

The Bear Essentials: How Landscape-Level Conservation May Help Save Florida's Biodiversity and Realize the Vision of the National Wildlife Refuge System Improvement Act

by Jason Totoiu

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Summary

The express mission of the National Wildlife Refuge System “is to administer a national network of lands and waters for conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States.” But the establishment of individual refuges has not always focused on achieving a genuine network of conservation lands. Taking the Everglades Headwaters National Wildlife Refuge as a model, this Article explores how the landscape-level approach can help the Refuge System more fully realize its conservation mission and restoration potential.

Florida. If you are like many people, thoughts of amusement parks, retirement communities, and weird news stories might be your first associations with the state. With nearly 20 million residents and interstates crisscrossing the peninsula, the thought of panthers and bears traveling hundreds of miles through a rich mosaic of protected natural areas may seem inconceivable.

But in 2010, researchers discovered that a radio-collared Florida black bear known as M34 embarked on an eight-week journey, traveling a straight-line distance of more than 500 miles from the southern Everglades to just south of Orlando in central Florida. During his journey, M34 traversed five counties through conservation areas and ranch lands, across busy roads, and even swam across the Kissimmee River.¹

Two years later, inspired by the travels of M34, a conservationist, a photojournalist, a filmmaker, and a bear biologist set out on an expedition from the Florida Everglades to the Okefenokee National Wildlife Refuge to see the state through the eyes of a Florida panther or Florida black bear.² Travelling by foot, kayak, and horseback, the team chronicled their voyage through photography, social media, and ultimately a documentary film. Along the way, they met with landowners, conservationists, and political leaders to bring greater awareness to the natural beauty of Florida and to make the case that, despite extensive habitat fragmentation, a statewide network of connected natural areas is still possible. Building upon decades of work by scientists and conservation organizations, the Florida Wildlife Corridor may be the most ambitious landscape conservation plan in the country.

At the heart of this wildlife corridor, through which the team traveled during both of its expeditions, is the Everglades headwaters. The headwaters contain millions of

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1. Florida Wildlife Corridor, *Path of the Black Bear*, <http://floridawildlifecorridor.org/about-expeditions/bear-treks> (last visited Nov. 18, 2016).
2. Anthony DeFeo, *Expedition Points Out Need for Protected Wildlife Corridor in Florida*, FLA. TIMES-UNION, Apr. 20, 2012, available at <http://m.wap.jacksonville.com/news/florida/2012-04-20/story/expedition-points-out-need-protected-wildlife-corridor-florida#gsc.tab=0>. The team recently completed a second expedition traveling from the Everglades headwaters to the Gulf Island National Seashore in the Florida Panhandle. See Steve Newborn, *Fl Wildlife Corridor Expedition Ends 1,000-Mile Journey*, WJCT, Mar. 25, 2015, <http://news.wjct.org/post/fl-wildlife-corridor-expedition-ends-1000-mile-journey>.

acres of grasslands, wetlands, scrub, longleaf pine savannas, and cattle ranches that extend from the outskirts of metropolitan Orlando, through the Kissimmee River Valley, down to Lake Okeechobee.³

Recognizing the need for preserving these lands, the U.S. Fish and Wildlife Service (FWS) in 2012 established the Everglades Headwaters National Wildlife Refuge, which would protect 150,000 acres of habitat in central Florida. Through the use of both fee simple acquisition to create biological reserves and conservation easements that would limit development on working lands, FWS aims to “protect and restore one of the great grassland and savanna landscapes of eastern North America,” which is “one of the nation’s prime areas of biological diversity.”⁴

This Article explores how this landscape-level approach to conservation may not only support the connected network of conservation lands necessary for the long-term viability of species such as Florida’s black bear, but also help the National Wildlife Refuge System (Refuge System) realize its conservation mission and restoration potential under the National Wildlife Refuge System Improvement Act. The Article begins with an overview of the Refuge System, including its origins, history, and legislative reform. Part II examines the evolution of refuges’ conservation role throughout the years, from a vision of them as “anchor points” to one that acknowledges the need for landscape-level approaches. Part III then profiles the Everglades Headwaters National Wildlife Refuge, and explains how it serves as a long-awaited model for realizing the Refuge System’s mission of administering a national network of lands and waters for conservation and advancing ecological restoration. Part IV identifies some of the challenges to successful implementation of this landscape-level initiative, and makes a few recommendations for maximizing conservation and restoration benefits.

I. The National Wildlife Refuge System

The mission of the Refuge System “is to administer a national network of lands and waters for conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”⁵ The Refuge System is the only federal land that is managed chiefly for wildlife conservation.⁶ Today, it includes more than 560 national wildlife

refuges spanning across 150 million acres.⁷ These refuges provide habitat for more than 700 species of birds, 220 species of mammals, 250 species of reptiles and amphibians, and more than 1,000 species of fish.⁸ Nearly 400 threatened and endangered plants and animals occur on refuge lands and millions of birds use refuges during their annual migrations.⁹ The Refuge System receives more than 45 million visitors each year. Each state has at least one refuge,¹⁰ and there is one within an hour’s drive of every major metropolitan area in the country.¹¹

The evolution of the Refuge System has not followed a clear trajectory in the service of wildlife protection.¹² In particular, the establishment of individual refuges has not always focused on achieving a connected network of conservation lands.¹³ The history of the Refuge System has been marked by periods of great opportunity, managerial struggles, legislative reform, and, most recently, ambitious planning and policy efforts aimed at landscape-level conservation.

A. Origins and Early Years

The history of the Refuge System is complicated,¹⁴ but its roots can be traced back to presidential proclamations beginning in the 1860s.¹⁵ While the earliest efforts were likely aimed at protecting the government’s revenue interests in such species as fur-bearing seals, the latter part of the 20th century witnessed dwindling wildlife populations, leading hunting and scientific groups (including the Boone and Crockett Club) to lobby the U.S. Congress to take action.¹⁶ The first national wildlife refuge was established in 1903, when President Theodore Roosevelt (a Boone and Crockett Club member) took executive action to protect plummeting wading bird populations on Florida’s east coast from plume hunters who were supplying the fashion and costume industry.¹⁷ Following successful efforts by the American Ornithologists Union and (what is now) the National Audubon Society to persuade Florida to pass a

3. U.S. FISH & WILDLIFE SERVICE (FWS), EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE, PRELIMINARY PROJECT PROPOSAL, PHASE 1 OF 4 PHASES OF GREATER EVERGLADES STRATEGIC HABITAT CONSERVATION INITIATIVE, POLK, OSCEOLA, INDIAN RIVER, OKEECHOBEE, AND HIGHLANDS COUNTIES, FLORIDA 4 (2010).

