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# Adaptive Ecosystem Management and Regulatory Penalty Defaults: Toward a Bounded Pragmatism

Bradley C. Karkkainen<sup>†</sup>

## INTRODUCTION

Conservation ecologists and natural resource managers assert that integrated management of complex ecosystems requires an iterative and adaptive management approach.<sup>1</sup> Under this view, policy measures are seen as inescapably provisional and experimental, subject to subsequent modification in response to new learning and changing conditions.<sup>2</sup> In characteristically Deweyan fashion, this “rolling rule” strategy pragmatically and continuously adjusts both ends and means in light of experience and learning. Yet

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1. See, e.g., KAI N. LEE, COMPASS AND GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT 7-10 (1993) (arguing for the need for adaptive management as a strategy to learn how to achieve an environmentally sustainable economy); CARL WALTERS, ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES 2-3 (Wayne M. Getz ed., 1986) (arguing that uncertainty and complexity of ecological systems call for an “adaptive learning process, where management activities themselves are viewed as the primary tools for experimentation”); Kristen Blann & Stephen S. Light, The Key Ingredients of an Adaptive Probe 1-3 (unpublished manuscript), available at <http://www.iatp.org/AEAM/probe.doc> (last visited Mar. 9, 2003); Kai N. Lee, *Appraising Adaptive Management*, CONSERVATION ECOLOGY 3 (Sept. 8, 1999), at <http://www.consecol.org/vol3/iss2/art3/index.html>; Carl Walters, *Challenges in Adaptive Management of Riparian and Coastal Ecosystems*, CONSERVATION ECOLOGY 1 (Nov. 11, 1997), at [www.consecol.org/vol1/iss2/art1/index.html](http://www.consecol.org/vol1/iss2/art1/index.html).

2. See Charles Sabel et al., *Beyond Backyard Environmentalism*, in BEYOND BACKYARD ENVIRONMENTALISM 1, 6-9 (Joshua Cohen & Joel Rogers eds., 2000) (describing the pragmatic “rolling rule” regulatory regime).

lawyers, legal academics, and environmental NGOs worry that the absence of clear, legally enforceable, fixed procedural rules and substantive standards will translate into a kind of open-ended discretion likely to yield to unprincipled compromise, self-dealing, and a lack of accountability in basic governance processes.<sup>3</sup> In short, the concern is that adaptive management stands in tension with the fundamental rule of law precepts.<sup>4</sup>

This Article argues that one important category of rule, the “regulatory penalty default,” is compatible with an adaptive approach to decision making, and indeed may be a necessary precondition. A regulatory penalty default is a harsh or quasi-punitive regulatory requirement that applies as the default rule if parties fail to reach a satisfactory alternative arrangement. Like their counterparts in contract theory, regulatory penalty defaults have an information-forcing character: By creating incentives for regulated entities to contract around the default rule, they also create corollary incentives for these parties to produce and disclose such information as may be necessary to construct and win regulatory approval for alternative proposals. Regulatory penalty defaults also can introduce accountability into such agreements if they are structured to establish threshold standards of environmental performance. The “no-take” provision of the Endangered Species Act (ESA),<sup>5</sup> coupled with

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3. See, e.g., Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of “New Age” Environmental Protection*, 41 WASHBURN L.J. 50, 52 (2001) (expressing concern that without additional accountability measures, “adaptive management may become just another smokescreen to cover politically adaptive evasion of agency responsibilities”); *id.* at 61-62 (arguing that policy flexibility is dangerous because resource management agencies are both “institutionally vulnerable to focused political pressures” that are more likely to come from regulated entities than regulatory beneficiaries, and also prone to “overestimate the effectiveness of their flexible protective strategies”); see also Jody Freeman, *The Contracting State*, 28 FLA. ST. U. L. REV. 155, 157 (2000) (noting concerns that “contractual regulatory instruments” are “a recipe for either corporatism or capture”); Jacqueline Savitz, *Compensating Citizens*, in BEYOND BACKYARD ENVIRONMENTALISM, *supra* note 2, at 65, 67-68 (arguing that a shift toward participatory decision making leaves ordinary citizens at a disadvantage relative to the money, skill, and technical expertise of regulated parties, thus serving as a “smokescreen” for deregulation).

4. See Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity and Dynamism*, 21 VA. ENVTL. L.J. 189, 235 (2002) (citing Antonin Scalia, *The Rule of Law as the Law of Rules*, 56 U. CHI. L. REV. 1175, 1185-87 (1989)).

5. Endangered Species Act (ESA) § 9(a), 16 U.S.C. § 1538(a)(1) (2000) (making it unlawful to “take” any listed species of fish or wildlife); ESA

the Habitat Conservation Plan (HCP) provision,<sup>6</sup> exhibits important elements of this regulatory structure.

Part I of this Article discusses the concept of adaptive management and the leading rationales for its use in natural resource management. Part I.A identifies a number of distinct variants on the concept of adaptive management, in theory and in practice. Part I.B situates the adaptive management concept in the pragmatist philosophical tradition of John Dewey and his “experimental method of inquiry.” Part I.C discusses leading criticisms of an adaptive management approach: specifically, that the degree of discretion required for its operation stands at odds with fundamental notions of legal accountability, and may exacerbate familiar problems of regulatory capture. Part II introduces the concept of the regulatory penalty default as an antidote to these concerns. Part III examines the ESA’s HCP provision as an illustrative (albeit imperfect) example of the regulatory penalty default architecture, and Part IV draws some general conclusions from that analysis. Part V introduces a note of caution about agency rent-seeking and bargaining failures that might limit the usefulness of regulatory penalty defaults in some contexts, and concludes with a recommendation that the regulatory penalty default architecture be designed to incorporate, in an adaptive and experimentalist manner, rolling improvements in both default rules and performance thresholds.

## I. ADAPTIVE MANAGEMENT AND ITS CRITICS

Adaptive management has become something of a mantra among conservation ecologists and natural resource managers seeking to establish “place-based” integrated management of ecosystems.<sup>7</sup> The argument for adaptive management proceeds

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§ 3(19), 16 U.S.C. § 1532(19) (defining “take” to include “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”); 50 C.F.R. § 17.3 (2001) (defining “harm” to include “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering”).

6. ESA § 10(a), 16 U.S.C. 1539(a) (authorizing issuance of “incidental take permits” if accompanied by an approved Habitat Conservation Plan).

7. Fred Bosselman, *A Role for State Planning: Intergenerational Equity and Adaptive Management*, 12 U. FLA. J.L. & PUB. POL’Y 311, 323-25 (2001) (describing increasing prominence of adaptive management in ecological science); A. Dan Tarlock, *Putting Rivers Back in the Landscape: The Revival of Watershed Management in the United States*, 6 HASTINGS W.-NW. J. ENVTL. L.

from the recognition that conventional environmental regulation and natural resource management operate piecemeal, attempting to fraction ecological complexes into smaller, putatively manageable components, and parceling out management responsibilities among mission specific agencies and programs.<sup>8</sup>

Consider the typical estuarine ecosystem. Harvesting of commercially exploited fish and shellfish is the responsibility of the state fisheries agency, while recreational fisheries fall under the jurisdiction of a state fish and game department. If endangered species are affected, the U.S. Fish & Wildlife Service (FWS) or National Marine Fisheries Service may also play a role. Water pollution is both the responsibility of the Environmental Protection Agency (EPA) and the corresponding state water pollution control agency. Air pollution, which may affect water quality through atmospheric deposition, falls under both the EPA and a state air pollution control agency. Land use decisions affecting shorelines and tributaries are largely the responsibility of local units of government, although decisions within a state designated "coastal zone" may also require review by a state coastal zone commission. Developments in coastal or riparian wetlands, on the other hand, require permits from the Army Corps of Engineers (Corps). Agricultural practices that may affect soil and chemical runoff in upstream tributaries fall under the purview of either (or both) the federal or state departments of agriculture. Coastal, riparian, and upland forests, which influence both water quality and seasonal flow patterns, may be the responsibility of state or local park departments, state or federal forest agencies, the National Park Service, or private landowners.<sup>9</sup>

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& POL'Y 167, 189-92 (2000) (noting shift in natural resources management toward bioregional ecosystem-scale approaches relying on adaptive management strategies).

8. Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 29-30 (2001) (discussing shortcomings of current fragmentary and piecemeal approaches to environmental regulation).

9. See Jon Cannon, *Choices and Institutions in Watershed Management*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 379, 387-91 (2000) (describing horizontal and vertical fragmentation of management responsibilities and interagency competition as barriers to effective management at watershed scales); William Goldfarb, *Watershed Management: Slogan or Solution?*, 21 B.C. ENVTL. AFF. L. REV. 483, 485-85 (1994) (stating that responsibility for managing water resources is fragmented among numerous federal, state, and local agencies); Ann Powers & Eric S. Andreas, *Long Island Sound: A*

Because this fragmented, piecemeal approach tends to ignore the synergistic effects and complex interdependencies among the various components and stressors that make up the ecosystem, management interventions often prove ineffective or even counterproductive. For example, oyster populations may be profoundly affected by water quality and the availability of suitable habitat; yet these variables typically fall outside the jurisdiction of the state fisheries agency, which instead attempts to manage oyster abundance solely by regulating the size of the harvest. By the same token, even though filter-feeding oysters play a critical role in regulating estuarine water quality, state and federal water pollution control agencies attempt to manage water quality solely by regulating pollution inputs. In the Chesapeake Bay, for example, oyster populations have fallen to about one percent of historic levels; where it once took three days for oysters to filter all of the Bay's water, it now takes a full year.<sup>10</sup> Finally, because oyster reefs provide valuable habitat for other plant and animal species, oysters are critical to the overall health of the Bay's ecosystem.<sup>11</sup> What is required is integrated management at an ecosystem scale, which in turn requires a high degree of interagency, intergovernmental, and public-private coordination.

Because ecosystems are complex and dynamic entities, however, they are difficult to manage. Contrary to earlier ecological thinking, they do not tend toward steady-state equilibrium conditions, but instead change over time and exhibit nonlinear effects.<sup>12</sup> Given their dynamic and complex makeup, they are subject to a high degree of stochasticity, making it impossible to predict, much less manage, their precise trajectory.<sup>13</sup> Further complicating the management

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*Bibliography of Legal and Related Materials*, 14 PACE ENVTL. L. REV. 447, 449-51 (1996) (noting interrelatedness of problems and fragmentation of responsibility in estuarine management).

10. CHESAPEAKE BAY PROGRAM, STATE OF THE CHESAPEAKE BAY: A REPORT TO THE CITIZENS OF THE BAY REGION 13, <http://www.chesapeakebay.net/pubs/sob/index.cfm> (July 2002).

11. *See id.*

12. *See* DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY 10 (1990); C.S. Holling et al., *Science, Sustainability, and Resource Management*, in LINKING SOCIAL AND ECOLOGICAL SYSTEMS: MANAGEMENT PRACTICES AND SOCIAL MECHANISMS FOR BUILDING RESILIENCE 342, 352-54 (Fikret Berkes & Carl Folke eds., 1998).

13. REED F. NOSS ET AL., THE SCIENCE OF CONSERVATION PLANNING: HABITAT CONSERVATION UNDER THE ENDANGERED SPECIES ACT 64 (1997)

task, we often possess only rudimentary and incomplete scientific understanding of ecological components and processes.<sup>14</sup>

The question, then, is how to manage. The favored solution among conservation ecologists is some form of adaptive management, a “learning-by-doing” approach that views policies and management interventions as explicitly experimental and provisional, and looks to revise both our understanding of ecosystems and subsequent policies as we learn from an iterative series of policy experiments.

#### A. VARIETIES OF ADAPTIVE MANAGEMENT

While there is widespread agreement among ecologists and resource managers on the importance of adaptive management, considerably less agreement exists about the meaning of that term.

##### 1. Scientific Hypothesis-Testing

The term “adaptive management” is generally attributed to ecologist C.S. “Buzz” Holling, who actually used the lengthier locution “adaptive environmental assessment and management” as the title and subject of his seminal 1978 book.<sup>15</sup> Holling developed the concept not in the context of adaptive management, but by way of criticizing standard techniques of environmental impact assessment.<sup>16</sup> As an ecological expert called upon to participate in several major environmental impact studies, Holling objected to an approach that front-loaded inquiry concerning the ecological impacts of a proposed action into a single, comprehensive, expert-driven, pre-decision study. Holling argued that this purely predictive approach was often predicated upon highly uncertain scientific models. Given this uncertainty, a more scientifically defensible

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(asserting that “[s]cientists recognize that we will never be able to predict with great accuracy the outcome of conservation decisions” due in part to the “inherent stochasticity or chaos of nature”); Holling et al., *supra* note 12, at 352-53 (stating that “[the] inherent unpredictability of ecosystems plays havoc with conventional resource management science”).

14. See NOSS ET AL., *supra* note 13, at 64; Holling et al., *supra* note 12, at 346-47.

15. C.S. HOLLING ET. AL., ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 1-2 (C.S. Holling ed., 1978).

16. See *id.* at 47-48 (describing adaptive environmental assessment and management as an alternative to conventional forms of environmental impact assessment).

approach would be to assemble collaborative, interdisciplinary assessment teams who would not only make initial predictions, but identify areas of uncertainty, develop testable hypotheses, and use the implementation phase of the proposed action to verify and field-test these hypotheses.<sup>17</sup> This approach, he argued, would treat environmental impact assessment itself as an ongoing adaptive process to improve scientific understanding over time, and thereby enhance science's predictive capacity.<sup>18</sup>

Carl Walters, a Canadian fisheries biologist, further developed the adaptive management concept in the context of fisheries and wildlife management, proceeding from "the central tenet that management involves a continual learning process that cannot conveniently be separated into functions like 'research' and 'ongoing regulatory activities,' and probably never converges to a state of blissful equilibrium involving full knowledge and optimum productivity."<sup>19</sup> Walters's conception of adaptive management emphasizes the importance of cross-disciplinary integration of existing scientific knowledge into conceptual models of complex dynamic ecosystem processes.<sup>20</sup> Analysis of these models then leads to the identification of areas of uncertainty, generation of specific testable hypotheses, and the design of experimental policies to prove or disprove the hypotheses thus generated.<sup>21</sup> The results of this quasi-scientific process lead in turn to revision of the ecological models upon which later management decisions, including subsequent rounds of policy experimentation, would be predicated.<sup>22</sup> Walters's version of ecosystem management arose in the context of "place-based" natural resource management, albeit originally with the relatively narrow objective of improving management of target fish or wildlife species. By building a structured process of scientific experimentation into management decisions, Walters's approach, like Holling's, in effect harnesses management in service of the scientific

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17. See *id.* at 11-16 (describing core procedures and techniques of adaptive environmental assessment and management).

18. See *id.* at 133 ("Prediction and traditional 'environmental impact assessments' suppose that there is a 'before and after,' whereas environmental management is an ongoing process. . . . Environmental assessment should be an ongoing investigation into, not a one-time prediction of, impacts.").

19. WALTERS, *supra* note 1, at 8.

20. *Id.* at 41-43.

21. *Id.* at 334-36.

22. Walters, *supra* note 1, ¶ 5.



research enterprise. Thus, both Holling and Walters envision adaptive management as a process driven more by the research needs of science than by management imperatives per se. The new learning generated by this process would be expected to inform subsequent rounds of management decisions.

