equivalent value and function between destroyed and restored wetlands," with value determined on the basis of acreage. Id. at 612.

[FN61]. Id.

[FN62]. Id. at 658.

[FN63]. Id. at 660.

[FN64]. "Complexity theory" has become somewhat of a cottage industry among scientists, mathematicians and economists, and has spawned a dizzying array of competing definitions and assumptions. See generally Kauffman, supra note 8; M. Mitchell Waldrop, Complexity: The Emerging Science at the Edge of Order and Chaos (1992). For the purposes of my analysis, I wish to avoid points of disagreement within the complexity camp and focus, instead, on the general outlines of this intellectual movement.

[FN65]. Complexity theorist Stuart Kauffman refers to this process as "coevolution." See Kauffman, supra note 8, at 215-21.

[FN66]. For a primer on chaos theory, see James Gleick, Chaos: Making a New Science (1987).

[FN67]. John Steinbeck, The Kittens and the Curtain (unpublished, undated typed manuscript with holographic corrections, on file with the Wells Fargo Steinbeck Collection, Department of Special Collections, Stanford University Libraries, box 4, series ix, folder 109). Quoted with the permission of Stanford University.

[FN68]. Id. at 3.

[FN69]. See Gerald Holton, Thematic Origins of Scientific Thought: Kepler to Einstein 102 (1988). Recently the physicists Eric Cornell and Carl Wieman raised questions about the supposed contradictory nature of light's behavior. In a 1995 experiment, they showed that light's wave-like and particle-like properties could be made to resonate without self-contradiction when exposed to a temperature of 20 billionths of a degree above absolute zero. Playing Catch Up, The Economist, Oct. 13, 2001, available in 2001 WL 7320580. For this work, they were awarded the 2001 Nobel Prize in Physics (shared with Wolfgang Ketterle). Id.

[FN70]. Edward F. Ricketts & Jack Calvin, Between Pacific Tides (3d ed. 1966).

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[FN71]. Id. at 4.

[FN72]. Audio Tape: Interview of Joseph Campbell by Pauline Pearson, John Steinbeck Library, Salinas, CA (Nov. 28, 1983) (on file with the National Steinbeck Center, Salinas, CA; oral history collection; tape 1; copy 1; side 2) [hereinafter "Campbell Interview"]. Portions of this interview are quoted with the permission of the National Steinbeck Center.

[FN73]. See generally Cannery Row, supra note 6.

[FN74]. Id. at 96-97.

[FN75]. Id. at 194-201.

[FN76]. Id. at 194.

[FN77]. John Steinbeck, The Red Pony (Penguin Books 1994) (1937).

[FN78]. Id.

[FN79]. See Stuart Kauffman, supra note 8, at 302.

[FN80]. The Grapes of Wrath, supra note 34, at 3-5.

[FN81]. See Robert R.M. Verchick, Dust Bowl Blues: Saving and Sharing the Ogallala Aquifer, 14 J. Envtl. L. & Litig. 13, 16-19 (1999).

[FN82]. Id.

[FN83]. Id.

[FN84]. See, e.g., Woody Guthrie, Dust Bowl Pneumonia Blues, on Dust Bowl Ballads (Rounder Records 1988) (1940).

[FN85]. See Robert DeMott, Preface, in John Steinbeck, Working Days: The Journals of The Grapes of Wrath 13 (Robert DeMott ed., 1989) [hereinafter Working Days]. At other times, Steinbeck sought inspiration from Pyotr Ilyich Tchaikovsky's Swan Lake. See id.

[FN86]. See Benson, supra note 5, at 418-23 (describing the various attacks on the novel that followed its publication).

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[FN87]. See id. at 418.

[FN88]. See Letter from John Steinbeck to Pascal Covici (Jan. 16, 1939), in A Life in Letters, supra note 12, at 178-79 ("I've tried to write [The Grapes of Wrath] the way lives are being lived, not the way books are being written.").