4. Establishment of Everglades Headwaters National Wildlife Refuge and Conservation Area, 77 Fed. Reg. 2754-55 (Jan. 19, 2012).

5. 16 U.S.C. §668dd(a)(2).

6. MICHAEL J. BEAN & MELANIE J. ROWLAND, THE EVOLUTION OF NATIONAL WILDLIFE LAW 283 (1997); ROBERT L. FISCHMAN, THE NATIONAL WILDLIFE REFUGES: COORDINATING A CONSERVATION SYSTEM THROUGH LAW 32 (2003).

7. FWS, *National Wildlife Refuge System—A Hundred Years in the Making*, <http://www.fws.gov/refuges/about/> (last visited Nov. 18, 2016) [hereinafter *A Hundred Years in the Making*]; Press Release, FWS, Happy Birthday, National Wildlife Refuge System! (Feb. 29, 2016), available at http://www.fws.gov/news/ShowNews.cfm?ref=happy-birthday-national-wildlife-refuge-system!-&_ID=35482.

8. *A Hundred Years in the Making*, *supra* note 7.

9. *Id.*

10. Press Release, *supra* note 7.

11. *A Hundred Years in the Making*, *supra* note 7.

12. Prof. Robert Fischman has aptly characterized the system’s growth as being of “fits and starts.” FISCHMAN, *supra* note 6, at 32.

13. See 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, 92 (2007); Jamison E. Colburn, *The Indignity of Federal Wildlife Habitat Law*, 57 ALA. L. REV. 417, 461-65 (2005).

14. ERIC T. FREYFOGLE & DALE D. GOBLE, *WILDLIFE LAW: A PRIMER* 209 (2009). See also FISCHMAN, *supra* note 6 (providing a comprehensive discussion of the history of the Refuge System).

15. FWS, *Short History of the Refuge System: The Early Years (1864-1920)*, http://www.fws.gov/refuges/history/over/over_hist-a_fs.html (last visited Nov. 18, 2016) [hereinafter *History of the Refuge System*]; FISCHMAN, *supra* note 6, at 34.

16. *History of the Refuge System*, *supra* note 15.

17. FISCHMAN, *supra* note 6, at 35.

non-game bird protection law, President Roosevelt issued a proclamation reserving Pelican Island as a “preserve and breeding ground for native birds.”¹⁸

A series of similar presidential proclamations and legislative actions soon followed. In the first decade of the 20th century, President Roosevelt and Congress reserved areas for nesting birds in Florida and Louisiana, sea bird populations along the Pacific Coast, and “overlay” protections for inland reservoir waters.¹⁹ By the end of President Roosevelt’s Administration, he had established more than 50 reserves.²⁰ During the next decade, refuges were established to conserve bison and elk populations and other game species.²¹

With the passage of the Migratory Bird Conservation Act in 1929, the nation began to have a more systematic approach to the acquisition of lands for national wildlife refuges.²² In keeping with the early years of refuge establishment, the Act provided Congress with the authority to acquire lands as “inviolate sanctuaries” for migratory birds.²³

The System received another stimulus with the passage of the Migratory Bird Hunting and Conservation Stamp Act in 1934. Later amendments provided a continuous source of funding for the acquisition of migratory bird habitat through the sale of “duck stamps” that waterfowl hunters must purchase.²⁴ With the creation of the federal duck stamp program and its funding stream, the growth of the Refuge System accelerated.²⁵ The program’s increased investment in the acquisition of refuge lands for waterfowl habitat also led to a departure from the early vision of wildlife refuges as “inviolate sanctuaries” toward a more prominent role for hunting on refuge lands.²⁶ The 1930s witnessed the greatest growth in the Refuge System, with 120 refuges established in that decade alone.²⁷

While the Migratory Bird Conservation Act provided some structure, and the duck stamp program injected significant funding into land acquisition efforts, the growth of the Refuge System for the first several decades of the 20th century consisted largely of a series of land acquisitions of diverse, fragmented properties. These properties were managed for a variety of overlapping goals and included wildlife and game ranges, waterfowl production areas, and wildlife

management areas.²⁸ Many of these areas also contained croplands²⁹ and rangelands.³⁰

B. Mid-Century Growth and Legislative Reform

The System continued to grow in piecemeal fashion and lacked structure until the 1960s, when Congress passed a series of laws aimed at consolidating and managing the Refuge System.³¹

The first of these laws was the Refuge Recreation Act of 1962. With increased demand for recreational activities on federal public lands, Congress enacted the Recreation Act authorizing recreational use of refuges when uses did not interfere with a refuge’s purposes. Congress’ recognition that a refuge could have multiple purposes and that uses of or activities on the refuge must be compatible with those purposes represented a significant evolution of the Refuge System.³² This “compatibility” requirement would later become a central principle of refuge management.³³

In 1966, Congress enacted the Refuge Administration Act. The Act designated and organized all existing refuges, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas into a single Refuge System.³⁴ The Refuge Administration Act was also significant in that it provided additional management direction building upon the Recreation Act’s compatibility requirement for refuge uses.³⁵ However, the Refuge Administration Act still lacked specific management criteria and objectives, which led to management problems throughout the following three decades.³⁶

C. The Need for More Comprehensive Legislation

In 1968, a committee led by A. Starker Leopold³⁷ issued a report identifying several instances in which uses of refuges were interfering with wildlife conservation, including overgrazing of upland sagebrush and recreational disturbances

18. *History of the Refuge System*, *supra* note 15; FISCHMAN, *supra* note 6, at 35.

19. *History of the Refuge System*, *supra* note 15. Overlay refuges have been established on lands and waters owned by other federal agencies and provide additional layers of protection for wildlife. One example is the Pathfinder National Wildlife Refuge, which was created in 1909 on Bureau of Reclamation lands. See FWS, *Pathfinder National Wildlife Refuge, Wyoming—About the Refuge*, <http://www.fws.gov/refuge/Pathfinder/about.html> (last visited Nov. 18, 2016).

20. *History of the Refuge System*, *supra* note 15; FISCHMAN, *supra* note 6, at 35.

21. *Id.*

22. See BEAN & ROWLAND, *supra* note 6, at 284.

23. *Id.* at 284; FISCHMAN, *supra* note 6, at 37.