Walters also usefully distinguishes what he calls "active" adaptive management from "passive" adaptive management, and both of these in turn from mere "trial and error."<sup>23</sup> "Active" adaptive management, in Walters's view, consists of conscious generation and testing of specific scientific hypotheses through narrowly tailored, scientifically designed management experiments.<sup>24</sup> "Passive" adaptive management, in contrast, involves heightened monitoring of key indicators and adjustment of policies in response to what may be learned through such careful observation, while foregoing the conscious experimental hypothesis-testing of the "active" model.<sup>25</sup> Even "passive" adaptive management is, in Walters's view, several notches in sophistication above old fashioned "trial and error," a crude and familiar process in which the manager simply tries an approach thought most likely to succeed, and if it fails, moves on to the next most likely successful alternative.<sup>26</sup>

Kai Lee, a social scientist who served as a member of the Northwest Power Planning Council in the 1980s, was perhaps the first to introduce a variant of the Holling-Walters notion of adaptive management into large scale natural resources management in the United States. Lee employed it to inform adjustments to hydroelectric dam operations in the Pacific Northwest in a largely unsuccessful bid to reconcile power production goals with salmon habitat protection needs. He later became an important popularizer of the adaptive management concept through his widely cited book, *Compass and Gyroscope*.<sup>27</sup> Like Holling and Walters, Lee conceives of adaptive management as a modality of scientific inquiry, but

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23. WALTERS, *supra* note 1, at 64, 232.

24. *See id.* at 232 (defining "actively adaptive policies" as those that "include deliberate probing for information" through conscious experimentation).

25. *See id.* at 232, 248-52 (characterizing "passively adaptive policies" as those that are reassessed and adjusted regularly in response to new data and information, but do not include "deliberate probing" through hypothesis-testing experimental policies).

26. *See id.* at 64 (characterizing "trial and error" as a process of "blind probing" without rigorous model-building and hypothesis-testing).

27. LEE, *supra* note 1, at 8.

there are also crucial differences. Walters in particular emphasizes the central importance of integrative ecological modeling; for Walters, integrative ecosystem models are the source of the hypotheses to be tested through adaptive management techniques. In a sense, the whole point of the adaptive management exercise is to fill in “knowledge gaps” in the underlying ecosystem models.<sup>28</sup> Lee, however, appears to de-emphasize the integrative model-building and model-revising aspects of Walters’s approach, with the result that his conception appears somewhat more mechanistic and narrow-gauge. In Lee’s view, adaptive management proceeds directly to advance competing hypotheses in an area of scientific uncertainty, and then devises replicable policy experiments to test these various hypotheses, treating pre-experiment conditions as the control.<sup>29</sup> Such experimentation, he urges, will reduce uncertainty with respect to the specific question under examination, and thus inform subsequent rounds of decision making. Lee’s conception thus appears both less integrative and more optimistic about the prospect of generating definitive “right answers” to specific questions than either Holling’s or Walters’s approaches, which are predicated upon deep skepticism as to the possibility of generating definitive answers, but are confident that science can nonetheless provide continuously improved understanding by peeling back layer after layer of uncertainty.<sup>30</sup>

## 2. Macro-Adaptation: Evolving Institutional Configurations

Holling, Walters, and Lee have in common an understanding of “adaptive management” as a carefully

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28. See Walters, *supra* note 1, ¶ 2 (stating that such “knowledge gaps” often “involve biophysical processes and relationships that have defied traditional methods of scientific investigation” and that large-scale adaptive management experiments provide the “quickest, most effective way to fill the gaps”).

29. Lee, *supra* note 1 (“Experimentation has three components: a clear hypothesis, a way of controlling factors that are (thought to be) extraneous to the hypothesis, and opportunities to replicate the experiment to check its reliability.”).

30. Compare LEE, *supra* note 1, at 56-58 (describing adaptive management as a means of generating “reliable knowledge” and “unambiguous results” through rigorous controlled and replicable experiments) with HOLLING, *supra* note 15, at 133, 135 (emphasizing the inevitability of uncertainty and the need to design environmental management institutions that are responsive to change and “resilient enough to absorb the unexpected and learn from it”).

tailored, rigorously structured variant on the familiar scientific method of experimental hypothesis-testing—one that employs policy measures as the experiment to field-test scientific hypotheses. The goal is to improve scientific understanding in the first instance; management improvements will follow, if at all, only indirectly, through advancement of the science upon which policy is based. Others, however, use the term more broadly (and in the view of Walters and Lee, perhaps somewhat promiscuously).<sup>31</sup> Yet from a manager's perspective, there may be good reason to broaden the adaptive management concept beyond scientific hypothesis-testing.

Two Minnesotans, Kristen Blann and Stephen Light, are among the most articulate expositors of a broader conception of adaptive management. In their view, adaptive management is not simply about improving the science upon which ecosystem management is based. Instead, “the heart of adaptive management is the recognition of the need for more fundamental transformation in response to the failures of conventional scientific management,” because “the most significant barriers [to effective ecosystem management lie] within the institutional architecture of resource management bureaucracies and institutions themselves.”<sup>32</sup> In short, what we do not know about how to manage complex ecosystems extends well beyond scientific gaps or shortfalls in technical knowledge. It includes fundamental questions of institutional design: How can we successfully organize ourselves to undertake the complex task of managing ecosystems? What is required is a “thorough, integrated, and interdisciplinary assessment not just of the resource, but of the architecture of conventional resource management decision making itself,”<sup>33</sup> proceeding (not surprisingly) in the familiar adaptive and experimental fashion, treating any given set of institutional arrangements as itself an experiment to be tested and improved continuously over time, even as the technical and scientific side of adaptive management proceeds apace. As a corollary, Blann and Light are quick to challenge claims to exclusive competence made by resource managers and scientists, who are inevitably subject to “competency traps and

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31. See Walters, *supra* note 1, ¶ 2 (criticizing “peculiar and myopic definitions of adaptive management”).

32. Blann & Light, *supra* note 1, at 2.

33. *Id.* at 3.

[the] inertia of dominant paradigms.”<sup>34</sup> They therefore call for broader systematic input by various “stakeholder” groups, who in their view are often able to inject important policy-relevant perspectives and new information into the dialogue, to challenge conventional assumptions and approaches, and to generate an expanded range of policy options and richer conceptual models of what is at stake.<sup>35</sup>

### 3. “Adaptive Management” at the Hands of Federal Agencies

Whether conceived as a narrowly scientific method or an expansive approach to the human and institutional, as well as the scientific and technical aspects, of ecosystem management, the adaptive management concept has captured the attention of high-level policy makers. It has become almost a *de rigueur* catchphrase in discussions of natural resources management. Yet an examination of what federal agencies actually mean when they use the term suggests a much narrower conception than any of those outlined.

#### a. *Habitat Conservation Plans*

The FWS purports to employ adaptive management in the design of a number of high-profile HCPs under the ESA. What this form of “adaptive management” appears to reduce to in practice, however, is inclusion of a pre-specified set of contingency measures within the plan that would be triggered if the initial effort fails to produce expected results.<sup>36</sup> Such an

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34. *See id.* at 2.

35. *See id.* at 9-12. This broad view of adaptive management thus roughly approximates Jody Freeman’s notion of “collaborative governance.” *See* Jody Freeman, *Collaborative Governance in the Administrative State*, 45 UCLA L. REV. 22 (stating that “collaborative governance” features “a problem-solving orientation,” “broad participation,” “provisional solutions,” accountability through interdependence and mutual monitoring, and “a flexible, engaged agency”).

36. *See* U.S. FISH & WILDLIFE SERV. & NAT’L MARINE FISHERIES SERV., ENDANGERED SPECIES HABITAT CONSERVATION PLANNING HANDBOOK 3-25 (1996) (stating that adaptive management plans in HCPs should contain clearly specified thresholds triggering review, and “a clear understanding and agreement” as to the “range of adjustments which might be required”); Marj Nelson, *The Changing Face of HCPs*, ENDANGERED SPECIES BULL., July/Aug. 2000, at 4, 5-6 (stating that “adaptive management” in HCPs consists of pre-defined contingency plans coupled with monitoring programs that trigger alternative management policies at pre-specified thresholds); Gregory A. Thomas, *Incorporating Adaptive Management and the Precautionary Principle into HCP Design*, 18 ENDANGERED SPECIES UPDATE, Mar./Apr. 2001, at 32, 33 (stating that “another word for adaptive management” as practiced in HCPs

approach involves neither the rigorous testing of scientific hypotheses envisioned by Holling, Walters, and Lee, nor the attention to institutional innovation and adaptation recommended by Blann and Light. At best, borrowing Walters's classification, it may represent a highly constrained form of "passive" adaptive management, or perhaps nothing more than a structured variant on "trial-and-error" learning ("if Plan A doesn't work, we'll try Plan B").<sup>37</sup> Yet because the contingency measures must be specified in advance to be included in the plan, this approach appears to lack the open-endedness of even the most familiar forms of trial-and-error learning. While perhaps an improvement over conventional rule-based approaches that simply assume away uncertainty and proceed on the expectation that *ex ante* predictions will turn out to be accurate, the FWS's version of "adaptive management" is a very modest one that compares unfavorably to the more rigorous and robust conceptions outlined in Part I.A.1.

*b. United States Forest Service*

The U.S. Forest Service has enthusiastically embraced the concept of adaptive management, nowhere more so than in its Northwest Forest Plan, the Clinton-era effort to develop collaborative ecosystem management in the Pacific Northwest. The Northwest Forest Plan's goal was to reconcile continued timber production with protection of endangered species like the northern spotted owl and various salmon species.<sup>38</sup> In the U.S. Forest Service's conception, however, adaptive management is not a recipe for general reorientation of natural

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"is 'contingency planning'").

37. See *supra* notes 25-26 and accompanying text.

38. See U.S. DEPT. OF AGRIC. ET AL., RECORD OF DECISION FOR AMENDMENTS TO THE FOREST SERVICE AND BUREAU OF LAND MANAGEMENT PLANNING DOCUMENTS WITHIN THE RANGE OF THE NORTHERN SPOTTED OWL 2-4 (Apr. 13, 1994) [hereinafter ROD] (setting forth objectives of the Northwest Forest Plan to achieve "land allocations and standards and guidelines" that are both "ecologically sound" and "provide for a steady supply of timber sales and nontimber resources"); Rebecca W. Watson, *Ecosystem Management in the Northwest: "Is Everybody Happy?"*, 14 NAT. RESOURCES & ENVT. 173, 174 (2002) (detailing the Northwest Forest Plan's impetus, content, and level of success); Andrew N. Gray, *Adaptive Ecosystem Management in the Pacific Northwest: A Case Study From Coastal Oregon*, 4 CONSERVATION ECOLOGY 6 (Nov. 23, 2000), at <http://www.consecol.org/vol4/iss2/art6/index.html> (describing the Northwest Forest Plan as a plan to protect older forests and the animals that depend on them).

resource management policies. Instead, it is a specialized research task to be carried out within specially designated and territorially circumscribed “Adaptive Management Areas,” where innovative approaches to forestry management might be developed and field-tested.<sup>39</sup> On this conception, adaptive management might be thought to bear a striking resemblance to a familiar and time-honored “trial-and-error” method, the “pilot project”—useful perhaps, but arguably more of a change in terminology than in direction.<sup>40</sup>

### c. *Everglades Restoration*

The Corps, the lead federal agency in the Comprehensive Everglades Restoration Plan, has made the concept of adaptive management a touchstone in its ambitious, multi-billion dollar plan to re-do South Florida’s plumbing in the interest of ecosystem restoration.<sup>41</sup> Corps documents tend to discuss adaptive management in a highly general way, however. Although the Corps promises adaptive policy adjustments in response to future scientific discoveries and monitoring data, it has thus far said little about what will be studied and

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39. See ROD, *supra* note 38, at 6 (stating that ten “Adaptive Management Areas” representing about 6% of federal land within the northern spotted owl’s range will be used to “test new management approaches to integrate and achieve ecological, economic, and other social and community objectives”).

40. See Lee, *supra* note 1 (criticizing the Forest Service’s adaptive management areas approach as little more than a “trial and error” exercise in confined test plots, reducing adaptive management to a “buzzword” that “means less than it seems to promise”). This criticism is consistent with Oliver Houck’s broader characterization of ecosystem management as practiced by the Forest Service as essentially just a new label attached to a familiar, highly discretionary “multiple use” management approach. See Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 974-75 (1997) (“Ecosystem management, as currently promoted, is politics with a strong flavor of law-avoidance.”).

41. See Michael Voss, *The Central and Southern Florida Project Comprehensive Review Study: Restoring the Everglades*, 27 ECOLOGY L.Q. 751, 752-53 (2000) (stating that the Army Corps of Engineers adopted adaptive management as a framework for the Everglades restoration effort); U.S. ARMY CORPS OF ENGINEERS & S. FLA. WATER MGMT. DIST., CENTRAL AND SOUTHERN FLORIDA PROJECT COMPREHENSIVE REVIEW STUDY, FINAL INTEGRATED FEASIBILITY REPORT AND PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT 5-32 (stating that CERP will rely on adaptive assessment to “revise, improve and fine tune management procedures”), [http://www.evergladesplan.org/docs/comp\\_plan\\_apr99/sect5.pdf](http://www.evergladesplan.org/docs/comp_plan_apr99/sect5.pdf) (April 1999); Adaptive Assessment Team of the Comprehensive Everglades Restoration Plan, Adaptive Assessment/Management SOP White Paper 1, at [http://www.evergladesplan.org/pm/recover/recover\\_docs/aat/082901\\_aa\\_sop\\_draft.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/aat/082901_aa_sop_draft.pdf) (Aug. 29, 2001).

monitored, or what policies might be adjusted.<sup>42</sup> Critics charge that this approach affords the Corps an opportunity to put off tough decisions until later, while retaining discretion in the early planning stages of a massive public works project to move in any number of different directions.<sup>43</sup> To a substantial degree, evaluations of the merits of this approach boil down to a question of trust. Those who think the Corps has reformed or is capable of reform might think an adaptive approach desirable and necessary, given the extraordinarily complex task of re-engineering all of South Florida's hydrology in an effort to mimic historical "natural" hydrological conditions that existed prior to massive anthropogenic disturbance. Because those conditions are now impossible to replicate perfectly, substantial experimentation is arguably justified. Others, more skeptical, see the same old Corps up to its same old tricks, planning yet another massive public works project for which it seeks prior authorization of funds and environmental clearances while retaining vast discretionary authority to devise the plan as it goes along, all under the guise of "adaptive management."

#### B. ADAPTIVE MANAGEMENT AS DEWEYAN PRAGMATISM

Although "adaptive management" as practiced by federal agencies to date must be rated something of a disappointment, the concept is not likely to go away anytime soon. Nor should its implications be underestimated. Adaptive management presents a fundamental challenge to familiar natural resource management and environmental protection paradigms: It displaces fragmentary fixed rules with integrative science and management predicated on a continuous process of experimentation and mutually informed readjustment of both goals and means. This process appears to many lawyers as

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42. See, e.g., SOUTH FLA. WATER MGMT. DIST., 2003 EVERGLADES CONSOLIDATED REPORT 7B-11 (2003) (describing the responsibility of interagency RECOVER team to develop an adaptive management plan in support of the Comprehensive Everglades Restoration Plan, but discussing all tasks in the future tense and general terms, e.g., "RECOVER teams will organize and interpret new information obtained from system-wide and local monitoring and research programs" and "will use modeling to identify potential solutions to any performance problems"), [http://www.sfwmd.gov/org/ema/everglades/consolidated\\_03/ecr2003/chapters/ch7b.pdf](http://www.sfwmd.gov/org/ema/everglades/consolidated_03/ecr2003/chapters/ch7b.pdf). (last visited March 1, 2003).