[FN89]. See id. at 419-22. Steinbeck expected The Grapes of Wrath to stir political controversy when released. Indeed, the book's title, taken from a verse in Julia Ward Howe's Battle Hymn of the Republic (1862) was meant to immunize him from anticipated accusations of being "un-American." See Letter from John Steinbeck to Pascal Covici (Jan. 1, 1939), in A Life in Letters, supra note 12, at 174-75. The idea for the title came from Steinbeck's first wife, Carol, and John embraced it enthusiastically. In fact, he insisted that his publisher include the full score of the hymn inside the book's front cover. Id. See also Working Days, supra note 85, at 65, 70-71 (including Steinbeck's correspondence on this point and a photograph of the first edition's inside front cover).

[FN90]. See Karl Marx, The Coming Upheaval, in The Marx-Engels Reader 218 (Robert C. Tucker ed., 2d ed. 1978).

[FN91]. See generally Georg Wilhelm Friedrich Hegel, Elements of the Philosophy of Right (Allen W. Wood ed., H.B. Nisbet trans., 1991).

[FN92]. See generally Hegel's Science of Logic (A.V. Miller trans., Humanities Press 1976) (1969).

[FN93]. Tarlock, supra note 25, at 1127 (describing how ecologists were slow to adopt the concept of dynamism, even after it had found favor among physicists, biologists, and other types of scientists).

[FN94]. Id.

[FN95]. Dictionary of Ecology, supra note 20, at 196.

[FN96]. Tarlock, supra note 25, at 1126.

[FN97]. See, e.g., Botkin, supra note 1, at 76-77 (describing how Aldo Leopold attributed--perhaps inaccurately--the crash of mule deer populations on the North Rim of the Grand Canyon to the government's eradication of predators like wolves and mountain lions).

[FN98]. Aldo Leopold, A Sand County Almanac 224-25 (1949).

[FN99]. For more information on New Ecology, see supra note 25.

[FN100]. Daniel B. Botkin, Our Natural History: The Lessons of Lewis and Clark 22-24 (1995).

[FN101]. See Committee on the Science of Climate Change of the National Research Council, Climate Change Science: An Analysis of Some Key Questions (2001) (describing examples of very abrupt, natural climate changes,

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including one that marked the end of the Younger Dryas cold interval 14,000 years ago, when the earth's average temperature rose fifteen degrees Fahrenheit in a single decade).

[FN102]. See generally Kauffman, supra note 8; M. Mitchell Waldrop, Complexity: The Emerging Science at the Edge of Order and Chaos (1992). For a skeptical view of this trend, see Edward O. Wilson, Consilience: The Unity of Knowledge 96-104 (1998).

[FN103]. Rio Declaration on Environment and Development, United Nations Conference on Environment and Development, U.N. Doc. A/CONF.151/5 (1992), reprinted in 31 I.L.M. 874, 879 (1992). Although this definition is the most widely accepted, many variations exist. See Christopher D. Stone, Is There a Precautionary Principle?, 31 Envtl. L. Rep. (Envtl. L. Inst.) 10,790 (July 2001).

[FN104]. Steve F. Arnold et al., Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals, 272 Science 1489 (1996).

[FN105]. See Clifford Rechtschaffen & Eileen Gauna, Environmental Justice: Law, Policy, & Regulation 104-05 (2002).

[FN106]. See Holly Doremus, supra note 7, at 52 (describing adaptive management as "managing according to a plan by which decisions are made and modified as a function of what is known and learned about the system, including information about the effect of previous management actions").

[FN107]. See id.

[FN108]. Janet C. Neuman, Adaptive Management: How Water Law Needs to Change, 31 Envtl. L. Rep. (Envtl. L. Inst.) 11,432, 11,432 (Dec. 2001).

[FN109]. Mayr, supra note 48, at 85.

[FN110]. Of course, the Keynesian revolution did much to question the balance of laissez-faire economics. Before the Great Depression, conventional wisdom held to a belief that the market was homeostatically self-regulating. Government attempts to influence market activity were viewed as wrong, both as matters of principle and of practicality. John Maynard Keynes questioned the idea of inherent market balance, arguing that inherent "risk, uncertainty, and ignorance" allowed some market actors to take unfair advantage of others. This led him to advocate a regulatory role for government. See John Maynard Keynes, The End of Laissez-Faire, in Essays in Persuasion 312, 317-18 (W.W. Norton & Co. 1963) (1932).

[FN111]. See discussion infra Part V.

[FN112]. John Steinbeck, Foreword, in Ricketts & Calvin, supra note 70, at v.