24. FWS, *Short History of the Refuge System: Organization and Growth (1921-1955)*, http://www.fws.gov/refuges/history/over/over_hist-b_fs.html (last visited Nov. 18, 2016).

25. FISCHMAN, *supra* note 6, at 37.

26. *Id.* at 37, 39; see also FREYFOGLE & GOBLE, *supra* note 14, at 210.

27. FWS, NATIONAL WILDLIFE REFUGE SYSTEM LAND PROTECTION PROJECTS, AN ASSESSMENT OF LAND PROTECTION PROJECTS: A PLAN FOR STRATEGIC GROWTH (2013) [hereinafter A PLAN FOR STRATEGIC GROWTH].

28. FREYFOGLE & GOBLE, *supra* note 14, at 209.

29. See Charles G. Curtin, *The Evolution of the U.S. National Wildlife Refuge System and the Doctrine of Compatibility*, 7 CONSERVATION BIOLOGY 29, 31 (1993).

30. See *id.* at 31. Beginning in the 1930s, several game ranges were set aside by Executive Orders, which carried with them provisions for livestock grazing. These ranges included Hart Mountain National Antelope Range (1935), Desert Game Range (1936), Fort Peck Game Range (1936) (later named the Charles M. Russell National Wildlife Refuge in 1963), Sheldon Game Range (1936), Kofa Game Range (1936), and Cabeza Prieta Game Range (1939). The Charles M. Russell National Wildlife Refuge is the only former game range that continues to use livestock grazing to manage habitat. See FWS, *Refuge History and Vision*, in FINAL COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT: CHARLES M. RUSSELL NATIONAL WILDLIFE REFUGE AND UL BEND NATIONAL WILDLIFE REFUGE—MONTANA (2012), available at http://www.fws.gov/mountain-prairie/refuges/completedPlanPDFs_A-E/cmr_ulb_ccp_final_2_refuge.pdf.

31. FREYFOGLE & GOBLE, *supra* note 14, at 209. See also FISCHMAN, *supra* note 6, at 41.

32. FREYFOGLE & GOBLE, *supra* note 14, at 210.

33. *Id.*

34. Pub. L. No. 89-669, §§1(a), 4(a). FISCHMAN, *supra* note 6, at 46.

35. FISCHMAN, *supra* note 6, at 46.

36. *Id.* at 53; FREYFOGLE & GOBLE, *supra* note 14, at 211.

37. Son of noted conservationist Aldo Leopold.

to wildlife.³⁸ After passage of the National Environmental Policy Act (NEPA) in 1970,³⁹ FWS prepared an environmental impact statement (EIS) for a proposed management plan for the Refuge System in 1976.⁴⁰ The EIS recognized that public demands had increased beyond the capacity of the Refuge System.⁴¹

In 1981, a report by the U.S. Government Accountability Office (GAO) found that grazing practices, timber harvesting, and public recreation prevented managers from managing refuges primarily for wildlife.⁴² The GAO issued another report in 1989 finding that FWS had failed to effectively deal with a range of incompatible uses occurring on refuge lands.⁴³ The GAO cited FWS' approval of secondary uses based on non-biological factors and its lack of jurisdiction over mineral rights, military uses, navigable waters, and easements on agricultural and grazing lands as the primary causes for incompatible uses.⁴⁴

Still, the Refuge System continued to expand. Nearly 70 refuges were added each decade from the 1960s to the 1990s.⁴⁵ Problems persisted and even intensified with these additions, but further reform would not come until the 1990s with the issuance of an Executive Order and, ultimately, the passage of the 1997 National Wildlife Refuge System Improvement Act.

D. The 1997 National Wildlife Refuge System Improvement Act

Amidst growing concerns about the adequacy of the Refuge Administration Act to deal with incompatible uses, President William Clinton issued an Executive Order in 1996 calling for more detailed management criteria,⁴⁶ and Congress took action in 1997 by passing the National Wildlife Refuge System Improvement Act (Refuge Improvement Act).⁴⁷ Described by Prof. Robert Fischman as “the most recent comprehensive congressional charter, or organic legislation, for a public land system,”⁴⁸ the Refuge Improvement Act brought much-needed structure, direction, and vision to the Refuge System.

The Refuge Improvement Act⁴⁹ emphasizes the central role of wildlife conservation in the mission and administration of the Refuge System. It sets forth the mission of the Refuge System as “administer[ing] a national network of lands and waters for conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United

States for the benefit of present and future generations of Americans.”⁵⁰ Further, FWS must ensure that the biological integrity, diversity, and environmental health of the Refuge System are maintained for present and future generations.⁵¹ FWS is also directed to plan and direct growth in a manner that is best designed to accomplish the mission of the Refuge System, to contribute to the ecosystems of the United States, and to complement efforts of states and other federal agencies to conserve (and where appropriate restore) fish and wildlife and their habitats.⁵²

The Refuge Improvement Act also establishes a set of compatibility standards and procedures to govern uses that may occur on refuge lands.⁵³ A “compatible use” is defined as a “wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.”⁵⁴

Wildlife-dependent uses are found compatible when they are consistent with the refuge's conservation mission. “Wildlife-dependent recreation” and “wildlife-dependent recreational uses” include hunting, fishing, wildlife observation and photography, or environmental education and interpretation.⁵⁵ Such uses are frequently referenced in the Refuge Improvement Act, which encourages increased opportunities for “traditional outdoor activities.”⁵⁶ On more than one occasion, the Refuge Improvement Act describes compatible wildlife-dependent uses as a way for the public “to better appreciate the value and need for fish and wildlife conservation.”⁵⁷ Such uses receive priority consideration in refuge planning and management.⁵⁸

Other, non-wildlife-dependent economic uses—such as farming and grazing—may only be authorized where FWS determines that the use “contributes to the achievement of the national wildlife refuge purposes or the National Wildlife Refuge System mission.”⁵⁹

In addition, the Refuge Improvement Act establishes a planning process that requires a 15-year comprehensive conservation plan (CCP) for each refuge or refuge complex.⁶⁰ The CCP identifies and describes the refuge's purposes; the distribution, migration patterns, and abundance of fish, wildlife, and plant populations and related habitats; the archaeological and cultural values; significant problems that may adversely affect habitats; and the actions neces-

38. FISCHMAN, *supra* note 6, at 57.

39. 42 U.S.C. §§4321-4370(h), ELR STAT. NEPA §§2-209.

40. *Id.*

41. *Id.*

42. *Id.* at 58.