43. See, e.g., Voss, *supra* note 41, at 768-69 (describing concerns about the range of discretion vested in the Corps of Engineers through the adaptive management concept).

distinctly un-law-like and therefore deeply threatening.<sup>44</sup>

Yet while adaptive ecosystem management is still something of a novelty—indeed, perhaps only an idea still awaiting its first real test run—the underlying experimental approach should be a familiar one to philosophical pragmatists. John Dewey outlined the core elements of a similarly adaptive and experimental approach to policy making in his seminal early twentieth century works. In his *Logic*, for example, Dewey argued that every social policy “is *logically*, and *should* be actually, of the nature of an experiment” to be tested in practice, subjecting its consequences to rigorous observation and analysis with an eye toward revising the policy in light of what is learned from that experience.<sup>45</sup> In a long overlooked legal essay, Dewey extended that view to the law generally, arguing that legal precepts should be subjected to “a more experimental and flexible logic” in which “general legal rules and principles are [treated as] working hypotheses needing to be constantly tested by the way in which they work out in application to concrete situations.”<sup>46</sup>

For Dewey, of course, the experimental method was closely tied to a broader epistemology of fallibilism, which viewed every conclusion of fact as necessarily and inescapably provisional and subject to revision or rejection when tested against subsequent experience.<sup>47</sup> This fallibilist epistemology, and its corollary instrumentalist focus on a pragmatic “theory

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44. See Timothy H. Profeta, *Managing Without a Balance: Environmental Regulation in Light of Ecological Advances*, 7 DUKE ENVTL. L. & POLY F. 71, 86 (1986) (stating that adaptive management is “counterintuitive for the American legal system, which puts a premium on firm rules of law”); Stewart, *supra* note 8, at 57 (questioning the “compatibility of such arrangements with democratic values of transparency, accountability, and the rule of law”); A. Dan Tarlock, *Fred Bosselman as Participant-Observer Lawyer: The Case of Habitat Conservation Planning*, 16 J. LAND USE & ENVTL. L. 43, 52 (2001) (stating that “[m]any environmental NGOs recoil” at the discretion required for collaboration and adaptive decision making because it threatens to displace mandatory standards with deals and to push hard management decisions to the future).

45. JOHN DEWEY, *LOGIC: THE THEORY OF INQUIRY* 508-09 (1938).

46. John Dewey, *Logical Method and the Law*, 10 CORNELL L.Q. 17, 26-27 (1924); see also JOHN DEWEY, *THE QUEST FOR CERTAINTY* 277 (1929) (urging that all “standards, principles, [and] rules” be “recognized [as] hypotheses . . . to be tested and confirmed—and altered—through consequences effected by acting upon them”).

47. See DEWEY, *supra* note 45, at 39-40 (endorsing Peirce’s “fallibilism” as “something more than a prudential maxim” but instead an inescapable feature of the human condition).



of inquiry” or “experimental logic” at the expense of philosophy’s traditional and, in Dewey’s view, misguided quest for immutable certainty (“truth” as conventionally understood),<sup>48</sup> led to Dewey’s famous exchange with Bertrand Russell, widely viewed at the time as a victory for Russell, and a historical turning point after which philosophical pragmatism began to lose favor in American academic circles.<sup>49</sup>

Dewey’s experimentalism was, in part, inspired by Darwin’s theory of evolution.<sup>50</sup> In Dewey’s view, intelligent inquiry reflects the human species’s organic adaptive response to our complex and changing environment.<sup>51</sup> In that sense, it is continuous with the adaptive responses of other, non-human organisms to their own environmental conditions.<sup>52</sup> In Dewey’s view, evolutionary adaptation proceeds not only at the generic level of the species, but also at the level of individual organisms and, in the case of social species, social groups or populations. These groups or populations’ survival over time would be determined by their ability to respond efficiently to inherently uncertain environmental conditions.<sup>53</sup> For humans, then,

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48. See DEWEY, *supra* note 46, at 242-46 (criticizing philosophy’s “quest for certainty” in an inherently uncertain world); see also JOHN DEWEY, *What Pragmatism Means by Practical*, in *ESSAYS IN EXPERIMENTAL LOGIC* 303, 305 (1916) (urging that we “regard pragmatism as primarily a method, and treat the account of ideas and their truth and of reality somewhat incidentally so far as the discussion of them serves to exemplify or enforce the method”).

49. See TOM BURKE, *DEWEY’S NEW LOGIC: A REPLY TO RUSSELL* 7-8 (1994) (stating that Dewey’s exchange with Russell proved “devastating to Dewey’s chances for serious consideration by philosophers and logicians”). Russell objected, *inter alia*, on the metaphysical grounds that objects must exist independently of human experience, something for which there was no room in Dewey’s theory. See *id.* at 54-55. Russell also objected on epistemological grounds that raw sense data constitute an irreducible core of immediately knowable fact, the foundation upon which a non-fallibilist epistemology can be built. See *id.* at 54-55, 85-86. These propositions are themselves highly contested, of course, and recently pragmatism has regained a foothold among academic philosophers, with some recent scholarship arguing that Russell misunderstood Dewey’s positions. See, e.g., *id.* at 7 (arguing that Russell “simply failed to comprehend Dewey’s views”).

50. See JOHN DEWEY, *The Influence of Darwinism on Philosophy*, in *THE INFLUENCE OF DARWIN ON PHILOSOPHY AND OTHER ESSAYS IN CONTEMPORARY THOUGHT* 1, 2, 18-19 (Peter Smith, 1951) (arguing that Darwin’s theory undercuts the entire tradition of Western philosophy and its search for transcendental truth and meaning, and urges a reorientation toward the pragmatic).

51. DEWEY, *supra* note 45, at 25-26, 32-33.

52. See *id.* at 35-36, 43-44.

53. See *id.* at 42-46; Richard Field, *John Dewey*, *The Internet Encyclopedia of Philosophy*, at <http://www.utm.edu/research/iep/d/dewey.htm>

language, culture, and reasoned inquiry itself should be understood as complex adaptive responses to the problem of survival common to all species.<sup>54</sup>

For Dewey, reason was inevitably rooted in and bound by practical experience; the error of conventional philosophy was its attempt to isolate reason by dissevering it from its organic instrumental role, and hypostatizing it as "Pure Reason," capable of directly apprehending abstract a priori "Truth." In our experience-bound condition, uncertainty was ubiquitous and inescapable; and much else followed from that premise.<sup>55</sup> It foreclosed the possibility of transcendental truth, or knowledge of anything outside human experience. Accordingly, the best we could do is proceed incrementally and experimentally, judging the value of our ideas not against some abstract standard of perfect truth but by their practical consequences—i.e., would they be confirmed by subsequent experience in a way that these ideas could be put to use in solving human problems?

Yet one need not embrace Dewey's philosophical commitment to universal fallibilism or his rejection of the possibility of transcendental truth to recognize the potential value of his "experimental method of inquiry" as an instrumental approach to solving problems under conditions of complexity and uncertainty. Even if one rejects Dewey's epistemology as a general matter and assumes that some things *are* ultimately certain and knowable, one might acknowledge some domain of deep, befuddling, and intractable uncertainty. Within that domain of uncertainty, whatever its scope, Dewey's experimental method seems a promising way to proceed. Conservation ecologists tell us that the complex dynamics of ecosystems clearly represent one such domain of uncertainty. Perhaps not surprisingly their recommended solution of "adaptive management" closely tracks the experimental method of inquiry Dewey outlined early in the last century.

As Professor Dan Farber helpfully reminds us, however, uncertainty is not confined to the realm of ecosystem management: It is pervasive throughout environmental

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(2001).

54. See DEWEY, *supra* note 45, at 42-45 (arguing that the influence of culture on behavioral manifestations, the development of language, and personal traits set humans apart from other animals).

55. See *supra* note 48.

policy.<sup>56</sup> For that reason, Farber, echoing Dewey, urges that we regard *all* of environmental policy as a “learning experience” and search out dynamic models of environmental decision making.<sup>57</sup> While much remains to be done to sort out just what “adaptive management” means in theory and in practice, it appears to offer at least the rudimentary elements of an approach that can be expanded beyond its present confines, and provides the conceptual underpinnings for a new pragmatic approach to environmental decision making.

### C. ADAPTIVE MANAGEMENT’S CRITICS

Whatever its theoretical virtues, however, the notion of open-ended adaptive decision making sets alarm bells ringing among seasoned environmental lawyers, NGOs, and academic commentators.<sup>58</sup> It is tempting, perhaps, to dismiss their concerns as an overreaction based on fear of the unfamiliar; a knee-jerk response by those who have profited most from more familiar rule-based and rule-bound regulatory approaches; or tunnel vision rooted in professional self-interest and self-definition.<sup>59</sup> After all, in general lawyers articulate, interpret, apply, and enforce rules. A less rule-based and rule-bound approach to environmental policy might threaten to put environmental lawyers out of work, or at least diminish our influence.

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56. See Daniel A. Farber, *Environmental Protection as a Learning Experience*, 27 LOY. L.A. L. REV. 791, 796-97 (1994) (noting that a “high degree of uncertainty” still exists in understanding environmental risks); see generally DANIEL A. FARBER, *ECO-PRAGMATISM* 5 (1999) (stating that “environmental law often involves long-run risks only recently discovered by science and still subject to great uncertainty”).

57. See Farber, *supra* note 56, at 801-06 (“[W]e need to move agencies to a more dynamic model in which regulation is viewed as an ongoing cycle of experimentation and adaptation.”).

58. See Doremus, *supra* note 3, at 62 (arguing that agencies will “seek out any flexibility the statute allows, and exploit it to deflect controversy” by “defer[ring] controversial decisions . . . delegat[ing] those decisions to others, optimistically interpret[ing] data, and assum[ing] that uncertain or as yet unproven initiatives will rescue disappearing species”); Houck, *supra* note 40, at 880-83 (stating that specific, mandatory legal rules are necessary because “commodity users have overridden the good intentions and discretionary language” of past natural resource management statutes).

59. See A. Dan Tarlock, *The Future of Environmental “Rule of Law” Litigation*, 17 PACE ENVTL. L. REV. 237, 241-42, 259-62 (2000) (arguing that environmental NGOs are often skeptical of agency discretion and have successfully advanced environmental protection goals through rule-enforcing litigation).

Setting aside such ad hominem considerations, however, these critics raise legitimate concerns. First is the familiar problem of agency capture. Agency capture can also occur in the context of centralized rule making, of course, but environmental NGOs express heightened concerns when decisions are to be made in devolved, “place-based” arenas under highly flexible and discretionary standards like those seemingly required for adaptive management.<sup>60</sup> The playing field may not be level in local arenas; concentrated local interests with an interest in the outcome will often be in a stronger position to influence the decision-making process in their favor. Guardians of the “public interest” acknowledge that, owing to familiar free rider and coordination problems, they are typically underfunded and understaffed and destined to remain so—a problem whether decisions are made locally or centrally. A crucial difference, they argue, is that they can maximize their influence by concentrating scarce resources on a limited number of high-profile, national-level battles. Meanwhile their opponents, putatively “concentrated” economic interests, may find their power diluted at a national level, where they face free-rider and coordination problems of their own as they attempt to disseminate information, aggregate interests, and coordinate lobbying efforts across a far-flung national economic and political stage. Thus the two sides may be more or less evenly matched as they do battle on a limited agenda of high-profile issues before national-level decision makers. If decision making is devolved to more numerous and localized fora, the argument goes, the limited resources of environmental organizations will be quickly diluted, while concentrated local economic interests may actually gain strength through direct access to decision makers.<sup>61</sup>

The argument appears plausible on its face, though much turns on how well organized environmentalists are, or can become, at the local level. National environmental organizations built on a highly centralized staff model—with members relating to the organization primarily by sending

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60. See *supra* note 3 and accompanying text; see also Michael McCloskey, *The Skeptic: Collaboration Has Its Limits*, HIGH COUNTRY NEWS ¶¶ 6-20 (May 13, 1996) (expressing concern that industry can exercise a potentially higher influence at the local, rather than national, level), at [http://www.hcn.org/servlets/hcn.Article?article\\_id=1839](http://www.hcn.org/servlets/hcn.Article?article_id=1839).

61. See McCloskey, *supra* note 60, ¶ 14 (arguing that local environmental activists are often poorly trained and ill-equipped to operate on the basis of parity with entrenched local economic actors).

checks and receiving informational mailings and solicitations for additional donations—are likely to have little influence in localized decision-making arenas. Those groups with strong and active local chapters may view matters differently. Indeed, there are some indications of a divergence of views among environmental groups. Local environmental groups often support and actively participate in local collaborative processes, which afford them greater opportunities for participation than more remote top-down, rule-making approaches.<sup>62</sup> Among national organizations, those that can field an effective local presence and those that define their mission to include place-based resource protection are also more likely to favor, or at least not to oppose, locally devolved decision making, provided their members or local chapters are afforded adequate opportunities to participate.<sup>63</sup> Indeed, the shift of power *within* the environmental movement implied by the localization of environmental decision making might be as threatening to some highly centralized national organizations as any putative loss of power for environmentalism as a whole.<sup>64</sup>

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62. See Ed Marston, *Squishy-Soft Processes, Hard Results*, HIGH COUNTRY NEWS ¶¶ 12-16 (Aug. 28, 2000) (arguing that successes of local environmental groups in collaborative decision-making processes reflect their maturation and growing independence from the paternal protection of national environmental organizations upon whom they were long dependent), at [http://www.hcn.org/servlets/hcn.Article?article\\_id=5981](http://www.hcn.org/servlets/hcn.Article?article_id=5981); McCloskey, *supra* note 60, ¶¶ 6, 7 (acknowledging that local activists often support local collaborative processes and find them “empowering,” while bitterly criticizing national environmental organizations for “cold-shouldering” such opportunities).

63. See, e.g., THE NATURE CONSERVANCY, ANNUAL REPORT 2001, 2-3 (stating that “[t]he Conservancy protects specific places where plant and animal species can live for generations to come” through a range of strategies, including land acquisition, helping other landowners manage their lands, and collaborating with public and private partners in scientifically-based regional conservation strategies), [http://nature.org/aboutus/annualreport2001/files/ar\\_web\\_2.pdf](http://nature.org/aboutus/annualreport2001/files/ar_web_2.pdf) (last visited March 1, 2003). For a generally optimistic view of trends toward a greater role for environmental NGOs in locally devolved ecosystem governance, see Lee P. Breckenridge, *Nonprofit Environmental Organizations and the Restructuring of Institutions for Ecosystem Management*, 25 ECOLOGY L.Q. 692, 692 (1999) (noting that “nonprofit organizations have become key figures in coordinating transactions to resolve conflicts over exploitation and conservation of natural resources,” but these developments pose new concerns about the representativeness of NGO views and the dangers of cooptation).

64. See Lisa Jones, *Howdy, Neighbor! As a Last Resort, Westerners Start Talking to Each Other*, HIGH COUNTRY NEWS (May 13, 1996) (noting arguments that some national NGOs find local collaborative processes threatening because they shift decision making away from Washington and

More importantly, perhaps, even if environmental NGOs do participate in local collaborative processes, critics warn about the dangers of unprincipled deal making in the absence of clear external standards.<sup>65</sup> The flexibility demanded by adaptive management thus might be thought to stand at odds with fundamental principles of accountability. In particular, it is sometimes argued that in the absence of clear and objective rules enforceable on judicial review, the agency and its bargaining partners will effectively have license to strike whatever deals they want, implicating fundamental rule of law concerns.<sup>66</sup> On an immediately practical plane, this often translates into the concern that citizen suits, the favored tool of generations of environmental lawyers, will become more difficult and perhaps impossible in the absence of clear substantive rules, procedures, and legally enforceable timetables.<sup>67</sup>

Finally, it is sometimes suggested that flexible and collaborative approaches like adaptive management are premised on the naive assumption that regulated parties will willingly cooperate in constructing new and potentially costly regulatory requirements—in effect, to help prepare the noose for their own hanging. But experience demonstrates, it is argued, that environmental progress often comes at a high price.<sup>68</sup> Strong medicine is therefore required, either in the

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reduce the sharply polarized and adversarial climate upon which their fundraising depends), at [http://www.hcn.org/servlets/hcn.Article?article\\_id=1828](http://www.hcn.org/servlets/hcn.Article?article_id=1828); see also Jason Scott Johnston, *The Law and Economics of Environmental Contracts*, in ENVIRONMENTAL CONTRACTS: COMPARATIVE APPROACHES TO REGULATORY INNOVATION IN THE UNITED STATES AND EUROPE 295-96 (Eric Orts & Kurt Deketelaere eds., 2002) [hereinafter ENVIRONMENTAL CONTRACTS] (noting the divergence of interests between national and local environmental groups and their differing attitudes toward contractual solutions).

65. See *supra* note 3 and accompanying text; see also Breckenridge, *supra* note 63, at 705-06 (cautioning that the “nonprofit form of organization alone provides no substantive guarantee that ecological goals will be pursued” and that some “may work to entrench existing interests”).

