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Stewarding Species: How the Endangered Species Act Must Improve

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Stewarding Species: How the Endangered Species Act Must Improve

Justin Berchiolli*

This Note situates a roundtable discussion hosted by the University of California, Irvine School of Law Center for Land, Environment, and Natural Resources and the Environmental Policy Innovation Center into scholarly discourse. The Note identifies the three most important areas that the Endangered Species Act must improve to maximize conservation outcomes: promoting recovery, protecting habitat, and managing change. Within these areas, this Note highlights the importance of offering clearer guidance to the implementing Agencies, providing additional flexibility for working with private stakeholders, allowing for change and risk adaptation, increasing ecosystem-management implementation, and enabling proactivity.

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INTRODUCTION

Since its ambitious advent some four decades ago, the Endangered Species Act (hereinafter “ESA” or “Act”)¹ has developed substantially.² Controversy and disagreement have accompanied this growth, and many proposals to change the Act have surfaced over the years.³ While the majority of proposals focus on making the Act more efficient to benefit the regulated community, a sizeable countercurrent of scholarship addresses the ecological shortcomings of the Act and proposes improvements to maximize conservation outcomes.⁴ This Note focuses on three areas likely to provide the most impactful modifications to the Act: (1) promoting recovery; (2) protecting habitat; and (3) managing change. Building upon a survey of ESA-amelioration scholarship, this Note integrates proposals addressing the major shortcomings in these three areas with the reactions of experts who attended a roundtable discussion hosted jointly by the University of California, Irvine School

1. Endangered Species Act of 1973, 16 U.S.C. §§ 1531–44 (2018).

2. See generally J.B. Ruhl, *Endangered Species Act Innovations in the Post-Babbitonian Era—Are There Any?*, 14 DUKE ENVTL. L. & POL’Y F. 419 (2004) (tracing ESA development across different administrations).

3. See, e.g., *Attacks on the Endangered Species Act*, CTR. FOR BIOLOGICAL DIVERSITY (Dec. 20, 2017), https://www.biologicaldiversity.org/campaigns/esa_attacks/table [<https://perma.cc/8RAV-MKJN>].

4. See, e.g., *infra* notes 5–160.

of Law Center for Land, Environment, and Natural Resources and the Environmental Policy Innovation Center.

I. PROMOTING RECOVERY

A. *No Statutory Duty to Recover Species*

The ESA aims “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species.”⁵ By codifying the preservation of species and ecosystems, the Act implicitly acknowledges extinction prevention as a central goal. And by further requiring the development and implementation of recovery plans, the Act also adopts the recovery of these species as a central goal.⁶ Despite mandating the survival of species and requiring recovery plan development, the ESA imposes no duty to implement recovery plans or to ensure the recovery of listed species.⁷ The absence of a statutory mandate requiring recovery plan implementation—or even just recovery—robs the Fish and Wildlife Service and the National Marine Fisheries Service (hereinafter “Services” or “Agencies”) of temporal accountability to such an extent that it forestalls species recovery, perhaps indefinitely.⁸

Many scholars agree that recovery ought to be required and view requiring a recovery plan as an important step to achieving recovery.⁹ Similarly, imposing procedural deadlines could easily resolve the practice of incomplete and latent recovery plan designation and implementation.¹⁰ Requiring both recovery and recovery planning provides a meaningful backdrop for designing and overseeing recovery goals.¹¹ The Services already provide biannual recovery reports to

5. 16 U.S.C. § 1531(b) (2018).

6. See 16 U.S.C. § 1533(f)(1) (2018).

7. Patrick A. Parenteau, *Rearranging the Deck Chairs: Endangered Species Act Reforms in an Era of Mass Extinction*, 22 WM. & MARY ENVTL. L. & POL'Y REV. 227, 264 (1998); Eric Helmy, *Teeth for a Paper Tiger: Redressing the Deficiencies of the Recovery Provisions of the Endangered Species Act*, 30 ENVTL. L. 843, 853–54 (2000) (portraying various scholars criticizing lack of this duty as generally rendering recovery plans unenforceable and removing the important safety net of citizen suit litigation).

8. See University of California, Irvine School of Law Center for Land, Environment, and Natural Resources and the Environmental Policy Innovation Center Roundtable Workshop 3, 21 (Apr. 11, 2019) [hereinafter UCI Law ESA Roundtable] (transcript available from the UC Irvine School of Law) (on file with author and UC Irvine School of Law) (identifying as drivers of Agency inaction the inability of stakeholders to challenge either adequacy of recovery process or failure to impose recovery plans); see also Helmy, *supra* note 7, at 846.

9. See, e.g., UCI Law ESA Roundtable, *supra* note 8, at 21–23. The textual solution to require recovery is to amend 16 U.S.C. § 1533(f)(1) by striking the phrase “unless [the Secretary] finds that such a plan will not promote the conservation of the species.” See also Helmy, *supra* note 7, at 854 (offering administrative mechanics for implementing this change).

10. See UCI Law ESA Roundtable, *supra* note 8, at 21–22; see also Helmy, *supra* note 7, at 845.

11. See, e.g., Robert P. Davison et al., Wildlife Society, *Practical Solutions to Improve the Effectiveness of the Endangered Species Act for Wildlife Conservation*, WILDLIFE SOC'Y TECHNICAL REV. 05-1, Dec. 2005, at 10 (suggesting Office of Management and Budget hold agencies accountable, through Government Performance and Results Act procedures, for contributing to meaningful

Congress, but they are insufficient because they do not allow for measurable benchmarks.¹² A simple improvement would be to require these reports to outline changes in species threats and demographic status and to provide an assessment of the current status of the species' population relative to recovery.¹³

Requiring recovery may seem simple, but the Act has operated for decades without a recovery mandate. As a result, the Services have made "survival" the de facto implementation standard for two important potential recovery mechanisms, Section 7 jeopardy findings and Section 10(a) incidental take permits.¹⁴ For example, the Section 7(a)(2) jeopardy prohibition currently bans actions "that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of *both* the survival and recovery of a listed species in the wild."¹⁵ Thus, unless an action threatens the survival of a listed species, it may legally reduce its prospect of recovery.¹⁶ This language draws a distinction between survival and recovery that lacks scientific merit and undermines recovery efforts by rendering them unenforceable.¹⁷ To make this management standard more productive for recovering species, some commentators suggest disaggregating the concepts of survival and recovery, implicating nothing more than a simple textual modification.¹⁸ By changing "both" to "or," the statute would prohibit actions affecting survival *or* recovery, integrating recovery considerations into jeopardy determinations, and extending the relevance of recovery across the statute by requiring the Services to more consistently consider recovery goals.

Even if policymakers were to adopt regulations promoting and overseeing species recovery, increasing the regulatory burden on the Services without equally increasing their funding may not translate to Agency-driven recovery progress.¹⁹ However, the imposition of additional statutory obligations creates more

progress towards recovery of listed species); *see also* UCI Law ESA Roundtable, *supra* note 8, at 25 (identifying median age of recovery plans as twenty-two years, implying necessity of revision mechanism such as requirement that prior to delisting species, Services must first review and update recovery plan and base delisting determination on updated recovery plan).