43. *Id.* at 58-60.

44. *Id.* at 59-60.

45. A PLAN FOR STRATEGIC GROWTH, *supra* note 27.

46. FISCHMAN, *supra* note 6, at 61-63.

47. *See id.*; FREYFOGLE & GOBLE, *supra* note 14, at 211.

48. Robert L. Fischman, *The National Wildlife Refuge System and the Hallmarks of Modern Organic Legislation*, 29 *ECOLOGY L.Q.* 457, 459 (2002).

49. 16 U.S.C. §§668dd, 668ee.

50. *Id.* §668dd(a)(2). As Eric Freyfogle and Dale Goble observe, the Act's reference to “habitats within the United States” directs FWS to look beyond refuge boundaries and consider fish and wildlife and their habitats throughout the nation. FREYFOGLE & GOBLE, *supra* note 14, at 211.

51. *Id.* §668dd(a)(4)(B).

52. *Id.* §668dd(a)(4)(C).

53. *Id.* §668dd(d)(3).

54. *Id.* §668ee(1).

55. *Id.* §668ee(2).

56. *Id.* §668dd(a)(4)(K).

57. *Id.* §668dd(a)(3)(B), (a)(4)(H).

58. *See id.* §668dd(a)(3)(C).

59. 50 C.F.R. §29.1.

60. 16 U.S.C. §668dd(e). A refuge complex is an administrative grouping of two or more refuges primarily managed from a central office location. *See* FWS, *St. Marks: About the Complex*, https://www.fws.gov/refuge/St_Marks/About_the_Complex.html (last visited Nov. 18, 2016).

sary to correct or mitigate these problems.⁶¹ CCPs must also identify opportunities for compatible wildlife-dependent recreational uses.⁶² FWS is also directed to consult with adjoining federal, state, and local governments, and private landowners and affected state-level conservation agencies when preparing each CCP, as well as coordinate the development of the CCP with relevant state conservation plans for fish, wildlife, and their habitats.⁶³

The Refuge Improvement Act states that each refuge “shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established.”⁶⁴ Where there is a conflict between the purposes of a refuge and the mission of the Refuge System, the conflict “shall be resolved in a manner that first protects the purposes of the refuge, and, to the extent practicable, that also achieves the mission of the System.”⁶⁵

The Refuge Improvement Act provides a solid statutory scheme for managing a vast network of public lands focused on wildlife conservation, maintaining biodiversity, and supporting ecological restoration. However, it may be too early to determine whether the Act has succeeded in addressing the disorganization,⁶⁶ incompatible uses, and other threats that the Refuge System has faced over the years.

Since the passage of the Refuge Improvement Act, FWS has engaged in planning initiatives to define the vision for the Refuge System. While only intended to provide general guidance for refuge staff, these planning initiatives give insight into administrators’ general thinking and management since the enactment of the Refuge Improvement Act. Most relevant for this discussion is the emerging vision for the role of private lands in the Refuge System.

II. National Wildlife Refuge Design: From Anchor Points to Landscape-Level Conservation

A. Anchor Points

Whether it was to protect imperiled wading bird or game populations in the early years or to conserve habitat for wintering waterfowl populations mid-century through the expenditure of federal duck stamp revenues, the vast majority of the country’s national wildlife refuges were created as wildlife reserves, often in response to a threat to a particular species. These reserves were most often established through fee simple acquisition, and their management has focused on preserving wildlife habitat within their boundaries. This trend continued with the enactment of the Endangered Species Act (ESA) in 1973,⁶⁷ and many refuges have been established for the primary

purpose of protecting a particular endangered species and its habitat. Historically, these reserves have functioned as conservation “anchor points”—lands that are owned and managed by the federal government as smaller but ecologically significant components of a larger landscape of public and private lands.⁶⁸

Biological reserves have played a critical role in protecting biodiversity from human exploitation, habitat loss, and exotic and invasive species in the United States.⁶⁹ As E.O. Wilson explains, America’s conservation movement—born during the 19th and early 20th centuries—came late, but “mercifully not too late.”⁷⁰ The assemblage of federal, state, and local parks, augmented by private reserves, that the movement nurtured has helped save many of our nation’s flora and fauna.⁷¹

Unfortunately, the anchor-based approach of protecting independent, spatially separated reserves has only been partially successful.⁷² Existing reserves are too few and too small to protect biodiversity in the face of ongoing natural resource exploitation, habitat loss, and climate change.⁷³ Many national wildlife refuges are smaller than the areas over which large-scale ecological processes occur, and are thus too small to independently maintain viable populations of many species.⁷⁴ The majority of the refuges in the lower 48 states are generally small habitat fragments, often reserved to provide species-specific protections, threatened by neighboring uses or incompatible refuge uses, and not historically managed under broad ecosystem-level biodiversity management principles.⁷⁵ Many national parks are also not large enough to sustain viable populations of larger mammals.⁷⁶ Further, parks and other reserves are often not buffered from more intensive surrounding land uses.⁷⁷

68. See A PLAN FOR STRATEGIC GROWTH, *supra* note 27.

69. Lisette Cantú-Salazar & Kevin J. Gaston, *Very Large Protected Areas and Their Contribution to Terrestrial Biological Conservation*, 60 *BIOSCIENCE* 808-18 (2010). Reserves have also helped conserve biodiversity throughout the world. A 2014 study, which analyzed more than 80 different studies on the effectiveness of parks and nature reserves in protecting wildlife, found that protected areas have positive biodiversity value. See Jeremy Hance, *Protected Areas Do Work, Concludes Study*, MONGABAY, Sept. 15, 2014, <https://news.mongabay.com/2014/09/protected-areas-do-work-concludes-study/>; Bernard W.T. Coetzee et al., *Local Scale Comparisons of Biodiversity as a Test for Global Protected Area Ecological Performance: A Meta-Analysis*, 9 *PLoS ONE* 1-11 (2014).

70. EDWARD O. WILSON, *HALF-EARTH: OUR PLANET’S FIGHT FOR LIFE* 73 (2016).

71. *Id.*

72. *Id.* at 74.

73. REED F. NOSS & ALLEN COOPERRIDER, *SAVING NATURE’S LEGACY: PROTECTING AND RESTORING BIODIVERSITY* 71 (1994); WILSON, *supra* note 70, at 74.

74. Robert P. Davison et al., *The National Wildlife Refuge System*, in 1 *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE* 94 (Dale D. Goble et al. eds., Island Press 2006).