66. See *supra* note 4.

67. See Doremus, *supra* note 3, at 84 (“Citizen suits are most effective when statutes impose clear obligations or limits. Adaptive management seems at first blush ill suited to such clarity.”).

68. Estimates of the aggregate cost of federal environmental regulation range into the hundreds of billions of dollars annually. See, e.g., Jonathan Adler, *Free & Green: A New Approach to Environmental Protection*, 24 HARV. J. L. & PUB. POL’Y 653, 657 (2001) (citing a cost of \$206 billion in 1999). Recent scholarship has questioned the empirical basis for these kinds of estimates, however, because most rely on industry or agency studies that may

form of tough mandatory rules or substantial economic carrots-and-sticks. Collaboration, on this view, occasions stonewalling, strategic bargaining, dilatory tactics, and other forms of unilaterally imposed transaction costs, tending inevitably toward stalemate or least-common-denominator outcomes.<sup>69</sup> In short, the critics charge that adaptive management and related approaches leave regulated parties with inadequate incentives to take the business of environmental progress seriously.

Evaluating all the empirical claims embedded in these arguments is beyond the scope of this Article. Let us suppose for the sake of argument, however, that the criticisms have merit, or at least are sufficiently plausible to warrant concern. We appear then to be hooked on the horns of a dilemma. According to the conservation ecologists, further progress toward effective ecosystem management is impossible without some form of adaptive management—the uncertainties are simply too great.<sup>70</sup> On the other hand, if the critics are right that in the absence of tough mandatory rules we risk agency capture, lack of accountability, and inadequate motivation on the part of private parties, then we open the possibility of backsliding with respect to environmental protection goals.<sup>71</sup>

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be biased upward or downward. See Thomas O. McGarity & Ruth Ruttenberg, *Counting the Cost of Health, Safety and Environmental Regulation*, 80 TEX. L. REV. 1997, 2057 (2002) (concluding that “regulatee and agency-prepared regulatory cost estimates should be taken with a large grain of salt” because they are “rarely grounded in firm empirical analysis and are often heavily dependent upon fanciful assumptions”).

69. See Cary Coglianese, *Is Consensus an Appropriate Basis for Regulatory Policy?*, in ENVIRONMENTAL CONTRACTS, *supra* note 64, at 93, 113 (arguing that negotiated decision-making processes tend toward least-common-denominator solutions, are often exceedingly time-consuming and resource-intensive, and may exacerbate underlying conflicts); David B. Spence & Lekha Gopalakrishnan, *Bargaining Theory and Regulatory Reform: The Political Logic of Inefficient Regulation*, 53 VAND. L. REV. 599, 625-34 (2000) (arguing that strategic bargaining is a major impediment to effective regulatory negotiation); Rena I. Steinzor, *Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-Control*, 22 HARV. ENVTL. L. REV. 103, 141-43 (1998) [hereinafter Steinzor, *Dangerous Journey*] (arguing that lengthy and complex negotiations place “public interest representatives” at a disadvantage); Rena I. Steinzor, *Regulatory Reinvention and Project XL: Does the Emperor Have Any Clothes?*, 26 ENVTL. L. REP. 10527, 10529-30 (1996) [hereinafter Steinzor, *Project XL*] (characterizing the EPA’s Project XL as a “free-for-all” of “unrelated exemptions” as “companies feel free to submit lengthy ‘wish lists,’ which will not receive rigorous and effective review”).

70. See *supra* notes 7-13 and accompanying text.

71. See *supra* notes 58-69 and accompanying text.

So we seem to be left with an unpalatable choice—do we avoid the risk of backsliding while foreclosing the possibility of progress, or instead lay the groundwork for possible progress while assuming the risk of retreat?

Or can we have it both ways? I argue that a particular kind of rule—the “regulatory penalty default”—can set some outer bounds of accountability without straightjacketing the adaptive management process with excessive prescription. Not only is this approach compatible with adaptive management, but in some circumstances might be its prerequisite, the means through which we can create the proper incentives for parties to engage meaningfully in the adaptive decision-making enterprise.

## II. REGULATORY PENALTY DEFAULTS: INFORMATION-FORCING RULES

The emergence of adaptive ecosystem management is part of a broader trend in environmental regulation, characterized by a shift from highly interventionist, top-down, direct regulatory prescription of *mandatory rules* of behavior—the familiar “command-and-control” model—to *incentive-based* approaches that seek to elicit desired, environmentally beneficial outcomes through largely self-directed and self-managed initiatives. An important class of these incentive-based approaches relies on backstopping default rules that regulated entities are free to “contract around” through implicit or explicit bargaining with regulators and, in some cases, regulatory beneficiaries.<sup>72</sup> A handful of early precursors of this default-rule approach can be found in the regulatory programs enacted in the 1970s,<sup>73</sup> even though mandatory rules

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72. See David A. Dana, *The New “Contractarian” Paradigm in Environmental Regulation*, 2000 U. ILL. L. REV. 35, 36 (noting the emergence of a “contractarian” approach to environmental regulation in which regulated entities individually contract to undertake measures not required by formal law in exchange for relief from otherwise applicable rules); Shi-Ling Hsu, *A Game-Theoretic Approach to Regulatory Negotiation and a Framework for Empirical Analysis*, 26 HARV. ENVTL. L. REV. 33, 33 (2002) (stating that increased reliance on conciliatory negotiation oriented regulatory strategies coincides with increase skepticism about the effectiveness of “top-down” regulation); Johnston, *supra* note 64, at 286 (describing environmental contracting against background status quo regulation as a “default rule approach”).

73. For example, the Clean Air Act encourages states to develop State Implementation Plans to achieve federally mandated air quality standards against a default rule authorizing EPA to impose a Federal Implementation



predominated in that era. More recently, some rules initially conceived as mandatory have been redefined as default rules, in whole or in part.<sup>74</sup> Elsewhere, innovative regulatory programs have consciously incorporated default-rule approaches. Together, these categories seem to encompass the lion's share of the most innovative regulatory reform and reinvention initiatives that have emerged in recent years.

As indicated in Part I, among the most commonly voiced criticisms of these devolutionary proposals are that regulated parties will lack adequate incentives to undertake voluntary self-regulatory measures, that they will exploit opportunities to "game" the system through rent-seeking strategic bargaining, and that negotiations will become mired in excessive transaction costs. The critics, however, often ignore the important role played by default rules in creating incentives for, and policing the boundaries of, bargaining and cooperation. More particularly, one class of regulatory default rule, the "regulatory penalty default," can create powerful incentives to cooperate, while also forcing the production and disclosure of information critical to the regulatory process.<sup>75</sup>

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Plan (FIP) if a state fails to act or produces an unsatisfactory plan. See 42 U.S.C. § 7410(a) (2000) (authorizing State Implementation Plans); *id.* § 7410(c) (authorizing EPA Administrator to issue FIP if a state fails to act or submits a plan that does not meet federal criteria). Many environmental permitting programs also incorporate a default rule approach. Wetlands permitting under the Clean Water Act, for example, relies on a default rule broadly prohibiting the discharge of dredged and fill material, but authorizes site-specific permitting if the applicant can demonstrate that no "practicable alternative" is available and all "appropriate and practicable" steps are taken to minimize adverse environmental impacts. See 33 U.S.C. § 1311(a) (2000) (prohibiting the "discharge of any pollutant by any person" unless authorized by permit); *id.* 1344(a), (b) (authorizing issuance of permits for "discharge of dredged or fill material" at "specified disposal sites" pursuant to regulatory guidelines); 40 C.F.R. 230.10(a), (d) (2002) (establishing "no practicable alternative" and "minimize adverse impacts" standards).

74. Recognizing the burdens placed on regulated entities by highly prescriptive "command-and-control" regulation, as well as the difficulties agencies face in crafting such complex rules, agencies themselves have sought to reconfigure some conventional mandatory rules into default rules. Broadly speaking, these post-hoc reinterpretations of mandatory rules as default rules are a subset of what Farber calls "positive slippage" (or "affirmative slippage"). In practice, the differences that emerge between a nominal statutory mandate and the actual practice of regulated entities when that divergence is created by the regulatory agency itself in search of a better way of doing business. Daniel A. Farber, *Taking Slippage Seriously*, 23 HARV. ENVTL. L. REV. 297, 305-11 (1999) (defining "positive slippage"); *id.* at 315 & n.76 (noting in passing that some cases of "positive slippage" involve penalty default rules).

75. The concept of a *regulatory* penalty default is not wholly new; others

A “regulatory penalty default” is a regulatory default rule that imposes harsh consequences on regulated entities, and thereby heightens incentives to “bargain around” the default rule. The “penalty default” notion is adapted from contract theory, where a penalty default is a gap-filling interpretive rule that intentionally imposes a harsh outcome on one or more parties in order to create an incentive for the parties to contract around the default rule in favor of an explicit alternative arrangement better tailored to their particular circumstances.<sup>76</sup> In the contract context, penalty default rules are said to be especially appropriate in contexts of information asymmetry, where one party might not have adequate incentive to reveal germane, privately held information.<sup>77</sup> Penalty default rules enhance efficient contracting by providing the incentive to reveal this type of information. Because this otherwise silent party desires to avoid the harsh consequences of the penalty default, she will reveal her hand in contract bargaining, leading to better-informed bargaining and explicit negotiation over mutually advantageous contract terms. Contract penalty

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have identified it, but left the idea largely undeveloped. See, e.g., IAN AYRES & JOHN BRAITHWAITE, RESPONSIVE REGULATION: TRANSCENDING THE DEREGULATION DEBATE 108-09 (1992) (suggesting that a regulatory scheme based on contracting around default rules could consist of either “majoritarian” defaults or “penalty” defaults). Similarly, in discussing “affirmative slippage” from existing rules, Farber brushes up against the penalty default concept but leaves it mostly unexplored. See Farber, *supra* note 74, at 59, 315-16 & n.76 (1999) (noting the “interesting body of scholarship” on information-forcing penalty defaults in contract theory, which “might have some lessons for environmental law”).

76. See Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87, 91-93 (1989) (“Penalty defaults are designed to give at least one party to the contract an incentive to contract around the default rule and therefore to choose affirmatively the contract provision they prefer. . . . [P]enalty defaults are purposefully set at what the parties would *not* want—in order to encourage the parties to reveal information to each other or to third parties . . . .” (emphasis added)). The classic example is *Hadley v. Baxendale*, in which a miller sued a carrier for consequential damages consisting of lost profits resulting from delayed shipment of a crankshaft necessary to run the mill. 156 Eng. Rep 145 (Ex. Ch. 1854). The court ruled that absent an explicit contract term, the shipper’s liability would be limited to reasonably foreseeable damages. *Id.* This rule, Ayres and Gertner argue, creates a penalty default that penalizes the miller for failing to reveal the unusually large damages he would incur, but allows similarly situated parties to contract around the default rule.

77. See Barry E. Adler, *The Questionable Ascent of Hadley v. Baxendale*, 51 STAN. L. REV. 1547, 1554-56 (1999) (explaining that properly designed penalty default rules can elicit asymmetrically held information by penalizing the better informed party for failing to contract around the rule).

default rules are thus said to have an "information-forcing" character.<sup>78</sup>

The regulatory analogy is concededly inexact. Contract rules are mainly interpretive or gap-filling in character.<sup>79</sup> With a few important exceptions, freedom of contract between parties is the prevailing norm, but some interpretive and interstitial rules are needed to resolve interpretive disputes and to supply missing terms in incomplete contracts. Given the fairly modest interstitial role played by legal rules in the contract regime, most contract rules are appropriately understood as default rules: Parties generally remain free to contract around them simply by expressly agreeing to alternative terms.<sup>80</sup>

Environmental regulation is typically far more imperial in its designs, however, going well beyond the interpretive and gap-filling functions of contract rules.<sup>81</sup> Contracts are presumed to be voluntary and mutually beneficial arrangements between parties; the function of the state in contract law is to establish some basic background rules and conditions conducive to this voluntary activity, and to serve as a neutral umpire when disputes arise under the contract. Moreover, contract negotiation typically need not be forced by the legal regime; the operative assumption of contract law is

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78. See Ayres & Gertner, *supra* note 76, at 91-95; Charles J. Goetz & Robert E. Scott, *Enforcing Promises: An Examination of the Basis of Contract*, 89 YALE L.J. 1261, 1300 (1980) (stating that a rule limiting the award of damages for unascertainable consequences of the breach induces the promisee to disclose information that the promisor may not have and thereby "increase[s] the efficiency of the promissory activity").

79. Ayres & Gertner, *supra* note 76, at 87; Randy Barnett, *The Sound of Silence: Default Rules and Contractual Consent*, 78 VA. L. REV. 821, 821-25 (1992) (discussing the gap-filling contract rules but criticizing this conception as inadequately attentive to the role of consent in contract).

80. See E. ALLAN FARNSWORTH, CONTRACTS § 1.10, at 36 (3d ed. 1999) ("It is important to understand . . . that the great bulk of the general rules of contract law, including those of the Uniform Commercial Code and the Vienna Convention, are subject to contrary provision by the parties."). Not all contract rules are default rules, however. See Barnett, *supra* note 79, at 825-26 (discussing mandatory contract rules concerning fraud, duress, and unconscionability).

81. See Adler, *supra* note 77, at 661 (stating that the conventional paradigm of environmental regulation is predicated upon direct regulatory control of any activity that has an environmental impact not factored into the cost of products or services); Stewart, *supra* note 8, at 30-31 (characterizing environmental regulation as "a form of economic central planning" that requires detailed specifications of behavior of regulated activities).

that contracting will occur on the volition of the parties, and the function of contract law is simply to advance the goal of efficient contract bargaining. Environmental regulation, in contrast, starts from the premise that strong medicine will be required to alter the behavior of otherwise reluctant regulated entities. The goal, generally speaking, is to force regulated parties to internalize sometimes quite large environmental costs that they have been accustomed to externalize. Thus, environmental regulation seems to call for a more coercive and interventionist posture on the part of the state. Most environmental rules tackle this challenge head-on: A governmental authority typically issues authoritative commands prescribing the alternative behavior that must be undertaken. These prescriptions are often made in considerable detail, on penalty of substantial coercive sanctions for noncompliance. In general we may label these *mandatory rules*.<sup>82</sup>

Some regulatory rules, however, operate not as mandatory rules but as *default rules*.<sup>83</sup> Under this approach, regulated entities are granted the option to avoid compliance with an otherwise mandatory rule by “voluntarily” undertaking some self-initiated alternative course of action that under specified conditions may be deemed a satisfactory substitute for the otherwise prescribed behavior. Regulatory *penalty default* rules are a specialized subset of this broader category of regulatory default rules. A regulatory penalty default is a default rule that, if it takes effect, imposes, or is intended to impose, harsh terms on the regulated entity, thereby creating an incentive for the regulated entity to come forward “voluntarily” with acceptable alternatives—in effect, to “contract out” of the otherwise applicable default requirements.

Like their contract cousins, regulatory penalty default rules can be designed to have an information-forcing character. Indeed, this is one of their principal virtues, one that ought to be exploited more systematically as we look to reform and reinvent our regulatory system.<sup>84</sup> A crucial difference,

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82. See, e.g., Stephen J. Ware, *Default Rules from Mandatory Rules: Privatizing Law Through Arbitration*, 83 MINN. L. REV. 703, 710-11 (1999) (distinguishing non-waivable mandatory rules from default rules, and arguing that arbitration sometimes converts mandatory law into default rules).

83. See *supra* note 72 and accompanying text.

84. The “information problem” in environmental regulation—the problem faced by regulators in assembling the information required to prescribe

however, is that unlike contract penalty defaults, regulatory penalty defaults are also negotiation-forcing: They so alter the incentive structure that bargaining will occur in situations where, absent the penalty default rule, negotiation would likely not occur.<sup>85</sup> To that extent, the negotiation of “voluntary” alternatives to the regulatory penalty default rule is not quite as freely volitional as ordinary contract bargaining. In the regulatory context, then, the penalty default rule has a more ambitious aim. It seeks to influence whether bargaining occurs in the first instance, as well as the information revealed during the course of bargaining. Nonetheless, the overall thrust of a regulatory penalty default approach is to place the onus of producing information on the regulated entity.

