

RESTORATION RX: AN EVALUATION AND PRESCRIPTION

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I. INTRODUCTION

A visitor comes to a farm and sees a pig with a wooden leg. Trying to be discreet, she says to the farmer, "So I see your pig here." The farmer says, "Yeah this pig is great. I don't know what I'd do without him." A little less obliquely, the curious visitor asks, "Well what's the deal with the pig?" The farmer replies, "This pig walks my kids to school in the morning, he brings in my newspaper every day, he guards the house at night. He's terrific." The visitor, unable to contain her curiosity says, "So what's the deal with the wooden leg?" The farmer looks at her and says, "A pig like that, you don't eat all at once."¹

I apologize if the story is a little brutal, but it raises a question that surrounds the discussion about restoration and, more broadly, about the human relationship with the rest of the environment. Are we eating the golden pig limb by limb, all the while professing to value him? I will return to that question with specific reference to restoration later, to help identify what challenges lie ahead in developing a prescription for the safe and effective use of environmental restoration.

In this introductory Article, I explore what ethics, science, economics, and law suggest about the value of restoration. These themes—the questions and

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1. This is based on a story appearing in DAVID R. COLBURN & LANCE DEHAVEN-SMITH, *GOVERNMENT IN THE SUNSHINE STATE: FLORIDA SINCE STATEHOOD* 118 (1999).

challenges posed by ethics, science, economics, and law—resonate throughout the Articles in this Symposium. Drawing on the presentations given at the Symposium and the literature on environmental restoration, this Article reviews some of the major questions that science and ethics pose for restoration, as well as the challenges posed by the economic and legal contexts within which environmental restoration occurs.

When looked at together, these questions focus our attention on the central challenge for those interested in restoration in the new millennium: determining whether, when, and how to use this powerful and promising tool. Drawing on metaphors from medicine, I begin to sketch out what I call “a prescription” for restoration. What emerges is a set of general principles and a series of questions we should ask before prescribing restoration, to ensure its proper use.

Metaphors from the fields of health and medicine are common in discussing restoration—references to healing a wounded earth abound.² A premise of my remarks is that there may be value in exploring these metaphors and meanings, in taking to heart that restoration is a remedy or therapeutic technique to cure something we consider bad, unhealthy, or damaged. Like American allopathic medicine, restoration is based in science but poses ethical questions in its application. It is intrusive but has the potential to do tremendous good. Like any therapy or remedy, it can be used appropriately and inappropriately, skillfully and ineptly, successfully and destructively. If used inappropriately or excessively, restoration has the potential to do more harm than good.³ The legal and economic contexts of both restoration and health care affect the quality of the treatment. There may be side effects of the treatment to be taken into account. So, as with medical healing techniques, determining the appropriate context for environmental restoration and ensuring that it is used skillfully may be a key factor in its long-term success. Identifying this context is a challenge to which this Symposium has contributed substantially.

After a brief comment on the definition of restoration, this Article addresses the challenges posed by science, ethics, and the legal and socio-economic contexts in which restoration occurs.

2. Aldo Leopold used this metaphor more generally with reference to conservation when he wrote of “the science of land health” in a 1941 essay. Aldo Leopold, *Wilderness as a Land Laboratory*, reprinted in WILD EARTH, Fall 1999, at 1. He spoke of the “ailments of the land” and “land doctoring” and analogized conservation to “local alleviations of biotic pain” as opposed to a cure. *Id.* at 2. See also Special Issue, *Helping Nature Heal*, WHOLE EARTH REV., Spring 1990 (discussing environmental restoration).

3. In medicine, the development of increasingly resistant strains of disease is an example of the unintended and undesirable consequence of the overuse of antibiotics. See Wolfgang Witte, *Medical Consequences of Antibiotic Use in Agriculture*, 279 SCIENCE 996, 996–97 (1998).

II. WHAT IS ENVIRONMENTAL RESTORATION?

The most common definition of the root verb "restore" is a useful starting point in considering what restoration means. "Restore: [t]o bring back to the original state."⁴ What is significant about this definition is how poorly it describes environmental restoration. Yet this is the first definition that may come to mind when we use the word restoration. Incorporating this sense of "restore" into the meaning of environmental restoration can lead to distracting, if not misleading questions—for example, what is the "original state?" Since there is no single moment of origin, or at least not one on which we have information, what then? The questions go on and on.⁵ Many papers in the restoration literature demonstrate a widespread understanding among those engaged in and advocating restoration that bringing land back to its "original state" when restoring natural systems is neither possible, nor desirable.⁶ Still, the allure of this definition should not be overlooked.

The health-related definition of restore—"to bring back to a healthy and vigorous state"⁷—may better describe environmental restoration. In contrast to the first definition considered, this one creates less tension with the limitations of science and the dynamic nature of the environment. What emerges from this Symposium evokes still other meanings of the verb restore—meanings sometimes overlooked in the environmental context—that better fit environmental restoration, such as: "to make amends for, to compensate, to make good [loss or damage];"⁸ or "to replace humankind in a state of grace; to free from the effects of sin."⁹

Author and naturalist Gary Paul Nabhan writes not only of restoring the environment, but also of restoring our relationship with the environment. His poetic translation of native concepts of restoring, wildness, and "re-storying" provides another set of meanings, positive and creative in the potential they offer

4. OXFORD ENGLISH DICTIONARY 755 (2d ed. 1989).

5. A 1992 National Research Council Report on restoration of aquatic ecosystems, while raising other questions, avoided these problems with a definition of restoration as "returning an ecosystem to a close approximation of its condition prior to disturbance." NATIONAL RESEARCH COUNCIL, RESTORATION OF AQUATIC ECOSYSTEMS: SCIENCE, TECHNOLOGY AND PUBLIC POLICY 2 (1992).

6. See, e.g., Laura L. Jackson et al., *Ecological Restoration: A Definition and Comments*, 3 RESTORATION ECOLOGY 71, 73 (1995). See also Richard J. Hobbs & David A. Norton, *Towards a Conceptual Framework for Restoration Ecology*, 4 RESTORATION ECOLOGY 93, 98 (1996); Bruce P. Van Haveren et al., *Restoring the Ecological Integrity of Public Lands*, 52 J. SOIL & WATER CONSERVATION 4 (1997). Frederick Turner appears to believe that environmentalism is largely premised on the fiction that nature is unchanging. See Frederick Turner, *The Invented Landscape*, in BEYOND PRESERVATION: RESTORING AND INVENTING LANDSCAPES 35, 38–39 (A. Dwight Baldwin, Jr. et al. eds., 1994) [hereinafter BEYOND PRESERVATION].

7. OXFORD ENGLISH DICTIONARY, *supra* note 4, at 756.

8. *Id.* at 755.

9. *Id.* at 756.

for restoring the role of humans as part of nature.¹⁰ Luther Propst suggests that restoration is essential as an act of hope or caring, to provide a reasoned basis for hope.¹¹ In her generous reading at the Symposium, Terry Tempest Williams spoke of restoration of the spirit and read about “forgiveness and restoration” in the context of the South African Truth and Reconciliation Commission. These references evoke the notion of a return to grace and may shed light both on human motivations to restore and the ethics of restoration. They also leave us with a sense of environmental restoration’s possibilities.

The centrality of science and ethics is apparent in technical definitions of environmental restoration. Restoration¹² is sometimes defined specifically to include or to exclude a range of activities such as reclamation,¹³ rehabilitation,¹⁴ reallocation,¹⁵ and reconstruction.¹⁶ Most definitions make clear that restoration has both scientific and normative dimensions. They emphasize scientifically defined goals: restoration of natural processes and functions, the interaction of

10. GARY PAUL NABHAN, *DESERT LEGENDS* 183, 193 (1994) (“To restore any place, we must also begin to re-story it, to make it the lesson of our legends, festivals, and seasonal rites.”).

11. C. Luther Propst & Peter W. Culp, *Searching for Cibola: Community-Based Environmental Restoration in the Colorado River Watershed*, 42 *ARIZ. L. REV.* 259, 279 (2000).

12. Richard J. Hobbs and David A. Norton remark that:
Ecologists seem to take perverse delight in developing complex terminologies. The ensuing ecological verbiage is of doubtful value, especially when there is little general agreement on correct usage. This is certainly true in the field of restoration ecology, where the terms restoration...rehabilitation, reallocation, reconstruction and many others are used differently or interchangeably depending on whose paper you read.

Hobbs & Norton, *supra* note 6, at 94.

