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Beyond Trust Species: The Conservation Potential of the National Wildlife Refuge System in the Wake of Climate Change

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Beyond Trust Species: The Conservation Potential of the National Wildlife Refuge System in the Wake of Climate Change

ABSTRACT

Over the last two decades, the U.S. Fish and Wildlife Service (FWS) has come to define its conservation mission in the context of species protection. The concept of “trust species” is now a common focal point for the myriad responsibilities of the FWS. This has become problematic for one of the major programs of the agency: management of the world’s largest biodiversity conservation network, the National Wildlife Refuge System (NWRS). A major legislative overhaul of the NWRS charter and the imperatives of climate change adaptation have weakened the concept as a reliable touchstone for NWRS management and expansion. The FWS should build on its culture and history to respond to new challenges that the conservation network cannot meet with the “trust species” concept alone. While management to benefit specific species offers a simple measure of accomplishment, as a policy tool it creates more problems than it solves. Adherence to the “trust species” theme limits full engagement with, and abdicates the FWS leadership role in, contemporary conservation challenges and science. This article makes the case for alternative measures of NWRS conservation success that move beyond just counting populations. Ecological integrity offers a more accurate theme for NWRS goals, a more robust tool for adapting to climate change, and a concept that the scientific literature recognizes and quantifies.

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INTRODUCTION

Over the last two decades, the U.S. Fish and Wildlife Service (FWS, or Service) has come to define its conservation mission in a species-oriented context. The concept of “trust species” is now a common focal point for the myriad responsibilities of the FWS. This has become problematic for one of the major programs of the agency: management of the world’s largest biodiversity conservation network, the National Wildlife Refuge System (NWRS, or Refuge System). A major legislative overhaul of the NWRS charter and the imperatives of climate change adaptation have weakened the trust concept as a reliable touchstone for NWRS management and expansion. The FWS should build on its history and culture to respond to new challenges that its conservation network cannot meet via the “trust species” concept alone. While management to increase populations of specific species offers a simple measure of accomplishment, as a policy tool it creates more problems than it solves. Adherence solely to the “trust species” theme limits full engagement with, and abdicates the FWS leadership role in, contemporary conservation challenges and science. This article makes the case for alternative measures of NWRS success that move beyond a species-and-population-focused conservation paradigm.

We begin in Part I by tracing the rise of the trust concept to prominence as the dominant FWS conservation theme. We illustrate how the idea works in practice with three examples. In Part II we proceed to analyze what the “trust species” theme offers for conservation objectives and what problems it presents for the NWRS. We conclude that, on balance, its strengths do not justify its dominance. In particular, the trust concept has four problems. First, it fails to capture the NWRS’s full, systemic statutory mandate, and thus neglects an important part of Congress’s instructions. Second, it invites confusion with real federal trust duties pertaining to natural resources damages and relations with Indian tribes. Third, it risks conflation with state public trust doctrines, and therefore

blurs the distinction between the FWS's functions and the state role in wildlife management. Fourth, it narrows the FWS conservation vision to only a subset of elements within the broader ecological concerns animating landscape-level nature protection. Part III shows how a broader, more inclusive approach could better address climate change, ecosystem management, and land acquisition. We conclude with suggestions for alternatives to the reductive "trust species" focus. Ecological integrity offers a more appropriate organizational theme for the NWRS goals, a more robust tool for adapting to climate change, and a concept that the scientific literature both recognizes and quantifies.

I. THE FWS USE OF THE TRUST CONCEPT TO STEER THE NWRS

"Trust species" or "trust resources" are terms connected to a FWS view that its management authority is defined by and limited to a subset of biota. Though its scope varies in different contexts, generally that subset encompasses threatened and endangered species, migratory birds, interjurisdictional fish, and selected marine mammals. When used in the context of "resources," it includes wetlands. All versions of the FWS trust concept share a list-based, reductive approach to conservation. The trust concept also suggests the existence of a nondiscretionary duty to act, which we discuss in Part II. Over the past two decades, the trust concept has become a label of convenience, nowhere precisely defined, and wielded inconsistently for various ends.

"Trust species," and the selective conservation mission it implies, appears to have emerged in the late 1980s. The NWRS's previous conservation vision embraced broader goals. Key concept documents before 1980 recommend comprehensive ecological and landscape objectives.¹ While all cite migratory birds and/or endangered species as fundamental, none utilize the term "trust" in reference to such taxa or employ a list to constrain the Refuge System's conservation role. Nor does trust terminology appear in either the 1976 final environmental impact statement (EIS) for the NWRS or two subsequent draft EISs.²

1. THOMAS H. BECK, DEP'T OF AGRIC., REPORT OF THE PRESIDENT'S COMMITTEE ON WILDLIFE RESTORATION (1934); ROBERT L. HERBST, DEP'T OF THE INTERIOR, ASSISTANT SECRETARY'S RESPONSE TO NATIONAL WILDLIFE REFUGE TASK FORCE REPORT AND FISH AND WILDLIFE SERVICE DIRECTOR'S RECOMMENDATIONS RELATED TO THAT REPORT (1979); A. Starker Leopold et al., *Reports of the Special Advisory Board on Wildlife Management for the Secretary of the Interior*, in TRANSACTIONS OF THE THIRTY-THIRD NORTH AMERICAN WILDLIFE AND NATURAL RESOURCES CONFERENCE 30-54 (Wildlife Mgmt. Inst. 1968).

2. U.S. FISH & WILDLIFE SERV., OPERATION OF THE NATIONAL WILDLIFE REFUGE SYSTEM: FINAL ENVIRONMENTAL STATEMENT (1976); U.S. FISH & WILDLIFE SERV., MANAGEMENT OF THE NATIONAL WILDLIFE REFUGES: DRAFT ENVIRONMENTAL IMPACT STATEMENT (1988); U.S. FISH &

In the 1980s and into the next decade, the NWRS and the FWS selected biodiversity as a conservation driver. The “natural diversity” mandate of the new Alaskan refuges, along with internal FWS documents, workshops, and a FWS-endorsed multi-agency forum during this period all reflect this general trend.³ In 1989, FWS Director John Turner told Congress that “maintenance and enhancement of biological diversity” is fundamental to the FWS.⁴ He stated that the FWS could contribute to protection of “regional ecosystems and biological communities” via land acquisition and technical assistance.⁵ Director Turner subsequently reinforced this view in a 1991 vision document that focused NWRS priorities on areas of high diversity, declining habitats, and linkages between protected areas.⁶ As late as 1993, the NWRS “proposed action” in a never-completed, programmatic draft EIS would have increased attention to non-game species, acquired lands for biodiversity and corridor values, and led to a “significant increase in biodiversity initiatives” in terrestrial habitats.⁷

Despite these statements, however, the FWS ultimately backed away from biodiversity. Instead, throughout the remainder of the 1990s, it came to employ a trust concept to describe its mission. The first published reference we could find is in a 1991 report of a forum convened to discuss protection of biodiversity on federal lands. In the forum proceedings, the FWS qualified its support for biodiversity by noting that its agency mission involves “federal interest public trust resources.”⁸ Internal FWS documents now commonly contain references to “trust respon-

WILDLIFE SERV., REFUGES 2003: DRAFT ENVIRONMENTAL IMPACT STATEMENT, A PLAN FOR THE FUTURE OF THE NATIONAL WILDLIFE REFUGE SYSTEM (1993) [hereinafter USFWS 1993].

3. Alaska National Interest Lands Conservation Act, 16 U.S.C. §§ 3101–3233 (2006); THE KEYSTONE CTR., FINAL CONSENSUS REPORT OF THE KEYSTONE POLICY DIALOGUE ON BIOLOGICAL DIVERSITY ON FEDERAL LANDS (1991); Deborah Holle et al., Biodiversity The Common Thread: Where Should Responsibility for the Conservation of Biodiversity Reside Within the U.S. Fish and Wildlife Service? And Why? Evaluation of the U.S. Fish and Wildlife Service’s Mission and Responsibilities Relative to Conserving Biodiversity (May 1991) (unpublished internal document on file with the author); Memorandum from Chief, Division of Refuges, U.S. Fish & Wildlife Serv. to Panel Members, U.S. Fish & Wildlife Serv. Biodiversity Workshop (Oct. 28, 1992) (on file with author).

4. *National Biological Diversity Conservation and Environmental Research Act: Hearing on H.R. 1268 Before the H. Subcomm. on Fisheries & Wildlife Conservation & the Environment, H. Comm. on Merchant Marine & Fisheries*, 101st Cong. 1 (1989) (statement of John F. Turner, Director, Fish & Wildlife Serv.) (on file with author).

5. *Id.* at 10.

6. U.S. FISH & WILDLIFE SERV., VISION FOR THE FUTURE: 1991 TOTAL QUALITY MANAGEMENT PLAN 2 (1991).

7. USFWS 1993, *supra* note 2, at 8–15.

8. THE KEYSTONE CTR., *supra* note 3, at 57.

sibility,” “trust resources,” and other similar terms.⁹ Yet these terms defy precise definition, as reflected by their inconsistent use. Some documents refer to taxa for which the Service has a statutory mandate,¹⁰ but others, such as the NWRS 1999 Strategic Plan, add species listed in executive orders that establish refuges.¹¹ The 2006 Partners for Fish and Wildlife Act attempts to codify the Service’s “Federal trust species” by listing the most commonly cited elements: “migratory birds, threatened species, endangered species, interjurisdictional fish, marine mammals, and other species of concern.”¹² Still, the phrase “other species of concern” hedges any specificity.