[FN113]. Id. at vi.

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[FN114]. The term homo proteus was coined by Edward Wilson. Wilson, supra note 102, at 304.

[FN115]. Alston Chase, Playing God in Yellowstone: The Destruction of America's First National Park 382-83 (Harcourt Brace 1987) (1986).

[FN116]. Id.

[FN117]. Id.

[FN118]. See Tarlock, supra note 26, at 204 (explaining that "[i]n the future, a major environmental management task will be the restoration of degraded ecosystems").

[FN119]. See Gregg Easterbrook, A Moment on the Earth: The Coming Age of Environmental Optimism 94-96 (1995). Easterbrook's book has spurred considerable controversy. For a critique of its conclusions on scientific grounds, see Paul R. Ehrlich & Anne H. Ehrlich, Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens our Future 218-26 (1996).

[FN120]. See Charles C. Mann, 1491, Atlantic Monthly, Mar. 2002, at 41.

[FN121]. Id.

[FN122]. Annie Dillard, Living by Fiction 55 (1982).

[FN123]. The Log, supra note 2, at 145; cf. Botkin, supra note 1, at 189 (describing the loss of the normative belief in the "constancy of undisturbed nature" as "uncomfortable psychologically").

[FN124]. John Steinbeck, The Affair at 7, Rue de M --, in Prize Stories 1956: The O. Henry Awards 258, 264 (Paul Engle & Hansford Martin eds., 1956) (reprinting story from Harper's Bazaar). An early draft of this little-known story can be found at Stanford's Department of Special Collections. See John Steinbeck, The Affair at 1 Avenue de M--(typed manuscript with typed notes from Marlène Gray) (on file with the Wells Fargo Steinbeck Collection, Department of Special Collections, Stanford University Libraries, box 5, series ix).

[FN125]. Harriet Beecher Stowe, Uncle Tom's Cabin: or Life Among the Lowly (1852).

[FN126]. See Benson, supra note 5, at 422-23 (quoting part of the Committee's final report, issued in 1942). Unfortunately, the events of World War II eclipsed the issue of migrant workers, and the plight of America's migrants was soon forgotten. Id.

[FN127]. Campbell Interview, supra note 72, at side 1.

[FN128]. Paul R. Ehrlich, Human Natures: Genes, Cultures, and the Human Prospect 325-26 (2000) (arguing that because "few significant human problems today lie strictly within the boundaries of current disciplines,"

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interdisciplinary scholarship is essential); Wilson, supra note 102, at 229-30 (describing the ways in which evolutionary theory can better inform study of the arts).

[FN129]. Wilson, supra note 102, at 57.

[FN130]. See Nancy Levit, Listening to Tribal Legends: An Essay on Law and the Scientific Method, 58 Fordham L. Rev. 263, 269-70 (1989).

[FN131]. Homer, The Iliad 283 (Richard Lattimore trans., University of Chicago Press 1951).

[FN132]. Virginia Woolf, To the Lighthouse 308 (Harvest/HBJ 1955) (1927).

[FN133]. See, e.g., Steinbeck & Ricketts, supra note 16.

[FN134]. Benson, supra note 5, at 347.

[FN135]. Id. at 504-14, 1002-22 (describing Steinbeck's role as war correspondent during World War II and the Vietnam War, respectively).

[FN136]. The Grapes of Wrath, supra note 34, at 495-96.

[FN137]. Id. at 561-62.

[FN138]. Id. at 141-44.

[FN139]. Id. at 476-77.

[FN140]. Steinbeck scholar James Brasch argues that the Biblical history of the Jews' struggle toward the Promised Land influences many of Steinbeck's works, but is most evident in The Grapes of Wrath. James D. Brasch, The Grapes of Wrath and Old Testament Skepticism, reprinted in John Steinbeck's The Grapes of Wrath 45, 45 (Harold Bloom ed., 1988).

[FN141]. See Jay Parini, John Steinbeck 351 (1995) (noting that East of Eden arose out of Steinbeck's attempt "to write out the Cain and Abel story").

[FN142]. See id. at 149. Indeed, Steinbeck expressed disappointment that readers did not recognize "the plan of the Arthurian cycle" upon which Tortilla Flat was based. Id. (quoting an unpublished journal entry by Steinbeck, on file with the San Jose State University Library).