75. Bradley C. Karkkainen, *Biodiversity and Land*, 83 *CORNELL L. REV.* 1, 36 (1997).

76. NOSS & COOPERRIDER, *supra* note 73, at xx, 22. See also DAVID QUAMMEN, *THE SONG OF THE DODO: ISLAND BIOGEOGRAPHY IN AN AGE OF EXTINCTION* 487-93 (1996) (discussing the work of William Newmark, whose doctoral dissertation on the decline in mammalian populations in 14 national parks was featured in the journal *Nature* and the *New York Times* in 1987. Newmark concluded that these population losses were most likely due to their small size and geographic isolation).

77. *Id.* at 71-72.

61. 16 U.S.C. §668dd(e)(2).

62. *Id.* §668dd(3)(2)(F).

63. *Id.* §668dd(e)(3).

64. *Id.* §668dd(a)(3)(A).

65. *Id.* §668dd(a)(4)(D).

66. See Fischman, *supra* note 46, at 622.

67. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

Given these limitations, existing reserves may help slow species loss, but not be enough to stop it.⁷⁸

Most scientists agree that reserves are critical to conservation and that more reserves should be created.⁷⁹ These reserves must be larger,⁸⁰ located in the right places, and better managed.⁸¹ But increasing the number and size of reserves on the scale necessary to adequately protect the nation's biodiversity presents several significant challenges. Aside from cost,⁸² and in many instances the lack of political support,⁸³ it may not always be possible to increase the size of existing reserves as the surrounding natural lands are too fragmented.⁸⁴ Further, a reserve approach that emphasizes stasis and natural stability may be inadequate given the potential for climate change to significantly alter existing ecosystems.⁸⁵ Simply increasing the size and number of biological reserves may be insufficient to conserve the nation's biodiversity, given these challenges.⁸⁶ Rather, a threefold approach that focuses on increasing the size and number of reserves where practicable, connecting these reserves, and shielding them from more intense human activities through the establishment of multiple buffer zones will likely be necessary to conserve the nation's biodiversity.⁸⁷

The emphasis on the importance of large, connected biological reserves is rooted in the theory of island biogeography, developed by Wilson and Robert MacArthur and tested by Wilson and Dan Simberloff in the Florida Keys in the 1960s.⁸⁸ Under this theory, islands experience a balance between immigration and extinction—as new species arrive, old species disappear, but the number of species

present at any given time remains the same.⁸⁹ The number of species present is attributed to the size of the island (the “area effect”) and the distance from the island to the mainland (“the distance effect”). As island size and proximity to the mainland increase, so does the number of species.⁹⁰ Thus, smaller remote islands have fewer species than large islands closer to the mainland, as they receive fewer immigrants and experience more extinctions.⁹¹

The theory has been extremely important to scientists seeking to understand how extinction occurs and how to prevent it.⁹² Building upon the work of Wilson and MacArthur, Jared Diamond observed that government efforts to set aside small, disconnected biological reserves on mainlands could transform a landscape into several isolated, land-bridge islands.⁹³ This led to the development of a set of biological reserve “design principles” by Diamond and others beginning in the 1970s, which favored large and connected reserves.⁹⁴

These design principles were later refined in the 1980s, with the development of “regional reserve network design” to help prevent species extinction as a result of geographic isolation.⁹⁵ Developed and promoted by scientists Reed Noss and Larry Harris, regional reserve network design holds that conservation efforts should focus on protecting the most sensitive sites, underrepresented sites, and biodiversity hotspots through core reserves while shielding these areas with buffer zones, bordering lands that are managed to allow more intensive human activities that either threaten or cause disturbance to these core reserve areas.⁹⁶ Maintaining or restoring habitat connectivity between large contiguous reserves and across large landscapes should be a priority.⁹⁷ In sum, these design principles seek to maintain large, contiguous blocks of habitat containing

78. Michael L. Rosenzweig, *Beyond Set-Asides*, in 1 THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE 259 (Dale D. Goble et al. eds., Island Press 2006); WILSON, *supra* note 70, 186-87 (2016) (stating that the gradual increase in reserves has not been enough to halt the acceleration of species extinction).

79. See Karkkainen, *supra* note 75; Michael Soule, *Also Seeking Common Ground in Conservation*, 28 CONSERVATION BIOLOGY 637-38 (2014).

80. As Wilson explains, large plots contain many more ecosystems and the species composing them at a sustainable level. As reserve size increases, biodiversity also increases. The inverse also holds true, and often permanently. WILSON, *supra* note 70, at 3-4.

81. Soule, *supra* note 79.

82. Karkkainen, *supra* note 75, at 13.

83. Robert L. Glicksman & Graeme S. Cumming, *Landscape Level Management of Parks, Refuges, and Preserves for Ecosystem Resilience*, in RESILIENCE AND LAW 36 (Ahjond S. Garmestani ed., Columbia Press 2012) (contending political support for a significant expansion of federal lands does not exist and is unlikely to develop given the displacement of private ownership it would entail).

84. NOSS & COOPERRIDER, *supra* note 73, at 100; Karkkainen, *supra* note 75, at 12.

85. Glicksman & Cumming, *supra* note 83, at 6-7.

86. NOSS & COOPERRIDER, *supra* note 73, at 71.

87. In recent years, several biologists have argued for designating at least 50% of the earth's lands and waters as protected areas and establishing the necessary connectivity between these areas. See WILSON, *supra* note 70; Reed F. Noss et al., *Bolder Thinking for Conservation*, 26 CONSERVATION BIOLOGY 1, 3 (2011).

88. See EDWARD O. WILSON, THE DIVERSITY OF LIFE 220-28 (1992); Edward O. Wilson & Daniel S. Simberloff, *Experimental Zoogeography of Islands: Defaunation and Monitoring Techniques*, 50 ECOLOGY 267-78 (1969); ROBERT H. MACARTHUR & EDWARD O. WILSON, THE THEORY OF ISLAND BIOGEOGRAPHY (1967); Robert H. MacArthur & Edward O. Wilson, *An Equilibrium Theory of Insular Zoogeography*, 17 EVOLUTION 373-87 (1963). See also QUAMMEN, *supra* note 76, at 414-15, 428-31, 634-35.