12. UCI Law ESA Roundtable, *supra* note 8, at 21.

13. *Id.*

14. 16 U.S.C. §§ 1536(a)(2), 1539(a) (2018); Parenteau, *supra* note 7, at 307. This Note only cursorily considers incidental take permits, which allow for the "take" of endangered or threatened species in exchange for the implementation of Habitat Conservation Plans (HCPs).

15. 50 C.F.R. § 402.02 (2019) (emphasis added).

16. Parenteau, *supra* note 7, at 270.

17. *Id.* (demonstrating difficulty of enforcing recovery plans given that courts require showing that action actually threatens species extinction).

18. 50 C.F.R. § 402.02 (2019) ("[T]hat reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of . . . the survival [*or*] recovery of a listed species in the wild.") (emphasis added); *see* Parenteau, *supra* note 7, at 270.

19. *See, e.g.*, Parenteau, *supra* note 7, at 264 (arguing that Services' recovery-plan capabilities are "[u]nderstaffed, underfunded, and besieged on all sides," resulting in a limited ability to move the recovery process forward); *see also* Robert L. Fischman, *Predictions and Prescriptions for the Endangered Species Act*, 34 ENVTL. L. 451, 472 (2004) (examining cost projections of recovering listed species versus resource availability). More broadly, the lack of funding and resources limits the potential of any statutory changes explored in this Note.

enforceable duties subjecting Agencies to citizen suit enforcement oversight. This expanded safety net may enable the public to help drive recovery. Moreover, requiring Agencies to achieve more with less may also encourage Agencies to seek partnerships with stakeholders, such as a system of mitigation banking or transferable mitigation credits.²⁰ Some commentators advocate directing the Services to contract with private stakeholders to recover species when doing so is cost effective.²¹ These types of partnerships would do more than maximize resources, by using the guarantees and enforcement mechanisms of contract law to extend the jurisdiction of the Services into private land where the majority of legal protections for endangered species could not otherwise follow.²²

To further operationalize recovery, some commentators suggest implementing a net positive recovery standard to guide Agency action, encouraging Agencies not to approve projects unless they benefit recovery.²³ Such a standard, coupled with an actual recovery mandate, will result in the Services allowing fewer government actions to impact species.²⁴ Changing internal Agency policy promotes recovery without spending additional money.

B. Unclear Definition of Recovery

Clearly defined recovery goals will facilitate recovering species. Currently, once a species is listed into the ESA framework under Section 3, its road to recovery is unclear, and thus, insecure.²⁵ The ESA defines the concept of “recovery” implicitly and unhelpfully as when a species is no longer “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.”²⁶ The lack of a clearly articulated and attainable goal for listed species makes it harder to delineate, track, and enforce recovery progress.²⁷ In

20. See UCI Law ESA Roundtable, *supra* note 8, at 8–9, 26 (advocating making recovery planning accessible and transparent to enable stakeholder partnerships by using accessible interactive databases tracking recovery status); see also *id.* at 15 (identifying need to incentivize Services to act); see *infra* notes 86–87 and accompanying text for a discussion on banking.

21. *Id.* at 28 (limiting this suggestion to species benefitting from proactive restoration such as invasive species control).

22. See, e.g., Randy T. Simmons, *Fixing the Endangered Species Act*, 3 INDEP. REV., no. 4, Spring 1999, at 511, 513. As a practical matter, the Services cannot enforce legal protections on private land because they lack the ability to monitor or access these lands.

23. UCI Law ESA Roundtable, *supra* note 8, at 8–9.

24. Davison et al., *supra* note 11, at 6 (examining how a recovery mandate will impact how Agencies advise other agencies, make jeopardy determinations, and react to incidental take permits).

25. Parenteau, *supra* note 7, at 264 (identifying lack of clear recovery plan standards and uncertainty regarding enforcement).

26. 16 U.S.C. §§ 1532(6), (20) (2018); KEYSTONE CTR., THE KEYSTONE WORKING GROUP ON ENDANGERED SPECIES ACT HABITAT ISSUES 31 (2006); Mark W. Schwartz, *The Performance of the Endangered Species Act*, 39 ANN. REV. ECOLOGY EVOLUTION & SYSTEMATICS 279, 283 (2008) (“Recovery plans tend to underemphasize monitoring threats to species and biotic interactions relative to monitoring population trends.”).

27. See Daniel M. Evans et al., *Species Recovery in the United States: Increasing the Effectiveness of the Endangered Species Act*, ISSUES IN ECOLOGY, Winter 2016, at 21 (advocating for recovery oversight

particular, scholars have identified poorly defined recovery as creating a disconnect between the five-factor listing threat analysis employed under Section 3²⁸ and how the Services decide to assess recovery criteria.²⁹

Scholars have provided several methods of clarifying the meaning of recovery. One way of clearly articulating recovery goals is to define recovery as the reverse of the five-factor listing analysis.³⁰ Another method is to adopt a two-element recovery rule whereby a species is recovered so long as:

- (1) the population [has] increased or, at least, stabilized at a point that it is both sufficiently large and dispersed to reduce the risk from a stochastic event to an acceptable level; and (2) there [is] sufficient security against either the recurrence of the threats that prompted the listing, or of new risks, so that the species is unlikely to slip back into a threatened status.³¹

A third proposal identifies the International Union for Conservation of Nature and Natural Resources Red List status as an appropriate guide for assessing recovery.³²

Setting objective recovery criteria for species may be impractical from a cost perspective,³³ but the prospect of recovery nevertheless increases with the adoption of clearer and more measurable metrics. Defining recovery also allows for adjusting³⁴ and assessing recovery goals. Clearer and more objective standards also incentivize the Services by holding them accountable.³⁵ Moreover, quantifying recovery goals generates information³⁶ useful to achieving recovery by providing

process to include numerical measurements, at specific times and places, with clearly stated levels of statistical confidence); Schwartz, *supra* note 26, at 283.

28. 16 U.S.C. § 1533(a)(1) (2018) (“The Secretary shall . . . determine whether any species is an endangered species or a threatened species because of any of the following factors: (A) the present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.”).

29. UCI Law ESA Roundtable, *supra* note 8, at 21; *see also id.* at 23 (warning against overextending discretion to agencies to decide how and when to meet recovery because of lacking judiciary oversight).

30. UCI Law ESA Roundtable, *supra* note 8, at 23.

31. KEYSTONE CTR., *supra* note 26, at 32; *see also* Schwartz, *supra* note 26, at 294 (arguing that recovery assessments should be based on population viability and extinction risk as opposed to population size). *See infra* Section II.B for more on stochasticity and risk.

32. UCI Law ESA Roundtable, *supra* note 8, at 24; *see* Int’l Union for Conservation of Nature, THE IUCN RED LIST OF THREATENED SPECIES, <https://www.iucnredlist.org> [<https://perma.cc/GVL2-9Z3F>] (last visited Feb. 22, 2020).

33. UCI Law ESA Roundtable, *supra* note 8, at 23.

34. *See infra* Section III.C on adaptive management.

35. *See, e.g.*, UCI Law ESA Roundtable, *supra* note 8, at 23–24.

36. Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of “New Age” Environmental Protection*, 41 WASHBURN L.J. 50, 70–72 (2001).

the Services with a broader foundation for making choices and prioritizing resources.³⁷

C. Disparate Resource Allocation Among Listed Species

The lack of a blanket recovery mandate and the general resource shortage combine to result in a disproportionate allocation of recovery resources to relatively few species, substantially diminishing the potential to recover most other species.³⁸ Agency discretion, litigation, and the sheer number of listed species requiring recovery plans exacerbate the unequal and potentially ecologically-inefficient distribution of resources.³⁹ As a result, many species lack recovery plans and the Services have no effective guidance for addressing this backlog.⁴⁰

Some scholars suggest prioritizing recovering species that most need meaningful recovery progress or that most benefit their ecosystem.⁴¹ Adopting a uniform and explicit system for prioritizing recovery actions based on need would enable the Services to more broadly allocate its funding to benefit diverse and historically neglected species.⁴² Under such an approach, experts, nonprofits, and Agencies may collaborate to prioritize listing and funding allocations, designate habitat, and provide strategies for maximizing funding impact.⁴³

On the other hand, some scholars recommend expanding the scope of the ESA to adopt an ecosystem-wide, as opposed to a species-specific, approach.⁴⁴ Adopting an ecosystem-wide approach would justify spending more money on species that benefit their ecosystems but lack charisma and thus receive less funding. Recovering these utilitarian species would benefit other listed species by improving the health of the underlying shared system. Using an ecosystem-based prioritization

37. See UCI Law ESA Roundtable, *supra* note 8, at 30 (identifying lack of data as undercutting Services' potential to recover species).

38. Schwartz, *supra* note 26, at 283; Davison et al., *supra* note 11, at 9; Evans et al., *supra* note 27, at 11.

39. Parenteau, *supra* note 7, at 264.

40. *Id.* But see Schwartz, *supra* note 26, at 286–87 (arguing that although Congress charged the U.S. Fish and Wildlife Service to develop a priority ranking system based on threat and utility of funding in achieving recovery, Services have not followed it).

41. See Evans et al., *supra* note 27, at 11, 25.

42. *Id.* at 11; see, e.g., Schwartz, *supra* note 26, at 282 (pointing out that the ESA largely fails to protect plants and invertebrates).

43. W. LANDOWNERS ALL., SPEAKING FROM EXPERIENCE: LANDOWNERS & THE ENDANGERED SPECIES ACT 20–21 (2017) (promoting adoption of peer-reviewed recovery outlines at the time of listing decisions and imposition of specified recovery timeframes to streamline recovery process and harbor goodwill among private landowners); Davison et al., *supra* note 11, at 6, 10 (promoting adoption of biologically based priority scheme developed by Agencies through public notice and comment); Evans et al., *supra* note 27, at 13.

44. See, e.g., John Charles Kunich, *Preserving the Womb of the Unknown Species with Hotspots Legislation*, 52 HASTINGS L.J. 1149, 1193 (2001); Parenteau, *supra* note 7, at 279; Evans et al., *supra* note 27, at 25. But see UCI Law ESA Roundtable, *supra* note 8, at 3–4 (warning of design scope incongruity, lack of resources, and potential for overlooking localized species).

model may also help maximize recovery dollars by promoting ecosystem health, which may help concurrently recover multiple species.⁴⁵

A prioritization plan must nevertheless contend with public desire or litigation diverting attention to particular species.⁴⁶ The difficulty of forecasting recovery costs compounds this political reality, further highlighting why Agencies apply most of their funding to relatively few species.⁴⁷ Accordingly, adopting a prioritization scheme is worthwhile, but its impact largely depends on political factors outside the scope of this Note.

D. Ecologically Ineffective Populations

Statutory recovery mandates fail to adequately protect ecologically effective populations of species, whose absence decreases biodiversity by reducing critical interactions among species.⁴⁸ Many listed species subsist in isolated populations with relatively small population sizes and relatively insecure survival prospects.⁴⁹ As habitat fragmentation intensifies, metapopulation and patch dynamics become increasingly important, compounding the Act's failure to protect ecologically-meaningful and resilient populations.⁵⁰ To remedy this, commentators have suggested explicitly defining and adopting the distinct recovery goal of ecologically-effective populations.⁵¹ Enabling these populations requires assessing the functional role of a species within its ecosystem and maximizing the genetic diversity, resilience, and geographic distribution necessary to preserve this function.⁵²

The ESA already incorporates into its goal the protection of single species and broad ecosystems.⁵³ But scholars heavily debate the feasibility and effectiveness of

45. See UCI Law ESA Roundtable, *supra* note 8, at 8 (arguing that recovering species in areas that do not have other listed species overlapping geographically provides biggest return on investments).

46. See, e.g., Candee Wilde, *Evaluating the Endangered Species Act: Trends in Mega-Petitions, Judicial Review, and Budget Constraints Reveal a Costly Dilemma for Species Conservation*, 25 VILL. ENVTL. L.J. 307, 318–23 (2014).

47. UCI Law ESA Roundtable, *supra* note 8, at 21.

48. Kunich, *supra* note 44, at 1199–1220 (arguing for prioritizing conservation of species most important to their ecosystems and lamenting that “[t]here is no formal system for assigning higher priority to indicator or keystone species, whether in listing, designation of critical habitat, or development of recovery plans.”); Evans et al., *supra* note 27, at 23 (defining ecologically effective population as the population size below which the species is so rare that it cannot perform one or more ecosystem functions, such as predation or seed dispersal).

49. Evans et al., *supra* note 27, at 23.

50. Daniel J. Rohlf, *Six Biological Reasons Why the Endangered Species Act Doesn't Work—and What to Do About It*, 5 CONSERVATION BIOLOGY 274, 277 (1991).

51. Evans et al., *supra* note 27, at 23.

52. *Id.* at 11, 23; Rohlf, *supra* note 50, at 277 (suggesting, as a means of operationalizing this goal, translocation and artificial breeding exchanges between isolated species populations to help preserve genetic fitness and general long-term survivability of species).

53. 16 U.S.C. § 1531(b) (2018).

using the ESA to protect ecosystems, as opposed to individual species,⁵⁴ and we have insufficiently tested its mechanisms.⁵⁵ Nevertheless, guidance that identifies and operationalizes the link between species and ecosystems is useful insofar as it promotes recovery of ecologically extinct species populations to ecologically meaningful populations.⁵⁶ Moreover, adopting changes focused on ecological dynamics may maximize resource expenditure by providing a mutually-beneficial framework wherein adopting measures that promote the health of species within their ecosystems conversely promotes the health of various species within the ecosystem.⁵⁷

Applying an ecosystem framework is also useful because it institutionalizes the science of ecosystem ecology in the practice of species management, providing a framework that may be scaled with increased funding.⁵⁸ Even if increased funding does not arrive, using ecosystem-based principles for species-specific management also maximizes the resilience of ecological communities in the face of system-wide environmental challenges that undermine efforts to protect any one species.⁵⁹

II. PROTECTING HABITAT

Habitat is the cornerstone of species survival, let alone recovery.⁶⁰ Conferring legal protections upon a species is pointless without adequately protecting the habitat upon which it depends.⁶¹ The ESA protects habitat primarily by designating

54. Kunich, *supra* note 44, at 1193–95 (arguing inadequacy of ESA as legislative strategy for addressing global biodiversity problem because it focuses on individual imperiled domestic species as opposed to network of species concentrated in planet’s most significant pockets of life); *see* Parenteau, *supra* note 7, at 279 (identifying as examples of how ecosystem management approach could be effective, the Natural Communities Conservation Plan (NCCP) in Southern California and the Balcones Canyonlands Plan outside Austin, Texas). *Contra* Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 974–78 (1997) (arguing that an ecosystem approach is too vague a concept to serve as useful model for species protection, and that it is better to use a surrogate species approach, with specific, enforceable standards); UCI Law ESA Roundtable, *supra* note 8, at 3 (noting as a limitation of adopting ecosystem-based framework that forty-seven percent of listed species are localized within the county level and do not fit larger ecosystem management frameworks); *cf.* Holly Doremus, *The Endangered Species Act: Static Law Meets Dynamic World*, 32 WASH. U. J.L. & POLY 175, 232 (2010) (examining shortcoming of ecosystem approach in protecting genetic subdivisions); Schwartz, *supra* note 26, at 283 (identifying multispecies plans in Florida and Hawaii as promising but poorly executed).