[FN143]. Cf. Wilson, supra note 102, at 264. Edward Wilson writes: "[T]he harsh lessons of history have made it clear that one code of ethics is not as good--at least, not as durable--as another. The same is true of religions. Some

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cosmologies are factually less correct than others, and some ethical precepts are less workable." Id.

[FN144]. This ideal has philosophical grounding in the classical republican political tradition. See Cass R. Sunstein, Beyond the Republican Revival, 97 Yale L.J. 1539, 1548-49 (1988). But, in some form, it is also a matter of common sense. In a democracy, leaders who do not understand the needs of their constituents or who lack the imagination to address those needs do not remain leaders for long.

[FN145]. See Levit, supra note 130, at 269-70.

[FN146]. Rachel Carson, Silent Spring 54-55 (1962).

[FN147]. See generally id.; see also Rachel Carson, The Sea Around Us (1951).

[FN148]. John Steinbeck, Nobel Acceptance Speech (Dec. 10, 1962), in A Life in Letters, supra note 12, at 897, 898 [hereinafter Nobel Acceptance Speech].

[FN149]. See John Steinbeck, In Dubious Battle 256-57 (1936).

[FN150]. John Steinbeck, East of Eden 8-12 (1952).

[FN151]. The Grapes of Wrath, supra note 34, at 618-19.

[FN152]. See supra note 37 and accompanying text.

[FN153]. The Grapes of Wrath, supra note 34, at 42-53.

[FN154]. Id. at 50.

[FN155]. Id. at 52.

[FN156]. Id. at 42.

[FN157]. Id.

[FN158]. Hannah Arendt, The Origins of Totalitarianism 477 (Harvest/HBJ 1979) (1951).

[FN159]. Id.

[FN160]. Id. at 478.

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[FN161]. Interestingly, Richard Posner, a founder of the formalistic law- and-economics movement, is an admirer of Frederic Nietzsche, a founding father of lonely nihilism. Larissa MacFarquhar, The Bench Burner, The New Yorker, Dec. 10, 2001, at 78, 84 ("Nietzsche is perhaps the philosopher who has had the deepest influence on Posner."). Of course, Judge Posner would not, himself, characterize Nietzschean philosophy as limiting or even lonely. On the contrary, he describes it as "basically optimistic, cheerful, and forward- looking." Id. at 86.

[FN162]. The Grapes of Wrath, supra note 34, at 206.

[FN163]. Ehrlich, supra note 128, at 121-22.

[FN164]. See Joshua Greene et al., An fMRI Investigation of Emotional Engagement in Moral Judgment, 293 Science 2105-08 (2001); Erica Klarreich, Heart Joins Head in Moral Maze, Nature, Sept. 14, 2001, available at http:// www.nature.com/nsu/nsu_pf/010920/010920-1.html (last visited Nov. 19, 2002).

[FN165]. George Lakoff & Mark Turner, More than Cool Reason: A Field Guide to Poetic Metaphor 214 (1989). On the power of poetry, they write:

> Recent discoveries about the nature of metaphor suggest that metaphor is anything but peripheral to the life of the mind. It is central to our understanding of our selves, our culture, and the world at large. Poetry, through metaphor, exercises our minds so that we can extend our normal powers of comprehension beyond the range of the metaphors we are brought up to see the world through.

Id.

[FN166]. Martha C. Nussbaum, Cultivating Humanity: A Classical Defense of Reforming Liberal Education 10-11 (1997).

[FN167]. See generally Richard Wright, Native Son (1940) (chronicling the life of a poor, under-educated black man, whose life spins out of control when he commits murder and later confronts the criminal justice system).

[FN168]. Nussbaum, supra note 166, at 13.

[FN169]. Id. at 10; see also Robert Coles, The Call of Service: A Witness to Idealism 161-73 (1993) (describing how seminar discussions on the works of Raymond Carver, James Baldwin, George Eliot, and others have helped university students assign personal and political meaning to their community service work). Human compassion can, and arguably should, extend in application to other species. See Robert R.M. Verchick, A New Species of Rights?, 89 Cal. L. Rev. 207, 220-21 (reviewing Steven M. Wise, Rattling the Cage: Toward Legal Rights for Animals (2000)) (2001).