89. NOSS & COOPERRIDER, *supra* note 73, at 220; QUAMMEN, *supra* note 76, at 414-15.

90. NOSS & COOPERRIDER, *supra* note 73, at 220-28; QUAMMEN, *supra* note 76, at 414-15.

91. QUAMMEN, *supra* note 76, at 420-23.

92. NOSS & COOPERRIDER, *supra* note 73, at 34.

93. QUAMMEN, *supra* note 76, at 442-43.

94. See *id.* at 444-47 (citing Jared M. Diamond, *The Island Dilemma: Lessons of Modern Biogeographic Studies for the Design of Natural Reserves*, 7 BIOLOGICAL CONSERVATION 129-46 (1975)). In addition to Diamond, John Terborgh argued for the establishment of corridors between reserves and very large reserves to save large predators. *Id.* at 447. These design principles were not without their critics, however. At the center of a bitter academic debate was the principle holding that, all things being equal, a single large reserve is better than several small reserves. Simberloff and others have argued that a single large reserve does not always support more species than several small reserves. See QUAMMEN, *supra* note 76, at 459 (citing Daniel S. Simberloff & Lawrence G. Abele, *Island Biogeography Theory and Conservation Practice*, 191 SCI. 285-86 (1976)). Known as “single large or several small” (SLOSS), the debate continued for many years and at times still arises in conservation biology. See QUAMMEN, *supra* note 76, at 445-46, 457-87; NOSS & COOPERRIDER, *supra* note 73, at 138-40. Notwithstanding the debate, it would appear that most biologists agree that we need larger reserves and more of them. See NOSS & COOPERRIDER, *supra* note 73, at 140-41 (citing a paper by Michael Soule and Simberloff, who had been on opposing ends of the SLOSS debate).

95. NOSS & COOPERRIDER, *supra* note 73, at 138-42.

96. *Id.* at 100.

97. Noss et al., *supra* note 87, at 26.

large populations of target species well-distributed across their native range.⁹⁸

In the case of national wildlife refuges, Noss has argued that refuges likely would better serve their purposes of maintaining the biological integrity, diversity, and environmental health if connected with other refuges and protected areas in an expansive, interactive network.⁹⁹ A connected system of refuges could be “a whole greater than the sum of its parts.”¹⁰⁰ A network of connected natural lands previously severed by human activities can provide a range of functions, including providing daily and seasonal movements of animals; facilitating dispersal, gene flow, and rescue effects; allowing for shifts in species ranges (such as in response to climate change); and maintaining ecological processes (such as fire).¹⁰¹

Drawing upon the principles of biological reserve design, Prof. Richard Fink argued that the Refuge System should be managed at a regional landscape scale through a “wildlife reserve network” strategy that is modeled on the biosphere reserve approach developed under the United Nations Educational, Scientific, and Cultural Organization’s Man and the Biosphere Program.¹⁰² Under this approach, core areas are surrounded by buffer zones, which are in turn surrounded by transition areas that allow for increasingly more intensive land uses.¹⁰³ This model allows for corridors and linkages, reducing habitat fragmentation and facilitating movement of species between natural areas, while still allowing for human uses.¹⁰⁴

In short, a growing scientific consensus suggested that in order to meet its goals, the Refuge System must look beyond the borders of spatially separated reserves and consider the broader landscape through an ecosystem-based approach that focuses on larger biological communities or whole ecosystems.¹⁰⁵

98. NOSS & COOPERRIDER, *supra* note 73, at 141. Noss adds that blocks of habitat that are roadless or inaccessible to humans are preferred, especially as it applies to most large carnivores. *Id.* at 141-42.

99. Reed F. Noss, *Some Suggestions for Keeping National Wildlife Refuges Healthy and Whole*, 44 NAT. RESOURCES J. 1093, 1109 (2004).

100. *Id.* at 1093, 1110.

101. *Id.* at 1093, 1109-10.

102. Richard J. Fink, *The National Wildlife Refuges: Theory, Practice, and Prospect*, 18 HARV. ENVTL. L. REV. 1, 122 (1995).

103. *Id.* at 1, 120.

104. *Id.* at 1, 99.

105. *See id.* at 120-22. *See also* FREYFOGLE & GOBLE, *supra* note 14, at 217-18. A biological community is an assemblage of species that interact in an area. NOSS & COOPERRIDER, *supra* note 73, at 8. An ecosystem is a community of interdependent plants, animals, and microorganisms and their abiotic environment of soil, weather, fire, and other disturbances. *Id.* at 9; REED F. NOSS & ROBERT L. PETERS, *ENDANGERED ECOSYSTEMS: A STATUS REPORT ON AMERICA’S VANISHING HABITAT AND WILDLIFE* 4 (1995). Ecosystems can also range in scale. NOSS & COOPERRIDER, *supra* note 73, at 9. While scientists often consider ecosystems at the same spatial scale as communities, the term ecosystem may be used to describe a geographic region that includes several different communities. For example, “ecosystem” can be applied to describe a particular community within the Florida landscape—such as dry prairies, freshwater marshes, or dunes and maritime forests—whereas “the south Florida landscape,” which includes the Everglades and comprises several different habitats and plant communities, has been identified as the most endangered ecosystem in the United States due to tremendous development pressure. *See* RONALD L. MYERS & JOHN J. EWEL, *ECOSYSTEMS OF FLORIDA* (1990); NOSS & PETERS, *supra* at iii, 54.

By the close of the 20th century, FWS began to do that, placing greater focus on conserving ecosystems through landscape-level planning.¹⁰⁶ In 1995, FWS finalized a memorandum of understanding between itself and several other federal agencies calling on the federal government to provide leadership in and cooperate with activities that foster an ecosystem approach to natural resource management.¹⁰⁷ The goal of the approach was to restore and sustain the health, productivity, and biological diversity of ecosystems through a management approach that integrated social and economic goals.¹⁰⁸ The memorandum also emphasized, among other things, improving coordination among federal agencies, more efficient and cost-effective approaches, relying on the best science, forming partnerships with landowners and other stakeholders, and adaptive management.¹⁰⁹

In 1999, FWS released a strategic plan for the Refuge System entitled *Fulfilling the Promise*. The plan signaled the agency’s desire to shift from conserving site-specific wildlife populations to an ecosystem-based conservation approach.¹¹⁰ While the plan recognized the importance of looking beyond reserves and identified the need to leverage public-private partnerships,¹¹¹ it largely continued to view refuges as anchors for biodiversity and ecosystems. Linkages and wildlife corridors were viewed as supportive but not primary features in the Refuge System.¹¹²

While not fully developed or implemented, these initiatives marked the start of an agency shift toward considering the larger ecosystem in its conservation planning. Another facet of this shift was the greater role that private lands began to assume in FWS’ vision of an ecosystem approach. For example, the term “ecosystem” was used in the 1995 memorandum of understanding to include people’s relationship to the natural world, and the importance of engaging private entities to advance wildlife conservation on a much larger scale.¹¹³ A “new generation” of landscape-level planning and management initiatives aimed at serving both public and private lands across a broader landscape has emerged as possibly the most ambitious conservation approach undertaken by FWS in its administration of the Refuge System.¹¹⁴

106. *See* Robert L. Fischman, *Leveraging Federal Land Plans Into Landscape Conservation*, 6 J. ENVTL. L. & ENERGY 46, 47 (2016).