55. Evans et al., *supra* note 27, at 25.

56. *See, e.g.*, Eric V. Hull, *Protecting Endangered Species in an Era of Climate Change: The Need for a Smarter Land Use Ethic*, 31 GA. ST. U. L. REV., 579, 602–04 (2015); Evans et al., *supra* note 27.

57. *See, e.g.*, David S. Wilcove et al., *Rebuilding the Ark: Toward a More Effective Endangered Species Act for Private Land* (Dec. 5, 1996), https://omnilearn.net/esacourse/pdfs/Rebuilding_the_Ark.pdf [<https://perma.cc/HE2R-P8B2>]. *But see* UCI Law ESA Roundtable, *supra* note 8, at 26 (arguing that some ecological tradeoffs benefit systems while harming species and vice versa).

58. *See* Evans et al., *supra* note 27, at 21–26.

59. For more discussion on addressing climate change in the ESA, *see infra* Section III.

60. *See, e.g.*, Rohlf, *supra* note 50, at 278.

61. *Id.*

critical habitat for species when they are listed.⁶² The Act also protects habitat quality through permitting and consulting.⁶³ Despite the importance of habitat to the survival and recovery of species, the Act fails to adequately protect it.⁶⁴

A. Lack of Critical Habitat

The Section 3 statutory cost-benefit critical habitat designation consideration represents a major impediment to the Act's ability to protect critical habitat.⁶⁵ Agencies may exclude areas of critical habitat based on economic grounds,⁶⁶ a lack of resources,⁶⁷ a lack of information,⁶⁸ or a high political cost.⁶⁹

Removing or restricting the cost-benefit gatekeeping mechanism is the most straightforward way to increase critical habitat designation.⁷⁰ In addition to removing a significant hurdle to designation, making this change would allow the Services to avoid complex and expensive economic-impact analyses, leaving the Agencies with more resources to assess and designate more critical habitat.⁷¹ However, because the Services lack sufficient resources to designate critical habitat for the majority of listed species,⁷² removing the cost-benefit hurdle fails to address the root of the problem. There would still be a large backlog of listed species without critical habitat. Moreover, allowing Agencies to look past cost-benefit does not mean that the tradeoffs and their political costs cease to exist. Making the critical

62. 16 U.S.C. § 1533(a)(3) (2018).

63. Schwartz, *supra* note 26, at 284 (identifying as indirect benefits of critical habitat, streamlining Section 7 consultations, incentivizing habitat-conscious land management, and providing guidelines for Habitat Conservation Plans).

64. See, e.g., Karin P. Sheldon, *Habitat Conservation Planning: Addressing the Achilles Heel of the Endangered Species Act*, 6 N.Y.U. ENVTL. L.J. 279, 282–83 (1998); UCI Law ESA Roundtable, *supra* note 8, at 11, 16–21.

65. Rohlf, *supra* note 50, at 278 (“[B]y broadly interpreting Congress’s exception that critical habitat need not be established if not ‘prudent’ or determinable, the Services avoided designating critical habitat concurrent with listings.”).

66. See *id.* (arguing that enabling cost-benefit analysis results in agencies avoiding political conflict by listing less critical habitat, an irreconcilable decision given the necessity of habitat to recovery).

67. See Schwartz, *supra* note 26, at 284 (quantifying lack of progress in designating critical habitat over thirty-two years); Davison et al., *supra* note 11, at 6 (arguing that Services lack resources to comply with ESA critical habitat designation requirements).

68. See Davison et al., *supra* note 11, at 5 (arguing that, “[a]t the time of listing, the specific areas occupied by a species, and the physical and biological features that define habitats ‘essential to the conservation’ of the species, generally are not well known”).

69. See, e.g., UCI Law ESA Roundtable, *supra* note 8, at 16 (arguing that critical habitat designation inflames private property owners, resulting in the Services avoiding its designation and instead indirectly protecting habitat with restrictive jeopardy determinations).

70. 16 U.S.C. § 1533(b)(2) (2018) (“The Secretary shall designate critical habitat . . . after taking into consideration [its] economic impact . . .”).

71. See Davison et al., *supra* note 11, at 5 (exploring the expenses associated with critical habitat cost benefit analysis).

72. See *supra* note 19 and accompanying text.

habitat designation process less controversial would thus make it more effective.⁷³ In fact, Agencies view designating critical habitat as one of the most contentious things that they do and avoid it when possible.⁷⁴

1. *Shifting Critical Habitat Designation to the Recovery Planning Phase*

To reduce controversy and otherwise promote more effective habitat planning, many commentators suggest designating critical habitat after listing, during the recovery planning phase.⁷⁵ The recovery planning process generates significant amounts of information absent from the species listing stage, resulting in decreased planning costs, more time for public preparation, and a more established framework for public partnership.⁷⁶ In turn, these effects result in more transparency, less conflict, and decreased litigation costs.⁷⁷ Tying critical habitat and recovery more closely together would even allow for both processes to be leveraged against each other, for instance, by requiring the designation of critical habitat by a certain date if the Services fail to complete recovery planning within that time period.⁷⁸

Considering the twin goals of critical habitat preservation and recovery simultaneously also provides a more comprehensive framework for more effective landscape-level conservation.⁷⁹ This broader framework allows for more proactivity,⁸⁰ facilitates private partnerships,⁸¹ and increases the flexibility of species-specific goals.⁸²

73. See Dave Owen, *Critical Habitat and the Challenge of Regulating Small Harms*, 64 FLA. L. REV. 141, 186, 190 (2012) (suggesting that the Services avoid political pressure by ignoring statutory directives to avoid political pressure).

74. *Id.* at 186–87, 190.

75. KEYSTONE CTR., *supra* note 26, at 6; Sam Kalen, *Landscape Shifting Paradigm for the Endangered Species Act: An Integrated Critical Habitat Recovery Program*, 55 NAT. RES. J. 47, 92 (2014) (identifying informational benefits of engaging in recovery planning first, or concurrently to, critical habitat designations); Davison et al., *supra* note 11, at 6 (advising caution “when there is an urgent eminent threat to significant amount of occupied habitat that would warrant designation at the time of listing”). *But see* UCI Law ESA Roundtable, *supra* note 8, at 17 (warning that if critical habitat is not initially designated, the opportunity to protect requisite geographic area for recovery may be lost).

76. UCI Law ESA Roundtable, *supra* note 8, at 17–18; *see infra* Section II.A.2.

77. KEYSTONE CTR., *supra* note 26, at 34.

78. UCI Law ESA Roundtable, *supra* note 8, at 16.

79. See, e.g., Kalen, *supra* note 75, at 100–02 (outlining such an integrated approach to include specific management objectives, plans, or policies based on recovery plans, and suggesting concurrently drafting National Environmental Policy Act documents outlining management objectives of critical habitat).