13. See Jackson et al., *supra* note 6, at 75 (noting the definition in the context of SMCRA’s enactment as “a lesser goal than complete restoration,...resulting in a stable, self-sustaining ecosystem that may or may not include some exotic species and that includes a similar but not identical structure and functioning as the original land”). See also JAMES A. HARRIS ET AL., *LAND RESTORATION AND RECLAMATION* 16–17 (1996) (defining reclamation as a process by which previously unusable land is returned to a state whereby some use may be made of it).

14. See Hobbs & Norton, *supra* note 6, at 94. See also Mohan K. Wali, *Ecology of the Rehabilitation Process*, in *ECOSYSTEM REHABILITATION* 8 (Mohan K. Wali ed., 1992) (“Rehabilitation implies that the land will be returned to a form and productivity in conformity with an approved land use plan, ensuring that the system will remain in a stable ecological state, that does not contribute substantially to environmental deterioration and is consistent with the surrounding aesthetic values.”).

15. See Hobbs & Norton, *supra* note 6, at 94.

16. See *id.* See also, e.g., Wali, *supra* note 14, at 8 (approving “ecosystem reconstruction” as a suitable term for restoration).

organisms and the physical environment.¹⁷ But many definitions also locate restoration in relation to some concept like “degradation” or “damage.”¹⁸ Perhaps not surprisingly, it is difficult to find definitions of these latter terms in the restoration literature. The value-laden terms are used in place of neutral terms like “change” to the environment. The idea is that the environment has been changed adversely—hurt, damaged, injured. The use of the terms degradation and damage confirm that the meaning of restoration is determined both by ecology and ethics, by science and human values, a point emphasized by Victor Baker.¹⁹

The definition of “ecological restoration” adopted by the Society for Ecological Restoration (“SER”) highlights the combination of scientific and normative attributes. The SER definition, adopted in a 1994 resolution, provides that “[e]cological restoration is the process of repairing damage caused by humans to the diversity and dynamics of indigenous ecosystems.”²⁰ The SER definition speaks of “repairing damage,” thereby introducing some subjective determinations as to what constitutes “damage.”

The SER also explicitly recognizes that among the elements of every restoration project are a “judgment of need” and “an ecological approach.”²¹ A “judgment of need” inevitably involves both scientific observation of change to an ecosystem or area and a value judgment that the change is undesirable. Diagnosis, here as in medicine, is an important but not entirely objective process. It requires that we study the systems involved, but also that we consult our values. What is “needed” will depend on what we care about, what we value. The implication is that ethics is among the primary forces driving restoration, along with scientific information and expertise.

17. See V. Thomas Parker, *The Scale of Successional Models & Restoration Objectives*, 5 RESTORATION ECOLOGY 301, 301–02 (1997) (pointing out that restoration often combines goals that are of different scales and that processes are defined by a multitude of characteristics, such as magnitude, frequency, and extent). See also Jackson et al., *supra* note 6, at 72 (“Ecological restoration implies that we wish to restore organisms and their interactions with one another and the physical environment.”).

18. See HARRIS ET AL., *supra* note 13, at 17 (“Land restoration is the process by which an area is returned to its original state prior to degradation of any sort....”). See also WILLIAM J. MITSCH & JAMES G. GOSSELINK, *WETLANDS* 578 (2d ed. 1993) (defining wetland restoration as the rehabilitation of wetlands that may be degraded or hydrologically altered); Jackson et al., *supra* note 6, at 71.

19. See generally Victor R. Baker, *Science, Engineering, and the Perception of Environmental Restoration*, 42 ARIZ. L. REV. 287 (2000).

20. Jackson et al., *supra* note 6, at 71. While restorations properly termed “ecological restoration” are perhaps only a subset of all environmental restoration, they are an important category.

21. *Id.* at 71–72. This is listed as the first of the elements included in every restoration project. The SER definition is notable for the extent to which it squarely presents and addresses questions of value as well as those of science. See *id.* at 71–74.

The SER elaboration on the definition also specifies that an ecological approach is an element of every true restoration.²² An ecological approach is essential to enabling natural processes to return, where possible, or to recreating those processes.

III. EVALUATING THE SCIENTIFIC CONTEXT FOR RESTORATION

Against this backdrop, I offer three observations about scientific understanding and restoration. They are: (1) the essential role of science in environmental restoration; (2) what science cannot tell us; and (3) the challenge of restoring dynamic natural systems.

A. Restoration as Applied Science: The Essential Role of Science in Environmental Restoration

Environmental restoration, to merit the label, must be grounded on sound science.

Rx: Consult your ecologist before beginning this or any course of treatment. A general caution, appropriate for any medicine, is to consult your practitioner before beginning treatment.

Whatever the limits of our knowledge, we need to avail ourselves of the best information possible in undertaking restoration. An essential but often overlooked initial step in restoration is to “[i]dentify processes leading to degradation.”²³ In medical parlance, a diagnosis of the illness, not merely a cataloguing of the symptoms, is needed.²⁴

Once the causes of the harm are diagnosed, restoration seeks to reestablish the natural processes. In medicine, we would say that the goal of restoration is a cure as opposed to palliative or cosmetic treatment. Although these terms “diagnosis” and “cure” are simply stated, they pose tremendous challenges for our scientific understanding and the limited experience and information we have.

22. See *id.* at 72 (“Ecological restoration implies that we wish to restore organisms and their interactions with one another and the physical environment.”).

23. Hobbs & Norton, *supra* note 6, at 95. See also Propst & Culp, *supra* note 11, at 281–82.

24. Leopold drew this distinction in *Wilderness as a Land Laboratory*: In general the trend of the evidence indicates that in land, just as in the human body, the symptom may lie in one organ and the cause in another. The practices we now call conservation are, to a large extent, local alleviations of biotic pain. They are necessary, but they must not be confused with cures.

Leopold, *supra* note 2, at 2.

Another implication of the important role played by science in restoration is the challenge of the science-policy-law interplay described so aptly by Bill Rodgers. To employ science effectively requires that we remain alert to the twin phenomena Professor Rodgers describes in his article: self deception and asking science to resolve policy questions that it cannot answer.²⁵

B. Restoration as Experiment: What Science Cannot Tell Us

Many commentators have noted how slowly scientific knowledge about restoration has developed.²⁶ Data and models to guide restorationists in the many decisions and judgments that a restoration project encompasses are lacking.²⁷ It is not known how closely the attributes of known functioning ecosystems must be approximated in order to restore function.²⁸ The problem of evaluating "success" in restoration remains a major theoretical and practical challenge.²⁹ Beyond these basic problems, the influence of large-scale and off-site processes on a restoration site can be substantial.³⁰ Large-scale processes may affect and complicate the restoration process at various stages: identification of the sources of degradation, setting of appropriate goals, and design and implementation of steps to achieve

25. See William H. Rodgers, *The Myth of the Win-Win: Misdiagnosis in the Business of Reassembling Nature*, 42 ARIZ. L. REV. 297, 298–302, 304–06 (2000).

26. See Edith B. Allen et al., *Developing the Conceptual Basis for Restoration Ecology*, 5 RESTORATION ECOLOGY 275, 275 (1997) ("There are by now thousands of restoration and reclamation projects across the country, but only a small proportion of them has been planned, scrutinized, and measured by ecologists and other scientists."). See also Andre Clewell & John P. Rieger, *What Practitioners Need from Restoration Ecologists*, 5 RESTORATION ECOLOGY 350, 350 (1997) ("Practitioners need a much firmer ecological foundation for developing and implementing restoration programs."). Among the broad informational and theoretical inadequacies Clewell and Rieger identify are the following: baseline information on reference ecosystems, a method for selecting reference ecosystems, information about the substrate and its functioning at sites including soil's functioning as a medium for plant growth, insufficient knowledge about local ecotypes, and the lack of measures of success by which to evaluate restoration. See *id.* at 350–53

27. See Hobbs & Norton, *supra* note 6, at 93–94, 96 (criticizing methodologies developed for restoration projects as largely ad hoc and site-specific and identifying "key principles and generalities that might be used to formulate a conceptual framework for restoration ecology"). Leopold identified the lack of data as a problem as early as 1941. See Leopold, *supra* note 2, at 3 ("A science of land health needs, first of all, a base-datum of normality, a picture of how healthy land maintains itself as an organism.").