[FN170]. Ehrlich, supra note 128, at 38-39, 315; Wilson, supra note 102, at 168-69.

[FN171]. Ehrlich, supra note 128, at 216.

[FN172]. Id. at 326-27.

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[FN173]. See id.

[FN174]. See id. at 314 (noting people's tendency to become empathetically involved in fictional characters).

[FN175]. I thank Steinbeck scholar Robert DeMott for this insight.

[FN176]. See discussion supra at Part III.A.2.

[FN177]. See discussion supra at Part III.B.2.

[FN178]. See discussion supra at Part III.C.

[FN179]. Don DeLillo, Some Words for John Steinbeck, in John Steinbeck: Centennial Reflections by American Writers 34 (Susan Shillinglaw ed., 2000) (copy on file with the author).

[FN180]. Lisa Heinzerling, The Rights of Statistical People, 24 Harv. Envtl. L. Rev. 189, 203-06 (2000). In describing the valuation of lives, Heinzerling states:

> [T]o put the idea in concrete terms: if each person in a population of 1,000 faces a 1/1,000 risk of death from a particular hazard, and each person is willing to pay $5 to eliminate this risk to herself then the value of a 'statistical life' in this population is $5,000 ... In practice ... analysts treat the valuation achieved ... as a valuation of life itself.

Id. at 203-04.

[FN181]. See id. at 191.

[FN182]. Jeremy Bernstein & Steve Gibb, Rolling Back the Regulatory State, Env. Forum, July-Aug. 2002, at 19, 25-26.

[FN183]. Id.

[FN184]. Nussbaum, supra note 11, at 47.

[FN185]. This was one goal of President Clinton's Executive Order No. 12,898 on Environmental Justice, which required all federal agencies to consider the effects of their policies and decisions on the health and environment of low-income and minority communities. See Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, Exec. Order No. 12,898, 3 C.F.R. 859 (1995), reprinted in 42 U.S.C. ß 4321, Admin. Mat. 45075. Implementation of this order remained incomplete at the close of the Clinton Administration. See Denis Binder et al., A Survey of Federal Agency Response to President Clinton's Executive Order No. 12,898 on Environmental Justice, 31 Envtl. L. Rep. (Envtl. L. Inst.) 11,133, 11,150 (Oct. 2001). While the order remains in effect, further implementation of the order does not appear to be a strong priority under the current administration.

[FN186]. Empirical research suggests that "ill people do not place a lower value on life expectancy improvements

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than healthy people." Bernstein & Gibb, supra note 182, at 26 (quoting Alan Krupnick, an economist formerly with the White House Council of Economic Advisers) (emphasis added).

[FN187]. See Edith Brown Weiss, In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity 17-21 (1989).

[FN188]. See, e.g., National Environment Policy Act, 42 U.S.C. ß 4331(b)(1) (1994) (declaring the duty of each generation to act "as trustee of the environment for succeeding generations"); World Comm'n on Env't and Dev., Our Common Future 430 (1987) (endorsing sustainable development, which is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs").

[FN189]. See Lisa Heinzerling, Regulatory Costs of Mythic Proportions, 107 Yale L.J. 1981, 2047 (1998).

[FN190]. See Bernstein & Gibb, supra note 182, at 25.

[FN191]. See Heinzerling, supra note 189, at 2046.

[FN192]. The skeptical reader might respond that future generations might be glad that we did not strictly regulate if that choice left future generations a stronger economy or infrastructure than would otherwise be available. But this argument is not an argument for discounting. Discounting assumes that future desires are less compelling than present desires. The skeptic's response only emphasizes that future generations value their own welfare to the same degree we do.

[FN193]. Indeed, it is probable that our global actions today, whether good or bad, will change the identities of these future human beings. This brain twister is called "Parfit's Paradox." See Derek Parfit, On Doing the Best for Our Children, in Ethics and Population 100, 101-02 (M. Bayles ed., 1976).

[FN194]. Roy Siegfried, Keeping the Rainbow: The Environmental Challenge for Africa and the World 52 (2002) (attributing the line to Groucho Marx).

[FN195]. See discussion supra Part IV.B.

[FN196]. Umberto Eco, Fictional Protocols, in Six Walks in the Fictional Woods 117, 131 (1994).