80. Fischman, *supra* note 19, at 479 (arguing that area-wide planning is one example of preventive healthcare system for biodiversity that will take pressure off post-listing Agency action by already having habitat accounted for and protected).

81. Davison et al., *supra* note 11, at 12 (arguing that landscape focus better integrates landowner and government partnerships by informing them of major conservation needs in the landscape in question, allowing for flexible contributions).

82. Fischman, *supra* note 19, at 479 (demonstrating how landscape-based planning enables greater flexibility in trade-offs that agencies make with regulated entities, such as preserving habitat on one side of watershed versus the other). *But cf.* Frederic H. Wagner, *Whatever Happened to the National*

2. Prioritization and Partnership

Even with the benefits of adjusting the timing of critical habitat designation, the Services must still negotiate a substantial backlog of species without critical habitat designations.⁸³ Some commentators suggest prioritizing designation based on need.⁸⁴ Other commentators suggest prioritizing designations by excluding habitat protected by partnership initiatives like Habitat Conservation Plans.⁸⁵ This prioritization approach acknowledges different tiers of critical habitat whereby the lower tier(s) forego statutory protection in exchange for a partnership structure with incentives for private stakeholders to invest in conservation and steward habitat.⁸⁶ Integrating the Section 7 consultation process with offsite mitigation and a habitat mitigation banking program would allow landowners to create and market habitat or ecosystem protection values.⁸⁷

Excluding from critical habitat designations habitats that may otherwise already be protected by partnership initiatives allows Agencies to focus on protecting landscapes that lack any regulatory oversight.⁸⁸ Furthermore, offering choices in regulatory regimes reduces the political cost of habitat by emphasizing

Biological Survey, 49 BIOSCIENCE 219, 219 (1999) (pointing out that effective landscape-based management requires significant information production to understand the location, vigor, trends, and needs of species).

83. Schwartz, *supra* note 26, at 284; Davison et al., *supra* note 11, at 3.

84. Davison et al., *supra* note 11 (arguing that such a prioritization scheme could be achieved administratively by amending the ESA to require Agencies to establish, through notice and comment, detailed policy and procedural guidance on how to identify, quantify, and map critical habitat, assess economic and other impacts of designation, and balance benefits of designating any specific area in comparison to benefits of not designating).

85. *Id.* at 6; Owen, *supra* note 73, at 196–97; *see also* Parenteau, *supra* note 7, at 309; UCI Law ESA Roundtable, *supra* note 8, at 16 (encouraging adoption of no net-loss standard for critical habitat management that would provide additional guidance and safeguards for relying on HCPs). *But cf.* Alejandro E. Camacho, *Can Regulation Evolve? Lessons from a Study in Maladaptive Management*, 55 UCLA L. REV 293, 324–25, 336 (2007) (identifying shortcomings in HCP design process including lack of focus on structural issues or allowance for adaptive management); *id.* at 320–22, 328, 352 (identifying shortcomings in HCP review process including lack of a program-wide framework for enabling multi-party negotiations or adaptive management, and lack of enforcement).

86. UCI Law ESA Roundtable, *supra* note 8, at 17; *see also id.* at 18–20 (proposing system whereby if landowner voluntarily creates HCP with plan for species recovery increase, critical habitat is not designated, allowing stakeholders a choice to meet unwritten critical habitat requirements with customized HCP approach or let Agencies do so with traditional approach); *id.* at 18 (suggesting an alternative whereby Services administer a land-trust system that enables private investment by offering benefits, like tax deductions, akin to those present in conservation easements).

87. J.B. Ruhl, *Who Needs Congress? An Agenda for Administrative Reform of The Endangered Species Act*, 6 N.Y.U. ENVTL. L.J. 367, 405 (“The advantage of the banking approach is that it divorces decisions about the size of a habitat conservation area from the specific project-by-project impact evaluation required by the permitting program, and therefore larger and more contiguous preserves than might otherwise be possible are allowed.”). *But cf.* Owen, *supra* note 73, at 192–93 (acknowledging the critique of mitigation that the good quality of existing land is traded for the potential to restore already-degraded land, but nevertheless arguing that without offsite mitigation, many small environmental harms will simply escape regulatory coverage).

88. Davison et al., *supra* note 11, at 6.

partnership, increasing transparency, and tailoring regulatory solutions.⁸⁹ By making critical habitat less controversial and more flexible, this framework empowers the Services to choose between traditional critical habitat designation or partnership-based alternatives.

B. Deficient Habitat Degradation Standard

The overall lack of designated critical habitat is a major shortcoming in how the Act protects critical habitat.⁹⁰ But critical habitat management is equally impactful.⁹¹ An unclear and overly permissive Section 7 adverse modification standard enables the degradation of existing critical habitat.⁹² Despite the statutory mandate clearly outlawing adverse modification of habitat, the Services have complicated and undermined the textually rigid standard with ad hoc reasoning through individual consulting and permitting decisions.⁹³ In practice, the Services ignore the incremental nature of harm to species and write small-scale habitat degradation out of the ESA's protections.⁹⁴

An explicit prohibition on adverse modification of critical habitat is necessary to protect species from the aggregate impact of many small harms that do not independently threaten recovery or survival and are consequently overlooked by the

89. See, e.g., Owen, *supra* note 73, at 190; UCI Law ESA Roundtable, *supra* note 8, at 16.

90. See, e.g., Davison et al., *supra* note 11, at 5.

91. See 16 U.S.C. § 1536(a)(2) (2018) (“Each Federal agency shall . . . insure that any action . . . is not likely to . . . result in the destruction or adverse modification of habitat of such species . . .”).

92. Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277, 297 (1993); Owen, *supra* note 73, at 146; Rohlf, *supra* note 52, at 278.

93. Owen, *supra* note 73, at 146 (arguing that Services have given adverse modification prohibition hardly any independent significance, instead treating prohibition as redundant with other measures).

94. *Id.*

Section 7 jeopardy standard and the Section 9 take standard.⁹⁵ The Agencies may even overlook the adverse modification standard as being redundant.⁹⁶

Commentators offer several solutions. One direct solution is to make the adverse modification standard more stringent so that even if a government action reduces a species' chances for recovery without imperiling its ability to survive, it is still outlawed.⁹⁷ A similar and complementary change would strengthen the definition of "take" to explicitly outlaw any adverse impact on primary constituent elements of critical habitat.⁹⁸ Adopting these changes as well as those listed above in Section I would provide critical habitat with a much more effective role in promoting the survival and recovery of endangered species. Because habitat is requisite for recovery, the more importance recovery is given, the more protection habitat will receive.⁹⁹

Increasing the rigidity of the adverse modification standard would benefit from clarifying the line between impermissible adverse modification and permissible habitat degradation. The Services will always allow some degree of habitat degradation.¹⁰⁰ To this end, perhaps critical habitat designations ought to be restricted in size to more precisely reflect the minimum, but absolutely necessary, confines of survival and recovery.¹⁰¹ Integrating critical habitat designation into recovery planning should help clarify the utility of critical habitat by tying recovery