### III. AN ILLUSTRATION: THE ENDANGERED SPECIES ACT AND THE HABITAT CONSERVATION PLAN

One of the boldest efforts to reconfigure conventional environmental regulation into a penalty default regime was the Department of the Interior’s aggressive expansion of HCPs during Bruce Babbitt’s tenure as Secretary of the Interior. Babbitt took a previously obscure and rarely used permit provision, section 10(a) of the ESA,<sup>86</sup> and transformed it into the centerpiece of his endangered species and ecosystem conservation policy.

Section 9 of the ESA famously prohibits the “take” of listed species of fish and wildlife.<sup>87</sup> By statute, “take” includes

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effective and efficient rules—has become a recurring theme in my own recent work, and elsewhere in the environmental law literature. See, e.g., Daniel C. Esty, *Next-Generation Environmental Law: A Response to Richard Stewart*, 29 CAP. U. L. REV. 193 (2001); Daniel C. Esty, *Toward Data-Driven Environmentalism: The Environmental Sustainability Index*, 31 ENVTL. L. REP. 10603 (2001); Farber, *supra* note 56; Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity, and Dynamism*, 21 VA. ENVTL. L.J. 189 (2002); Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257 (2001) [hereinafter Karkkainen, *Information as Environmental Regulation*]; Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903 (2002); Eric W. Orts & Paul Kleindorfer, *Informational Regulation of Environmental Risks*, 18 RISK ANALYSIS 155 (1998).

85. I owe this insight to Bill Simon, who also introduced me to the penalty default concept.

86. 16 U.S.C. § 1539(a) (2000).

87. See *id.* § 1538(a)(1)(B) (making it unlawful to “take” any species of fish or wildlife listed as endangered); 50 C.F.R. §§ 17.31(a), 17.71 (2001) (extending

harm.<sup>88</sup> By regulation, “harm” extends to adverse modification of endangered species habitat if it disrupts essential behaviors.<sup>89</sup> The result can be a blanket prohibition on habitat-modifying activities, including, *inter alia*, such basic economic land uses as agriculture, silviculture, and real estate development on lands where endangered species occur, including lands held by private parties.<sup>90</sup>

The ESA was amended in 1982 to create a small escape hatch for landowners caught in the viselike grip of this broadly “prohibitive policy.”<sup>91</sup> The presence of several listed species of butterflies had effectively barred developers from building a potentially lucrative housing development on San Bruno Mountain, an undeveloped area on the San Mateo peninsula just south of San Francisco.<sup>92</sup> The developers countered with an offer to scale back their proposed development, dedicate the remaining undeveloped land as a publicly-owned butterfly habitat reserve, and undertake significant affirmative habitat enhancements, including removing invasive vegetation, replanting native species, and implementing an active, permanently funded habitat management program involving periodic prescribed burns to mimic the natural fire disturbance regime under which native vegetation prospers. Although the butterfly habitat would be slightly reduced in size (about 13%

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prohibition on “take” to fish, wildlife, and plant species listed as threatened).

88. 16 U.S.C. § 1532(19) (defining “take” to include “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”).

89. See 50 C.F.R. § 17.3 (defining “harm” to include “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering”); see also *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687, 704-08 (1997) (upholding 50 C.F.R. § 17.3 as a reasonable agency interpretation of the statutory prohibition on “take”).

90. This seemingly sweeping and intrusive regulation may be something of a paper tiger, however, because the FWS’s limited monitoring and enforcement capabilities probably allow many violations to proceed undetected. See Dana, *supra* note 72, at 38-39 (stating that from an environmentalist perspective, the ESA is “underinclusive and underenforced”); Hsu, *supra* note 72, at 58-59, 61 (stating that detection of ESA violations and enforcement of legal requirements on private lands are “woefully inadequate”).

91. See generally STEVEN L. YAFFEE, PROHIBITIVE POLICY: IMPLEMENTING THE FEDERAL ENDANGERED SPECIES ACT 1, 32-58 (1982) (discussing the ESA as a “prohibitive policy,” defined as an inflexible, extreme boundary-setting government intervention that does not allow regulatees to develop alternative means to reach the prescribed social policy end goals).

92. See *Friends of Endangered Species v. Jantzen*, 760 F.2d 976, 979 (9th Cir. 1985).

smaller), this modest loss of acreage would be more than offset by qualitative improvements in the land's ability to support butterflies.<sup>93</sup> This combination of measures, the developers argued, would better serve conservation goals than the "hands-off" approach demanded by straightforward application of the section 9 "no-take" provision, which prohibited further modification of already degraded habitat but required no affirmative conservation or restoration measures.<sup>94</sup> The FWS accepted the logic of the developer's proposal but insisted it had no legal authority to strike such a deal.<sup>95</sup> Congress then added section 10(a) to the statute, authorizing the FWS to issue permits for "incidental take" of a listed species, provided the result would not be to appreciably reduce the species's prospects for survival and recovery in the wild, and if accompanied by an approved and adequately funded HCP designed, at a minimum, to mitigate and minimize adverse impacts.<sup>96</sup>

In enacting section 10(a), Congress plainly contemplated cases like the San Bruno Mountain plan which involved "win-win" (Pareto-superior) opportunities for enhanced species protection in exchange for minor variances from the otherwise-applicable "no-take" rule. For many years subsequent to its enactment, however, the section 10(a) "incidental take" permit provision was rarely invoked.<sup>97</sup> In part this may have been due to spotty section 9 enforcement by a historically understaffed, underfunded, and politically weak agency, which left landowners little inducement to seek formal section 10(a) permits; *de facto*, then, "incidental take" and perhaps something more was already occurring on a widespread basis

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93. *Id.* at 980, 982.

94. See Craig Anthony (Tony) Arnold, *Conserving Habitats and Building Habitats: The Emerging Impact of the Endangered Species Act on Land Use Development*, 10 STAN. ENVTL. L.J. 1, 20-21 (1991) (noting that a biological study commissioned by proponents of the San Bruno HCP concluded that even without development, butterfly habitat would continue to decline due to encroaching brush and illegal offroad vehicular traffic).

95. See Graham M. Lyons, *Habitat Conservation Plans: Restoring the Promise of Construction*, 23 ENVIRONS ENVTL. L. & POL'Y J. 83, 90 (1999) (stating that the San Bruno HCP could not be implemented without a congressional amendment to section 9 authorizing such agreements).

96. See 16 U.S.C. § 1539(a) (2000).

97. See Karin P. Sheldon, *Habitat Conservation Planning: Addressing the Achilles Heel of the Endangered Species Act*, 6 N.Y.U. ENVTL. L.J. 279, 299-300 (1998) (stating that only 14 HCPs were approved in the first 10 years after Congress amended the statute).

without permits.<sup>98</sup> Even scrupulously law-abiding landowners had to question whether the costs of producing an HCP could be justified by its dubious benefits, especially given uncertainty as to whether a permit would issue under the indefinite and highly discretionary standards set out in the statute.<sup>99</sup>

Enter Bruce Babbitt and the California gnatcatcher, a small songbird dependent on the coastal sage scrub, a habitat type unique to southern California that was vanishing rapidly under the onslaught of urban sprawl. Listing the gnatcatcher as threatened or endangered would introduce legal uncertainty into development plans across a large swath of San Diego, Orange, and Riverside Counties, potentially at huge cost to local landowners, developers, and local governments.<sup>100</sup> Hoping to avoid listing, California had earlier enacted the Natural Community Conservation Planning Act (NCCP)<sup>101</sup> to provide a framework for voluntary, collaborative, public-private habitat conservation planning on a regional scale.<sup>102</sup> This voluntary process carried inadequate incentives, however, and was

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98. See MICHAEL J. BEAN ET AL., RECONCILING CONFLICTS UNDER THE ENDANGERED SPECIES ACT: THE HABITAT CONSERVATION PLANNING EXPERIENCE 41 (1991) (suggesting that landowners had no incentive to seek HCPs because they faced no credible threat of section 9 enforcement in cases of incidental takings).

99. See Sheldon, *supra* note 97, at 301-10 (describing barriers to successful HCP negotiations, including a lengthy and costly decision-making process and uncertainties arising from lack of clarity and consistency in HCP policy). Under section 10(a), incidental take permits are not available "as of right," but instead are discretionary. See 16 U.S.C. § 1539(a) (stating that the Secretary of Interior "may permit" incidental take "under such terms and conditions as he shall prescribe," provided applicant meets all statutory requirements and "such other measures that the Secretary may require as being necessary or appropriate" (emphasis added)).

100. See Marc J. Ebbin, *Is the Southern California Approach to Conservation Succeeding?*, 24 *ECOLOGY L.Q.* 695, 702 (1997) (noting that the listing "might have led to a showdown over the fate of the last remnants of undisturbed landscape"); George Frampton, *Ecosystem Management in the Clinton Administration*, 7 *DUKE ENVTL. L. & POL'Y F.* 39, 41-42 (1996) (stating that the federal government instead allowed the problem to be resolved on a more local level); Sheldon, *supra* note 97, at 335-36 (noting that California responded to threatened listings for a number of species on some of the most valuable land in the United States).

101. CAL. FISH & GAME CODES §§ 2800-2840 (1998).

102. See CRAIG W. THOMAS, BUREAUCRATIC LANDSCAPES: INTERAGENCY COOPERATION AND THE PRESERVATION OF BIODIVERSITY (forthcoming 2003) (manuscript at 210, on file with author); Sheldon, *supra* note 99, at 335-36 (noting that California Governor Pete Wilson instituted the NCCP to respond to the impending listing).



making little, if any, progress.<sup>103</sup> Babbitt decided to list the gnatcatcher, cognizant that this would precipitate a crisis and force reluctant parties to take the NCCP planning process seriously.<sup>104</sup> In response, landowners and developers—led by Orange County's largest landowner and developer, the Irvine Company—joined with state and local officials, conservationists, and federal agents to hammer out ambitious regional multiple species conservation plans in each of the three principal counties, providing for thousands of acres of coastal sage scrub habitat reserves and employing local land use regulatory authority to restrict and channel development on other environmentally sensitive lands.<sup>105</sup>

Success in California spawned ambition on a national scale, as HCPs became a showcase of Clinton-era regulatory reinvention.<sup>106</sup> Some 360 HCPs covering 30 million acres had

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103. See THOMAS, *supra* note 102 (manuscript at 217); John M. Gaffin, *Can We Conserve California's Fisheries Through Natural Community Conservation Planning?*, 27 ENVTL. L. 791, 793 (1997) (noting that the results of the voluntary NCCP in the case of the gnatcatcher "were disappointing"); Sheldon, *supra* note 99, at 335-36 (stating that environmental groups rejected the voluntary NCCP process as inadequate and petitioned to list the gnatcatcher as endangered).

104. See Ebbin, *supra* note 100, at 696 (stating that Secretary Babbitt decided to give the gnatcatcher legal protection under the ESA, but in a way that accommodates the collaborative and ecosystem-oriented thrust of the NCCP).

105. See THOMAS, *supra* note 102 (manuscript at 222); Ebbin, *supra* note 100, at 696-97 & n.7. The Southern California plans did not arise under the section 10(a) "incidental take" provision, but under section 4(d), which authorizes the Secretary of the Interior to promulgate special rules for the protection of species listed as "threatened." See 16 U.S.C. § 1533(d) (2000) (authorizing the Secretary of Interior to "issue such regulations as he deems necessary and advisable to provide for the conservation of [threatened] species"). In this case, because the section 4(d) rules allowed local governments and developers to operate in derogation from the otherwise-applicable section 9 "take" prohibition, the species-specific section 4(d) rules negotiated operated as the functional equivalent of a section 10(a) permit and HCP, while allowing for greater planning flexibility. See THOMAS, *supra* note 102 (manuscript at 220-21, 224); Robert L. Fischman & Jaelith Hall-Rivera, *A Lesson for Conservation from Pollution Control Law: Cooperative Federalism for Recovery Under the Endangered Species Act*, 24 COLUM. J. ENVTL. L. 45, 96-97 (2002) (explaining that the gnatcatcher section 4(d) rule extends section 9 protection to the gnatcatcher, but exempts land-use activities consistent with a valid NCCP plan approved by FWS as consistent with section 10(b) incidental take permit criteria).

106. See Frampton, *supra* note 100, at 41-42 (describing Clinton administration efforts to expand use of HCPs following the southern California experience).

been negotiated by September 2001.<sup>107</sup> In the process, section 9 was transformed from an inflexible, uniform, mandatory, and strictly prohibitory rule into a penalty default rule around which landowners and other affected parties would be invited to contract for locally tailored solutions. This, in turn, would require regulated parties to produce and reveal information about land characteristics, biological conditions, and economic development plans and prospects. As a consequence, regulated parties might propose and win regulatory approval for location-specific affirmative conservation measures at a level of detail that would be difficult or impossible for regulatory authorities to prescribe from afar. In principle, such plans might extend across the full range of local variations in habitat types and economic conditions.

Of course, the *de facto* penalty default rule in the HCP context—the section 9 “no-take” provision—was not initially designed to function either as a penalty or as a default rule. Instead, it was intended as an ordinary mandatory rule. But the rule turned out to have such harsh consequences for affected landowners that it could easily be converted to a penalty default by exploiting an obscure, congressionally authorized variance provision already available in the statute.

#### IV. REGULARIZING REGULATION WHILE AVOIDING THE STRAIGHTJACKET OF TOP-DOWN PRESCRIPTION

The story of HCPs is not an unqualified success, but it is a protean example of the power of penalty defaults from which the following important lessons can be drawn. First, a properly structured penalty default rule can create powerful incentives for regulated parties to step forward with ambitious “voluntary” environmental initiatives. This is so because the default position—the consequences of noncooperation—can be set at a painfully high level by the strategic exercise of federal, state, or local governmental authority.<sup>108</sup> Whatever one may

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107. See U.S. FISH & WILDLIFE SERVICE, HABITAT CONSERVATION PLANS AND THE INCIDENTAL TAKE PERMITTING PROCESS, at <http://endangered.fws.gov/hcp/HCPs-and-Incidental-%20Take.pdf> (Nov. 2001).

108. Government's spending power may provide an alternative, or sometimes complementary, incentive—a financial “carrot” to go along with the coercive “stick” of penalty default rules. Indeed, many of the most ambitious HCPs couple private-party concessions with federal expenditures on habitat acquisition and management. See Bradley C. Karkkainen, *Biodiversity and Land*, 83 CORNELL L. REV. 1, 101-02 (1997).

think of the particulars of the San Bruno Mountain and southern California coastal sage scrub agreements, it appears that landowners and local governments in those cases have pledged a far more ambitious set of affirmative conservation measures than could have been expected had the penalty default of section 9 not been hanging over their heads.<sup>109</sup>

Second, contrary to the claims of some critics of the HCP program, such negotiated departures from a default standard need not involve an erosion from a stronger level of environmental protection to a weaker one. As the San Bruno Mountain case clearly indicates, the ESA section 9 “no-take” standard does not mandate affirmative conservation measures designed to confer positive benefits on protected species or biological communities, such as native vegetation restoration, invasive species removal, and prescribed burns to mimic the natural fire disturbance regime.<sup>110</sup> Such measures are often critical to maintenance of native plant and animal communities. Bargaining against a default rule can produce these sorts of affirmative conservation measures, which in many cases may be more beneficial to protected species than strict application of the prohibitory “do-no-harm” section 9 rule.<sup>111</sup> When the private costs of such bargained-for affirmative measures are less than the private losses that would result from strict application of the section 9 default rule, the landowner has a rational economic incentive to seek regulatory approval to undertake the affirmative alternative.