The FWS further confuses the picture when it employs the term “trust *resources*,” a looser interpretation of the trust concept. This more expansive term probably arose out of the Service’s wetland-related responsibilities. The prominence of wetlands inventory, management, and acquisition within the FWS culture derives from the association of these activities with waterfowl conservation and the Emergency Wetlands Resources Act of 1986.¹³ But now, other non-species biological elements pass through the door opened by the “trust resources” terminology. For example, the comprehensive conservation plan (CCP) for the remote Pacific island refuges cites coral reefs as a “trust resource,” reflecting the refuge’s establishment purpose.¹⁴ Other CCPs have stretched the concept even further beyond its origins. The Chesapeake Marshlands National Wildlife Refuge Complex plan, along with plans from other Northeastern Region refuges, defines the term to include cultural resources, navigable waters, and “public lands like state parks and national wildlife refuges.”¹⁵ Some within the NWRS carry this yet further, suggesting that,

9. U.S. FISH & WILDLIFE SERV., FULFILLING THE PROMISE: THE NATIONAL WILDLIFE REFUGE SYSTEM (1999) [hereinafter USFWS 1999]; U.S. FISH & WILDLIFE SERV., A BLUEPRINT FOR THE FUTURE OF MIGRATORY BIRDS: MIGRATORY BIRD PROGRAM STRATEGIC PLAN 2004–2014 (2004); U.S. FISH & WILDLIFE SERV., STRATEGIC PLAN OF THE PARTNERS FOR FISH AND WILDLIFE PROGRAM: STEWARDSHIP OF FISH AND WILDLIFE THROUGH VOLUNTARY CONSERVATION, OCTOBER 1, 2006, TO SEPTEMBER 30, 2010 (2006) [hereinafter USFWS 2006a].

10. USFWS 1999, *supra* note 9, at xii; USFWS 2006a, *supra* note 9, at 2.

11. USFWS 1999, *supra* note 9, at 17.

12. Partners for Fish and Wildlife Act, 16 U.S.C. § 3772(1) (2006).

13. Emergency Wetlands Resources Act of 1986, Pub. L. No. 99-645, 100 Stat. 3582 (1986) (requiring a National Wetlands Priority Conservation Plan and authorizing wetland purchases from the Land and Water Conservation fund) (codified as amended in scattered sections of 16 U.S.C.).

14. U.S. FISH & WILDLIFE SERV., HOWLAND ISLAND NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN 1-1 (2008), available at <http://www.fws.gov/pacific/planning/main/docs/HI-PI/HBJ/Howland%20Final%20CCCP.pdf>.

15. U.S. FISH & WILDLIFE SERV., CHESAPEAKE MARSHLANDS NATIONAL WILDLIFE REFUGE COMPLEX COMPREHENSIVE CONSERVATION PLAN (2006).

pursuant to the National Wildlife Refuge System Improvement Act (NWRISA),¹⁶ the Refuge System's trust responsibilities must include ecosystems, as well as "biological integrity, diversity and environmental health."¹⁷ Others, in perhaps the broadest interpretation, consider all lands within the NWRs as a trust resource or trust responsibility of the FWS.¹⁸ At some point, the effort to squeeze bits and pieces of individual refuge purposes and programmatic goals into the categories of listed trust resources becomes a meaningless exercise that undermines the priority-setting objective of the trust concept. These examples illustrate the FWS's variable and amorphous application of "trust" terminology and the doctrine that such terminology reflects.

The 2006 Strategic Habitat Conservation "business model," the Partners for Fish and Wildlife Program, and the NWRs acquisition strategy illustrate three ways the trust concept influences the Refuge System. In particular, the concept is associated with measures of success based on species' populations. In contrast, as we show in Part III, ecological objectives and measures are better suited to the statutory mission of the NWRs and the challenges presented by climate change. The three illustrations that follow show the tension between a species-based approach to conservation and one oriented toward maintenance of biodiversity and ecological values.

A. Strategic Habitat Conservation

In 2006, FWS introduced Strategic Habitat Conservation (SHC) as its conservation "business model"¹⁹ to increase accountability via, in its purest form, a singular measure of success—increased populations of FWS "trust species."²⁰ Employing elements of adaptive management in a range of applications across the FWS and the Refuge System, it guides

16. National Wildlife Refuge System Improvement Act of 1997, Pub. L. No. 105-57, 111 Stat. 1252 (1997) (codified as amended at 16 U.S.C. § 668dd).

17. U.S. Fish & Wildlife Serv., Minutes of Regional Refuge Biologist Meeting, Bolger Center, Potomac, Md., Attachment IV 1 (Oct. 2007) (on file with author).

18. Noah P. Matson, *Maintaining the Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System*, 44 NAT. RESOURCES J. 1137, 1154 (2004).

19. U.S. FISH & WILDLIFE SERV., STRATEGIC HABITAT CONSERVATION HANDBOOK: A GUIDE TO IMPLEMENTING THE TECHNICAL ELEMENTS OF STRATEGIC HABITAT CONSERVATION 4 (Version 1.0 2008) [hereinafter USFWS 2008]; See also U.S. FISH & WILDLIFE SERV., F.Y. 2010 BUDGET JUSTIFICATION (calling the SHC a "business model"), available at http://www.doi.gov/budget/2010/data/greenbook/FY2010_FWS_Greenbook.pdf.

20. U.S. FISH & WILDLIFE SERV., STRATEGIC HABITAT CONSERVATION: FINAL REPORT OF THE NATIONAL ECOLOGICAL ASSESSMENT TEAM 13 (2006) [hereinafter USFWS 2006b] (flowchart of SHC operation at a landscape scale showing how selected, priority species drive habitat management).

managers to identify areas where habitat limitations inhibit population growth and then to relieve the restraints through management, restoration, and/or protection.²¹ In defining the purview of the FWS in terms of species populations, a companion handbook assigns ecosystem outcomes to “other agencies and organizations with different mandates.”²² Ultimately, in specific locales and on the ground, practitioners may not adhere faithfully to the population metric, reflecting SHC’s self-characterization as “a tool, not a rule.”²³ However, the model’s lack of an explicit avenue for direct ecosystem-based outcomes remains a contentious issue.²⁴

Prior to SHC’s genesis, the NWRS had developed a strategy based on a two-track approach using “coarse” and “fine” filters.²⁵ This proposed strategy would have first conserved ecosystems as surrogates for species in order to capture the needs of a full spectrum of wildlife. It would have then employed a secondary, “fine filter” to identify and acquire lands meeting the unique needs of particularly sensitive species. This strategy, completed in 2004, noted that either approach alone “would be incomplete in identifying the high priority habitats necessary for conserving species and the larger ecological communities for which these species depend.”²⁶ During subsequent SHC development, however, the FWS dropped the “coarse filter” in favor of the final conservation model solely emphasizing populations of “trust species.”

The SHC model putatively applies only to species for which habitat constraints limit conservation targets. The NWRS might still pursue ecosystem objectives through its acquisition program in parallel to its SHC-based populations management. However, a Service-wide emphasis on SHC—encompassing directorate-level oversight, a chartered implementation team, a website, and regional teams and workshops—has muted discussion of biodiversity, environmental health, and ecological integrity as alternative objectives for NWRS expansion. The “coarse filter/fine filter” concept has lapsed into obscurity, and dialogue around

21. *Id.*

22. USFWS 2008, *supra* note 19, at 6.

23. USFWS 2006b, *supra* note 20, at 11.

24. Pauline M. Drobney et al., *Other Views: Refining SHC*, 5 REFUGE UPDATE 16 (July/Aug. 2008).

25. J. Michael Scott et al., *Gap Analysis: A Geographic Approach to Protection of Biological Diversity*, 123 WILDLIFE MONOGRAPHS 7 (Jan. 1993), available at http://www2.bren.ucsb.edu/~fd/fd/pubs/scott_et_al93.pdf (explaining the coarse- and fine-filter approach to conservation); U.S. FISH & WILDLIFE SERV., A PROCESS FOR INTEGRATING WILDLIFE POPULATION, BIODIVERSITY, AND HABITAT GOALS AND OBJECTIVES ON THE NATIONAL WILDLIFE REFUGE SYSTEM: COORDINATING WITH PARTNERS AT ALL LANDSCAPE SCALES (2004) (internal report on file with author) [hereinafter USFWS 2004].

26. USFWS 2004, *supra* note 25, at 8.

such a dual role for the Refuge System²⁷ has withered. We aim to revive the debate by evaluating the “trust species” idea animating SHC.

B. Partners for Fish and Wildlife

The Partners for Fish and Wildlife Program (PFW) arose out of the 1970s drought and the Food Security Act of 1985.²⁸ Responding to loss of waterfowl habitats, PFW began as a mechanism to expend Farm Bill funds for wetland restoration on private lands. It has since expanded to stream restoration, endangered species habitats, and uplands.²⁹ The PFW is now a freestanding national program, but it originated within the NWRS, and its field activities in two of the FWS’s eight regions are still administered via the refuge program. The FWS considers PFW a bridge between federal and private land conservation.³⁰ Indeed, PFW operational policy assigns highest priority to projects complementing NWRS activities.³¹ Thus, much of its work occurs in the vicinity of refuges, and PFW projects buffer refuges from outside developmental pressures.

A “trust species” focus is central to virtually all of the PFW’s operational documents. The Partners for Fish and Wildlife Act explicitly directs PFW to support certain taxa (e.g., migratory birds and marine mammals), and the program’s mission statement, governing policy, and strategic plan all employ “trust species” as organizing elements.³² Its two overriding priorities for ranking projects both reference specific benefits for trust taxa.³³ In short, PFW projects must improve “trust species” habitats and maximize their benefits.³⁴

If the PFW did not have such close ties to the NWRS, its fealty to the trust concept would not be so relevant to the current discussion. However, the PFW’s stated tie to refuges implies an expectation that the NWRS shares the species emphasis over other biodiversity scales. Yet, as we note in Part III, climate change and human encroachment make connectivity, resilience, and ecosystem function more pressing conservation concerns. As the NWRS addresses those concerns via its own statutory

27. Drobney et al., *supra* note 24.

28. Food Security Act of 1985, Pub. L. No. 99-198, 99 Stat. 1354 (1985) (codified as amended at 16 U.S.C. §§ 3801–3862).

29. *Partners for Fish and Wildlife Program—Program History*, U.S. FISH & WILDLIFE SERV., <http://www.fws.gov/partners/programHistory.html> (last updated May 21, 2010).

30. USFWS 2006a, *supra* note 9, at 2.

31. U.S. FISH & WILDLIFE SERV., *Partners for Fish and Wildlife Program*, in SERVICE MANUAL, 640 FW 1.9(A)(1) (2003) [hereinafter USFWS 2003].

32. Partners for Fish and Wildlife Act, 16 U.S.C. § 3771(b) (2006); USFWS 2003, *supra* note 31; USFWS 2006a, *supra* note 9.

33. USFWS 2003, *supra* note 31.

34. *Id.* at § 1.11(A).

mandates, the potential of PFW as an ally cannot be overstated. The PFW's focus on "trust species," however, will limit its potential to coordinate surrounding matrix lands with a refuge management philosophy focused on biodiversity and ecosystem integrity.