28. See Hobbs & Norton, *supra* note 6, at 100.

29. *Id.* at 100, 101–02. See also Clewell & Rieger, *supra* note 26, at 353. Some part of this challenge may be ethical: to identify the values we seek to restore through application of science. See *id.* Joseph Feller and David Brown's insights on the shortcomings of current public rangeland management provide a good example. See Joseph M. Feller & David E. Brown, *From Old-Growth Forests to Old-Growth Grasslands: Managing Rangelands for Structure and Function*, 42 ARIZ. L. REV. 319, 328–35 (2000).

30. See Parker, *supra* note 17, at 303–04.

goals.³¹ These complicating factors can range from the long-term and global—as with climate change—to the local and immediate—as with degradation attributed to an adjacent parcel of land beyond the restoration project's boundaries.³²

In light of our limited knowledge about and ability to control these factors in some cases, outcomes are necessarily the result of experimentation. For this reason, the medical metaphor suggests that restoration should be undertaken with the care of uncontrolled medical experimentation, with awareness of its risks. This does not mean we should not undertake restoration,³³ only that we must approach decisions on whether, how, and when to restore with appropriate respect for the limitations of our understanding. Luther Propst's discussion of development affecting the Santa Cruz River emphasizes the importance of an attitude of humility as we approach restoration.³⁴ Victor Baker and Dan Luecke both highlight the need to embrace adaptive management in scientific practice and as an ethic to guide restoration projects, to enable us to respond most effectively to the ongoing learning process that restoration represents.³⁵ Gary Paul Nabhan's writings remind us that our knowledge is imperfect, that when we undertake to restore the health of a person or a system, there are intangible values that may be lost, that we can never recover.³⁶ Further, the damage we seek to cure may be irreversible. Some ecologists emphasize that the human footprint is never completely removed by restoration.³⁷

This lack of knowledge also reminds us that restoration has ethical implications. The high level of uncertainty enhances the subjectivity of restoration

31. The role played by disturbance regimes can be significant. Recreating these requires attention to various dimensions such as frequency, magnitude, area, and season. *See id.* at 302.

32. *See id.* at 303–04.

33. Clewell and Rieger see the value of ongoing restorations as experiments and urge the importance of not wasting them as opportunities to enhance our understanding and collect essential data. *See Clewell & Rieger, supra* note 26, at 350.

34. *See Propst & Culp, supra* note 11, at 261–70. James C. Scott argues that the same danger faces social engineers who radically simplify social design; that is, they ignore at their peril that there are limits to what we know about complex functioning orders, whether natural or social. *See* JAMES C. SCOTT, *SEEING LIKE A STATE: HOW CERTAIN SCHEMES TO IMPROVE THE HUMAN CONDITION HAVE FAILED* 7 (1998). Scott advocates the importance of local practical knowledge. *Id.* at 327. Adaptive management connotes a similar approach.

35. *See Baker, supra* note 19, 293–95 (describing the ethic of environmental pragmatism); Daniel F. Luecke, *An Environmental Perspective on Large Ecosystem Restoration Processes and the Role of the Market, Litigation, and Regulation*, 42 ARIZ. L. REV. 395, 396–97 (2000).

36. *See NABHAN, supra* note 10, at 183–93.

37. *See, e.g.,* William L. Graf, *Geomorphology and Policy for Restoration of Impounded American Rivers: What is 'Natural?'*, in *THE SCIENTIFIC NATURE OF GEOMORPHOLOGY: PROCEEDINGS OF THE 27TH BINGHAMTON SYMPOSIUM IN GEOMORPHOLOGY* 443, 469 (Bruce L. Rhodes & Colin E. Thorn eds., 1996) (“It is rarely possible to restore truly natural conditions to regulated rivers....”).

and makes the process more value-laden, the ethics that guide it more determinative, and the outcomes less predictable.

C. The Challenge of Restoring Dynamic Natural Systems

A third ecological insight—that natural systems are dynamic, not static³⁸—raises a related set of concerns relevant to the practice of restoration. We cannot simply go back, identify, and then recreate some single mythic ideal state of a given natural system.³⁹ When we decide to undertake restoration, we must judge what attributes of the ecosystem to restore⁴⁰ and then identify the processes and functions that would enable the ecosystem to continue to evolve with those attributes.⁴¹ In this way, the enterprise of restoration is inevitably both scientifically complex and value-laden.

The goals of restoration are determined in important ways by the fact that restoration lacks a single known or knowable baseline to which we can restore systems, and that these systems continually evolve. These facts suggest that we can and should aspire only to return systems to a state of independent functioning. This in turn suggests another guidepost: that successful restoration must focus on the functioning of the system as a whole. The goal is not cosmetic—to eliminate certain physical symptoms, or create a certain fixed condition—but holistic. In medical terms, we want to return the body to a state of healthy functioning, not merely treat symptoms, undertake cosmetic surgery, or manage pain with

38. See DANIEL B. BOTKIN, *DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY* 6–12 (1990); Steward T.A. Pickett et al., *The New Paradigm in Ecology: Implications for Conservation Biology Above the Species Level*, in *CONSERVATION BIOLOGY: THE THEORY AND PRACTICE OF NATURE CONSERVATION, PRESERVATION, AND MANAGEMENT* 65 (Peggy L. Fiedler & Subodh K. Jain eds., 1992).

39. See Hobbs & Norton, *supra* note 6, at 98 (“The recognition that alternative states are possible in any particular location, even under natural conditions, also provides cause for thought about the restoration goals to be set, especially with reference to defining ‘naturalness.’”). See also *id.* at 101; Parker, *supra* note 17, at 301 (“If processes are dynamic in their spatial and temporal features, characteristics of a system to be considered need to be described from a dynamic perspective.”).

40. Commenting on the Society for Ecological Restoration’s definition, Jackson, Lopoukhine, and Hillyard suggest that the decision to restore should be premised on human impacts that disturb the flux of nature itself, as measured by “the potential for continued evolution of species, the persistence of species and the complexity and flexibility of their interactions.” Jackson et al., *supra* note 6, at 72. For a discussion of approaches to selection of parameters of ecosystem health, see Hobbs & Norton, *supra* note 6, at 101–02.

41. See Parker, *supra* note 17, at 304–05.

palliatives.⁴² This dictates a focus on processes, not endpoints, and on systems, not individual organisms or species.⁴³

Rx: A holistic approach is needed. Where restoration is undertaken, it should focus on the whole system, on curing the root cause of the problem and restoring the system to a state of independent functioning. Palliative treatments should be a last resort if employed.

Robert Glennon and John Thorson highlight a related risk that we face: the enduring allure of engineering fixes as responses to underlying problems we have caused in natural systems.⁴⁴ These superficial fixes may be designed without ever identifying the root causes of the degradation. They seek to treat the symptoms, usually with only partial or temporary success, and often at great cost.⁴⁵ They often seek to freeze natural systems into a channel that fits human convenience and bears no relation to the prior functioning system.

42. Jackson, Loupoukhine, and Hillyard state:

The ecological approach is distinguished from a landscaping approach, where the goal is to create a certain "look" more or less immediately. Because populations of organisms cannot sustain themselves if required interactions with other species and ecosystem processes are absent, the landscaped area requires intensive management. The ecologically restored area, by contrast, will support healthy populations indefinitely, with minimum intervention.

Jackson et al., *supra* note 6, at 72.

43. See Parker, *supra* note 17, at 301 ("Rather than composition, the rate of change in total composition or of a particular species set may be a more appropriate consideration, or the rate of cover or biomass change or other system attributes."). See also Pickett et al., *supra* note 38, at 71, 74-77. The importance of this focus is also discussed in Alyson C. Flournoy, *Preserving Dynamic Ecosystems: Wetlands, Ecology and Law*, 7 DUKE ENVTL. L. & POL'Y F. 105, 112 (1996). Leopold, drawing on the metaphor of health, highlighted this same focus. "The most important characteristic of organism is that capacity for internal self-renewal known as health." Leopold, *supra* note 2, at 2.

44. See generally Robert J. Glennon & John T. Thorson, *Federal Environmental Restoration Initiatives: An Analysis of Agency Performance and the Capacity for Change*, 42 ARIZ. L. REV. 483 (2000). See also Leopold, *supra* note 2, at 2 ("Many conservation treatments are obviously superficial. Flood control dams have no relation to the cause of floods. Check dams and terraces do not touch the cause of erosion. Refuges and propagating plants to maintain animals do not explain why the animal fails to maintain itself.").