95. 16 U.S.C. § 1538 (2018); Owen, *supra* note 73, at 161 (arguing that critical habitat's adverse modification standard is critical to protecting endangered species because many environmental changes occur based on aggregate of many small harms, e.g., watershed degradation caused by small surface level changes and other stressors). "Indeed, because of this unique role and the pervasive challenges of incremental environmental degradation, this prohibition appears to be one of the most powerful and important levers in all of environmental law." *Id.*; *see also id.* at 173, 180–81 (further cataloguing utility of codified, albeit largely ignored, critical habitat adverse modification prohibition to: (1) increase likelihood that consulted agencies would engage in informal consultation prior to proceeding with projects; (2) spur Services to think more carefully about species' habitat needs and help them develop more protective conditions; (3) provide Services with more leverage to negotiate habitat conditions; (4) help landowners and action agencies avoid conflict with species' needs; (5) provide basis for regulated entities' beliefs that critical habitat designations increase regulatory stringency, thereby deterring some activities that might otherwise harm species; (6) affect regulatory approaches of other environmental agencies by providing signal that some habitats are particularly important; (7) provide information that helps Services implement other statutory requirements; (8) lead to more thorough and rigorous analysis of habitat needs; and (9) help write recovery plans, negotiate HCPs, and target spending to conservation and recovery projects); Houck, *supra* note 94, at 310 (demonstrating critical habitat's utility in contrast to jeopardy standard in context of judicial enforcement due to its relative perceived rigidity contrasted with flexibly interpreted jeopardy standard).

96. Owen, *supra* note 73, at 166 ("[T]he agencies have treated the class of actions that adversely modifies habitat without also causing jeopardy as a null set.").

97. Rohlf, *supra* note 50, at 278; *see supra* notes 14–18 and accompanying text.

98. UCI Law ESA Roundtable, *supra* note 8, at 16 (suggesting allowing citizen suit enforcement of this proposal).

99. For example, Section 7 jeopardy findings would have to be more closely reconciled with the existence of quality habitat. *See supra* notes 14–18 and accompanying text.

100. Owen, *supra* note 73, at 194.

101. UCI Law ESA Roundtable, *supra* note 8, at 16 (suggesting that Services do not faithfully uphold adverse modification standard because they cannot glean which parts of designated critical habitat actually contain the physical or biological features critical to habitat).

plans to specific habitat usage.¹⁰² Creating tiers of critical habitat will also help by providing a clear distinction between the highest tier of critical habitat containing untouchable critical habitat, and lower tiers containing intermediate zones of important, albeit not “critical,” habitat.¹⁰³

C. Inadequate Consideration of Ecosystems

As mentioned above in Section I.D, the Act is rooted in a framework that somewhat ignores the ecological interactions of species that are constituent representations of the ecosystems within which they function.¹⁰⁴ The rationale cited in Section I.D applies with equal vigor to the context of protecting critical habitat by adopting large scale ecosystem-management principles.¹⁰⁵ Several commentators suggest using surrogate species as a proxy for identifying the habitat and management needs of larger groups of species that embody closely-related ecological requirements, biological traits, and responses to environmental change.¹⁰⁶ Applying this broader framework provides ecological,¹⁰⁷ financial, and political benefits.¹⁰⁸ As explored above in Section I.D, habitat quality and species resilience are interconnected, and applying ecological principles that seek to preserve and maximize the wellbeing of ecological communities will also benefit the species within that system.¹⁰⁹ Moreover, inherent in recognizing the importance of preserving ecosystems is the acknowledgement of the large scale of habitat that warrants some degree of protection, even if not under the critical habitat framework. Tiering critical habitat with buffer zones that allow for, and thus incentivize, private partnership,¹¹⁰ will expand the regulatory safety net, even if the standard of protection differs across the habitat. And again, the potential for

102. *See id.* at 16–18.

103. *See id.*

104. Kunich, *supra* note 44; Evans et al., *supra* note 27, at 23.

105. *See, e.g.*, Parenteau, *supra* note 7, at 249, 306.

106. *See* Rohlf, *supra* note 50, at 275; Evans et al., *supra* note 27, at 25; Simmons, *supra* note 22, at 513.

107. Evans et al., *supra* note 27, at 25 (explaining that implementing surrogate species framework allows for cross-management of species that are interdependent, such as predator and prey, and for taking advantage of umbrella species dynamics with broad ecological requirements or geographic ranges including multiple species of concern).

108. *Id.* (arguing that management centered on surrogate species reduces costs and facilitates decision-making within policy- and management-relevant timeframes by allowing conservation planning to proceed without full knowledge of every impacted species or ecosystem element).

109. *See supra* notes 53–64 and accompanying text.

110. *See, e.g.*, KEYSTONE CTR., *supra* note 26, at 19–20, 22 (advocating for expansion of incentive-based partnerships between private landowners and Agencies such as Conservation Reserve Program, Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, Healthy Forests Reserve Program, and Forest Stewardship Program); Davison et al., *supra* note 11, at 6 (advocating for expansion of Landowner Incentive Program); Evans et al., *supra* note 27, at 16 (advocating for development of partnerships with landowners to manage recovery of conservation-reliant species). Other commentators suggest going even further by shifting entirely from the penalty-based approach under Section 9 to the positive incentive approach to harness the voluntary compliance of private landowners. *See, e.g.*, Simmons, *supra* note 22, at 530–33.

insufficient resources does not detract from the fact that operationalizing ecosystem management provides the Services with a useful framework.¹¹¹

III. MANAGING CHANGE

As time passes, the challenges to preventing extinction and promoting recovery increase.¹¹² To be sure, the Act never fully considered these challenges at its inception,¹¹³ but habitat fragmentation and climate change increasingly complicate the reality of biodiversity conservation.¹¹⁴ Though many commentators agree that the ESA should not attempt to mitigate climate change,¹¹⁵ the Act should nevertheless strive to become more effective at addressing the increasingly changing and increasingly challenging conservation context exacerbated by climate change.

A. Underemphasizing Dynamism

The ESA conceptualizes its goal as maintaining the constancy of species within ecosystems that are, however, dynamic.¹¹⁶ Goals of static, enduring species populations are undoubtedly problematic in light of naturally occurring population fluctuations, naturally occurring evolution, and naturally occurring extinction.¹¹⁷ This unrealistic goal of constancy undermines how the Act addresses listing, habitat, and recovery.¹¹⁸

The listing framework may account for the reality of evolutionary dynamism exacerbated by climate change by adopting new guidelines for the identification of species and subspecies that will enable a broader acceptance of adaptive divergence in genetics, behavior, and ecology.¹¹⁹ The Act's treatment of habitat and recovery would benefit from adopting more realistic risk forecasts (see Sections II.B and C), acknowledging range shift and behavioral changes, and adopting an understanding of climate habitat "niches" that will change significantly, or even disappear, over time.¹²⁰ More openly acknowledging that an increasingly dynamic world produces significant ecological changes will justify increasing risk buffers (see Section II.B),

111. See *supra* Section I.D.

112. See generally Doremus, *supra* note 54 (examining the transition from traditional goals of ecological stasis to embracing the reality of dynamism).

113. *Id.* at 183–84.

114. See generally Alejandro E. Camacho, *Assisted Migration: Redefining Nature and Natural Resource Law Under Climate Change*, 27 YALE J. REG. 171 (2010) (discussing moving species into new habitats as an insurance strategy against climate change).