107. Memorandum of Understanding to Foster the Ecosystem Approach Between the Council on Environmental Quality, Department of Agriculture, Department of the Army, Department of Commerce, Department of Defense, Department of Energy, Department of Housing and Urban Development, Department of the Interior, Department of Justice, Department of Labor, Department of State, Department of Transportation, Environmental Protection Agency, and Office of Science and Technology Policy 1 (Dec. 15, 1995) [hereinafter Memorandum of Understanding].

108. *Id.*

109. *Id.* at 2.

110. FWS, *FULLFILLING THE PROMISE: THE NATIONAL WILDLIFE REFUGE SYSTEM* 15 (1999).

111. *Id.* at xiii.

112. *Id.* at 20-25, 32-35.

113. Memorandum of Understanding, *supra* note 107, at 2.

114. *See* Hon. David S. Hayes, Deputy Secretary, U.S. Department of the Interior, *Adopting a Landscape-Level Approach to Managing Our Nation’s Public Lands and Open Spaces*, Lecture at Stanford University and the Bill Lane Center for the American West (May 2, 2013).

B. Landscape-Level Conservation Design and Management

Recognizing that ecological communities often extend far beyond reserve boundaries and the role that neighboring private lands have within the larger ecosystem, scientists, conservationists, and land managers are increasingly turning toward a landscape-level, working lands-based approach to wildlife conservation.¹¹⁵ One of the largest landscape-level efforts in the past decade has been through the Refuge System.

In 2006, FWS endorsed strategic habitat conservation (SHC). The SHC is an “adaptive resource management framework” that is aimed at sustaining fish and wildlife populations at the landscape and ecosystem scale.¹¹⁶ The underlying principles of SHC include addressing conservation challenges at ecologically meaningful scales, working in partnership with private and public interests, adaptive management through biological planning (including managing “surrogate” species that are representative of a larger landscape), conservation design, conservation delivery (cost-benefit analysis), monitoring, and research.¹¹⁷

To implement SHC, FWS developed landscape conservation design (LCD) in 2009. An LCD is “an assessment of the landscape’s current and potential future condition,” a description of a desired future condition, and a suite of preliminary, coarse-scale management strategies that are developed by the greater conservation community.”¹¹⁸ With limited exceptions, it is FWS’ current policy that no CCP and land protection plan (LPP) (for new refuges) should be developed until after an LCD has been completed.¹¹⁹ These peer-reviewed landscape assessments are not only aimed at informing refuge planning, but also at the development of site-specific management plans within the larger landscape, including management plans for other public and private lands.¹²⁰

An LCD is developed by one of 22 landscape conservation cooperatives (LCC).¹²¹ LCCs were established by then-Secretary of the Interior Ken Salazar as part of a 2009 Order to integrate science and management to address climate change and other landscape-scale issues.¹²² LCCs are self-directed entities that are governed by a voluntary steering committee with members representing federal and state agencies, tribal governments, and nongovernmental organizations within one of 22 geographic regions.¹²³

C. A Landscape-Level Approach to Establishing the Next Generation of National Wildlife Refuges

In addition to conservation design and resource management, landscape-level approaches have been the focus of several new initiatives, vision statements, and policies charting the future growth of the Refuge System.

I. America’s Great Outdoors Initiative

In 2010, President Barack Obama launched the America’s Great Outdoors Initiative (AGO).¹²⁴ It directed the secretaries of the U.S. Departments of the Interior (DOI) and Agriculture (USDA), the Administrator of the U.S. Environmental Protection Agency, and the chair of the White House Council on Environmental Quality to develop a new conservation and recreation agenda.¹²⁵

The vision statement set forth in the AGO includes, among other things, conserving and restoring rural lands (working farms, ranches, and forests) through incentives and local partnerships.¹²⁶ Noting that more than 70% of land in the contiguous United States is in private ownership and that out of every three acres ever developed in the United States, one was developed from 1982 to 2007, the report emphasizes a conservation approach on a landscape scale.¹²⁷ The report contains several goals, which include supporting landscape conservation through economic incentives, technical assistance, and targeting federal expenditures toward conservation of working lands.¹²⁸

To further promote a more landscape-level approach, the AGO report reexamines the role of federal lands that often “occur with a patchwork that includes other public and private properties.”¹²⁹ Citing a “growing awareness among federal agencies that protecting large landscapes,

115. See *The Next 100 Years of American Conservation*, MEDIUM, <https://medium.com/@Interior/the-next-100-years-of-american-conservation-397c42b8f1f2#.xa6vc8sby>; Marc Miller et al., *Working Landscapes: The Future of Land Use Policy?*, 45 ELR 10833-45 (Sept. 2015).

116. FWS, CONSERVATION IN TRANSITION: LEADING CHANGE IN THE 21ST CENTURY 6, available at <https://www.fws.gov/landscape-conservation/pdf/ConservationInTransition.pdf> [hereinafter CONSERVATION IN TRANSITION]; FWS, STRATEGIC HABITAT CONSERVATION: A LASTING FISH & WILDLIFE HABITAT LEGACY (2012).

117. FWS, U.S. FISH & WILDLIFE SERVICE: ACHIEVING OUR CONSERVATION VISION USING STRATEGIC HABITAT CONSERVATION—WHAT IT MEANS FOR YOU 3, available at <https://www.fws.gov/landscape-conservation/pdf/Connecting-the-dots.pdf>; CONSERVATION IN TRANSITION, *supra* note 116, at 6. See also Vicky J. Meretsky & Robert L. Fischman, *Learning From Conservation Planning for the U.S. National Wildlife Refuges*, 28 CONSERVATION BIOLOGY 1415, 1416 (2012) (discussing how refuge CCPs have broadened their focus from migratory birds and game species to ecological integrity of the refuge and surrounding landscape as well as a shift toward collaboration across a wider landscape).