C. Strategic Growth

Commentators have long noted the Refuge System's haphazard growth.³⁵ Immediately after its inception in 1903, refuge establishment was broadly directed at saving water birds and big game. In response to the drought of the 1930s, however, it narrowed to protecting migratory waterfowl habitat. Since the 1960s, preventing species extinction has often motivated refuge creation. In addition to these major conservation objectives, personal preferences of elected and appointed officials, funding availability, donations, and a wide range of social program priorities have shaped refuge establishment.³⁶ By the end of the twentieth century, the Refuge System had become a hodgepodge of conservation units with tenuous coherence. The 1997 NWRSA responded by directing growth of the [Refuge] System to, among other aims, "contribute to the conservation of the *ecosystems* of the United States," and "complement the efforts of States and other Federal agencies."³⁷ Perhaps because of adherence to a "trust species" model of growth, the FWS implementation of this mandate has been erratic. Continued emphasis on the "trust species" model hampers fulfillment of Congress's mandate and misses opportunities to optimize the conservation potential of the NWRSA.

The FWS 1996 land acquisition policy included "significant biodiversity" among six acquisition objectives.³⁸ It explained that the FWS acquired lands to "protect representative examples of nationally significant native ecological communities."³⁹ The 1997 NWRSA's growth mandate supported this approach. *Fulfilling the Promise*, the Refuge System's 1999 strategic vision, appeared to embrace this responsibility. It stated that maintaining biodiversity would likely require new acquisitions and identified a lack of guidance to address non-"trust species" biodiversity

35. ROBERT L. FISCHMAN, *THE NATIONAL WILDLIFE REFUGES: COORDINATING A CONSERVATION SYSTEM THROUGH LAW* 23–24, 32–63 (2003); DEFENDERS OF WILDLIFE, *PUTTING WILDLIFE FIRST: RECOMMENDATIONS FOR REFORMING OUR TROUBLED REFUGE SYSTEM—REPORT OF THE COMMISSION ON NEW DIRECTIONS FOR THE NATIONAL WILDLIFE REFUGE SYSTEM* (1992); Leopold et al., *supra* note 1.

36. FISCHMAN, *supra* note 35, at 35.

37. 16 U.S.C. § 668dd(a)(4)(C) (2006) (emphasis added).

38. U.S. FISH & WILDLIFE SERV., *Policy and Responsibility, in SERVICE MANUAL*, 341 FW 1.4(F)) (1996).

39. *Id.*

objectives.⁴⁰ The NWRS responded with a Populations, Habitats, and Biodiversity Goals Team, which in 2004 articulated the dual-track “coarse” and “fine” process identifying both species *and* ecosystems as acquisition drivers.⁴¹

Even as that team began, however, a competing philosophy was emerging. A 2000 Director’s Memorandum superseded the progressive language of the 1996 acquisition policy.⁴² Highly process-oriented, it required only that an acquisition proposal describe a tract’s value in terms of “migratory birds, endangered and threatened species, [and] fishery resources.” Three months later the NWRS chartered a Strategic Growth–Thresholds Standards Team, which completed its study in 2002, two years before the Populations, Habitats, and Biodiversity Goals Team. The Strategic Growth team recommended five qualifying criteria for new acquisitions. The first stated, “any additions must contribute substantially toward the conservation of priority trust species.”⁴³ Three others required that a candidate acquisition tract support habitat goals, habitat connections, and biological integrity, but linked these parameters to life-cycle requirements of “trust species.”⁴⁴

The NWRS affirmed this “trust species” thresholds concept from the Strategic Growth team during its 2004 Conservation in Action Summit, a conference it held with stakeholders in celebration of its centennial. The Refuge System used this centennial summit as a forum to develop and adopt four major policy statements, or white papers. One of these defined the philosophical framework around which the NWRS would acquire new lands. While it affirmed the dual ecosystem/species approach of the Populations, Habitats, and Biodiversity Goals Team as a means of *initially* identifying potential acquisitions, it then proposed filtering these proposals using the trust-oriented threshold standards identified above.⁴⁵ The report also appended a draft Director’s Order that would have institutionalized this philosophy, but which stalled during the George W. Bush administration.

40. USFWS 1999, *supra* note 9, at 32–34.

41. USFWS 2004, *supra* note 25, at 8. This is the same team report dismissed during the SHC development process. *See supra* note 26 and accompanying text.

42. Memorandum from Director, U.S. Fish & Wildlife Serv., to Regional Directors, Regions 1–7, U.S. Fish & Wildlife Serv., regarding Changes to the Land Acquisition Planning Process 1 (Aug. 11, 2000) (on file with author).

43. U.S. FISH & WILDLIFE SERV., STRATEGIC GROWTH THRESHOLD STANDARDS, FULFILLING THE PROMISE, EXECUTIVE SUMMARY 3 (2002) (internal report on file with author).

44. *Id.*

45. U.S. FISH & WILDLIFE SERV., STRATEGIC GROWTH OF THE NATIONAL WILDLIFE REFUGE SYSTEM, WHITE PAPER FOR THE CONSERVATION IN ACTION SUMMIT 24 (2004).

Finally, in June 2004, soon after the Conservation in Action Summit, the FWS chartered the National Ecological Assessment Team that two years later produced the SHC concept now in use.⁴⁶ In the process, the ecosystem-based “coarse filter” proposal virtually disappeared. It remains somewhat in evidence in the NWRS Land Acquisition Priority System (LAPS), through which tracts approved for purchase compete for funding. The LAPS, first employed in 1987,⁴⁷ does consider ecosystem values—its 850-point system awards up to 200 points for a tract’s “ecosystem conservation value.”⁴⁸ But the LAPS gives greater emphasis to “trust species” concerns—allowing up to a combined 600 points for migratory birds, threatened and endangered species, and wetlands values.⁴⁹

D. “Trust Species” in NWRS Management

These three illustrations of how the trust concept steers the NWRS cover the management of existing lands, the interplay between the Refuge System and other FWS programs, and the acquisition of new tracts. In practice, the trust concept plays out differently and even inconsistently within and across each of these arenas. The inconsistency contributes to the varied interpretations and confusion surrounding the trust concept. For example, management on some existing refuges even now demonstrates a certain movement away from a purely “trust species” orientation. Some projects employ the adaptive cycle of SHC using endpoints other than measures of population change. Several refuges employ CCPs emphasizing ecosystem restoration goals.⁵⁰ And recent NWRS habitat management policy and guidance identify biodiversity and biological integrity as valid habitat management priorities.⁵¹ Even PFW engages in collaborative, landscape-oriented projects.

But there is much progress yet to be made, and perhaps no arena offers as much opportunity as land acquisition. Outside of Alaska, refuges established for ecosystem values are the exception.⁵² But those ex-

46. USFWS 2006b, *supra* note 20. For a reminder of the SHC concept, see *supra* text accompanying note 20.

47. U.S. Fish & Wildlife Serv., Land Acquisition Priority System ranking document for FY2004 iii (Mar. 20, 2002) (on file with author).

48. *Id.*

49. *Id.*

50. See *infra* text accompanying notes 132–34.

51. E.g., U.S. FISH & WILDLIFE SERV., IDENTIFYING REFUGE RESOURCES OF CONCERN AND MANAGEMENT PRIORITIES 17 (Fig. 1, step 3) (Aug. 2010); U.S. FISH & WILDLIFE SERV., *Habitat Management Plans*, in SERVICE MANUAL, 620 FW 1.4(G), 1.7(B) (2002).

52. E.g., Silvio O. Conte National Fish and Wildlife Refuge Act, Pub. L. No. 102-212, 105 Stat. 1655, 1656 (1991) (*inter alia* “[T]o restore and maintain the chemical, physical, and

ceptions point the way toward greater FWS involvement in promoting and managing ecological integrity. The consistent availability of Duck Stamp monies⁵³ assures migratory bird and wetland habitats continued prominence among new acquisitions. Additionally, priorities implicit in the weighing of factors in the LAPS assures continued preference for “trust species” in setting acquisition priorities. An overhaul of LAPS to more strongly promote identification of tracts for their ecosystem value would set the NWRS on a better course to address the daunting conservation challenges of the coming decades.

II. A CRITIQUE OF THE TRUST CONCEPT FOR NWRS CONSERVATION

Though the “trust species” concept retains some vitality for the FWS, its limitations for the NWRS are increasingly evident as the challenges of habitat loss and fragmentation, climate change, and other stressors mount. The 1997 organic act⁵⁴ for the NWRS undermined much of the rationale for the “trust species” doctrine as a unifying mission for the refuges. The defined statutory NWRS mission, combined with the pressing conservation challenges from climate change and a plethora of non-climate stressors (e.g., encroachment, invasives, and water scarcity), prompts this reevaluation of the merits of the “trust species” touchstone. On balance, the benefits it provides to the management of the Refuge System are outweighed by the problems and limitations it presents.

A. The Continued Merits of “Trust Species”

A history of predominantly species-oriented management has served NWRS conservation well. Why abandon a good thing? A conservative view rightly leans toward retaining prudent approaches that have achieved successes. Moreover, the FWS is an agency that has suffered over the years from its “roving parentage.”⁵⁵ Compared to the Na-

biological integrity of wetlands and other waters”); Bon Secour National Wildlife Refuge, Pub. L. No. 96-267, 94 Stat. 483, 484 (1980) (“[T]o conserve an undisturbed beach-dune ecosystem which includes a diversity of fish and wildlife”).

53. Duck Stamp monies are the revenues generated by the sale of migratory-bird hunting stamps, which are required on all state permits to hunt migratory waterfowl. FISCHMAN, *supra* note 35, at 37–38.

54. An organic act for a public land system is a charter for orchestrating management of the system’s units so that they can achieve large-scale objectives beyond the reach of any individual conservation area. Robert L. Fischman, *The National Wildlife Refuge System and the Hallmarks of Modern Organic Legislation*, 29 *ECOLOGY L.Q.* 457, 501–510 (2002).