[FN197]. Cf. The Log, supra note 2, at 14-15 (attributing Sicilians' thousand-year-old tradition of mounting deer horns on ship masts to the compulsion of an "essential race soul," and attributing the universal design of boat hulls to "the unconscious memories of [the builder's] ancestors").

[FN198]. Frank Ackerman & Lisa Heinzerling, Pricing the Priceless: Cost Benefit Analysis of Environmental Protection, 150 U. Pa. L. Rev. 1553, 1571 (2002).

[FN199]. See supra note 160 and accompanying text.

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[FN200]. See Botkin, No Man's Garden, supra note 25, at 202.

[FN201]. Economists have experimented with surveys and models that capture some of the intangible benefits of environmental programs, such as the "existence value" of a species or place, but such methods have serious flaws and very likely underestimate in monetary terms the value of such benefits. See Robert R.M. Verchick, Feathers or Gold? A Civic Economics for Environmental Law, 25 Harv. Envtl. L. Rev. 95 (2001).

[FN202]. For instance, Nature published a study in 1997 estimating the aggregate value of ecosystem services to be between $16 trillion and $54trillion per year. R. Costanza et al., The Value of the World's Ecosystem Services and Natural Capital, 387 Nature 253 (1997). To put this in perspective, the global Gross National Product is $18 trillion per year. James Salzman, Valuing Ecosystem Services, 24 Ecology L.Q. 887, 891 (1997).

[FN203]. The Log, supra note 2, at 248-50.

[FN204]. John Steinbeck, Travels with Charley 187-88 (1962)

[FN205]. See supra Part III.A.2.

[FN206]. Of Mice and Men, supra note 42, at 14 (italics omitted).

[FN207]. Botkin, supra note 100, at 269.

[FN208]. See supra Part III.A.2.

[FN209]. See supra Part IV.C.1.

[FN210]. See supra Part III.A.2.

[FN211]. See supra Part IV.C.1.

[FN212]. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121 (1985).

[FN213]. Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001).

[FN214]. Clean Water Act, 33 U.S.C. ß ß 1251-1387 (2000).

[FN215]. SWANCC, 531 U.S. at 162-64; Riverside, 474 U.S. at 123.

[FN216]. 33 U.S.C. ß 1344(a) (2000).

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[FN217]. 33 U.S.C. ß 1362(7) (2000).

[FN218]. Riverside, 474 U.S. at 125.

[FN219]. SWANCC, 531 U.S. at 162-67.

[FN220]. See Riverside, 474 U.S. at 126-27.

[FN221]. See Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837, 842-45 (1984).

[FN222]. See Riverside, 474 U.S. at 126-27.

[FN223]. Riverside, 474 U.S. at 132.

[FN224]. Id. (emphasis added).

[FN225]. Id. at 132.

[FN226]. Id.

[FN227]. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 132 (1985) (quoting the Clean Water Act, 33 U.S.C. ß 1344 (1994)).

[FN228]. Id. (quoting H.R. Rep. No. 92-911, at 76 (1972)).

[FN229]. See Brief of Amici Curiae National Wildlife Federation et al. [hereinafter "NWF Amicus Brief"], United States v. Riverside Bayview Homes, Inc., 474 U.S. 121 (1985) (No. 84-701).

[FN230]. Riverside, 474 U.S. at 132-33 (quoting S. Rep. No. 92-414, at 77 (1972)). See also NWF Amicus Brief, supra note 229 (making same argument).

[FN231]. Rivers and Harbors Appropriation Act, ch. 425, 30 Stat. 1151 (1899) (codified as amended at 33 U.S.C. ß ß 403-413 (2000)).

[FN232]. Federal Water Pollution Control Act, ch. 758, 62 Stat. 1155 (1948) (codified as amended at 33 U.S.C. ß ß 1251-1387 (2000)).

[FN233]. 30 Stat. 1152.

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[FN234]. 62 Stat. 1161. For more history on the federal role in water regulation, see Rogers, America's Waters: Federal Roles and Responsibilities (1993).

[FN235]. The legislation was passed as an amendment to the Federal Water Pollution Control Act and did not formally take the name "Clean Water Act" until the legislation was again amended in 1977. See William H. Rodgers, Jr., Environmental Law ß 4.1 (2d ed. 1994).