45. See generally Glennon & Thorson, *supra* note 44.

IV. EVALUATING THE ETHICAL CONTEXT FOR RESTORATION

The ethical questions posed by environmental restoration may represent the most interesting challenge. Restoration forces us to consider when human conduct is “degradation” and why we view it as such, as well as when restoration is “good” or “necessary” and why. In addition, sustained thought about restoration can lead us to such basic questions as whether humans are part of or apart from nature, what is natural, what is artificial, and whether restoration itself is natural.⁴⁶

A. The Ethics of Preservation and Restoration

Environmental restoration raises some stark ethical questions. At its most basic, restoration confronts us with the question of whether humans are part of or apart from nature.⁴⁷ If humans are to be viewed as fundamentally equivalent to every other species, then no matter how much we alter natural systems, every result is also natural. While no one may espouse this extreme position, some take the position that we are members of the natural community, and since eliminating human interference is not only unnatural but impossible, we should embrace an active role in shaping and constructing our landscape.⁴⁸ William Jordan has argued that to exclude restoration from our repertoire is to deny any positive human

46. See generally BEYOND PRESERVATION, *supra* note 6 (providing a fascinating dialogue on these questions). The book was sparked by a pair of provocative contributions from William R. Jordan III and Frederick Turner, who advocate restoration enthusiastically as a positive and creative endeavor by humans as part of the environment. See *infra* notes 47–51 and accompanying text. It also contains thoughtful critical responses from a number of different disciplinary perspectives. See also ROBERT ELLIOT, *FAKING NATURE: THE ETHICS OF ENVIRONMENTAL RESTORATION* 116–30 (1997) (exploring various positions on the relationship between the concept of the natural and human activity and the ethics that these may engender). The role of humans in nature is also explored by Oliver Houck. See generally Oliver A. Houck, *Are Humans Part of Ecosystems?*, 28 ENVTL. L. 1 (1998).

47. See, e.g., ELLIOTT, *supra* note 46, at 122–30 (assuming a distinction of gradation between natural and artificial change to the environment based on whether accomplished as a result of rational capacities of humans and arguing that wild or authentic nature adds value that cannot be recovered through restoration). While drawing a very different conclusion, William Jordan also recognizes a distinction. See William R. Jordan III, “Sunflower Forest”: *Ecological Restoration as the Basis for a New Environmental Paradigm*, in BEYOND PRESERVATION, *supra* note 6, at 17, 22. There, Jordan sets forth a new paradigm for the relationship between nature and culture which envisions humans as products of nature, but distinct because of our degree of self-awareness. See *id.* at 30. He sees ecological restoration as providing a basis for developing modern rituals that will help to negotiate the tension between ourselves and the rest of the natural world. See *id.*

48. See Jordan, *supra* note 47, at 18 (advancing the idea that the process of “ecosystem construction provides the basis for healthy interaction between human beings and the rest of nature”). Jordan makes clear that he views humans as natural, albeit in tension with the environment because we are not “just plain citizens” of the natural community. *Id.*

participation in nature, to relegate us to the role of consumers and observers.⁴⁹ This view builds on a valid premise—that humans continually affect and change the environment around us. Unless we choose to stop breathing, we involuntarily change the atmosphere with every breath. To some, this binary view suggests that since humans cannot avoid changing the environment, an undifferentiated concept we can call change or impact is inevitable. On this view, preservation may be an inadequate focus for those who value the environment.⁵⁰ Restoration is essential.⁵¹

A different perspective suggests that human participation in the environment can be distinguished by one or more of a list of attributes that arguably distinguish humans from some or all other elements of the environment: rationality, intentionality, technology, culture, or simply the scale, degree, and pace of humankind's ability to alter the rest of the environment.⁵² According to this approach, human activity should be viewed as altering the rest of the environment, with related ethical implications. Many varied ethical perspectives draw distinctions among different types and degrees of human impact and

49. See *id.* at 21. Jordan suggests that “[t]hrough the constructive process of restoration [the restorationist] breaks out of the essentially negative relationship with the natural landscape implicit in the preservationist program and establishes a relationship with that landscape that is both positive and mutually beneficial—and does so, moreover, without leaving civilization behind.” *Id.* at 22. At the root of our dilemma, in Jordan's view, is our identification with nature and our inability to exist without changing nature, coupled with our high degree of self awareness. This combination results in a profound tension in our relationship with nature that preservation does not help to resolve and may exacerbate. See *id.* at 30–31. For a contrasting view, see generally Houck, *supra* note 46.

50. See A. Dwight Baldwin, Jr. et al., *Introduction: Ecological Preservation versus Restoration and Invention*, in *BEYOND PRESERVATION*, *supra* note 6, at 3, 6–11 (discussing the restorationist and inventionist views of Jordan and Turner).

51. Baldwin and the other authors note the possibility that this view of humans as undifferentiated participants—on morally equal footing with all other biota in terms of our interactions with the environment—could affect the ethics not just of restoration but of preservation of nature as well:

Unless we are to renounce further progress in science and technology, and reverse secular trends in economic development, population growth, progress toward more equal standards of living, and so on, it seems that the techniques of landscape construction and reconstruction will become more rather than less important to us. The pressure of events is far more likely to force us to do something than to motivate us collectively to refrain from what we have done for centuries. In fact, if we are now coming to realize that our species has always interfered with nature, then involving ourselves with nature in this new way that we term restoration may be more consistent with the character of our species than preservation. To restrain our interference with nature may be the one impossible option.

Id. at 10–11.

52. See ELLIOTT, *supra* note 46, at 122–30. See also Jordan, *supra* note 47, at 30.

different uses of restoration.⁵³ These approaches posit that we can seek to affect the environment responsibly or not, and that we might have some duties to other humans, to nature or to future generations that attend both degrading and restoration activities.⁵⁴

Some go further and suggest that restoration, not preservation, may be suspect on ethical grounds. This ethical critique of restoration focuses on the transformation of nature and the associated transformation of the environment into a human artifact rather than a naturally evolved system.⁵⁵ Another critique of restoration has more pragmatic roots. This critique of restoration arises from concern about restoration's impact on the goal of conserving existing natural systems. Does restoration, by providing a way to repair damage from undesirable conduct encourage that undesirable conduct, justify it, assuage our guilt, or lead us to underestimate the costs of the degradation when we decide to undertake damaging activities in the first instance?

Of course, preservation and restoration are not absolutes and need not be incompatible in theory or in practice.⁵⁶ If we accept restoration as a legitimate enterprise in some cases, then it may be helpful to view restoration as one of four

53. In the course of rejecting a sharp dichotomy between the natural and the artificial, Robert Elliott, for example, suggests the need for a more nuanced assessment of the impact of human activity on the rest of nature and argues in favor of a conception of value that reflects these distinctions. See ELLIOTT, *supra* note 46, at 123–30. Such a position is implicit in the writings of many restorationists. See, e.g., Hobbs & Norton, *supra* note 6, at 100–01; Jackson et al., *supra* note 6, at 72–73.

54. The Society for Ecological Restoration proposes the following position which takes into account the natural flux in nature: “We suggest that when human activity has diminished the flux of nature...for at least 50 years, then ecological restoration should be required.” Jackson et al., *supra* note 6, at 72.

55. See ELLIOTT, *supra* note 46, at 97–111. Robert Elliot sets out justifications sometimes offered for restoration and its roots in “the replacement thesis”—the theory that restoration replaces the apparent valued elements of a natural system. *Id.* at 79–82. In rejecting the replacement thesis, Elliott points out several flaws, emphasizing that it overlooks and undermines the relational value of nature—the value that results from a system or entity being naturally evolved as opposed to an artifact of human culture. See *id.* at 79–82. Elliott is careful to distinguish between his position that what is natural is always value-adding and therefore that activities that destroy it diminish value, on the one hand, and the view that activities that destroy what is natural are necessarily bad or lacking in value, on the other. See *id.* at 116–42. He takes the former view: activities that destroy the natural may have other value that recommends them, but they are burdened by the costs that result from this destruction. See *id.* at 130–33, 137–42. Similarly, Elliott distinguishes among different degrees of human intrusion. For example, he contrasts the costs of the gradual change in natural systems caused by global warming with the devastation of a natural area by activities which leave nature only an insignificant force in the future evolution of the area. See *id.* at 126–27, 139. Ultimately Elliott sees the positive value of restoration as the potential for resurrection of natural value, which is contingent on “the withdrawal of human influence.” *Id.* at 144.