55. JEANNE NIENABER CLARKE & DANIEL C. MCCOOL, *STAKING OUT THE TERRAIN: POWER AND PERFORMANCE AMONG NATURAL RESOURCE AGENCIES* 107 (2nd ed. 1996).

tional Park Service, its sister agency in the Interior Department, the FWS (and thus, the NWRS) gets fewer dollars for each acre of conservation land it manages, enjoys less reverence from the public, and suffers from a diffuse, ever-changing set of objectives.⁵⁶ These institutional realities increase the value of the few traditions providing continuity to management and pride to FWS staff.

The “trust species” concept ties the NWRS land management program of the FWS more closely to the other operations of the agency. Unlike all the other major federal public land management agencies (i.e., the U.S. Forest Service, the National Park Service, and the Bureau of Land Management), the FWS has considerable regulatory responsibilities.⁵⁷ Figure 1 (below) illustrates the breadth of the agency’s activities and the challenge of weaving them together into a coherent mission. Most prominently, under the Endangered Species Act (ESA),⁵⁸ the Migratory Bird Treaty Act,⁵⁹ and the Lacey Act,⁶⁰ the FWS promulgates rules that bind all citizens and may even limit private land use. It employs enforcement officers with responsibilities that range far from the public estate. It also supervises other federal agencies’ compliance with wildlife laws.

This broad range of responsibilities creates a challenge in sustaining a strong sense of institutional identity. The “trust species” concept provides a rallying point for all operations. Especially with periodic calls to split off the NWRS for management by a new agency concerned solely with refuge administration,⁶¹ the concept strengthens the justification for retaining the NWRS within the FWS. Because most of the other FWS responsibilities are based on lists of particular taxa (i.e., endangered or threatened species, migratory birds, and interjurisdictional fish), the NWRS coheres with the rest of the FWS family when it also sings from the same “trust resources” songbook.

Neither the FWS nor the NWRS can protect everything. A “trust species” list enjoys the advantage of providing a clear statement of priorities. It facilitates better assessment and accountability, which are important strategic challenges for the FWS. But many of the specific listed resources that FWS is responsible for protecting are not species in the conventional biological sense. The ESA, for instance, specifically includes subspecies and “distinct population segments” as the resources of concern, as well as their habitats. And wetlands, acquired and protected

56. Robert L. Fischman, *The Significance of National Wildlife Refuges in the Development of U.S. Conservation Policy*, 21 J. LAND USE & ENVTL. L. 1 (2005).

57. See *infra* Figure 1 (illustrating the diverse functions of the FWS).

58. 16 U.S.C. §§ 1531–1544 (2006).

59. 16 U.S.C. §§ 703–712 (2006).

60. 16 U.S.C. §§ 701, 3371–3378 (2006).

61. FISCHMAN, *supra* note 35.

FIGURE 1: PRINCIPAL FWS CONSERVATION RESPONSIBILITIES

National Wildlife Refuge System	Manage system of 150 million acres, including 551 refuges & marine preserves & 37 wetland management districts.	Wildlife & Sport Fish Restoration Program	Coordinate state/federal partnerships; administer grants in support of conservation, hunting, fishing & boating.	Migratory Birds Program	Manage migratory bird populations; conserve their habitats.	Fisheries & Habitat Conservation Program	Manage national fish hatchery system, National Fish Habitat Action Plan, wetlands permits & natural resources damage assessments; collaborative conservation.	Endangered Species Program	Administer Endangered Species Act; conserve habitat for listed species.	International Affairs	Administer obligations under treaties & conventions; manage international conservation activities.
Additional Responsibilities											
External Affairs						Law Enforcement			Internal Management		

under the Migratory Bird Conservation Act⁶² and Emergency Wetlands Resources Act of 1986,⁶³ are hardly species. In this respect, “trust resources” is a more accurate term than “trust species” to describe the list-based conservation approach. The FWS frequently employs the two terms interchangeably. As the items on the list become more numerous and more diverse, the value of the trust concept for setting goals and priorities diminishes.

In addition to providing a list of key resources, the trust concept also generally describes the FWS’s legislated management responsibilities.⁶⁴ “Trust” reflects the heightened duty for protecting something special. In private trust law, the special resource might be an inheritance. In the public realm, trusts for historic preservation and educational institutions capture the same high regard for resources that can inspire and equip beneficiaries to realize their potential. This matches how most conservationists would regard the elements of the natural world under the stewardship of the FWS.

As a legal matter, a settlor (or grantor) creates a trust to husband a resource (the corpus of the trust) for a beneficiary. In the case of the NWRS, the settlor can be compared to Congress, which established the NWRS to conserve the natural resources of the refuges for the public as a beneficiary. Specifically, Congress framed the legislative mission of the NWRS as serving to “benefit” “present and future generations of Americans.”⁶⁵ And though the NWRS organic legislation does not use the term “trust” or “trustee,” Congress introduced the NWRSA with findings that implicitly endorsed President Clinton’s 1996 executive order (E.O. 12996). The Clinton order referred to the Interior Secretary’s “trustee and stewardship responsibilities” for the NWRS.⁶⁶ The trust concept connects with many people who can understand that NWRS conservation is for their benefit. Most Americans clearly understand the corpus of species,

62. 16 U.S.C. § 715 (2006).

63. Emergency Wetlands Resources Act of 1986, Pub. L. No. 99-645, 100 Stat. 3582 (codified as amended in scattered sections of 16 U.S.C.).

64. Professor Wilkinson has argued that the “trust notion, as a generic concept, is an appropriate description of the federal role in public land law,” but that it is different from the “public trust doctrine” and cannot be enforced directly against Congress or agencies. Charles F. Wilkinson, *The Public Trust Doctrine in Public Land Law*, 14 U.C. DAVIS L. REV. 269, 304 (1980). Wilkinson emphasizes those aspects of the “trust notion” that demand a higher level of care in management of public, as compared to private, resources. *Id.*

65. 16 U.S.C. § 668dd(a)(2) (2006).

66. Management and General Public Use of the National Wildlife Refuge System, Exec. Order No. 12,996, 61 Fed. Reg. 13,647, 13,647 (Mar. 28, 1996). *But see infra* note 76 and accompanying text (questioning whether the term “trustee” in the executive order relates to a general duty apart from the statutory responsibility to collect damages to refuge natural resources from pollution).

especially select animals (such as game), as a valued aspect of nature. Biodiversity and ecological integrity, in contrast, are more nebulous terms that fail to conjure the same emotional response in the political realm.

Another benefit of the trust concept derives from the trustee's fiduciary duty to avoid self-dealing and to make decisions based solely on the terms of the trust for the ultimate good of the beneficiary. The terms of the trust would be roughly analogous to the mandatory substantive management criteria Congress established in its legislative charter for the NWRS. The first and most important criterion, because it directly addresses the NWRS overall mission, is to "conserve," which means to "sustain and, where appropriate, restore and enhance, healthy populations of fish, wildlife, and plants."⁶⁷ This conception of conservation resembles the fiduciary duty of many trustees to sustain endowments in perpetuity. It also employs "populations," a concept that is central to the corpus of the "trust species" goal.

B. The Problems with "Trust Species"

Despite these considerable merits, as well as the utility and power of the trust analogy as a core value and communications tool, employing the trust concept as a way of prioritizing or justifying NWRS activities presents serious problems. This section organizes the objections into four categories: fidelity to statutory authority, confusion with real federal trust duties, confusion with state trust doctrines, and the mismatch between the reductive elements of the trust and the landscape-level NWRS mandates.

1. Fidelity to Statutory Authority

From a legal perspective, the lack of an explicit trust mandate in the NWRS organic legislation exposes a hazard of guiding refuge management with the trust concept. Despite a tradition of presidential influence, congressional commands remain the principal text guiding public land agencies. This is a central pillar of constitutional law (which vests public property management authority in Congress), administrative law (which requires all agencies to comply with legislation), and statutory interpretation (which looks first to whether a statute directly and unambiguously deals with an issue before turning to other sources of authority). Employing tests, slogans, or criteria that do not come from statutes distracts land managers from their essential task, which is to fulfill their legal charge. Simply put, the FWS does not really have any direct obliga-

67. 16 U.S.C. §§ 668dd(a)(4)(A), 668ee(4) (2006).

tions to the public beneficiaries other than the obligations Congress explicitly creates. More relevant to our point, Congress's ecological mandates to the FWS are as critical to the NWRS mission as the traditional species-focused purposes.⁶⁸ When the NWRS employs "trust species" management as its overarching theme, it elevates certain reductionist goals above the systemic goals Congress established in the 1997 NWRSIA. A more ecological approach to management would promote greater fidelity to statutory commands, such as the one to "ensure that the biological integrity, diversity, and environmental health of the [NWRS] are maintained for the benefit of present and future generations of Americans . . ." and to "plan and direct the continued growth of the [NWRS] . . . to contribute to the conservation of the ecosystems of the United States"⁶⁹

Despite strenuous efforts by environmentalists over the past 40 years, courts have consistently refused to find implied trust duties for federal public land managers. For instance, courts have rejected attempts to hold federal land managers to fiduciary standards of stewardship beyond explicit statutory duties.⁷⁰ Though some public land and environmental laws have provisions that can be generally described as *akin* to a trust, they do not establish real trust duties apart from the obligations delineated in the statutes themselves. Courts only enforce specific statutory mandates and cannot create new ones absent from statutes. Congress has created a statutory mandate for FWS trust management only in the narrow context of natural resources damages, as described in the following section.

2. Confusion with Real Federal Trust Duties

Besides distracting the NWRS from complying with the actual law, or at least skewing its attention toward the pre-1997 part of its responsibilities, a focus on the trust concept and its undisciplined use diminish its legal meaning and may cause confusion in the situations where the federal government does have a real trust responsibility to act. The recently settled *Cobell* litigation challenged the Department of the Interior's (DOI) fiduciary management of billions of dollars owed to American Indians for natural resources use since 1887.⁷¹ The litigation touched most DOI employees through the extensive court-ordered closings of government websites and e-mail accounts due to concerns about

68. See *infra* Part II.B.4.

69. 16 U.S.C. § 668dd(a)(4).

70. *Sierra Club v. Andrus*, 487 F. Supp. 443, 449 (D.D.C. 1980), *aff'd on other grounds sub nom. Sierra Club v. Watt*, 659 F.2d 203 (D.C. Cir. 1981).