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109. See THOMAS, *supra* note 102 (manuscript at 224-25) (stating that California’s voluntary NCCP habitat planning process “needed at least one federally listed species to provide the fundamental incentive for landowners, developers, and public agencies to sacrifice other land uses”). Indeed, some critics of HCPs have complained that the “voluntary” or “cooperative” process of negotiating binding land use plans consistent with habitat protection looks from their vantage point suspiciously like extortion. See, e.g., Kay Bailey Hutchison, *New Habitat Plan Hides an Old Game*, AUSTIN AM.-STATESMAN, Jan. 16, 1995, at A11.

110. See NOSS ET AL., *supra* note 13, at 65 (stating that the “seemingly rigorous standards of the ESA are actually of little or no value in addressing many of the principal threats to species” because the statute does not “compel the reconnection of already fragmented landscapes, the protection of suitable but unoccupied habitats, the control of invasive exotics or overabundant native opportunists . . . the augmentation of small populations, or any number of other actions”).

111. See *id.* at 65 (stating that regional habitat based conservation can be negotiated to include affirmative conservation measures that may be more beneficial than simply “[h]olding the line on any future impacts to a protected species”).

If the expected conservation benefits from such affirmative measures exceed the expected harm to the listed species resulting from any permitted derogation from the “no-take” rule, the government, acting on behalf of the species, has a rational incentive to agree to the bargain. In short, bargained-for conservation planning need not be a zero-sum game, or simple “slippage” from a stronger conservation standard to a weaker one.<sup>112</sup> The FWS might reasonably calculate that San Bruno Mountain butterflies would be better off with slightly smaller acreage of higher quality restored habitat than with slightly larger acreage of lower quality degraded habitat; and plainly the private landowner also calculated that it was better off under that arrangement. Neither the bargaining nor the affirmative conservation measures could have been expected to occur, however, without the penalty default rule to structure the incentives in that direction.

Third, a penalty default approach is likely to prove especially useful in a context like habitat conservation planning, or more broadly, in ecosystem management, where due to a high degree of local variability in environmental and economic conditions, mutually beneficial outcomes are likely to depend upon location-specific factors. When problems are highly location-specific, conventional mandatory rules will often be a poor “fit” in particular cases. In the San Bruno Mountain example, it is almost inconceivable that a rule prescribed in Washington could have identified the precise mix of restoration measures that would provide the greatest conservation benefits on that particular patch of habitat, much less one that would simultaneously be economically feasible for the landowner. Such a prescription would require highly detailed knowledge of the habitat type, the actual condition of the particular habitat patch, what invasive species were present in what quantities, what restoration alternatives would work best on this particular terrain, and so forth, as well as what kinds of development would be both economically feasible and compatible with a sound habitat enhancement plan. But if local parties—landowners, developers, conservation groups, and local governments—can be induced to bargain, they are likely to enter the discussion with some or perhaps a good deal of local information already in hand, and may be better

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112. See *id.* at 64-66 (arguing the regional HCPs may be preferable from a conservation perspective to the “seemingly rigorous” section 9 standard).

situated than federal regulators to develop or acquire the rest. A costly, uniform default rule that allows for locally-tailored, bargained-for alternatives, then, can be advantageous from a conservation perspective because it encourages the development of locally-flavored rules or approaches that better “fit” locally varying conditions.<sup>113</sup>

Fourth, as in the contract context, the penalty default approach in the regulatory context is information forcing, and is most advantageous in situations involving information asymmetries. This perhaps restates the previous point, but with a slightly different emphasis. The question here is, who should bear the cost of producing information—the regulator or the regulated? In conventional mandatory regulation, the regulator bears the burden of producing the information necessary to justify imposition of a regulatory standard. As has been widely observed, this often leaves the potentially regulated party with no incentive—indeed a *disincentive*—to cooperate by revealing what it knows or by producing additional information.<sup>114</sup> Under the penalty default approach, however, the regulated party begins with an incentive to avoid a harsh default rule, which it can accomplish only by affirmatively stepping forward with information to justify some alternative arrangement.<sup>115</sup> If the San Bruno Mountain

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113. Cf. IAN AYRES & JOHN BRAITHWAITE, *RESPONSIVE REGULATION: TRANSCENDING THE DEREGULATION DEBATE* 106 (1992) (detailing the benefits of allowing regulated entities to negotiate standards tailored to their unique circumstances).

114. See Mary L. Lyndon, *Information Economics and Chemical Toxicity: Designing Laws to Produce and Use Data*, 87 MICH. L. REV. 1795, 1819-20 (1989) (stating that businesses can avoid or mitigate the costs of regulation by limiting the amount or credibility of toxicity data, creating “strong incentives to produce studies aimed at increasing uncertainty”).

115. I have argued elsewhere that California’s Proposition 65, which requires business to issue “clear and reasonable” warnings to all persons they expose to certain toxic substances, has a similar information-forcing penalty default structure. In the case of environmental exposures, in particular, it is often highly uncertain who must be warned and what constitutes adequate warning, leaving the polluter potentially subject to civil liability or criminal liability for failure to warn. The statute allows, however, a state regulatory agency to promulgate “significant risk” thresholds, below which warnings are not required. To escape liability, then, polluters have an incentive to produce the information needed to allow the regulator to establish regulatory thresholds. The effect has been extraordinary industry cooperation in the production of toxicity and exposure data. This has allowed California to set regulatory standards at a record pace. See Karkkainen, *Information as Environmental Regulation*, *supra* note 84, at 345-47; see also David Roe, *Toxic Chemical Control Policy: Three Unabsorbed Facts*, 32 ENVTL. L. REP. 10232,

developer remains mum, it will be prohibited from developing; but if it produces and reveals an HCP tailored to local conditions and acceptable to the FWS, it may relieve itself of the harsh obligations of the penalty default rule. The burden of producing information and the incentive to do so thus shift from the regulator to the proponent of the locally tailored alternative. If the regulated entity is the cheapest information producer—that is, if it holds relevant information or is better situated than the regulator to produce it—this is a desirable allocation of responsibilities.

Fifth, properly structured, a penalty default approach can establish a minimum standard of environmental performance, and thus safeguard against unprincipled deal making and ensure a measure of accountability in the regulatory system without imposing highly prescriptive, mandatory controls on behavior. Here I depart from the actual practice of section 10(a) HCPs and imagine a slightly different set of arrangements. One of the greatest failings of the HCP program as implemented to date has been its failure to insist that HCPs provide a higher level of protection to listed species (or biotic communities, or whole ecosystems) than would be provided by strict application of section 9 alone. The legislative history of section 10(a) appears to contemplate a higher standard. Members of Congress emphasized the positive conservation benefits of the San Bruno Mountain plan and similar negotiated solutions, suggesting that they expected that incidental take permits would issue only in cases like San Bruno Mountain where listed species would be better off as a result of the agreement than under the section 9 “no-take” rule.<sup>116</sup> The statutory language they adopted falls short of that mark, however, requiring only a finding by the Secretary of the Interior that the taking “will not appreciably reduce the likelihood of survival and recovery of the species in the wild”<sup>117</sup>—suggesting that HCPs can be approved so long as the protected species is left only slightly worse off. Critics have

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10235-37 (2002) (detailing how Proposition 65 creates incentives for industry to cooperate in establishing regulatory standards).

116. See *Friends of Endangered Species v. Jantzen*, 760 F.2d 976, 982-83 (9th Cir. 1985) (quoting from legislative history of the enactment of section 10(a), which describes the San Bruno Mountain plan as the model and benchmark against which the adequacy of future HCPs should be judged and characterizes the plan as one whose “overall effect . . . can be beneficial to a species, even though some incidental taking may occur”).

117. ESA § 10(a)(2)(B)(iv), 16 U.S.C. § 1539(a)(2)(B)(iv) (2000).

argued that the FWS's interpretation of this standard goes even further, effectively reading "recovery" out of section 10(a), and thereby allowing the FWS to approve HCPs that leave some species substantially worse off in the long run, so long as there is no immediate threat to their short-term "survival."<sup>118</sup> We can imagine a different and stronger waiver requirement, one more in tune with what the legislative history suggests Congress thought it was approving: a standard that requires an affirmative showing that the listed species (or the biotic community, or the ecosystem) would actually be better off as a result of the proposed alternative.<sup>119</sup> Such a requirement would set a minimum threshold standard of environmental performance, limit the agency's ability to approve "sweetheart" deals with developers, and ensure accountability to congressionally approved environmental goals and objectives. But it would do so in a way that still allowed maximum flexibility to achieve innovative, locally tailored, "win-win" solutions, so long as the minimum standard of performance is met. In short, the penalty default approach can incorporate the desirable accountability benefits of rules, without the straightjacketing effects of mandatory prescriptive rules.

Sixth, to maintain accountability over time and under conditions of uncertainty, the penalty default approach might require a subsequent regulatory intervention, to be triggered if actual performance falls significantly short of bargained-for levels. It is one thing to propose and win regulatory approval for an alternative to the default rule on the promise and expectation that a certain level of environmental performance will be achieved. It is quite another to achieve the expected level of performance, given the kinds of complexities and uncertainties inherent in ecosystem management which were discussed at the outset of this Article. Thus to ensure

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118. See Jon P. Tasso, *Habitat Conservation Plans as Recovery Vehicles: Jump-Starting the Endangered Species Act*, 16 UCLA J. ENVTL. L. & POL'Y 297, 303-04 (1998). According to Tasso, FWS currently interprets the term "survival" in section 10(a) to mean a species's "short-term persistence" and "recovery" to mean its "long-term persistence." *Id.* at 299. It then interprets the statutory bar on a plan that "appreciably reduce[s] the likelihood of survival and recovery" to reach only actions that threaten both short-term ("survival") and long-term persistence ("recovery"). *Id.* at 302 (emphasis added) (quoting ESA, 16 U.S.C. § 1539 (a)(2)(B)(i)-(iv)). Consequently, an act that poses no immediate threat of extinction is permissible even if it impairs the species's prospects of recovery long-term. See *id.* at 302-05.

119. See *supra* note 116 and accompanying text.

accountability and enforceable standards of performance over time, provision should be made for undoing or revising the deal if actual performance falls significantly below the bargained-for level. This, in turn, requires ongoing monitoring of actual performance, a periodic review process, and re-opener provisions, adding potentially significant implementation costs. Some deals may be difficult or impossible to undo. This might occur when implementation of the bargained-for plan results in permanent alterations to habitat or costly investments in physical infrastructure, for example. In such cases, some other penalty, such as monetary compensation or a requirement to offset adverse impacts with comparable environmental benefits elsewhere, should attach.

Finally, one might be tempted to ask, "What is gained by thinking about measures like HCPs as 'regulatory penalty defaults'? Isn't this just a fancy name for a very familiar and well established kind of regulatory device, the variance from an otherwise applicable mandatory rule?" In my view, something is gained by thinking about the deeper incentive structure that is created by the penalty default device. The contract literature reveals the incentives created by penalty default rules in the contract context, and a similar logic of incentives applies in the regulatory context. Thinking in this way might allow us to imagine heretofore unexamined opportunities to restructure regulation so as to achieve the beneficial effects that I have outlined. Indeed, close examination of some recent regulatory reinvention proposals—including, *inter alia*, Project XL,<sup>120</sup> Performance Track,<sup>121</sup> "challenge regulation,"<sup>122</sup> the EPA's "self-

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120. See EPA, PROJECT XL: ENCOURAGING INNOVATION, DELIVERING RESULTS, EPA 00-K-00-001, <http://www.epa.gov/projectxl/xlbooklet.pdf> (Sept. 2000). This publication describes Project XL as an effort to stimulate experimentation with new environmental protection technologies and strategies by offering waivers from existing regulatory requirements in return for promises of "superior environmental protection." *Id.* at 1.

121. See EPA, NATIONAL ENVIRONMENTAL PERFORMANCE TRACK PROGRAM GUIDE, EPA 240-F-01-002 (describing Performance Track as a program to reward environmental self-regulation by granting waivers from certain record-keeping requirement to facilities and firms that implement environmental management systems and commit themselves to continuous improvements in environmental performance), <http://www.epa.gov/perfrac/programguide.pdf> (Oct. 2001).

122. See, e.g., EPA, 33/50 PROGRAM: THE FINAL RECORD, EPA-745-R-99-004 (describing the EPA's 33/50 program, which challenged polluting firms to meet voluntary targets of 50% reductions in 17 priority toxic pollutants by 1995, against the veiled background threat of regulatory intervention), <http://www.epa.gov/opptinr/3350/> (Mar. 1999).



policing” policy,<sup>123</sup> Ayres and Braithwaite’s proposal for “responsive regulation,”<sup>124</sup> and Eric Ort’s notion of “reflexive environmental law”<sup>125</sup>—reveals that they embrace the incentive architecture of the regulatory penalty default. Like the HCP program, however, their embrace is oddly backhanded, taking the present regulatory structure as the point of departure and using its real or imagined inefficiencies to create incentives for regulated entities to undertake voluntary or bargained-for self-improvement alternatives. For that reason, these proposals have been vulnerable to the charge that they are merely “parasitic” on the existing system of command-and-control regulation.<sup>126</sup> But the penalty default notion allows us to see the underlying regulatory logic of these reinvention proposals, as well as their limitations. Viewing these proposals as examples of penalty default regulation, we can quickly see that at a minimum, conventional command-style mandatory rules have come to play a very different role. It is not that they are effective in solving hard environmental problems. Rather, their sheer cost and inefficiency drive parties to seek to bargain around them. Reinvention strategies do not so much rest on the achievements of conventional regulation, as they rely on its failings.

Beyond these examples, however, the penalty default notion also allows us to begin to imagine how we might consciously construct new and perhaps better calibrated penalty default rules, creating more precise incentives than the crude ones generated out of a command-and-control system that establishes such incentives only through backhanded inadvertence. Perhaps some penalty default rules might be made harsher, or more lenient; or crafted to apply more broadly or more narrowly than those that have emerged out of current

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123. See Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations, 65 Fed. Reg. 19,618 (2000) (stating the EPA’s policy to eliminate or reduce gravity-based civil penalties and forebear criminal prosecution for self-discovered and self-corrected violations of regulatory standards so as to encourage higher levels of voluntary compliance and self-auditing).

124. AYRES & BRAITHWAITE, *supra* note 116, at 106-09 (proposing a model of “enforced self-regulation” in which regulated entities would devise and self-enforce rules tailored to their unique circumstances, thus contracting around generally less efficient “backstop” or “default” regulations).

125. Eric W. Orts, *Reflexive Environmental Law*, 89 NW. U. L. REV. 1227 (1995).

126. See, e.g., Eric Weltman & Matt Wilson, *Government’s Job*, in BEYOND BACKYARD ENVIRONMENTALISM, *supra* note 2, at 49, 50-51.

regulatory requirements designed with a much different end in view. The recent Clinton era of reinvention failed to dream such ambitious dreams, and instead settled for awkward efforts to adapt, by administrative reinterpretation, an established set of inefficient rules into a clumsy set of crude penalty defaults.

## V. SOME CAUTIONARY NOTES

### A. CONFLICTS OF INTEREST AND THE RENT-SEEKING AGENCY

What distinguishes regulatory penalty defaults from contract penalty defaults is that in the contract case the government is a neutral third-party arbiter evenhandedly setting default rules for private parties, while in the regulatory case the government both prescribes the default rule and typically is also a party to the bargained-for alternative. This commingling of roles introduces potentially serious conflict-of-interest problems.<sup>127</sup>

In the contract context, the penalty default rule is set by a neutral third party (either a common law judge or a legislature) with no particular interest in the outcome of any particular bargain, but only a generalized interest in promoting efficient bargaining.<sup>128</sup> In the regulatory context, in contrast, background penalty default rules are established and enforced by a regulatory arm of the state that is not neutral in subsequent bargaining against the background rule, but instead is an interested party to the ultimate agreement. From the perspective of regulated entities, the state's conflict of interest creates the potential for unequal bargaining and abuse, of a kind loosely akin to extortion. By setting extremely onerous default terms and high triggering thresholds for departure from the default rule—or perhaps simply by refusing to accept reasonable bargained-for terms on a case-by-case basis—a rent-seeking state might be able to exact extreme concessions from regulated entities.<sup>129</sup>

Perhaps the most crucial element in this volatile mix is the triggering threshold necessary to justify departure from the

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127. See Johnston, *supra* note 72, at 286-91.