56. See Baldwin et. al., *supra* note 50, at 10.

theoretically possible modes of interaction between humans and the environment. Humans can: (1) leave the environment untouched (an impossible option); (2) change the environment within certain ecologically and ethically identified bounds that do not affect the system's ability to continue to evolve with all major elements and processes intact (i.e., system remains at a state not necessitating restoration);⁵⁷ (3) change the environment in a way that replaces or stops natural processes (degradation);⁵⁸ and (4) restore the environment.⁵⁹ Assessed within this framework, restoration offers a positive option, since leaving the environment completely untouched is not a realistic option. Humans have continually engaged in degradation that stops and destroys natural systems, and we appear likely to continue this conduct for the foreseeable future. In this light, restoration is an additional mode of interaction that may offset degradation. Without viewing restoration as a substitute for preservation, we may value this mode of positive interaction with the environment.⁶⁰

The view of restoration as one of four modes of interaction more sharply highlights the challenge we face in ethically evaluating conduct that alters the environment. When should we sanction degradation of natural systems and when should we sanction restoration? These issues are of great importance for how we conceive of restoration. For purposes of this Article, they are raised only to note their implications for how we evaluate and prescribe restoration. If restoration is the only positive mode of human-nature interaction, there might be an ethical obligation to restore, like the duty of a physician to give aid to an injured or sick individual in an emergency. But if it represents a destructive force, then promoting restoration broadly may be ethically wrong. This perspective also raises the question as to whether the very possibility of restoration as an option affects human valuation of the environment. Does embracing restoration as a morally valid tool automatically lessen the value we place on natural systems by commodifying them, implying incorrectly that they are completely replaceable?

B. Environmental Ethics and Restoration

As the definitions of restoration in Part II show, even if we accept that restoration is valuable in theory, the restoration process itself forces us to make

57. The list of six criteria provided by Hobbs and Norton could provide a starting point for setting boundaries from an ecological perspective. *See* Hobbs & Norton, *supra* note 6, at 93.

58. *See supra* note 55 and accompanying text.

59. This vision incorporates one set of ecological and ethical premises about the desirability of, and appropriate goals for, restoration. *See* Hobbs & Norton, *supra* note 6, at 93.

60. This approach arguably differs from the views of Jordan and Turner by treating some types of human degradation—those that cause a lack of resilience or prevent the system from continuing to function—as categorically distinct from those with impacts below this threshold. The former may be viewed as raising ethical questions not posed by the latter.

additional choices with ethical dimensions. In evaluating how and when to accomplish restoration, we face difficult value-laden questions.

This essay does not attempt to catalogue or answer these questions. Instead, it focuses on why they inhere in restoration and suggests that they are a benefit, not a drawback, of restoration. This section first offers some observations about why these questions are difficult, controversial, and important for us to confront as individuals and as a society. It then argues that the occasion provided by restoration projects for grappling with these moral issues is itself a benefit and an important dimension of the restoration process.

C. The Challenge

As has been noted, deciding whether, how, and when to restore a natural system raises a host of questions that science cannot answer.⁶¹ Answering these questions may require us to consider such basic issues as why we value nature in the first place. These are not easy questions. They are difficult, if not impossible, to answer fully for several reasons.⁶²

First, we have confronted these challenging questions for a relatively short period of time. Human population and the power and speed of our technology for altering the environment have changed dramatically since the end of World War II, and the consequences of these changes have only begun to unfold over the past thirty years.⁶³ Broad public discussion of the ethics of our recent impact on the environment has only begun in the last thirty years.⁶⁴ Whether

61. See *supra* Part III.B; *supra* notes 26–37 and accompanying text.

62. Mark Sagoff, William H. Desvousges, Janet Lutz, and James Nicoll all present valuable perspectives exploring the role and limits of economics in addressing these questions. See generally William H. Desvousges & Janet C. Lutz, *Compensatory Restoration: Economic Principles and Practice*, 42 ARIZ. L. REV. 411 (2000); James L. Nicoll, *The Irrationality of Economic Rationality in the Restoration of Natural Resources*, 42 ARIZ. L. REV. 463 (2000); Mark Sagoff, *At the Monument to General Meade, or On the Difference Between Benefits and Beliefs*, 42 ARIZ. L. REV. 433 (2000).

63. See BARRY COMMONER, *THE CLOSING CIRCLE: NATURE, MAN, AND TECHNOLOGY* 127–29, 143–44 (1971). The end of World War II also marked the beginning of an era in which the American public developed greater interest in outdoor recreation and in which environmental quality became an important amenity to much of the U.S. population. See SAMUEL P. HAYS, *BEAUTY, HEALTH, AND PERMANENCE: ENVIRONMENTAL POLITICS IN THE UNITED STATES, 1955-1985*, at 3–4, 25–26 (1987). The first Earth Day, April 22, 1970, is often used to mark the dawning of environmental awareness in the United States. See Jerry L. Anderson, *The Environmental Revolution at Twenty-Five*, 26 RUTGERS L.J. 395, 396–97 (1995).

64. Following the publication of Rachel Carson's seminal book in 1962, see RACHEL CARSON, *SILENT SPRING* (1962), there was a flurry of works that formed and sparked public discussion on this topic. See, e.g., COMMONER, *supra* note 63; JOHN A. PASSMORE, *MAN'S RESPONSIBILITY FOR NATURE: ECOLOGICAL PROBLEMS AND WESTERN TRADITIONS* (1974); *THE LIMITS TO GROWTH: A REPORT FOR THE CLUB OF ROME'S PROJECT ON THE PREDICAMENT OF MANKIND* (Donella H. Meadows ed., 1972); *THE SUBVERSIVE*

we have or should have a distinct ethical relationship to the environment, what we value in the environment, and why we value those things are difficult and contested questions. Thirty years is a short time for us to sort out these questions as individuals or as a society.⁶⁵

Second, to the extent that public debate purports to address these issues, it frequently remains superficial, characterized by polarized and extreme discourse.⁶⁶ Epithets like “tree-hugger” or “environmental extremist” are tossed off to describe the ethics of advocates who embrace even relatively tame environmental values, and “property rights extremists” and “juggernaut” are common terms that reduce the values of those opposing environmental protection to a monolith.⁶⁷ And while

SCIENCE: ESSAYS TOWARD AN ECOLOGY OF MAN (Paul Shepard & Daniel McKinley eds., 1969); Lynn White, *The Historical Roots of Our Ecological Crisis*, 155 SCIENCE 1203 (1967).

65. The very question of whether and how humans might develop a distinctly environmental ethic, be it anthropocentric or biocentric, based on a theory of rights, intrinsic value or utilitarian philosophy, focusing on future generations or not, with religious or spiritual grounding or with roots in the ethics already embedded in property relationships, remains a subject of lively theoretical debate among environmental philosophers that can be followed in the pages of journals like *Environmental Ethics*. See also, e.g., J. BAIRD CALLICOTT, IN DEFENSE OF THE LAND ETHIC: ESSAYS IN ENVIRONMENTAL PHILOSOPHY (1989); BILL DEVAL & GEORGE SESSIONS, DEEP ECOLOGY: LIVING AS IF NATURE MATTERED (1985); ERIC T. FREYFOGLE, JUSTICE AND THE EARTH: IMAGES FOR OUR PLANETARY SURVIVAL (1993); HOLMES ROLSTON III, ENVIRONMENTAL ETHICS: DUTIES TO AND VALUES IN THE NATURAL WORLD (1988); CHARLENE SPRETNAK, THE RESURGENCE OF THE REAL: BODY, NATURE AND PLACE IN A HYPERMODERN WORLD (1997); CHRISTOPHER D. STONE, EARTH AND OTHER ETHICS: THE CASE FOR MORAL PLURALISM (1987); DHARMA GAIA: A HARVEST OF ESSAYS IN BUDDHISM AND ECOLOGY (Allan Hunt Badiner ed., 1990); Fred Bosselman, *Four Land Ethics: Order, Reform, Responsibility, Opportunity*, 24 ENVTL. L. 1439 (1994); Carol M. Rose, *Given-ness and Gift: Property and the Quest for Environmental Ethics*, 24 ENVTL. L. 1 (1994).

66. See Michael Spangle & David Knapp, *Ways We Talk about the Earth: An Exploration of Persuasive Tactics and Appeals in Environmental Discourse*, in EARTHTALK 3, 11 (Star A. Muir & Thomas L. Veenendall eds., 1996) (analyzing the discourse surrounding environmental conflict). They comment on the polarizing strategies used by several dominant voices in debates over environmental issues. See *id.* at 11, 16–18. David Easter deconstructs apparently neutral media images of environmental disputes and suggests how they may be structured around a preferred meaning that perpetuates a polarized view of environmental issues in *Activism in a Moderate World: Media Portrayals and Audience Interpretations of Environmental Activism*, in EARTHTALK, *supra*, at 45. But see WILLETT KEMPTON ET AL., ENVIRONMENTAL VALUES IN AMERICAN CULTURE 211 (1995) (suggesting that there is a cultural consensus about environmental values and that the issue is not like abortion or gun control in having two opposed alternative coherent viewpoints).