71. *Cobell v. Salazar*, 573 F.3d 808 (D.C. Cir. 2009).

the security of trust-fund account information. Especially for this generation of FWS managers who might circulate into other branches of the DOI, it is important to distinguish the responsibilities of NWRS administration from the trust duties constraining federal management of Indian natural resources. Even within the FWS, there is increasing emphasis on “working with tribes” to fulfill “federal trust responsibilities,” meaning the fiduciary duty toward self-governance and tribal claims to natural resources.⁷²

Another more serious potential for confusion arises from the specific, legal designation of the FWS as the federal trustee for recovery of natural resources damages due to releases of environmental contaminants. The Clean Water Act (CWA), the Oil Pollution Act (OPA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) each create a fiduciary role for the federal government to represent the interests of the public in recovering money and restoring natural resources damaged by pollution.⁷³ Under these statutes, natural resources is a broad category generally including land, animals, biota, air, and water.⁷⁴ Attorneys in the DOI Solicitor’s office and FWS teams around the country specialize in assessing the damage to natural resources from spills and other unfortunate releases.⁷⁵ Estimating the monetary value of the damages and allocating an appropriate proportion to the *federal* trust (as opposed to Indian and state authorities who also can claim damages to resources under their purview) is an important FWS task but differs substantially from NWRS administration. However, there is a link between the two. In addition to species listed under the ESA and fish and birds that cross state jurisdictions, many NWRS resources are among those for which the federal government has a trust duty to collect damages for harm under these statutes.⁷⁶ But using the same term for the ambitious mission and wider array of goals of affirmative NWRS management (rather than defensive recovery) muddles rele-

72. See, e.g., Memorandum from Tom Melius, Regional Director, U.S. Fish & Wildlife Serv., to all FWS Region 3 Employees (Jan. 27, 2011) (urging FWS employees to better understand the unique trust relationship between the federal government and tribes through viewing a training video at <http://www.fws.gov/midwest/Tribal/tribevideo.htm>) (on file with author).

73. 33 U.S.C. § 1321 (2006) (CWA provision); 33 U.S.C. § 2706 (2006) (OPA provision); 42 U.S.C. § 9607 (2006) (CERCLA provision).

74. 33 U.S.C. § 2701(20) (effective 1990); 42 U.S.C. § 9601(16) (effective 1980).

75. Dep’t of the Interior Natural Resource Damage Assessments, 43 C.F.R. pt. 11 (2003).

76. EPA National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. § 300.600 (2000). It is this duty to recover damages for NWRS that may have been behind the reference to “trustee” in President Clinton’s executive order for the refuges. Exec. Order No. 12,996, 61 Fed. Reg. at 13,647.

vant standards for the different tasks (land management versus damage recovery) and raises the potential for confusion.

3. *Confusion with the State Public Trust Doctrines*

The “trust species” concept for NWRS management tempts confusion between FWS responsibilities and *state* public trust duties. While there are helpful analogies between these obligations, they are fundamentally different legal creatures.⁷⁷ The differences reflect the disparities between national and state power in the United States. The U.S. Constitution limits national powers to just those enumerated in its text. In that respect, the federal government has only those powers specifically included in its creation. Federal trusts originate from *statutes* enacted pursuant to enumerated powers, such as regulating interstate (and American Indian) commerce and federal property.

In contrast, states have all other sovereign powers not constitutionally granted to the federal government. That includes all of the traditional privileges and duties of the sovereign stemming from the English Crown. The public trust doctrine is one of these ancient principles that states inherited from English law. Over the years, different states have developed varying interpretations of the doctrine, but it basically means that state governments must act to manage water and wildlife in a manner that sustains public interests in the resources. Most of the caselaw interpreting the public trust doctrine concerns public rights to fish, forage, hunt, and navigate along the shore. Usually courts invoke the public trust doctrine to limit exclusive private rights to trust resources.

The public trust doctrine also may limit governmental action itself in a manner similar to the fiduciary constraints on the activities of a private trustee. For instance, the California Supreme Court required the state to exercise “continuing supervisory control” over Los Angeles’s permitted water diversions to conserve the “scenery, ecology and human uses of Mono Lake.”⁷⁸ In a widely quoted formulation, the court stated that

the public trust is more than an affirmation of state power to use public property for public purposes. It is an affirmation of the duty of the state to protect the people’s common heritage of streams, lakes, marshlands and tidelands, surrendering that right of protection only in rare cases when the abandonment of that right is consistent with the purposes of the trust.⁷⁹

77. Wilkinson, *supra* note 64, at 276 (enumerating reasons why the classic public trust doctrine does not apply to federal public lands).

78. Nat’l Audubon Soc’y v. Superior Ct. of Alpine Cnty., 658 P.2d 709 (Cal. 1983).

79. *Id.* at 724.

Instead of constraining state authority to act, the public trust doctrine more often operates to grant states trusteeship powers to manage wild animal populations and seek compensation for damages to them.⁸⁰ Indeed, state law often describes this aspect of the trust as creating a state ownership interest in wildlife. While that accurately describes state law, it does not apply where the *federal* government asserts an interest in the same wildlife resource.⁸¹ The dispute over management of elk in the National Elk Refuge illustrates the disconnect when states assert sovereign power over the same wildlife that the federal government seeks to manage under its constitutional Property Clause authority.⁸² In situations like these, calling the federal role (derived from a constitutional power given to Congress, then delegated to the FWS through statute) a “trust” responsibility confuses the nature of the asserted federal power. To the extent that Congress authorized the FWS to call the shots for elk management in the National Elk Refuge, it is not because of the public trust doctrine but in spite of it. The state has power to act under its own authority, but it cannot prevent the Supremacy Clause of the Constitution from trumping that aspect of the public trust.⁸³

Constructive coordination between state natural resources agencies and the NWRS managers is an important objective. This cooperation has deep roots in practice over the past century of refuge administration and a strong foundation in federal legislation. But when the NWRS adopts the same trustee role that states legitimately claim for themselves, it obfuscates the boundaries between state and federal power. The NWRS can “complement” state wildlife management,⁸⁴ but the “trust species” theme tends to conflate federal management with state objectives more oriented toward game management.

Blurring the boundary between the state and federal role in wildlife management is not a mere theoretical concern. The 2006 NWRS management policies reflect this problem.⁸⁵ The Goals and Refuge Purposes

80. *E.g.*, *State Dep’t of Fisheries v. Gillette*, 621 P.2d 764 (Wash. Ct. App. 1980).

81. When deciding questions of federal power, the U.S. Supreme Court has characterized state ownership of wildlife as “pure fantasy” (*Douglas v. Seacoast Products, Inc.*, 431 U.S. 265, 284 (1977)) and a “legal fiction” (*Hughes v. Oklahoma*, 441 U.S. 322, 335 (1979)).

82. *Wyoming v. United States*, 279 F.3d 1214 (10th Cir. 2002). Litigation over elk management on the refuge continues, with the most recent decision, *Defenders of Wildlife v. Salazar*, 698 F. Supp. 2d 141 (D.D.C. 2010), *appeal docketed*, No. 10-5144 (D.C. Cir. May 14, 2010) (upholding the federal agencies’ elk management plan for National Elk Refuge despite its amorphous adaptive management approach to reducing winter elk populations).

83. *See Hughes v. Oklahoma*, 441 U.S. 322 (1979).

84. 16 U.S.C. § 668dd(a)(4)(C).

85. Robert L. Fischman, *From Words to Action: The Impact and Legal Status of the 2006 National Wildlife Refuge System Management Policies*, 26 *STAN. ENVTL. L.J.* 77, 116 (2007) (“Almost all of the weaknesses in the 2006 Policies derive from the Service’s reluctance to dis-

Policy relegates the systemic, NWRSA mission to a secondary (“to the extent practicable”)⁸⁶ position relative to the “paramount” individual purposes for which each refuge is established, which tend to focus more on traditional fish and game concerns.⁸⁷ That is not what Congress required in its instruction to resolve the extremely rare *conflicts* between individual refuge purposes and the systemic mission in a manner that first protects the individual purposes.⁸⁸ Instead, prioritizing establishment purposes is a policy choice reflecting a preference for the reductionist tradition in game management. The content of some of the 2006 policies displays the influence of state interests advanced by state fish and game officials assigned to the federal government through inter-agency personnel agreements.⁸⁹ The Appropriate Uses Policy allows state fish and game activities on refuges to escape critical evaluation through memoranda of understanding.⁹⁰ The policy also emphasizes the amount of hunting and fishing opportunities, which is the traditional focus of state trust responsibilities, over the distinctive recreational qualities that federally protected lands afford.⁹¹ An alternative policy would distinguish national wildlife refuges through visitor experiences that reflect a greater focus on education through contact with the very best practices of modern ecosystem management. Rather than hone the definition of “trust” resources, which is a term that generally triggers state responsibilities, the policies might better clarify for common understanding exactly what Congress has mandated the NWRS to do in support of a cooperative approach to conservation.⁹²

tance itself and its refuges from state game and fish management.”) [hereinafter Fischman, *From Words to Action*].

86. U.S. FISH & WILDLIFE SERV., *National Wildlife Refuge System Mission and Goals and Refuge Purposes*, in SERVICE MANUAL, 601 FW 1.5 (2006).

87. U.S. FISH & WILDLIFE SERV., *National Wildlife Refuge System Mission and Goals and Refuge Purposes*, in SERVICE MANUAL, 601 FW 1.19 (2006).

88. 16 U.S.C. § 668dd(a)(4)(D) (2006).

89. Fischman, *From Words to Action*, *supra* note 85, at 116–117.

90. U.S. FISH & WILDLIFE SERV., *Appropriate Refuge Uses*, in SERVICE MANUAL, 603 FW 1.2(B) (2006).

91. U.S. FISH & WILDLIFE SERV., *General Guidelines for Wildlife-Dependent Recreation*, in SERVICE MANUAL, 605 FW 1 (2006); see Fischman, *From Words to Action*, *supra* note 85, at 108–12 (discussing the emphasis in the policy).

92. On cooperative federalism in conservation, see Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179 (2006) (contrasting the versions of cooperative federalism in pollution control and resource management).