128. *Id.* at 287 (“[A] fair case can be made that the common law contract default rules come pretty close to what is optimal for typical contracting parties.”). *But cf. id.* at 287-88 (noting that some specialized areas of contract law are controlled by legislative and regulatory bodies that may be subject to interest group pressures and control).

129. See Johnston, *supra* note 72, at 286-91.

default rule. Part IV discussed the role that tough, judicially enforceable minimum performance thresholds might play in alleviating the concerns of regulatory beneficiaries about regulatory giveaways. Similarly, we might want to import some kind of judicially reviewable standard as a safeguard against abusive or extortionate demands by the agency. An obvious analogy can be drawn to the Supreme Court's recent Fifth Amendment "takings" jurisprudence with respect to regulatory "exactions." Conventional exactions, arising primarily in the real estate development context, appear to be based on a well established form of penalty-default regulation: The state or local land use regulatory authority typically establishes a highly restrictive regulatory permitting framework, and then bargains with the proposed developer to contract out of the otherwise applicable background rules, "exacting" concessions such as dedications of land for streets, parks, schools, and various other public amenities.<sup>130</sup> Like other forms of bargaining against background penalty default rules, these nominally "voluntary" agreements can look suspiciously like extortion from the point of view of the regulated party.

The Supreme Court has developed two doctrinal requirements to protect against this kind of abuse: the "essential nexus" and "rough proportionality" tests. Under *Nollan v. California Coastal Commission*,<sup>131</sup> concessions exacted from the regulated entity must bear some "essential nexus" to the purpose served by an otherwise legitimate governmental regulation; in the absence of such a nexus, the Court says, the exaction would amount to "an out-and-out plan of extortion."<sup>132</sup> In *Dolan v. City of Tigard*,<sup>133</sup> the Court added

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130. See JAMES A. KUSHNER, SUBDIVISION LAW AND GROWTH MANAGEMENT 6-126 to 6-131 (2d ed. 2001) (stating that as a condition for granting discretionary land use approval, communities often impose "exactions" consisting of dedications of land, construction of facilities and improvements, impact fees, and other public benefits).

131. 483 U.S. 825 (1987).

132. *Id.* at 837. In *Nollan*, the California Coastal Commission conditioned a permit for construction of a beachfront home on the Nollans' agreement to grant a permanent lateral easement across their land, allowing users of a public beach on one side of their property to gain access to another public beach on the other side of their property. *Id.* at 827-31. The Commission argued that the exaction was a reasonable means to offset adverse effects of the new construction on coastal values, including impairment of visual access to the ocean from the adjacent roadway. *Id.* at 838-39. The Court deemed the claimed nexus—"access"—to be little more than a "play on words," insofar as

another dimension to its “anti-extortion” jurisprudence, holding that in addition to the *Nollan* “essential nexus” requirement, the concessions exacted from the regulated party must be “roughly proportional” to the adverse impact of the permitted activity.

The *Nollan* and *Dolan* doctrines serve as a check on the most extreme forms of extortionate bargaining. Note, however, that these rules have limited scope; they do not reach *all* potentially extortionate bargaining against the backdrop of penalty default provisions. As both the *Nollan* and *Dolan* Courts indicate, these rules apply in circumstances where, if the government simply took what it instead exacts, that action would amount to a “taking” in the constitutional sense. In *Nollan*, the Court noted that the agency exacted surrender of the right to exclude, one of the “most essential sticks” in a landowner’s “bundle of rights,”<sup>134</sup> a result that if accomplished directly “we have no doubt . . . would have been a taking.”<sup>135</sup> In *Dolan*, the exaction effected a transfer of possession of a greenway, amounting to permanent physical occupation of the Dolans’ land, a per se category of taking if accomplished directly rather than indirectly through the exaction.<sup>136</sup> In other

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the public’s “visual access” to the ocean had little to do with the exacted “physical access” by permanent public easement over the Nollans’ land. There was simply not a sufficiently close connection, the Court said, between the purpose of the rule restricting development and the concession exacted. *Id.* at 838.

133. 512 U.S. 374 (1994). In *Dolan*, the city exacted dedication of a portion of the Dolans’ property for construction of a public storm drain system and a bicycle path along the creek running across the back of the Dolan parcel, reasoning that development in the creek’s floodplain would increase the risk of flooding and add to traffic congestion; the dedications therefore bore the required “essential nexus” to legitimate public purposes served by the regulatory scheme. The Court agreed that the required nexus was present, but held that the city must also demonstrate “rough proportionality” between what is exacted and the impact of what is permitted, based on “some sort of individualized determination that the required dedication is related both in nature and extent to the impact of the proposed development.” *Id.* at 391. The city did not meet this burden. Thus, as another safeguard against government-engineered extortion through bargaining against the backdrop of regulation, the Court in effect demands a rough equivalency between the quantum of private property interest surrendered and the quantum of public values harmed by the permitted activity. *See id.* at 388-96.

134. *Nollan*, 483 U.S. at 831.

135. *Id.*

136. *Dolan*, 512 U.S. at 377-82. In addition, the *Dolan* Court expressly ties its exactions jurisprudence to the broader doctrine of “unconstitutional conditions,” which holds that the government generally cannot condition

cases, however, the landowner or other regulated party may be asked to surrender a lesser quantum of property rights—limitations on land use, for example, that except in the most extreme cases are not likely to rise to the level of Fifth Amendment “takings” if accomplished directly through regulation. In such cases, *Nollan* and *Dolan* would not apply. The question is, should they?

Like many environmentalists and environmental scholars, I have been skeptical of the *Nollan-Dolan* “essential nexus/rough proportionality” requirements in the Fifth Amendment regulatory takings context, and would be loathe to extend these requirements as a matter of constitutional doctrine.<sup>137</sup> Nonetheless, precisely because these standards grow out of the Court’s concern about the potential for abuse in the form of government-sponsored “extortion,” they might suggest a rough-cast model out of which serviceable *statutory* standards might be fashioned to protect regulated parties against lesser but nonetheless serious forms of abusive bargaining.

Certainly a strong case can be made for some kind of *Nollan*-inspired “essential nexus” requirement, which seeks simply to ensure that bargained-for agreements are related to the purposes behind the regulatory scheme. After all, why should regulators be permitted to exact concessions wholly unrelated to the purpose of the regulation? One concern is that courts might construe such a nexus requirement too stringently, using it to rule out bargained-for arrangements that may be congruent with the broader purposes of the regulatory scheme, but not coincident with a narrower understanding of statutory purpose reached by the courts. This criticism can be leveled against the *Nollan* decision itself,

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granting of a benefit upon surrender of a constitutional right. *Id.* at 385. The unconstitutional conditions analogy holds, of course, only if what is surrendered amounts independently to a constitutional right, in this case, the right not to have one’s property “taken” in the Fifth Amendment sense without payment of just compensation. *Id.* at 385.

137. See Bradley C. Karkkainen, *Biodiversity and Land*, 83 CORNELL L. REV. 1, 91-92 (1997) (arguing that extension of the *Nollan* and *Dolan* tests to certain environmental permitting contexts might result in an increase in successful taking challenges, with unsettling implications for biodiversity conservation); Richard J. Lazarus, *Fairness in Environmental Law*, 27 ENVTL. L. 705, 722-32 (1997) (characterizing the *Nollan* and *Dolan* decisions as part of a broader “backlash” against environmental regulation, and urging that environmental law be more attentive to issues of distributional fairness to preempt further expansion of takings doctrine).

where the Court held that provisioning physical public access to ocean beaches by an exacted easement was unrelated to the goal of preventing visual impairment that it deemed to be the purpose behind the restriction on beachfront construction.<sup>138</sup> But the broader purpose behind California's coastal management act is to protect coastal resources and all forms of public access to them, physical as well as visual,<sup>139</sup> and management of trade-offs among the regulatory scheme's subsidiary goals of physical access, preservation of viewsheds, and protection of the natural environment is widely understood to be within the California Coastal Commission's mandate.<sup>140</sup> In response to this concern about the potential for strict judicial construction, the legislature adopting the regulatory scheme would be well advised to express both the purposes of the scheme and the statutory nexus requirement broadly, for example, by requiring that bargained-for alternatives be "reasonably related" to any of the (broadly stated) purposes set out in the statute.

The *Dolan* "rough proportionality" standard is more problematic. First, like many other court-constructed balancing tests, it invites judges to weigh incommensurables—in this case, to balance the harm caused by the permitted activity, on the one hand, against the burden to the regulated party on the other. The verbal formulation "rough proportionality" suggests some relatively finely calibrated, common metric by which to weigh such things. Typically, however, there is no common metric, introducing a heavy dose of subjective preference into the calculation.<sup>141</sup> Nor, even were

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138. 483 U.S. at 838.

139. See California Coastal Act, CAL. PUB. RES. CODE § 30001.5(a), (c) (West 2001) (declaring that among the "goals" of the Coastal Act are to "[p]rotect, maintain, and, where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources," and to "[m]aximize public access to and along the coast and maximize public recreational opportunities in the coastal zone").

140. See *id.* § 30007.5 (acknowledging that "conflicts may occur between one or more policies" of the California Coastal Act, and mandating that "such conflicts be resolved in a manner which on balance is the most protective of significant coastal resources").

141. Cf. Paul W. Kahn, *The Court, the Community and the Judicial Balance: The Jurisprudence of Justice Powell*, 97 YALE L.J. 1, 51-53 (1987) (criticizing judicial balancing tests on grounds that they invite judges to second-guess the policy judgments and political accommodations reached by democratic bodies on the basis of their own subjective re-weighing of interests).

a common metric available, is there any particular reason to think that generalist judges are better at making such calculations than legislators or regulatory agencies.<sup>142</sup> The *Dolan* Court further compounds the difficulty by shifting the burden to the regulator to justify the balance in the first instance, leaving judges ample leeway to second-guess the agency's "proportionality" calculation, or simply to reject it as unproven.<sup>143</sup>

A preferable approach, in my view, is to employ some looser and more deferential formulation that does not invite such judicial overreaching: for example, that the burden on the regulated party not be "grossly disproportional" to the public benefits of the bargained-for agreement. In addition, the burden of proving a violation of this standard should properly lie with the plaintiff.

One might also question whether the *Dolan* proportionality test, as formulated by the Court, asks the right questions. Specifically, why should the degree of *harm* caused by the permitted activity be the relevant consideration when evaluating the positive benefits of the regulation? A broader formulation, such as the importance of the public values served by the overall regulatory scheme and the particular bargained-for agreement, seems to better capture the benefits side of the ledger. Note, however, that this broader formulation threatens to make "rough proportionality" almost indistinguishable from another regulatory "takings" test: the now-familiar *Penn Central* balancing test, which weighs the nature and importance of the public values served by the regulation against the burden on the regulated party, taking into account "distinct investment-backed expectations."<sup>144</sup> That is a balance that more often weighs in favor of the regulatory scheme, as courts recognize that they are not well positioned to second-guess legislative judgments on such broad questions of public value.

The suggestion here, then, is that a modified form of the

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142. See *id.* at 52.

143. See Marshall S. Sprung, *Taking Sides The Burden of Proof Switch in Dolan v. City of Tigard*, 71 N.Y.U. L. REV. 1301, 1303 (1996) (stating that the *Dolan* Court required that "governments come forward and justify their regulatory land use decisions to the factfinder," disadvantaging governments as litigating parties).

144. See *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 123-28 (1978).

“essential nexus/rough proportionality” requirement be included in statutes establishing penalty-default regulation, requiring that bargained-for alternatives to the default rule must be “reasonably related” to the broadly stated purposes of the regulatory scheme, and that the bargained-for burden on regulated parties not be “grossly disproportional” to the public values advanced by the regulatory scheme. Such legislated standards, if judicially enforceable, would provide some protection to regulated parties against clearly abusive regulatory rent-seeking, even in cases where *Nollan* and *Dolan* themselves did not apply. Such standards might also provide some additional safeguard against unprincipled regulatory giveaways. The “reasonably related” standard, in particular, suggests that the concessions exacted must bear some reasonable means-end relationship to the environmentally protective purpose of the regulatory scheme, so that the deal produces environmental benefits of roughly the kind the statute was intended to promote. This would require, of course, that regulatory beneficiaries be granted standing to enforce these standards through judicial review via citizen suits, an avenue not generally available to regulatory beneficiaries in the Fifth Amendment takings context.

#### B. BARGAINING FAILURE

Regulatory penalty defaults must be constructed with an eye toward the likelihood that bargaining will sometimes fail. First, in some bargaining contexts transaction costs might prove excessive from the perspective of either the regulated party or the regulator, or both. Second, even setting aside transaction costs, in some circumstances mutually beneficial, Pareto-superior solutions might not be available. Notwithstanding this Article’s earlier insistence that bargaining against default rules need not be zero-sum, it is highly improbable that positive-sum solutions would be available in *all* circumstances. Whether Pareto-superior bargains are to be had will depend in part upon the nature of the default rule—how onerous its terms are, what level of environmental benefits it provides, and so forth. This leads to the seemingly absurd result that Pareto-superior solutions are most likely—and therefore successful bargaining is most likely to occur—in the case of extremely onerous default rules



providing modest regulatory benefits.<sup>145</sup> Of course, the goal here is not simply to induce the largest number of successful bargains, but rather to achieve the greatest regulatory benefit at the lowest total cost<sup>146</sup>—a goal likely to be better served by somewhat more moderate default rules establishing a higher threshold of regulatory benefits.

These considerations should operate as a practical constraint on the regulator's calculation as to where to set the default rule, and under what circumstances to approve departures from it. Recognition that sometimes we will simply have to live with the consequences of the default rule should tend to operate as a moderating influence in determining where to set the default rule. As a rough rule of thumb, default rules should probably not be set at levels that would regularly exceed technological and economic feasibility in the event of bargaining failure. But this notion stands in some tension with other goals of the penalty default-rule approach. After all, the whole point of penalty defaults is to create incentives for bargaining by imposing harsh default outcomes, a goal that could be undermined if default rules are made too mild. Setting appropriate penalty defaults thus becomes something of a balancing act.

Another factor in determining where to set the penalty default is the need to maintain a credible threat of enforcement. Extremely stringent default rules threatening severe economic and political disruption might not be viewed as credible by regulated parties, who might question the regulator's will actually enforce the rule, or perhaps count on political or legal recourse and on that basis decline to bargain. Too-harsh consequences might trigger congressional intervention, for example—a factor clearly at play in the ESA, where Secretary Babbitt felt compelled to tread gingerly against the background threat of repeal or drastic amendment of the statute.<sup>147</sup> In other cases, enforcement of penalty defaults might rise to the level of Fifth Amendment "takings,"

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145. See Johnston, *supra* note 64, at 286 (noting that "the greater the efficiency under a particular regulatory regime, the greater will be the gains to be realized from bargaining around that regime").

146. A lower total cost takes into account administrative and transaction costs, as well as private costs to regulated parties.

147. See Joseph L. Sax, *Environmental Law at the Turn of the Century: A Reportorial Fragment of Contemporary History*, 88 CAL. L. REV. 2375, 2380-81 (2000).

as we saw in Part IV.A. Regulated parties might count on these legal or political consequences, or simply calculate that against these background threats the agency is unlikely actually to enforce the default rule. These factors would also push in the direction of moderating the severity of penalty defaults.