67. The refreshing and valuable debate between Steven W. Carothers and David Wegner on the proposal to decommission Glen Canyon Dam shows the possibility of rising above such polarizing attacks. See generally Steven W. Carothers & Dorothy A. House, *Decommissioning Glen Canyon Dam: The Key to Colorado River Ecosystem Restoration and Recovery of Endangered Species?*, 42 ARIZ. L. REV. 215 (2000); David L. Wegner,

sharply conflicting values are often at stake, the broader public may not realize the extent to which these conflicts are embedded in choices we make every day.

A third obstacle, in addition to the limited time for development of a common ethic in this field and the extreme and polarized tenor of the debate, is the conflict among the many values we hold as individuals. Despite the fact that the American public consistently ranks protection of the environment a very high priority in polls,⁶⁸ our collective conduct suggests that we tolerate very high levels of degradation.⁶⁹ Deciding whether we value nature apart from its instrumental value to humankind demands that we confront this conflict and that we prioritize our values. It challenges us either to abandon a comfortable stance of sentimental attachment to charismatic and photogenic fauna or to compromise other conflicting values we currently pursue out of self-interest. Neither course is particularly appealing. The suggestion that we have no distinctly environmental ethic and that we do not truly care for future generations would not sit well with the majority of Americans, given their self-identification as environmentalists.⁷⁰ If our ethic is no more than a utilitarian and human-centered ethic, then the major task ahead is simply to assign appropriate weight to the human uses of nature.

Looking Toward the Future: The Time Has Come to Restore Glen Canyon, 42 ARIZ. L. REV. 239 (2000). These authors bring different scientific and ethical perspectives to bear on the question, but in a spirit of educating and informing the public, with the hope of generating debate among a broader segment of the public, not of cutting it short with superficial but appealing alternatives.

68. See, e.g., KEMPTON ET AL., *supra* note 66, at 4–5 (1995). In 1990, when asked to choose between a statement that economic growth must be sacrificed to protect and preserve the environment or the converse statement, 64% of those polled chose the environment, up from 38% in 1976; 56% of surveyed Americans agreed with the statement “we must protect the environment, even if it means jobs in the local community are lost;” 64% in another 1990 poll agreed with the statement “I would be willing to pay as much as 10 percent more a week for grocery items if I could be sure they would not harm the environment;” another poll found the median amount consumers stated they would pay monthly to ensure all goods and services they consumed were not harming the environment was \$36.99, up from \$8.10 in 1984 (which would equate with \$10.23 in 1990 dollars); the polls also show steady increase in public support for such positions from 1970 to 1990 despite the decreasing favor generally shown for regulation during the same time period. *Id.* Cf. SUSAN MITCHELL, *THE OFFICIAL GUIDE TO AMERICAN ATTITUDES* 93 (1996) (reporting that in 1994, 45% of Americans surveyed were very willing or fairly willing “to pay much higher prices in order to protect the environment”). Only 30% of those surveyed were very willing or fairly willing to accept cuts in their standard of living, and only 34% were very willing or fairly willing to pay much higher taxes in order to protect the environment. *Id.* at 95, 97. However, 76% chose a statement supporting government passing laws to make businesses protect the environment, and 57% supported government passing laws to make ordinary people protect the environment. *Id.* at 99, 101.

69. Bill Rodgers’ insights on the human capacity for self-deception may help to explain this inconsistency. See Rodgers, *supra* note 25, at 298–302.

70. See KEMPTON ET AL., *supra* note 66, at 4–5 (reporting that in 1990, 70% of Americans surveyed considered themselves to be environmentalists when asked, “Do you consider yourself to be an environmentalist or not?”).

Such a diminished commitment to the environment appears to be in conflict with the public's general attraction to saving endangered species, rescuing whales trapped in the ice in Alaska, and imagining ourselves as environmentalists who care for something beyond ourselves.⁷¹ Adopting and acting on an environmental ethic of any description may demand both more and less of the public.⁷² So perhaps one should not be surprised if the combined collage created by our laws, public opinion polls, and our conduct as individuals and as a polity, bespeaks either a lack of consensus or a lack of consistency in our ethical stance towards the environment.

D. Embracing the Ethical Challenges of Restoration

Recognizing that our environmental ethic is inchoate, that our ethics may not have yet reached their best expression, either in philosophy, in conduct, or in law and policy, may lead us to appreciate the value of coming to terms with these ethical questions. This recognition offers a new lens through which to consider the ethical challenges of restoration. If our ethics are evolving, then the debate that every instance of environmental restoration engenders can be seen as a valuable opportunity. Restoration concretizes the questions of how and why we value the environment. It offers the public a focus for debate in which the choices are concrete and real. Moreover, unlike other environmental controversies that foster this type of debate, restoration has a distinctly positive cast.⁷³ It offers a uniquely positive setting for the public to consider the values at stake both in degradation and in restoration.

What does this suggest for our prescription for the safe and effective use of restoration? First and foremost, we should embrace the ethical questions posed by restoration and recognize them as part of the important, ongoing process of our ethical development.⁷⁴ Since restoration raises significant and difficult value questions, for which there are no easy answers, we should maintain a keen

71. See Sherry Simpson, *Three Whales and a Juggernaut; Rescuers Feel Pressure to Succeed*, WASH. POST, Oct. 21, 1988, at A1.

72. Beyond the problems posed by the substance of these questions, we encounter the limits of the analytical tools available.

73. Restoration is viewed by some as the only purely positive mode of interaction with the environment. See Jordan, *supra* note 47, at 22.

74. See Baker, *supra* note 19, at 293-95. Aldo Leopold's famous essay *The Land Ethic* was an early clarion call heralding this point—the importance of the development of our ethics in relation to the environment. There, he wrote:

There is as yet no ethic dealing with man's relation to the land and to the animals and plants which grow upon it. Land, like Odysseus' slave-girls, is still property. The land-relation is still strictly economic, entailing privileges but not obligations.

The extension of ethics to this third element in the human environment is, if I read the evidence correctly, an evolutionary possibility and an ecological necessity.

Aldo Leopold, *The Land Ethic*, in A SAND COUNTY ALMANAC 217, 218 (1966).

awareness of the value choices that accompany the decision to restore and the choices made in pursuing restoration. Cataloging the values affected, and identifying who is affected and how, should be central in the restoration process, not incidental to a decision cloaked as scientific.

Catherine O'Neill describes how decisionmakers exclude certain values by excluding native peoples or communities of color from the decisionmaking process.⁷⁵ Kristin Shrader-Frechette's work demonstrates how the analytic techniques and processes employed by decisionmakers may silence the voices of the disempowered and of the broader public.⁷⁶ Avoiding these pitfalls requires that we incorporate values in a broadly democratic way into the decisionmaking processes that surround restoration.⁷⁷

Rx: Informed consent required: In undertaking restoration, there are value choices to be made. We need the best information possible and the opportunity for all affected to participate and evaluate the available options. Those affected should know all consequences and options and have a voice in the decision.⁷⁸

V. THE LEGAL CONTEXT FOR RESTORATION

In addition to exploring the scientific and ethical questions that surround the decision to restore, the legal context in which restoration is employed warrants scrutiny in developing a prescription for restoration's use. One relevant question is whether the legal context in which restoration occurs has a distorting effect on the decision to undertake restoration and, ultimately, on its safe and effective use to achieve the identified goals. If so, this should be accounted for in the prescription.

75. See generally Catherine A. O'Neill, *Restoration Affecting Native Resources: The Place of Native Ecological Science*, 42 ARIZ. L. REV. 343 (2000).

76. See Sean Walsh & Kristin Shrader-Frechette, *Environmental Justice and Procedural Safeguards: The Ethics of Environmental Restoration*, 42 ARIZ. L. REV. 525, 527-33 (2000).

77. See also Andrew Light, *Hegemony and Democracy: How Politics in Restoration Informs the Politics of Restoration*, 12 RESTORATION & MGMT. NOTES 140, 140 (1994) (arguing that good restoration should include not only sound ecological elements but egalitarian and democratic elements as well).