4. *The Mismatch Between the Reductive Elements of the Trust and the Landscape-Level NWRS Mandates*

The fourth problem with the “trust species” concept deals less with the nature of a trust responsibility and more with defining the actual corpus of the trust. The law governing the NWRS, like most federal wildlife law, defines “wildlife” and “fish and wildlife” to mean “any wild member of the animal kingdom.”⁹³ This might seem to suggest a species-based conservation approach, but the NWRSIA’s substantive management criteria actually point toward a broader focus. While these criteria are consistent with a trust concept, they are not particularly tied to a trust *species* approach, nor even a more generic *resource*. Instead, they include the mandate to “ensure that the biological integrity, diversity, and environmental health of the [NWRS] are maintained for the benefit of present and future generations of Americans” and “plan and direct the continued growth of the [NWRS] . . . to contribute to the conservation of the ecosystems of the United States.”⁹⁴ Once one accepts that legislation defines whatever duties the FWS has in managing the NWRS, then the question becomes whether those duties amount to a focus on a particular group of species. If they do not, the “trust species” concept may misdirect FWS resources, especially in regard to strategically growing the system.

The mismatch between the “trust species” concept and federal NWRS law exists on three levels. The first is that the particular species generally listed as the “trust species,” such as migratory birds, endangered species, and interjurisdictional fish,⁹⁵ do not correspond with the greater number of elements of biodiversity covered by the statutory mandates of the NWRSIA. The breadth of ecosystem elements and processes for which the NWRS is responsible under the NWRSIA is far greater than these species subsets. In addition to the NWRSIA, establishment mandates for individual refuges expand the list of protected elements to include such diverse taxa as subsistence game in Alaska, elk that winter in the National Elk Refuge, and longleaf pine populations in the Mountain Longleaf Pine National Wildlife Refuge.

But even if the FWS were to augment the species list, there remains a second mismatch: the NWRSIA does not focus on species at all. Instead, it formulates the Refuge System mission in terms of animal and

93. 16 U.S.C. § 668ee(7) (2006).

94. 16 U.S.C. § 668dd(a)(4).

95. *See, e.g.*, Partners for Fish and Wildlife Act, 16 U.S.C. § 3772(1) (defining trust species as “migratory birds, threatened species, endangered species, interjurisdictional fish, marine mammals, and other species of concern”).

plant “resources.”⁹⁶ The “resources” category is open-ended and not limited to a particular list. The NWRSA uses the word “species” only in its prefatory, uncodified “Findings,” where it observes that the NWRS “serves a pivotal role in the conservation of migratory birds, anadromous and interjurisdictional fish, marine mammals, endangered and threatened species, and the habitats on which these species depend.”⁹⁷ Without diminishing that pivotal role, it is fair to say that the NWRSA embraces new, far more diverse concerns than species per se. Some of those concerns relate to smaller scale biodiversity than species, such as subspecies or evolutionarily significant units, and others relate to the intrinsic ecological processes that support individual organisms. Even some individual refuge establishment purposes also include ecological terms, such as “native ecosystems” in Rocky Flats National Wildlife Refuge and coral reefs in the Hawaiian Islands National Wildlife Refuge. This second-level problem could be solved by using the term “trust resources” instead of “trust species,” as sometimes happens even now in the various nebulous applications of trust terminology within the FWS lexicon.⁹⁸ While that would more closely align the trust corpus with what Congress stated it wanted the NWRS to conserve, it would undermine one of the benefits of the current approach, however flawed: that a list of “trust species” provides a simple, clear, limited set of priorities for the FWS. Without that advantage, the trust concept itself becomes less attractive.

The third level at which the trust concept fails to match the vision of the organic legislation reflects two competing approaches to conservation. Both “species” and “resources” reflect the reductive tendency to confine the trust to specific elements. When applied to refuge management, the trust concept is wedded to the traditional, “resourceist” approach to conservation. This conception of conservation fragments nature into discrete resources having value to people, such as timber and game, which need to be managed in order to perpetuate a sustained flow.⁹⁹ Much in historic NWRS legal authority reflects that tradition. After all, some statutory provisions date back many decades.

However, the significance of the 1997 NWRSA, which provided the first comprehensive charter for the NWRS, is that it introduces broader, synthetic, ecological process concepts to the management objec-

96. 16 U.S.C. § 668dd(a)(2) (emphasis added).

97. National Wildlife Refuge System Improvement Act of 1997, Pub. L. No. 105-57, § 2, 111 Stat. 1252, 1252-53 (codified as amended at 16 U.S.C. 668dd note).

98. E.g., USFWS 2006b, *supra* note 20.

99. Julianne Lutz Newton & Eric T. Freyfogle, *Sustainability: A Dissent*, 19 CONSERVATION BIOLOGY 23 (2005).

tives.¹⁰⁰ The clearest expression of this more holistic, multi-dimensional vision for the NWRS is the mandate to ensure the maintenance of “the biological integrity, diversity, and environmental health” of the NWRS.¹⁰¹ This substantive management criterion, which could be shortened in practice to “ecological integrity,” echoes Aldo Leopold’s “land ethic,” which advances a holistic, ecological standard for evaluating conservation.¹⁰² It is adaptable to the stewardship idea of a trust but not oriented toward a corpus defined as species or resources. Other provisions of the NWRSIA that bolster a less reductive characterization of refuge management goals include the description of the Refuge System mission to administer a “national network of lands and waters”¹⁰³ and the mandate to direct the continued growth of the NWRS “in a manner that is best designed . . . to contribute to the conservation of the ecosystems of the United States.”¹⁰⁴

Not surprisingly, the FWS has explained how it intends to implement the broad, systemic mission. It expands the mission into five goals, three of which receive priority for management.¹⁰⁵ Of those three, one employs the classic trust formulation of “habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations.”¹⁰⁶ But another goal resonates more deeply with the holistic concerns of ecological integrity: “conserve those ecosystems, plant communities, wetlands . . . , and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.”¹⁰⁷ The challenges of the coming decades will require the NWRS to advance ecological integrity so that it can play an equally important role in the Refuge System’s conservation actions as the reductionist tradition.

Defining the bottom line for the NWRS in terms of simple, easy to see, readily measured elements has some obvious advantages. But it shares many of the same disadvantages of using imperiled species lists to allocate biodiversity conservation funds, to design reserves, to con-

100. See FISCHMAN, *supra* note 35; see also Vicky Meretsky et al., *New Directions in Conservation for the National Wildlife Refuge System*, 56 *BIOSCIENCE* 135 (2006).

101. 16 U.S.C. § 668dd(a)(4)(B) (2006).

102. ALDO LEOPOLD, *A SAND COUNTY ALMANAC* (1949). In contrast, Pinchot’s criteria for conservation were based on the aggregation of individuals’ utility, captured in the slogan “the greatest good for the greatest number.” GIFFORD PINCHOT, *BREAKING NEW GROUND* (1947).

103. 16 U.S.C. § 668dd(a)(2).

104. 16 U.S.C. § 668dd(a)(4)(C).

105. U.S. FISH & WILDLIFE SERV., *National Wildlife Refuge System Mission and Goals and Refuge Purposes*, in *SERVICE MANUAL*, 601 FW 1.8, 1.10 (2006).

106. *Id.* at 1.8.

107. *Id.*

strain development, and to signal the state of the environment.¹⁰⁸ Fidelity to the NWRSA justifies introducing complexity.¹⁰⁹ After all, the cutting edge of conservation science, where the NWRS should be, emphasizes sustaining processes and systems, not sustaining continual flows of elements (goods).

III. NEW CHALLENGES: CLIMATE CHANGE, ECOLOGICAL INTEGRITY, AND CONSERVATION BIOLOGY

Though the “trust species” concept might provide a concise, easily measured method for setting priorities, it fosters a reductionist view of conservation in contradiction to the science of today regarding not only climate change, but biodiversity in general. While making exceptions for some endangered species scenarios, the current literature on land protection and ecosystem management strongly promotes broader objectives for conservation. These include a focus on biodiversity generally, maintenance of representative ecosystems, resilience, and preservation of undeveloped hubs and linkages to facilitate evolutionary adaptation and range transitions among all biota. Though climate change has driven the more recent literature,¹¹⁰ these principles originally arose out of the long-standing recognition that fragmentation and other anthropogenic stressors have widespread and profound effects on the landscape.¹¹¹

The NWRS, with its 100 million acres of lands and surface waters and 50 million acres of marine resources, should be the backbone of any

108. Hugh P. Possingham et al., *Limits to the Use of Threatened Species Lists*, 17 *TRENDS IN ECOLOGY & EVOLUTION* 503 (2002).

109. James R. Karr, *Beyond Definitions: Maintaining Biological Integrity, Diversity, and Environmental Health in National Wildlife Refuges*, 44 *NAT. RESOURCES J.* 1067, 1073 (2004) (noting that the NWRSA marks a transition from species-related goals to more comprehensive biological objectives requiring “new measurement approaches to track and evaluate refuge condition and management success.”) [hereinafter Karr, *Beyond Definitions*].

110. L. Hannah et al., *Climate Change-Integrated Conservation Strategies*, 11 *GLOBAL ECOLOGY & BIOGEOGRAPHY* 485 (2002); Nicole E. Heller & Erika S. Zavaleta, *Biodiversity Management in the Face of Climate Change: A Review of 22 Years of Recommendations*, 142 *BIOLOGICAL CONSERVATION* 14 (2009); J.R. Mawdsley et al., *A Review of Climate-Change Adaptation Strategies for Wildlife Management and Biodiversity Conservation*, 23 *CONSERVATION BIOLOGY* 1080 (2009).

111. GARY K. MEFFE, LARRY A. NIELSEN, RICHARD L. KNIGHT & DENNIS A. SCHENBORN, *ECOSYSTEM MANAGEMENT: ADAPTIVE, COMMUNITY-BASED CONSERVATION* 59–73, 169–85 (G.K. Meffe et al. eds., 2002); Brian Czech & Paul R. Krausman, *Distribution and Causation of Species Endangerment in the United States*, 277 *SCIENCE* 1116 (1997); H.J. Mader, *Animal Habitat Isolation by Roads and Agricultural Fields*, 29 *BIOLOGICAL CONSERVATION* 81 (1984); Reed F. Noss & Larry D. Harris, *Nodes, Networks, and MUMs: Preserving Diversity at All Scales*, 10 *ENVTL. MGMT.* 299 (1986).

large-scale effort to safeguard biodiversity.¹¹² It is the largest land system in the world dedicated to wildlife conservation.¹¹³ With its uniquely rich variety of high-quality, low-elevation lands and deep, productive soils,¹¹⁴ and its vast repository of expertise in habitat restoration and management, the NWRS unconstructively limits its conservation practices with a “trust-species” constraint. Certainly the history and legal authority undergirding the NWRS do not compel such a narrow view.