[FN236]. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 133 (1985).

[FN237]. Id. at 137.

[FN238]. Id.

[FN239]. Id. at 132. The passage reads in full:
In determining the limits of its power to regulate discharges under the Act, the Corps must necessarily choose some point at which water ends and land begins. Our common experience tells us that this is often no easy task: the transition from water to solid ground is not necessarily or even typically an abrupt one.
Id.

[FN240]. See id. at 134. This point is made even more explicitly in the National Wildlife Federation's amicus brief. See NWF Amicus Brief, supra note 229, at 16 (referring to the importance of wetlands to duck populations and to America's bird hunters and bird watchers, when discussing the impact of wetlands preservation on interstate commerce).

[FN241]. An "organic" process is one "characterized by the systematic arrangement of parts." Random House Dictionary 620 (2d ed. 1980).

[FN242]. Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159, 163 (2001).

[FN243]. United States v. Riverside Bayview Homes, Inc. 474 U.S. 121, 130-31 (1985).

[FN244]. SWANCC, 531 U.S. at 168.

[FN245]. Id. at 163.

[FN246]. Riverside, 474 U.S. at 129.

[FN247]. SWANCC, 531 U.S. at 164 (2001) (citing 33 C.F.R. ß 404(a)).

[FN248]. Id. at 162.

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[FN249]. Id. at 171-72.

[FN250]. Id. at 173-74.

[FN251]. See id.

[FN252]. See id. at 172.

[FN253]. Id. at 162.

[FN254]. Id. at 167 (2001) (explaining reasoning in Riverside).

[FN255]. Id. at 176 (citing Brief for Dr. Gene Likens et al. as Amicus Curiae 6-22 [hereinafter Likens Brief]).

[FN256]. Id. (citing Brief for Petitioner, at 11).

[FN257]. Justices O'Connor and Stevens were the only other members of the Court who participated in both Riverside and SWANCC. Justice O'Connor, like Rehnquist, saw a distinction between the two cases and joined the Chief Justice in the SWANCC majority. See SWANCC, 531 U.S. at 162. Justice Stevens believed that the Court's inclusive interpretation of "navigable waters" in Riverside applied equally in SWANCC and filed a spirited dissent saying so. See SWANCC, 531 U.S. at 175 (Stevens, J., dissenting) (arguing that "once Congress crossed the legal watershed that separates navigable streams of commerce from marshes and inland lakes, there is no principled reason for limiting the statute's protection to those waters or wetlands that happen to lie near a navigable stream").

[FN258]. Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159, 170 (2001) (quoting Hagen v. Utah, 510 U.S. 399, 420 (1994)).

[FN259]. See United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 132 (1985) (quoting Clean Water Act, 33 U.S.C. ß 1344 (1994)).

[FN260]. Likens Brief, supra note 255, at 2-3.

[FN261]. See id. at 172. See also supra note 221.

[FN262]. SWANCC, 531 U.S. at 172.

[FN263]. Id.

[FN264]. Id. at 174 (citing Hess v. Port Authority Trans-Hudson Corp., 513 U.S. 30, 44 (1994)).

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[FN265]. Id.

[FN266]. See Brief of Petitioners, SWANCC, 531 U.S. 159 (2001); SWANCC, 531 U.S. at 191-97 (Stevens, J., dissenting).

[FN267]. See supra note 47 and accompanying text.

[FN268]. Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159, 174 (2001).

[FN269]. To a God Unknown, supra note 40.

[FN270]. See id. at unnumbered page preceding 1 (quoting passage from the Hindu Vedas).

[FN271]. Joseph Campbell, The Masks of God: Oriental Mythology 339 (1962).

[FN272]. See id.; see also Amiya Chakravarty, Quest for the Universal One, in Great Religions of the World 34, 34 (Merle Severy ed., 1971).

[FN273]. John Steinbeck, The Dirge of Success (unpublished typed manuscript with holographic corrections; on file with Wells Fargo Steinbeck Collection, Department of Special Collections, Stanford University Libraries, box 5, series ix, folder 5.) Quoted with the permission of Stanford University.

[FN274]. The Log, supra note 2, at 28-29.

[FN275]. Id.

[FN276]. Nobel Acceptance Speech, supra note 148, at 898.

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