78. The informed consent analogy also shows the limited usefulness of the medical metaphor for environmental restoration. In medicine, it is the patient who gives informed consent. In restoration, only the human representatives of the environment are currently recognized as moral agents. Under current thinking, the environment is a subject on which we decide to act—in the first instance to degrade it, and then to restore. Unlike the patient, the environment has no role in giving consent.

Restoration exists in a matrix of many different human values. Some of these values support the decision to degrade the environment, usually incidentally in the pursuit of some other stated value or goal. We choose to pursue values that entail altering and sometimes degrading the environment in the process, often knowingly. In light of this context, the risk lurks behind all applications of restoration that, if inappropriately employed, it may become a justification for humans to pursue degrading activities without a full accounting of the costs of degradation. Since restoration is possible, the environmental consequences of failing to prevent degradation may be underestimated or overlooked.⁷⁹ With an eye toward this potential problem, we can look at the legal context for environmental restoration.

Without surveying all the legal and policy contexts in which restoration might occur, one can learn a great deal from looking at the contexts in which laws and policies to date have most frequently prescribed or permitted environmental restoration. Two models which raise distinct issues and concerns are apparent: the project model and the quid pro quo model.

Under the project model, public funding, mandate, or permission is granted for a particular restoration project. The project may vary in scale from an effort by a local government or private entity to restore a small area of wetlands or prairie, for example, to a multi-agency undertaking of massive size and cost like the restoration of the Everglades. These projects are almost invariably "place-based." That is, they are conceived to rectify a problem or serve an objective related to a particular geographic location or ecosystem. The motivation for projects of this type may vary considerably, reflecting concern for ecological values, human health, economic values, or other related human values such as fresh water supply or flood control.

Despite the tremendous range of "projects" this label encompasses, a few generalizations seem applicable in most cases. First, these projects are generally undertaken to rectify harms that were produced unintentionally, often before the consequences of the degrading activity were known. The choices available at the time restoration is undertaken are limited: to accept the degradation or to restore in some fashion. Thus, assuming the costs of restoration are outweighed by the benefits it will produce and that restoration is a sufficiently high priority among competing uses of funds, the decision to authorize, fund, or mandate restoration may be viewed as a relatively positive step in its effect on environmental protection goals generally. Although the restoration project may indirectly lessen the perceived need for protection of other similar ecosystems, these restoration projects do not provide a direct incentive for other degradation. Indeed, the difficulty and expense of restoration may provide a cautionary reminder to the public of the high cost that undesirable environmental degradation can impose.

79. See *supra* note 55 and accompanying text.

Second, the project is selected because of identifiable values that can be advanced by restoration. This is an advantage in that the restoration goals may be explicitly identified when deciding whether to undertake the restoration project. Thus, the project more likely will be designed to achieve these articulated values and objectives.

The project-based model can itself develop within several different legal and policy contexts. Professor Bonnie Colby's work suggests that the form of the legal or policy action that prompts project-based restoration can affect its success.⁸⁰ Her study of dispute resolution suggests that voluntary negotiated transactions have significant advantages over litigated solutions.⁸¹ Her call for revamping the policy framework to encourage and facilitate negotiated solutions where restoration is a policy option suggests that current legal structures may offer advocates of restoration too few tools for advancing restoration as a policy alternative.

The alternative to the project model of restoration is what I call the "quid pro quo" model. An example of this is the implementation of section 404 of the Clean Water Act.⁸² Restoration is employed as a form of mitigation and may be mandated as a condition of granting a permit for a degrading activity, such as the dredging or filling of wetlands. Reclamation of mining lands under the Surface Mining Control and Reclamation Act⁸³ provides another example of what I call quid pro quo restoration. Both wetland mitigation through restoration and mining reclamation have achieved many positive benefits. But the context for restoration they exemplify is also problematic and warrants thoughtful and cautious use as a model for several reasons.

First, the requirement of restoration as a quid pro quo for degrading activity on another spot may promote an idea related to what Robert Elliott calls "the replacement thesis."⁸⁴ This is the idea that natural areas and systems can be recreated perfectly by humans, that restored areas are complete replacements for a natural area.⁸⁵ Quid pro quo restoration is not necessarily based on the idea that a restored area is a perfect replication of the same area pre-degradation, but superficially at least, it may promote a related notion—that natural areas and systems are commodities with no unique values, that they are interchangeable. If ten acres of wetlands are lost, the restoration of ten or twenty other acres

80. See generally Bonnie G. Colby & Tamra Pearson d'Estrée, *Evaluating Market Transactions, Litigation and Regulation as Tools for Implementing Environmental Restoration*, 42 ARIZ. L. REV. 381 (2000).

81. See *id.* at 386–91.

82. See Clean Water Act § 404, 33 U.S.C. § 1344 (1994).

83. Surface Mining Control and Reclamation Act, 30 U.S.C. §§ 1201–1328 (1994 & Supp. III 1997). See *id.* §§ 1231–1243 (describing the reclamation process).

84. See *supra* note 55 and accompanying text.

85. See *supra* note 55 and accompanying text.

elsewhere can substitute for them.⁸⁶ This notion removes from the equation the importance of place.

A related problem results when agencies permit scraping down of uplands to create new wetlands as a form of "restoration." When this activity is permitted, the promise of "mitigation" is not fulfilled. The loss is potentially aggravated, particularly if the resulting created wetland fails. These problems are not insurmountable,⁸⁷ but they suggest the need for care in the development of legal mechanisms in which restoration is a quid pro quo for degradation of other areas.

A second concern raised by quid pro quo restoration is that the permittee may be motivated to restore only instrumentally. The permittee desires successful restoration because dredge or fill permission is the quid pro quo for a permit, not because of any long-term or broader interest in the success of the restoration. This places a heavy burden on the monitoring agency overseeing the restoration, as well as necessitating high standards for the design of the restored areas to ensure that they are sustainable. Experience to date suggests that in the quid pro quo context, "landscape restoration" may predominate—efforts to recreate the appearance of the desired natural system, without sufficient attention to the processes that will enable it to continue to survive and evolve.⁸⁸ Agencies charged with oversight of quid pro quo restoration would do well to pay close attention to the factors identified as central to ecological restoration and to incorporate those factors where appropriate in mitigation projects.

Another risk posed by quid pro quo restoration derives from the strongly positive connotations of restoring to "unimpaired or perfect condition," of returning to a state of grace and revitalization. Mitigation provides an appealing focus for the human desire to feel positive about choices we are making.⁸⁹ Quid pro quo restoration runs the risk of putting a happy face on degradation, if we fail to ensure that the ethical and ecological choices represent a positive and wise trade-off. Restoration accomplished as a form of mitigation may become an

86. For a discussion of some of the flaws in this assumption, see Flournoy, *supra* note 43, at 129.

87. The shift in scale that mitigation banking enables, by restoring larger tracts of land, may help to alleviate this. Also, well-designed rules and guidelines can help to ensure that restored wetlands perform the same ecological functions as natural wetlands. Furthermore, rules can be designed to address the problem of "landscape restoration" by requiring reestablishment of key processes rather than mere vegetation counts as measures of compliance. All of these depend upon adequate monitoring and measures to ensure compliance, which have been lacking in the past in some jurisdictions. See Ann M. Redmond, *Florida Moves to Mitigation Banking*, NAT'L WETLANDS NEWSLETTER, Nov.–Dec. 1995, at 14–15 (citing lack of compliance with permit criteria at 81% of mitigation sites studied). A report on a follow-up study of Florida's experience is expected soon.

88. *Id.* See also Dennis M. King, *Economics: Costing Out Restoration*, 9 RESTORATION & MGMT. NOTES 15, 17 (1991) ("In the end, even with elaborate plan review procedures, market forces usually prevail and reward low cost restoration rather than long-term results.").

89. See generally Rodgers, *supra* note 25.

absolution for conduct, the cost of which we want to avoid reckoning. By tinkering with restoration and mitigation, we may overlook the choices we are in fact making, and what we are losing by making those choices.

What is the prescription we can distill from these comments on the legal and political context? It has two parts.

Rx: First, do no harm. The Hippocratic oath can be applied to ensure we don't create incentives for degradation through the legal context in which restoration occurs.

The Hippocratic oath may provide a useful ethical guidepost. The oath, with its injunction "first, do no harm," should remind us that restoration is not an excuse or justification for environmental degradation. Restoration, if used to justify doing harm in the first place, can be analogized to a medical doctor violating the oath and doing harm because he knows that cures are possible.⁹⁰ If restoration is employed in this fashion, like a doctor violating the oath, the treatment will do more overall harm than good.