By the same token, however, the credibility of the threat depends in part upon the regulatory agency's enforcement capacity and zeal. As we saw in the Endangered Species case, bargained-for outcomes were scarce in the early days of HCPs in part because the threat of section 9 enforcement by an underfunded, understaffed, and politically weak FWS was perceived to be minimal.<sup>148</sup> Thus, even while promoting HCPs as a workable alternative to repealing the ESA, the Babbitt-era Department of the Interior also ramped up ESA enforcement as an indispensable precondition for successful negotiation of HCPs.<sup>149</sup>

Apart from the stringency of the default rule and the credibility of the deterrent, regulators also must decide where to set the triggering threshold under which departures from the default rule would be permitted. I argued above that the triggering threshold should be one that promises environmental performance at least as great, or greater, than that expected from the default rule itself.<sup>150</sup> Relative levels of environmental performance may not be easy to define and quantify,<sup>151</sup> however, especially in circumstances involving bargaining over complex, multidimensional environmental

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148. See *supra* text accompanying notes 96-99.

149. See Sax, *supra* note 147, at 2381 (stating that the administration had a dual strategy to demonstrate that the ESA was both "workable (did not have to be revised) and working (was being effectively enforced and was accomplishing species protection)").

150. See *supra* Part IV.

151. One of the major problems with the EPA's Clinton-era Project XL program was its failure to define clearly what would count as "superior environmental performance," the triggering threshold to justify departure from otherwise applicable regulatory rules. As a result, negotiations often broke down in endless wrangling over whether various sets of expected outcomes should or should not count as "superior environmental performance." See Thomas E. Caballero, *Project XL: Making It Legal, Making It Work*, 17 STAN. ENVTL. L.J. 399, 406-08 (1998) (detailing ambiguities and disagreements concerning how to define and measure "superior environmental performance"); Stewart, *supra* note 8, at 67 (stating that Project XL has achieved "disappointing" results due in part to "uncertainties and inconsistencies in the establishment of default baselines, evaluation of proposals' environmental benefits, and the criteria for project approval").

outcomes such as habitat quality and ecosystem health. Here again, a deep tension is exposed. Crisp, bright-line performance thresholds are likely to reduce transaction costs and promote successful bargaining, but potentially at the cost of stifled creativity and missed opportunities for less obvious or harder-to-measure environmental gains. Defining sufficiently rich but objective metrics of performance, then, will be a task of central importance, and one that is unlikely to be settled once and for all time.

### C. TOWARD DYNAMIC PERFORMANCE BASELINES?

All this suggests that the performance thresholds necessary to trigger relief from the default rule must be set with great care, because where they are set will play a very large role in determining whether bargaining is successful and what kinds and levels of environmental gains follow. But that brings us full circle to the considerations that began this Article. Given pervasive complexity and uncertainty in ecosystem management and in environmental policy generally, we are likely never to know *ex ante* and with certainty which default rules and performance thresholds will generate optimal environmental outcomes. So when all is said and done, we seem to have fallen back into the same information trap that we sought to escape.

Yet all is not lost. Under such conditions of pervasive uncertainty, Dewey's experimental method of inquiry—or adaptive management, if you will—once again recommends itself.<sup>152</sup> The solution, then, is to set default rules and performance thresholds at the levels justified by our best current knowledge, but to treat default rules and performance standards and metrics themselves, like other elements of the environmental policy puzzle, as provisional and experimental, to be revised in light of subsequent learning. Building the capacity to learn and to revise default rules and performance thresholds in light of actual experience would require careful monitoring, analysis, comparison, and critique of both bargaining outcomes and the actual environmental consequences of various bargained-for arrangements, in characteristically Deweyan fashion.

This approach has additional implications. First, it suggests that bargained-for solutions should be of limited

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152. See *supra* Part I.B.

duration, to allow for subsequent adjustment in light of new learning and revision against the backdrop of revised rules and performance thresholds. Limiting the duration of bargained-for arrangements under a shifting regulatory background also introduces, however, an element of regulatory uncertainty that might threaten to undercut bargaining. From the point of view of many regulated parties, much of the value of a bargained-for regulatory alternative is precisely that it operates as a certain shield against future regulatory threats. For this reason, the Department of the Interior includes a controversial “no surprises” guarantee in HCPs, promising that if subsequent learning indicates the need for additional habitat- or species-protective measures, the burden of producing them will not fall on the landowner.<sup>153</sup>

Here, then, another deep tension is exposed: Pervasive uncertainty argues in favor of a dynamic regulatory baseline and more frequent renegotiation of agreements, while from the point of view of some regulated parties bargaining may best be effectuated by offering the assurance of fixed deals of certain terms and longer duration. Once again, there is no obvious way to resolve this tension, other than to suggest that these competing considerations must be balanced in the design of the default-rule regime, and rules and expectations adjusted in light of subsequent experience.

The demand for the certainty of fixed terms should not be overstated, however. Some parties may be more flexible than to require deals of fixed duration and certain terms. The contract literature has observed the emergence, primarily in business settings, of the so-called “relational contract” under conditions of complexity, high uncertainty, and unpredictable change.<sup>154</sup> In a relational contract, parties enter into a contractual relationship to work together for mutual benefit, often under highly indefinite performance standards such as “best efforts.”<sup>155</sup> These relationships are common in the business world, for example, in supply-chain management.<sup>156</sup> A

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153. See Joseph L. Sax, *The Ecosystem Approach: New Departures for Land and Water*, 24 *ECOLOGICAL L.Q.* 883, 884-85 (1997).

154. See generally Charles J. Goetz & Robert E. Scott, *Principles of Relational Contracts*, 67 *VA. L. REV.* 1089, 1090-91 (1981) (stating that relational contracts emerge “[w]here the future contingencies are peculiarly intricate or uncertain” so that “parties are incapable of reducing important terms of the arrangement to well-defined obligations”).

155. See *id.* at 1111-12.

156. Martin Christopher, *Relationships and Alliances: Embracing the Idea*

manufacturer in a highly competitive and technologically innovative industry might anticipate the need to manage rapid change in both its product line and production processes while maintaining or improving product quality, and therefore might not be able to specify in advance the precise quantities, prices, or technical specifications of the parts and supplies it will need. The need for stable cooperative relationships with reliable supply partners that are able to adjust their own production schedule and product lines on short notice thus becomes imperative. Flexible relational contracts that leave the details to be filled in later are essential in such settings.<sup>157</sup>

The obvious environmental analog is ecosystem management, which we described at the outset as requiring ongoing collaboration among multiple parties engaging in joint adaptive problem-solving under conditions of complexity and high uncertainty. Such arrangements are typically far more open-ended and “relational” in character than the simple model of two-party, fixed-term bargaining examined thus far. They are nonetheless purposive, in much the same way that industrial supply chain management is highly purposive.

As noted earlier, skeptics question whether parties will have adequate incentives voluntarily to undertake and maintain such collaborative “relational” arrangements, and to keep them on track toward real environmental performance gains. To be sure, some regional ecosystem management efforts, such as the Chesapeake Bay Program, have persisted over many years and appear to involve genuine efforts to achieve environmental objectives, but critics suggest that these are the exception, not the norm.<sup>158</sup> But once again, regulatory penalty defaults might offer a solution. The threat of harsh consequences if collaborative ecosystem management fails might trigger cooperation, motivate participants to undertake

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of *Network Competition*, in STRATEGIC SUPPLY CHAIN ALIGNMENTS 272, 272-73, 277-84 (John L. Gattorna ed., 1998) (describing the emergence of highly integrated, intensive, long-term customer-supplier strategic alliances, partially displacing traditional arms-length “transactional” relationships).

157. See NAT'L RESEARCH COUNCIL, SURVIVING SUPPLY CHAIN INTEGRATION: STRATEGIES FOR SMALL MANUFACTURERS 60-62 (2000) (stating that successful supply chain contracts “serve as frameworks for relationships,” are “unavoidably incomplete,” and include information-sharing and adaptive mechanisms rather than specifying detailed fixed rules).

158. See Cannon, *supra* note 9, at 407-16 (contrasting the Chesapeake Bay Program's success to the experience of other collaborative watershed management initiatives, and discussing explanatory hypotheses).

substantial commitments, and impose discipline on the process over the long term.

An example of such a collaboration-and-adaptation-reinforcing penalty default is the EPA's proposed total maximum daily load (TMDL) rule under the Clean Water Act (CWA). Section 303(d) of the CWA requires states to identify waters that fail to meet established water quality standards,<sup>159</sup> and to establish TMDLs for pollutants entering those waters.<sup>160</sup> If states fail to perform these duties, the obligation shifts to the EPA to prepare and implement TMDLs.<sup>161</sup> This requirement was long ignored until a rash of lawsuits in the 1990s forced the Clinton-era EPA to reexamine its TMDL policy. Abandoning its failing defensive litigation posture in favor of an aggressive policy offensive, the Clinton administration proposed a new rule that reinterpreted the section 303(d) TMDL requirement to require states to establish enforceable controls on nonpoint as well as point source pollution.<sup>162</sup> The rule—later suspended in response to congressional opposition, and still not in force<sup>163</sup>—would also require states to establish

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159. Under the Clean Water Act, states establish water-quality standards—consisting of a designated “use” and “criteria” determining pollutant levels appropriate to the designated use—for each water body segment within their borders. 33 U.S.C. § 1313(a), (c)(2)(A) (2000). In theory, these water-quality standards are then reflected in National Pollution Discharge Elimination System (NPDES) permits, which establish permissible effluent limitations for point sources of pollution as a complement to nationally uniform technology-based effluent limitations. In practice, however, the water quality side of the NPDES permit system is badly underdeveloped. States sometimes fail to establish (or to update) water quality standards. In other cases they adopt weak or vague standards, or fail to make the complex calculations necessary to translate broad area-wide media quality objectives into source-specific permit limitations. Perhaps most importantly, NPDES permits do not reach non-point sources of pollution.

160. Clean Water Act, 33 U.S.C. § 1313(d)(1)(A), (C).

161. *See id.* § 1313(d)(2).

162. *See* Revisions to the Water Quality and Management Regulation, 40 C.F.R. pts. 9, 122-124, 130 (2001) (previously published at 65 Fed. Reg. 43,586 (July 13, 2000)) (final EPA rule revising requirements for states to establish and enforce Total Maximum Daily Loads (TMDLs) of pollution from point and nonpoint sources for waterways with impaired water quality); *see also* Oliver A. Houck, *The Clean Water Act TMDL Program V: Aftershock and Prelude*, 32 ENVTL. L. REP. 10385 (2002) (describing TMDL rule making); Lisa E. Roberts, *Is the Gun Loaded This Time? EPA's Proposed Revisions to the Total Maximum Daily Load Program*, 6 ENVTL. LAW. 635, 648-56 (2000) (detailing history of TMDL litigation and the EPA's response, culminating in proposed new TMDL rule).

163. *See* Effective Date of Revisions to the Water Quality and Management Regulation, 40 C.F.R. pts. 9, 122-124, 130 (2002) (previously published at 66

water quality monitoring and modeling programs and to make subsequent adjustments to their TMDL requirements if the initial measures failed to improve water quality to acceptable levels.

The states complain that developing and implementing TMDLs requires extensive data, high-quality technical and scientific information, and sophisticated modeling capabilities that they may not have the financial or technical capacity to generate.<sup>164</sup> Indeed some have argued that the diversion of scarce agency resources to meet the demands of the TMDL process could undermine other and potentially more cost-effective water quality and aquatic ecosystem management efforts. But the onerous and straightjacketing character of the formal TMDL process has also triggered aggressive, proactive efforts on the part of some states to improve water quality in segments currently on their impaired waters lists, so as to preempt the need to produce TMDLs in the first instance. The Chesapeake Bay Program, for example, indicates that it plans to undergo a self-designed, collaborative, and experimental “parallel TMDL” process to assign pollutant loads basin-wide and on a tributary-specific basis to bring dissolved oxygen to a level that would allow each state to remove Bay waters and tributaries from its impaired waters list by 2010, a year before a formal TMDL would be required. By obviating the need for a formal TMDL, Chesapeake Bay Program participants believe they will protect flexibility for experimentation and voluntary approaches.<sup>165</sup> Imposition of an external penalty default, then, appears to supply the motivation needed to induce program participants to redouble their “relational” efforts to achieve real environmental performance gains in the Chesapeake Bay region.<sup>166</sup>

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Fed. Reg. 53,044 (Oct. 18, 2001) (establishing April 30, 2003, as the effective date for the new TMDL rule).

164. See Houck, *supra* note 162, at 10389-96.

165. See Karl Blankenship, *Bay Program Must Clean Chesapeake by 2010—Or Else*, BAY J., <http://www.bayjournal.com/99-09/TMDLS.HTM> (describing Chesapeake Bay Program cleanup as an effort to “beat the TMDL clock” to avoid inflexible and costly regulatory requirements) (Sept. 1999).

166. See CHESAPEAKE BAY PROGRAM, CHESAPEAKE BAY 2000, at 5 (stating joint commitment by Chesapeake Bay Program partners to undertake cooperative efforts to ensure that by 2010 they will improve water quality in the Bay and its tributaries so that these waters may be removed from the impaired waters list prior to the time when regulatory mechanisms under section 303(d) of the Clean Water Act would be applied), <http://www.chesapeakebay.net/pubs/chesapeake2000agreement.pdf> (June 28, 2000).

Like other examples discussed in this Article, the section 303(d) process and the EPA's proposed TMDL rule operate as penalty defaults accidentally rather than by design, and may not be ideally suited to that purpose. But the example suggests the constructive role that penalty defaults could play in encouraging collaborative and adaptive ecosystem management, and disciplining it to drive toward objective performance improvements.

### CONCLUSION

Drawing its inspiration from John Dewey's "experimental method of inquiry" and contemporary theories of adaptive ecosystem management, this Article has proposed a two-tiered adaptive approach to environmental problem-solving, centering on the use of penalty default rules to encourage flexible bargained-for arrangements. Under this approach, Congress and the regulatory agency would set credible, moderately stringent penalty default rules, with the expectation that most parties would elect to "bargain around" the harsh implications of the default rule by devising locally tailored solutions expected to meet or exceed environmental performance standards established by default rule.

This approach has some crucial advantages over conventional mandatory regulation. Rather than attempting to calibrate mandatory rules precisely to achieve optimal environmental outcomes—an impossibly ambitious task given the uncertainties and complexities involved—the regulator need only fashion a somewhat more imprecise and rough-hewn penalty default rule, around which bargaining would occur. Bargained-for solutions would be tailored to local conditions, which vary widely in the ecological management context. The penalty-default approach is "information-forcing," shifting the burden and the incentive to produce and disclose information to regulated parties who are often better-situated than central regulators to produce policy-relevant information. Yet properly structured, the penalty default approach retains the crucial advantages of accountability typically associated with mandatory rules. By thus wedding flexibility with accountability, the penalty default approach holds the potential to address important criticisms leveled against adaptive ecosystem management and "democratic experimentalist"



solutions more generally.<sup>167</sup>

Learning and adaptation enter this picture in two ways. First, as the central repository of information generated by a series of locally bargained-for outcomes, the regulator gains knowledge and experience over time, putting it in a position to identify and diffuse successful institutional innovations, scientific knowledge, management techniques, and other lessons learned from prior agreements into subsequent rounds of bargaining. Although every local situation is likely to be unique in some crucial respects, nonetheless there might be significant opportunity for rolling improvements in bargained-for solutions over time as generalizable lessons are learned through experience, and this information is incorporated into the design of later agreements. Second, as suggested in Part IV.C, systematic monitoring and analysis of the actual performance of bargained-for solutions sets the stage for revision and refinement of both default rules and performance expectations over time.

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167. The term "democratic experimentalism" was coined by my colleagues Mike Dorf and Chuck Sabel to describe a family of innovative regulatory strategies that seek to combine local deliberative experimentation with central coordination and rolling improvements in performance standards. See Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 283-89 (1998). A standard criticism of this body of work is that it fails to explain satisfactorily how local deliberation and experimentation can be reconciled with rules of accountability without strangling the former or eviscerating the latter. See, e.g., Burkard Eberlein & Dieter Kerwer, *Theorising the New Modes of European Union Governance*, European Integration Online Papers, at <http://eiop.or.at/eiop/texte/2002-005a.htm> (stating that a major theoretical question facing democratic experimentalism is "[h]ow can the shadow of hierarchy be reconciled with the autonomy necessary for deliberation?") (last visited March 1, 2003).