Climate change presents new challenges that will strain traditional conservation approaches.¹¹⁵ It substantially increases the likelihood of major compositional changes in nature, characterized by some as “no-analog ecosystems” and “novel species assemblages.”¹¹⁶ Future management objectives can no longer rely solely upon past population levels and habitat relationships or even upon heretofore known species assemblages and biotic communities.¹¹⁷ Indeed, given the uncertainties ahead, it seems particularly unwise to focus the management and growth of a 150 million-acre system primarily on the needs of the biotic subset defined as “trust species,” however expansive. Even managing adaptively, and in full anticipation of change, it is unlikely the NWRS could stay ahead of the curve by correctly guessing which lands to protect, the species compositions and habitat toward which any given tract might be evolving, or the population levels individual sites might be capable of

112. DEFENDERS OF WILDLIFE, KEEPING EVERY COG AND WHEEL: REFORMING AND IMPROVING THE NATIONAL WILDLIFE REFUGE SYSTEM 10–12 (2008). “With a commitment to better integration of programs, the refuge system can begin to fulfill its stated intention of shifting toward landscape-level planning and adaptive management to conserve America’s wildlife. This needed change reflects ongoing shifts in the practice of conservation science—from relatively narrow fields such as forestry, weed science or fisheries management, to today’s emphasis on an interdisciplinary, interagency approach of managing, restoring and connecting wildlife populations, watersheds and even entire ecosystems.” *Id.* at 8.

113. J. Michael Scott et al., *National Wildlife Refuges*, in PRELIMINARY REVIEW OF ADAPTATION OPTIONS FOR CLIMATE-SENSITIVE ECOSYSTEMS AND RESOURCES 121–76 (U.S. Climate Change Science Program Synthesis and Assessment Product 4.4 2008), available at <http://www.climate-science.gov/Library/sap/sap4-4/final-report/>.

114. J. Michael Scott et al., *National Wildlife Refuge System: Ecological Context and Integrity*, 44 NAT. RESOURCES J. 1041 (2004).

115. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: SYNTHESIS REPORT 30 (2007); Camille Parmesan, *Ecological and Evolutionary Responses to Recent Climate Change*, 37 ANN. REV. ECOLOGY, EVOLUTION & SYSTEMATICS 637 (2006).

116. Joshua J. Lawler et al., *Projected Climate-Induced Faunal Change in the Western Hemisphere*, 90 ECOLOGY 588 (2009); Diana Stralberg et al., *Re-Shuffling of Species with Climate Disruption: A No-Analog Future for California Birds?*, 4 PLoS ONE e6825 (2009), available at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0006825>; John W. Williams & Stephen T. Jackson, *Novel Climates, No-Analog Communities, and Ecological Surprises*, 5 FRONTIERS IN ECOLOGY & ENV’T 475 (2007).

117. Richard J. Hobbs et al., *Novel Ecosystems: Implications for Conservation and Restoration*, 24 TRENDS IN ECOLOGY & EVOLUTION 599 (2009).

sustaining. While there are avenues for thoughtful, species-focused management, a Refuge System that banks too heavily on that approach risks being overwhelmed by habitat degradation on multiple fronts¹¹⁸ and climate-driven faunal changes that include a flood of newly endangered species.¹¹⁹ A core complementary focus on ecosystem function and services, ecological integrity, and natural systems will prove more effective.

Such a dual approach would be a more robust response to climate change than one that emphasizes trust elements over ecological integrity.¹²⁰ The adaptation actions commonly recommended for protected areas, such as connectivity enhancement and protection of climate change refugia,¹²¹ more directly emerge from an ecological approach than one primarily prioritizing species. To assume the role we endorse here, the NWRS must fully embrace and defend the broadest interpretations of the ecological integrity and ecosystem preservation mandates of the NWR-SIA. This would mark the maturing of the FWS as the nation's chief steward of biodiversity, a role not yet identifiably assigned to any federal agency.

The ecological integrity concept¹²² has the additional advantage of summarizing much of what conservation biology has taught land managers over the past two decades.¹²³ A focus on ecological integrity lends itself to a systems approach and responds more adaptably than the "trust species" model to wide-scale disturbances, such as climate change. We know from studies of paleoecology that species once occurred in assemblages unlike any seen today, and climate change is believed to be a primary driver responsible for rearranging those relationships.¹²⁴ In response to ongoing climate change, we will likely see new combinations of species with no present day analogs. Such periodic remixing of species supports the growing evidence from field studies and models that it is

118. MILLENIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: SYNTHESIS REPORT (2005); Brad Griffith et al., *Climate Change Adaptation for the US National Wildlife Refuge System*, 44 ENVTL. MGMT. 1043 (2009); David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607 (1998).

119. JEFF T. PRICE & TERRY L. ROOT, U.S. FOREST SERV., POTENTIAL IMPACTS OF CLIMATE CHANGE ON NEOTROPICAL MIGRANTS (2005); Richard J. Hobbs et al., *Novel Ecosystems: Theoretical and Management Aspects of the New Ecological World Order*, 15 GLOBAL ECOLOGY & BIOGEOGRAPHY 1 (2006); Joshua Lawler et al., *Projected Climate-Induced Faunal Change in the Western Hemisphere*, 90 ECOLOGY 588 (2009); Chris D. Thomas et al., *Extinction Risk from Climate Change*, 427 NATURE 145 (2004).

120. Heller & Zavaleta, *supra* note 110; Mawdsley et al., *supra* note 110.

121. Scott et al., *supra* note 113.

122. See LEOPOLD, *supra* note 102 and accompanying text.

123. Robert L. Fischman, *The Meanings of Biological Integrity, Diversity, and Environmental Health*, 44 NAT. RESOURCES J. 989 (2004).

124. Williams & Jackson, *supra* note 116.

the *function* species perform, and not the species themselves, that is most important to maintaining ecological integrity and sustaining the services of ecosystems.¹²⁵ Identifying and promoting redundancy within a diverse range of functional groups (groups of species that perform similar functions) has the greatest potential to maintain ecological integrity after periods of ecosystem disturbance.¹²⁶ Because the “trust species” model takes no account of species function, it could encourage maintaining particular species at the expense of ecological integrity. It could also encourage futile resistance to inevitable ecosystem change rather than proactively exploring alternative management outcomes that would accommodate such change.

Ecological integrity is more difficult to measure than populations of species, but it is not impossible. Multimetric indices for ecological integrity are similar to Apgar scores in medicine or the Dow Jones Industrial Average in finance.¹²⁷ The “index of biological integrity,” initially used in assessing water quality, is the best known of the multimetric scales.¹²⁸ Such multimetric indices could assess how well refuges maintain and restore not just a small group of animals but the “full range of parts (genes, species, and assemblages) and processes (mutation, demography, biotic interactions, nutrient and energy dynamics, and metapopulation processes).”¹²⁹ Professor Karr, who pioneered multimetric indices of integrity, cautions,

In my experience, most researchers and refuge managers still assume that population size provides a reliable signal about refuge condition. Yet because species abundances vary so much as a result of natural environmental variation, even in pristine areas, population size is rarely a reliable indicator of human influence except for extreme population densities. Other attributes—such as taxa richness (number of unique

125. Sandra Diaz et al., *Biodiversity Loss Threatens Human Well-Being*, 4 PLOS BIOLOGY 1300 (2006); Garry Peterson et al., *Ecological Resilience, Biodiversity, and Scale*, 1 ECOSYSTEMS 6 (1998).

126. Thomas Elmqvist et al., *Response Diversity, Ecosystem Change, and Resilience*, 1 FRONTIERS ECOLOGY & ENV'T 488 (2003).

127. J.R. Karr, *Biological Integrity*, in ENCYCLOPEDIA OF ECOLOGY 408, 409 (Sven Erik Jorgensen & Brian D. Fath eds., 2008) (the Apgar index assesses the health of infants based on five measured criteria, such as heart rate and respiration) [hereinafter Karr, *Biological Integrity*]; Karr, *Beyond Definitions*, *supra* note 109, at 1077–78.

128. Karr, *Biological Integrity*, *supra* note 127, at 409.

129. *Id.* See also Alan A. Feest et al., *Biodiversity Quality: A Paradigm for Biodiversity*, 10 ECOLOGICAL INDICATORS 1077 (2010) (employing numerical indices to measure biodiversity); Reed F. Noss, *Indicators for Monitoring Biodiversity: A Hierarchical Approach*, 4 CONSERVATION BIOLOGY 355 (1990) (proposing measurable indicators of biodiversity across different scales).

taxa in a sample, including rare ones) and percentages of individuals belonging to tolerant taxa—vary consistently and systematically with human influence in many kinds of situations.¹³⁰

Unlike ecological *health*, which embodies value judgments about how well a resource meets social goals, ecological integrity can be objectively measured.¹³¹ As such, it is well-suited as a cross-cutting, broad concept to employ as a guiding principle for NWRS acquisition and management.

Indeed, some existing FWS initiatives show promise in addressing ecosystems and ecological processes. These current programs demonstrate that a conscious shift toward an ecological integrity focus would not be such a big leap for the Refuge System. For instance, several refuge CCPs include broad ecosystem-based goals rather than goals narrowly focused on “trust species” habitats. Ecosystem examples include tallgrass prairie (Tewaukon National Wildlife Refuge),¹³² Anoka sandplain (Sherburne National Wildlife Refuge),¹³³ and Sonoran desert (Cabeza Prieta National Wildlife Refuge).¹³⁴ And some refuges are developing a technique to measure the ecological integrity of coastal salt marshes.¹³⁵ The NWRS, PFW, and other FWS programs also participate in place-based, collaborative conservation initiatives such as the Blackfoot Chal-

130. Karr, *Beyond Definitions*, *supra* note 109, at 1079. Professor Karr provides advice on selecting metrics for biological integrity. His advice focuses on three issues during the selection process. First, the array of selected metrics should incorporate diverse dimensions of living systems. Robust metrics typically include taxa richness (biodiversity) and composition, tolerance or intolerance of specific environmental stressors, trophic organization (measured as relative abundance of selected trophic groups), health or condition of individuals, and richness or relative abundance of selected ecological groups. Next, primary measures should capture diverse components of biology, ranging from biomarkers and individual health to populations, community, ecosystem, and landscape attributes. Finally, measures should be selected that are sensitive to a range of types and levels of human influence (pollutants, agriculture, urbanization, logging, water withdrawal, alteration of physical environments, environmental fragmentation, overharvest, and so on). *Id.* at 1081.