115. UCI Law ESA Roundtable, *supra* note 8, at 25–26.

116. Doremus, *supra* note 54, at 175; Simmons, *supra* note 22, at 515 ("Instead of constancy and stability, disturbance and change have been the norm throughout the evolutionary history of the earth.").

117. Doremus, *supra* note 54, at 182; see also Simmons, *supra* note 22, at 516.

118. See Doremus, *supra* note 54, at 233.

119. *Id.* at 215, 233 (advocating for consulting with contemporary taxonomists to reimagine legal taxonomic frameworks based on acceptance of rapid evolutionary change spurred by climate change).

120. *Id.* at 226.

making recovery planning more adaptive (see Section II.C), and more fully embracing the principles of proactivity and precaution.

However, imparting a greater acceptance of dynamism into the Act is not without its risks. In particular, acknowledging impending natural extinction creates the challenge of distinguishing between unacceptable anthropogenic extinction and acceptable natural, unavoidable extinction.¹²¹ By allowing some species to continue their natural trajectory towards extinction, Agencies may accidentally, or even intentionally, misidentify species as having naturally impending extinctions to justify not allocating resources to them, not drafting recovery plans, or not designating critical habitat. But on balance, acknowledging dynamism is necessary because it creates a framework to prepare for risk.

B. Flawed Risk Projections

The ESA's conception of risk fails to adequately acknowledge climate change's impending challenges.¹²² In particular, the Section 7 consultation and biological opinion process and the Section 3 listing process fail to rigorously incorporate the risks posed by climate change.¹²³ A general solution is to treat uncertainty (especially human-caused environmental stochasticity) in a probabilistic manner as opposed to ignoring or discounting it.¹²⁴ The implications of managing this uncertainty manifest themselves differently in different sections of the Act.

Section 7 allows for the consideration of climate change but does not explicitly require it, which extends a counterproductive amount of deference to Agencies who should not have the discretion to ignore impending risks.¹²⁵ Some commentators have suggested addressing this by integrating guidelines for mandatory climate change-related risk mitigation into Section 7 consultations and the biological opinion process.¹²⁶ This would create a more rigid consultation process by equating a certain extent of reasonably foreseeable climate change impacts with unavoidable, and thus unacceptable, jeopardy.¹²⁷ However, these changes may increase the

121. See, e.g., Jacqueline Lesley Brown, *Preserving Species: The Endangered Species Act Versus Ecosystem Management Regime, Ecological and Political Considerations, and Recommendations for Reform*, 12 J. ENVTL. L. & LITIG. 151, 163 (1997).

122. See, e.g., Rohlf, *supra* note 50, at 279 (arguing that Services tend to overestimate species' chances of survival by discounting or ignoring natural as well as human-related stochastic threats to species' environments, creating paradigm whereby listed species often receive less protection than is necessary to ensure their continued existence).

123. James Ming Chen, *Αειζωΐας: Protecting Biodiversity Against the Effects of Climate Change Through the Endangered Species Act*, 47 WASH. U. J.L. & POL'Y 11, 19–20 (2015); Rohlf, *supra* note 50, at 276; see also Camacho, *supra* note 85, at 303 (arguing that HCPs fail to consider more than just habitat-based threats to endangered species, overlooking invasive species management and climatic change).

124. Rohlf, *supra* note 50, at 279.

125. Chen, *supra* note 123, at 19.

126. *Id.*

127. See *id.* (arguing that a less permissive consultation process will more faithfully serve statutory goal of preventing jeopardy); see also Evans et al., *supra* note 27, at 23 (proposing a specific framework for vulnerability assessments taking into account (1) species' exposure to climate change

political cost of consultations, which increases the duration of consultations while creating a bigger sink for Agency resources.¹²⁸ Given that some commentators have already identified Agencies opting for informal consultations to avoid resource-intensive formal consultations,¹²⁹ Agencies may eschew additional formal requirements like added climate change-risk considerations in favor of informal consultations.

Finally, the Section 3 listing standard lacks explicit biological criteria and inadequately defines “foreseeable future,”¹³⁰ leaving species-security determinations to the discretion of the Services, resulting in a different biological meaning for the terms “endangered” and “threatened.”¹³¹ Commentators suggest amending Section 3 to accurately reflect risk by setting specific standards regarding timing and likelihood of risk, codifying the difference between more secure species and those facing extinction.¹³²

Currently, the Services focus on resiliency, redundancy, and representation.¹³³ Instead, some commentators advocate focusing on more scientifically sound metrics like rarity (relative abundance), threats (and their scope, severity, and immediacy), and trends (in population numbers, area of occupancy, and range size).¹³⁴ Specifically, Agencies ought to holistically evaluate listing and delisting by considering population decline and loss, habitat loss, and range decline.¹³⁵ Adopting an objective standard of species security, despite inherent scientific uncertainty, would permit the Services to make and have more clearly articulated policy choices.¹³⁶ Moreover, transitioning to a more scientifically sound metric will also help the Services give adequate consideration to species sub-populations, which are necessary for long term survival but overlooked by current listing protocol.¹³⁷

based on past and future projected change; (2) species’ biological sensitivity (using long term physiological or ecological studies documenting species’ responses to climate change); and (3) potential that species and their habitat has to adapt to climate change).

128. Jacob W. Malcolm & Ya-Wei Li, *Data Contradict Common Perceptions About a Controversial Provision of the US Endangered Species Act*, 112 PROC. NAT’L ACAD. SCI. U.S. 15844, 15848 (2015).

129. *Id.*

130. 16 U.S.C. § 1533(b)(1)(B) (2018) (“[T]he Secretary shall give consideration to species which have been . . . identified as in danger of extinction, or likely to become so within the foreseeable future . . .”).

131. Rohlf, *supra* note 50, at 276 (arguing that without objective standard, Services make these determinations on case-by-case basis with reference to qualitative factors such as species’ historic abundance and threats to existence); *see also* Chen, *supra* note 123, at 14–15.

132. Rohlf, *supra* note 50, at 276.

133. Evans et al., *supra* note 27, at 6.

134. *Id.*

135. *Id.* at 22.

136. Rohlf, *supra* note 50, at 276.

137. Kunich, *supra* note 44, at 1201 (arguing that when species are endangered or threatened, each specific population represents critical role in long-term battle for survival, and that by not extending jeopardy protection to discrete populations, ESA allows for gradual population-by-population meta decline trending towards extinction); Rohlf, *supra* note 50, at 277 (elaborating on the benefits of multiple populations, including serving as sources of colonists and

Perhaps most importantly, legitimizing risk will justify listing species earlier, before they are demonstrably threatened or endangered.¹³⁸ The benefits of protecting species more proactively cannot be overstated. Enhancing conservation practices before a species becomes threatened or endangered keeps more management options open and reduces costs.¹³⁹ Even when the ESA succeeds in preventing extinction, dwindling populations of species offer reduced ecological function.¹⁴⁰

Several scholars point to the already robust backlog in deserving but unlisted species as a reality check on the effectiveness of designing criteria to list more species.¹⁴¹ Regardless of resource constraints preventing the Services from acting entirely proactively, adopting a modified standard of listing determinations will help prioritize listing meritorious species whenever the Services eventually do so.¹⁴²

C. Insufficient Consideration of Climate Change in Recovery Plans

Climate change is altering the compositions of biological communities and transforming environmental conditions.¹⁴³ On the aggregate, these environmental threats affect multiple populations of species, reducing the recovery chance of endangered species and minimizing the effectiveness of traditional ecological safeguards such as population migration.¹⁴⁴ However, Section 4 recovery plans do not adequately recognize or address these threats imposed by climate change, nor do they possess sufficient guiding principles enabling adaptation.¹⁴⁵

To adequately address climate change, recovery plans must become more flexible and more thorough. Recovery plans become more thorough by anticipating and integrating strategies for defending endangered species against climate change.¹⁴⁶ These strategies require ongoing human involvement such as prescribing fire, reconstructing habitat, controlling invasive exotic species, reducing pollution and overexploitation, and increasing the size and genetic variability of populations through artificial recruitment.¹⁴⁷ Other specifically proactive measures include

hedging against environmental stochasticity); *see also* Doremus, *supra* note 54, at 188 (identifying inadequacies in defining and protecting hybrids and local populations).