Rx: An ounce of prevention.... Preventive medicine, including lifestyle changes, is the safest and surest approach to assure complete functioning and should be attempted wherever possible.

Medicine offers another apt metaphor in its promotion of preventive medical care as opposed to treatment of disease. Just as medical science can offer, at best, a limited ability to cure diseases like cancer and AIDS, science cannot promise a cure for the damage that our conduct causes to natural systems. The alluring promise of miracle drugs and high-tech surgery and treatments can lull unwitting patients not to take preventive measures, to underestimate the costs associated with lifestyle choices. Restoration too can function like promised magic pills, lulling us into bad lifelong habits leading to environmental degradation that restorationists may be able to treat but cannot cure.

Scientists and policymakers, like good doctors, should direct us instead toward the path of preventive medicine. Like physicians who insist on the importance of those difficult lifestyle changes as the only proven and most successful ways to avoid heart disease and some cancers, those skilled in the use

90. See Donald Scherer, *Between Theory and Practice: Some Thoughts on Motivations Behind Restoration*, 12 RESTORATION & MGMT. NOTES 184, 188 (1994) (suggesting adoption of a principle analogous to "first, do no harm" in the restorationist's code of ethics). See also William R. Jordan III, *Two Psychologies*, 8 RESTORATION & MGMT. NOTES 2, 2 (1990) (stating that the challenge is "to see to it that restoration comes of age as a healing art, and not as a sort of environmental license to kill").

and prescription of restoration should always first advocate that we change our lifestyles to reduce impacts that are irreversible or fatal. We should stress prevention of the harm rather than rely on restoration techniques, not only because of an ethical commitment to preservation, but because of what we know of the ecology of restoration—that despite best efforts, we may be only treating symptoms and not curing the underlying disease.

VI. EVALUATING THE ECONOMIC CONTEXT OF RESTORATION

With the development of the science of restoration and governmental mandates and funding for restoration has come a growing market for restoration services.⁹¹ The economic forces of the marketplace have positive potential for encouraging the development of the science and technology of restoration, but they may also create undesirable pressures for which a prescription for restoration should account.

One such pressure that has been noted is the pressure on entrepreneur restorationists to provide low cost estimates to potential buyers of restoration services, whether governmental or private.⁹² In response to this pressure, these new entrepreneurs may design restorations that sacrifice sustainability for economy.⁹³ The end result is that inaccurately low figures become the basis for various policy decisions and become part of the expectations of private planners—a self-fulfilling prophecy. These same inaccurate figures may then be used to express the value of natural systems in some settings.⁹⁴

Also, the uses made of restoration by economic actors may not be entirely motivated by long-term environmental concern. Large corporations have increasingly decided to include restoration efforts as part of the landscaping of their corporate office developments.⁹⁵ The public relations value of restoration for economic actors may be significant. The instrumental nature of such restoration

91. See King, *supra* note 88, at 15.

92. See *id.* at 17 (noting that restorationists want both to attract business by being the low bidder and “to leave the impression that they are ahead of the competition with cost-saving techniques”).

93. See *id.* at 16. King points out that buyers of restoration services in the *quid pro quo* context “view restoration as a means to an end—permit acquisition—and are therefore typically sensitive to price and insensitive to the quality of the product.” *Id.* at 17. There may be other reasons beyond market pressures why restorationists may report only some of the costs of a restoration, excluding from their estimates costs such as land acquisition, permitting, planning, and hydrological and soil testing. See Marylee Guinon, *No Free Lunch*, 7 RESTORATION & MGMT. NOTES 56, 56 (1989).

94. See Guinon, *supra* note 93, at 56. Guinon notes that “the discrepancies between reported and true restoration costs, generally due to hidden costs and inaccurate cost data, are the rule rather than the exception and can be astoundingly large.” *Id.* Guinon estimates that the costs differ from the reported figures by ten times or more. See *id.*

95. See generally Jonathan Perry, *Greening Corporate Environments: Authorship and Politics in Restoration*, 12 RESTORATION & MGMT. NOTES 145 (1994).

may lead to the same concerns about quality that quid pro quo restoration raises.⁹⁶ Some commentators question the worth of this type of restoration, noting how the socio-economic context affects its value and meaning.⁹⁷ The question of what incentives are built into the socio-economic context is one that should be asked of all the contexts in which restoration is used.

Rx: Warning - toxic effects may result from overdoses or misapplication; do not use if contraindicated. Careful ongoing assessment of the legal, economic, and policy context is required to avoid overuse of this powerful remedy.

The medical analogy notes the potential for toxic effects from misapplication or overdose of a medicine or its use when contraindicated. Sensitivity to the context and restoration's value in context is essential to ensuring that restoration achieves its promise.

VII. RESTORATION RX: DEVELOPING A HEALTHY CONTEXT FOR RESTORATION

What prescription emerges from this review? To return to the tale of the pig, we need to be sure that the story of restoration, and of our relationship to the environment more broadly, does not become the story of fitting the pig with the wooden leg. We need a better punchline to the story of the pig and the farmer, an ending that entails conscious and careful assessment of our impacts and the costs we incur and the values we pursue—an ending with humility. The Articles arising from this Symposium shed light on how we can accomplish that, what we can successfully aspire to, and where the pitfalls lie.

From this overview, a list of key questions emerges—questions we should answer when evaluating restoration as a tool in a given situation. Detailed inquiries such as these are the tools that will enable us to determine when and where to prescribe restoration, in what dose, and with what precautions. Appended to this essay is a working list of some of the questions raised by the speakers at the Environmental Restoration Symposium. It is only a start, but these issues suggest a path for future development.

The tenor of the questions and the Articles in this volume are optimistic. They call to mind a remark by Jean Giono, author of *The Man Who Planted Trees*, a book about restoration and its tremendous positive power for humans and the rest of nature. "You know," Giono reportedly said, "there are also times in life

96. See Light, *supra* note 77, at 143 (describing a critical reading of several corporate environmental restoration projects by Jonathan Perry).

97. *Id.* at 143-44 (noting role of restoration in communicating a relationship between the corporation and the environment).

when a person has to rush off in pursuit of hopefulness."⁹⁸ This Symposium, the conversations it began, continued and enriched, and the Articles collected here represent that in the best sense—a rushing off, but with an awareness of each step being taken, of the obstacles in our path, and the light ahead.

APPENDIX A. SELECTED QUESTIONS TO ASK IN PRESCRIBING RESTORATION

A. The Scientific Context

What are the objective facts that warrant consideration of restoration? What are the causes of degradation?

What are the scientific unknowns and uncertainties, the risks associated with these uncertainties in undertaking restoration?

What is the appropriate scale in time and geography from which to consider the proposed restoration?

B. The Ethical and Political Context

What are the values affected by the restoration project, both positively and adversely?

Do the political processes for identifying the values affected ensure that underrepresented communities' views are included?

Is meaningful participation in relevant processes economically possible for affected members of the public?

What are the goals of restoration?

C. The Legal Context

Do those undertaking restoration have an ecological vision and grounding for the restoration project?

What are the institutional pressures for the status quo?

Have all relevant approaches—voluntary, compulsory, and compensatory—been considered and the approach best suited to the objectives selected?

Do the policy and legal framework need change to accommodate different or additional approaches?

Are the relevant institutions able to adapt to the changed vision that restoration demands?

98. Jean Giono, *Afterword* to JEAN GIONO, *THE MAN WHO PLANTED TREES* 51 (1985).

APPENDIX B

Restoration Rx: A Prescription

Consult your ecologist before beginning treatment. Obtain a proper diagnosis and prescription before employing this remedy.

Informed consent required: In undertaking restoration, there are value choices to be made. We need the best information possible and the opportunity for all affected to participate and evaluate the available options.

A holistic approach is needed. Where restoration is undertaken, it should focus on the whole system, on curing the root cause of the problem and restoring the system to a state of independent functioning. Palliative treatments should be a last resort, if employed.

First, do no harm, The Hippocratic oath should guide us to ensure that we don't create incentives for degradation through the legal context in which restoration occurs.

Warning: toxic effects may result from overdoses or misapplication; do not use if contraindicated. Careful ongoing assessment of the legal, economic and policy context is required to avoid overuse of this powerful remedy.

An ounce of prevention.... Preventive medicine, including lifestyle changes, is the safest and surest approach to assure complete functioning and should be attempted wherever possible.