131. Karr, *Biological Integrity*, *supra* note 127, at 409.

132. U.S. FISH & WILDLIFE SERV., TEWAUKON NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN (2000).

133. U.S. FISH & WILDLIFE SERV., SHERBURNE NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN (2005).

134. U.S. FISH & WILDLIFE SERV., CABEZA PRIETA NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN, WILDERNESS STEWARDSHIP PLAN AND ENVIRONMENTAL IMPACT STATEMENT (2007).

135. Hilary Neckles et al., Application of Structured Decision Making to Assessment of Salt Marshes on National Fish and Wildlife Refuges in the Northeastern, Southwestern, and Northwestern United States (Apr. 11, 2008) (unpublished case study) (on file with author).

lenge in Montana¹³⁶ and the Winyah Bay Focus Area in South Carolina.¹³⁷ These site-specific projects, by focusing on the full range of biota and ecosystems in a landscape, carry partner refuges and Service programs—such as PFW—into promising new arenas beyond individual species.

More broadly, the FWS 2010 strategic plan for climate change¹³⁸ proposes a new National Fish and Wildlife Adaptation Strategy as well as a concept called Landscape Conservation Cooperatives.¹³⁹ Through partnerships, both will benefit many species across broad landscapes. Finally, the NWRS policy on habitat management plans¹⁴⁰ and its accompanying handbook¹⁴¹ also suggest avenues of progress in moving beyond a purely trust focus. The policy employs the term “resources of concern” and identifies as underlying management priorities the 1997 NWRSIA’s mission for the Refuge System,¹⁴² “functional communities,” and biological integrity.¹⁴³ The FWS must promote such progressive policies and resist letting the “trust species” focus restrict its attention and imagination in generating a full range of ecological benefits.

If the NWRS fully embraced a broad biodiversity mandate as a complement to its traditionally recognized trust responsibilities, it would open the door to even more varied and innovative approaches to growing the Refuge System and to managing lands. There are ways to establish conservation priorities and management frameworks without relying solely on populations of species. Dawn Magness, for example, suggests using the relative vulnerability and resilience of a refuge to climate change in order to determine whether to resist ecosystem change or facilitate transition to new states.¹⁴⁴ Another approach would integrate

136. BLACKFOOT COMMUNITY CONSERVATION AREA COUNCIL, *BLACKFOOT CHALLENGE: MANAGEMENT PLAN FOR THE CORE* (Aug. 2010) (on file with author).

137. Roger L. Banks, *The Winyah Bay Focus Area*, in *ECOSYSTEM MANAGEMENT: ADAPTIVE, COMMUNITY-BASED CONSERVATION* 163–68 (G.K. Meffe et al. eds., 2002).

138. U.S. FISH & WILDLIFE SERV., *RIISING TO THE URGENT CHALLENGE: STRATEGIC PLAN FOR RESPONDING TO ACCELERATING CLIMATE CHANGE* (2010) [hereinafter *USFWS 2010*], available at <http://www.fws.gov/home/climatechange/pdf/CCStrategicPlan.pdf>.

139. U.S. FISH & WILDLIFE SERV., *LCC INFORMATION BULLETIN #1: FORM AND FUNCTION* (2010).

140. U.S. FISH & WILDLIFE SERV., *Habitat Management Plans*, in *SERVICE MANUAL*, 620 FW 1 (2002).

141. U.S. FISH & WILDLIFE SERV., *IDENTIFYING REFUGE RESOURCES OF CONCERN AND MANAGEMENT PRIORITIES* (Sept. 2010).

142. 16 U.S.C. §§ 668dd(a)(4)(A), 668ee(4). See note 67 and accompanying text.

143. U.S. FISH & WILDLIFE SERV., *Habitat Management Plans*, in *SERVICE MANUAL*, 620 FW 1.7 (2002).

144. Dawn Robin Magness, *Managing the National Wildlife Refuge System with Climate Change* (Aug. 2009) (unpublished Ph.D. dissertation, University of Alaska), available at <http://www.uaf.edu/files/rap/Magness%20dissertation%202009.pdf>. See generally, Erika S. Zavaleta & F. Stuart Chapin III, *Resilience Frameworks: Enhancing the Capacity to Adapt*

refuges into the landscape by constructing conservation frameworks on principles of green infrastructure.¹⁴⁵ Adoption of Noss's and Harris's concept of connected "multiple-use modules would especially complement use of green infrastructure frameworks."¹⁴⁶ Acquisition guidance might include a criterion of cost vs. ecosystem benefit¹⁴⁷ or revisit the "coarse filter/fine filter" model of ecosystem representation based on gap analysis.¹⁴⁸ These approaches offer alternatives to species-based decision-making and may only be fully explored if the NWRS embraces a more balanced conservation vision. Species need not and should not drive all conservation decision-making.

CONCLUSION

Today we face a singular conservation challenge—maintaining functional ecosystems in sufficient diversity to sustain us with the rich array of services indispensable to our quality of life. While many of the traditional conservation tools of the past will still serve in this challenge, the FWS will need to develop new strategies and approaches for the NWRS. Adherence to a "trust species" theme will limit full engagement with the great conservation challenges ahead. To retain its conservation leadership in the face of climate change, the NWRS will need to move beyond its predominant focus on populations.

Recent administrative reviews highlight the importance of measurable goals and clear priorities,¹⁴⁹ but these need not be measured only in terms of species or narrowly defined habitats. Multimetric indices of ecological integrity offer measures of progress across a broader range of conservation concerns than species counts.¹⁵⁰ Defining and tracking key elements of ecosystem function (e.g., hydrology, salinity, microfauna, species composition, fire, phenology, and the integrity of trophic struc-

to Change, in BEYOND NATURALNESS: RETHINKING PARK AND WILDERNESS STEWARDSHIP IN AN ERA OF RAPID CHANGE 142, 148–52 (David N. Cole & Laurie Yung eds., 2010).

145. MARK A. BENEDICT & EDWARD T. McMAHON, GREEN INFRASTRUCTURE: LINKING LANDSCAPES AND COMMUNITIES (2006); Jared Turesanyi Bowman, Connecting National Wildlife Refuges with Green Infrastructure: The Sherburne-Crane Meadows Complex (July 2008) (unpublished M.Sc. thesis, University of Minnesota) (on file with author).

146. Noss & Harris, *supra* note 111.

147. Brian Czech, *A Transdisciplinary Approach to Conservation Land Acquisition*, 16 CONSERVATION BIOLOGY 1488 (2002).

148. USFWS 2004, *supra* note 25.

149. OFFICE OF INSPECTOR GENERAL, U.S. DEP'T OF THE INTERIOR, PROGRAM ASSESSMENT RATING TOOL: REVIEW OF U.S. FISH AND WILDLIFE SERVICE NATIONAL WILDLIFE REFUGE SYSTEM (2007); MSI, AN INDEPENDENT EVALUATION OF THE EFFECTIVENESS OF THE U.S. FISH AND WILDLIFE SERVICE'S NATIONAL WILDLIFE REFUGE SYSTEM, FINAL REPORT (2008), available at http://www.fws.gov/refuges/pdfs/NWRS_Evaluation_FullReport.pdf.

150. Karr, *Beyond Definitions*, *supra* note 109.

tures) would provide more dependable bellwethers of impending ecosystem change than merely tracking the status and trends in populations of individual species or guilds. At minimum, managing to retain or restore these functions would enhance the general resilience of NWRS resources and strengthen the evolutionary processes needed to respond to change.

The NWRS's new draft blueprint for inventory and monitoring¹⁵¹ suggests promising movement in this direction. It constitutes a major policy statement and proposes a broad-based biotic inventory of FWS lands. It also calls for monitoring non-species parameters such as landscape stressors, ecological processes, and phenology. The NWRS should fully embrace these proposals, as well as explore alternative models for strategic expansion, create a new category of national biodiversity refuges, and actively integrate itself into national strategies to address fragmentation without constraining its role to the trust context.

The NWRS must significantly reconsider its current paradigm for adding lands to the Refuge System. The existing model, as illustrated in the LAPS scoring structure, heavily favors "trust species" and their supporting habitats. Instead, the FWS should add a land acquisition component identifying lands that contribute to nationally significant conservation priorities. These priorities include conservation of large, unfragmented landscapes, enhancement of green infrastructure via habitat connectivity, restoration of ecosystem function, and preservation of biodiversity. Acquisition of such lands need not rely on a direct link to "trust species."

The NWRS has evolved and even reinvented itself in response to past crises, such as the droughts of the 1930s and the awakening to species endangerment in the 1960s.¹⁵² We suggest that it do so again. The current threats to biodiversity from landscape fragmentation and climate change are equal to or greater than those past challenges which sparked significant revisions of Refuge System priorities. In transforming, the FWS need not leave behind its traditions. Rather, it should join with the broader environmental community in the challenge of creating new conservation paradigms in service to biodiversity, ecosystem function, and society. One approach short of abandoning the trust concept entirely would be to adopt a "trust responsibilities" theme that includes the full range of ecological elements and functions. This might include integrating ecological endpoints into SHC, promoting a biodiversity element into

151. U.S. Fish & Wildlife Serv., Strategic Plan for Inventories and Monitoring on National Wildlife Refuges: Adapting to Environmental Change (Sept. 1, 2010) (unpublished draft) (on file with author).

152. Scott et al., *supra* note 113.

PFW's work with refuges, and adopting measures that assure a higher profile for ecosystem preservation when strategically growing the NWRS. The reward for the NWRS would be a broader and more flexible range of alternatives for growth and management, and a more robust decision-making framework for the uncertain future. Many commentators have called upon protected area managers to revisit their operating guidelines in the context of climate change.¹⁵³ For the FWS we suggest embracing a role beyond "trust species" that broadly interprets the integrity and ecosystem mandates of the NWRSA. This would secure the FWS's continued legacy in the face of threats we may even now be unable to appreciate.

153. Jill S. Baron et al., *Options for National Parks and Reserves for Adapting to Climate Change*, 44 ENVTL. MGMT. 1033 (2009).