138. *See, e.g.*, Evans et al., *supra* note 27, at 6.

139. Simmons, *supra* note 22, at 514.

140. *See supra* Section I.D on ecologically ineffective populations.

141. *See, e.g.*, Schwartz, *supra* note 26, at 282; Evans et al., *supra* note 27, at 8.

142. Evans et al., *supra* note 27, at 6 (arguing that adopting the discussed Section 3 changes will help bring ESA's listed species into compliance with internationally recognized determinations of listing merit like NatureServe or the International Union for Conservation of Nature and Natural Resources Red List); *see also* UCI Law ESA Roundtable, *supra* note 8, at 24.

143. Evans et al., *supra* note 27, at 12 (examining impacts of changes in temperature and precipitation on species population dynamics).

144. *Id.* (anticipating the reduced ability of species populations to migrate by repopulating themselves).

145. *Id.* at 28; Davison et al., *supra* note 11, at 14.

146. *See, e.g.*, UCI Law ESA Roundtable, *supra* note 8, at 25–27.

147. Evans et al., *supra* note 27, at 11.

identifying and protecting future suitable habitats, actively helping species move beyond their historical ranges, and creating new habitat.¹⁴⁸ By virtue of requiring additional effort, these methods may join the list of proposals that are necessary, expensive, and unrealistic.¹⁴⁹ One can only hope that the Services will continue to maximize their funding, but in the meantime, these suggestions are useful for two reasons. Even in the absence of additional funding, providing and codifying clearer directives enables Agencies to internally divert funding to implement these strategies. Secondly, codifying thoroughness will incentivize the Services to seek partnerships with efficient industries that specialize in implementing risk reducing ecological practices.¹⁵⁰

Moreover, flexibility allows recovery plans to react to changed circumstances brought on by climate change.¹⁵¹ The framework of adaptive management incorporates the benefit of flexibility by offering an iterative approach to management whereby objectives evolve as impacted by progress, external change, and general scientific uncertainty.¹⁵² In light of climate change, this flexibility is particularly useful, if not emphatically required.¹⁵³ In particular, adaptive management integrates population ecology, conservation genetics, and habitat conservation with considerations of external and climactic risks.¹⁵⁴ These integrated measures of extinction risk clarify the projections and management responses related to habitat loss or restoration, migration, range, abundance, and adaptability, and would thereby help the Services integrate ESA Sections 7, 9, and 10 into recovery actions.¹⁵⁵

Commentators remain sharply divided on adaptive management.¹⁵⁶ An overreliance on adaptive management enshrines a rationale whereby potentially useful political confrontations and information-creation mechanisms are delayed or

148. Camacho, *supra* note 114, at 237 (suggesting also introducing species to replace important ecological niches or services lost due to global climate change and other stressors); Evans et al., *supra* note 29, at 24.

149. John Kostyack & Dan Rohlf, *Conserving Endangered Species in an Era of Global Warming*, 38 ENVTL. L. REP. NEWS & ANALYSIS 10203, 10206 (2008); Evans et al., *supra* note 27, at 24; UCI Law ESA Roundtable, *supra* note 8, at 26.

150. Before attending law school, the Author worked for an ecosystem restoration company that contracted with municipal and state governments to perform various facets of ecological reconstruction.

151. Davison et al., *supra* note 11, at 14; Evans et al., *supra* note 27, at 28.

152. Davison et al., *supra* note 11, at 14.

153. Evans et al., *supra* note 27, at 18 (arguing that, in light of limited information and inability to predict species' responses to management, adaptive management is necessary for species management because it enables managers to monitor and learn from results).

154. *Id.* at 22.

155. *Id.* (arguing also that adaptive management allows for wholistic approach to risk analysis because recovery criteria can integrate threat mitigation and consider adequacy of other regulatory mechanisms).

156. *See, e.g.*, Camacho, *supra* note 85, at 329, 340 (identifying failure of Agencies to implement adaptive management principles in context of HCPs); Doremus, *supra* note 36, at 76 (problematizing the use of adaptive management in sphere of HCPs and granting incidental take permits; providing critiques that may be extrapolated to other ESA sections).

entirely bypassed.¹⁵⁷ Approving uncertain decisions upon the promise of future flexibility fails to use the ESA's powerful information-generating tool now, at a time when informing statutory decisions is critical to understanding and addressing impending change and risk.¹⁵⁸ More generally, an overreliance on Agency flexibility can result in a failure to translate adaptive management principles into practice, leaving poorly defined plans to guide continuous management.¹⁵⁹ With flexibility at the core of its function yet at the mercy of overseeing Agencies, the concept of adaptive management is perhaps too optimistic when measured against the political realities of Agencies seeking to avoid conflict and the reality of resource shortages. Nevertheless, Agency flexibility works both ways. As the extent of environmental challenges becomes clearer, potential solutions will become more compelling and the public will embrace more responsibility for helping stem the tide of environmental degradation. We may soon have Agencies utilizing this flexibility to better implement stricter recovery plans to maximize conservation outcomes.

CONCLUSION

The Endangered Species Act is full of stifling shortcomings and ambitious potential. By examining the Act's framework of promoting recovery, protecting habitat, and managing change, this Note explored how the most effective improvements to the ESA are those that offer clear guidance to the Services, provide additional flexibility for partnering with private stakeholders, incorporate risk, increase implementation of ecosystem-management principles, and enable proactivity.

This Note has begun situating the benefits of these proposals with the realities of political cost and resource limitations. Further scholarship would benefit from more rigorously assessing the feasibility of proposals based on these challenges. Agency discretion¹⁶⁰ and the balance of power between Agencies, Congress, and the public also merits broader consideration. As the scale of environmental challenges continues to grow, the ESA must and will become more versatile, more accessible, and more effective to protect and steward our species.

157. Doremus, *supra* note 36, at 70–72.

158. *Id.* at 72.

159. Camacho, *supra* note 85, at 340 (demonstrating that agencies charged with duty of assessing and finetuning adaptive management strategies robbed adaptive management of its benefits by largely neglecting its potential for systematic, rigorous evaluation and adaptation); *see also* Doremus, *supra* note 36, at 70–71 (criticizing adaptive management in HCP context for offering initial flexibility to enable present action while often failing to provide sufficient flexibility later if initial models floundered).

160. *See, e.g.*, Owen, *supra* note 73, at 186, 190; Rohlf, *supra* note 50, at 276; UCI Law ESA Roundtable, *supra* note 8, at 23.