118. FWS, A LANDSCAPE-SCALE APPROACH TO REFUGE SYSTEM PLANNING 9 (2013), available at <https://www.fws.gov/refuges/vision/pdfs/PlanningGuideRev10.pdf>.

119. *Id.* at 5.

120. *Id.* at 9.

121. *Id.* at 5, 10.

122. Secretary of the Interior, Order No. 3289, Addressing the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources (Sept. 14, 2009).

123. Landscape Conservation Cooperative Network, *Organization Structure*, <https://lccnetwork.org/about/organizational-structure> (last visited Nov. 18, 2016).

124. COUNCIL ON ENVIRONMENTAL QUALITY ET AL., AMERICA’S GREAT OUTDOORS: A PROMISE TO FUTURE GENERATIONS (2011), available at https://www.whitehouse.gov/sites/default/files/microsites/ceq/ago_report_-_report_only_2-7-11.pdf.

125. *Id.* at 1.

126. *Id.* at 43-52.

127. *Id.* at 43.

128. *Id.* at 45-52.

129. *Id.* at 55.

wildlife and watersheds requires collaborative management across ownerships,¹³⁰ it calls on federal land managers to “partner beyond their boundaries” to achieve landscape-level benefits, including the creation of wildlife migration corridors,¹³¹ and identifies a “new conservation paradigm” developed by FWS and the Natural Resources Conservation Service that places targeted public lands within a matrix of working private lands.¹³² The report sets forth a list of recommendations that includes managing federal lands and waters to create and protect critical wildlife corridors and maintain landscape connectivity in collaboration with other public and private stakeholders.¹³³ One action item directs USDA, U.S. Department of Defense (DOD), U.S. Army Corps of Engineers (the Corps), and DOI to “incorporate wildlife corridor conservation and restoration into federal agency plans, programs, and actions.”¹³⁴

While only a guidance document, the AGO report places an increased emphasis on landscape-level conservation planning across a wide range of federally owned lands. It also seeks to stretch federal dollars by encouraging public-private partnerships. The AGO report serves as a foundation for FWS’ most recent strategic plan, *Conserving the Future: Wildlife Refuges and the Next Generation*.

2. Conserving the Future: Wildlife Refuges and the Next Generation

In conjunction with the AGO, FWS issued a new vision statement in 2011 entitled *Conserving the Future: Wildlife Refuges and the Next Generation*.¹³⁵ Citing population growth, troubles with the nation’s economy, increased climate change concerns, and additional habitat losses and fragmentation since the publication of *Fulfilling the Promise*,¹³⁶ *Conserving the Future* emphasizes a landscape-level approach to conservation and working on facilitating conservation benefits beyond refuge boundaries.¹³⁷ Explaining that FWS had previously focused primarily on what occurred within refuge boundaries “in isolation from the landscape around them,”¹³⁸ FWS states, “[W]e realize we must view and manage refuge lands as pieces of fabric woven into a landscape-level tapestry of conservation.”¹³⁹ The statement emphasizes collaboration with state and private interests in developing landscape-level approaches.

For growing the Refuge System, the plan calls for FWS to “consider how established and future refuges, other protected areas and working landscapes can function collectively to conserve fish, wildlife and their habitats for future generations.”¹⁴⁰ The Refuge System’s role

is to fill in some of the “conservation gaps” by protecting existing habitat (to protect against future losses) as well as “targeted restoration.”¹⁴¹ This gap analysis is to be performed both through the lens of habitat protection efforts required to fulfill migratory bird treaties and endangered species recovery plans and through the lens of landscape-level considerations, including habitat corridors and lands needed for climate change adaptation.¹⁴² To guide decisionmaking, the plan calls for increased collaboration with state and wildlife agencies¹⁴³ and guidance from state wildlife plans,¹⁴⁴ and highlights the use of newly developed LCCs to lead biological planning and conservation design.¹⁴⁵

The plan further identifies the role of working ranches, farms, and forests, as well as privately owned recreational properties, that can link and buffer protected areas.¹⁴⁶ Funding mechanisms such as the Farm Bill are identified as potential tools to secure protections and restore lands through conservation easements and long-term rental contracts. Characterizing the need to buffer conservation lands and connect them as “urgent,” FWS states that it must “aggressively pursue these and other opportunities to leverage habitat restoration and protection efforts, recognizing that, in many cases, outright acquisition of crucial habitat by the Refuge System is neither possible nor preferable.”¹⁴⁷

The landscape-level planning focus of *Conserving the Future* ultimately resulted in the development of the Refuge System’s first strategic growth policy in 2014.

3. 2014 National Wildlife Refuge Strategic Growth Policy

Following its release of *Conserving the Future*, FWS promulgated its first-ever “strategic growth policy” in 2014. The purpose of the strategic growth policy is to implement a strategic approach to the growth of the Refuge System as directed by the Refuge Improvement Act and in a manner that advances the recommendations set forth in *Conserving the Future*.¹⁴⁸ Among its objectives are to ensure that existing refuges, new refuges, and refuge expansions achieve conservation targets that have been developed at various landscape levels and to ensure that future growth is based on LCDs that advance an ecologically connected network of public and private lands resilient to climate change that support a broad range of species under changed conditions.¹⁴⁹

The policy reflects a “transition toward managing for functional landscapes,”¹⁵⁰ while also prioritizing recovery of threatened and endangered species, implementing the

130. *Id.*

131. *Id.*

132. *Id.* at 56.

133. *Id.* at 61.

134. *Id.*

135. FWS, *CONSERVING THE FUTURE—PROGRESS REPORT 1* (2012).

136. *Id.* at 9.

137. *Id.* at 17, 31, 39.

138. *Id.* at 31.

139. *Id.*

140. *Id.* at 39.

141. *Id.* at 40.

142. *Id.*

143. *Id.* at 12.

144. *Id.* at 30.

145. *Id.* at 31.

146. *Id.* at 40.

147. *Id.* at 42-43.

148. FWS, *Strategic Growth Policy*, 602 FW §5.5 (Sept. 4, 2014).

149. *Id.*

150. *Id.*

North American Waterfowl Management Plan, and conserving migratory birds of conservation concern.¹⁵¹ To be considered as an addition to the Refuge System, FWS must consider specific science-based criteria, which include identifying priority conservation species or the surrogate species that represent them, explaining how an area or combination of areas contributes to achieving stated population objectives, identifying priority conservation areas, and identifying ways in which the proposed refuge will mitigate climate change stressors.¹⁵² The policy concludes by requiring FWS to interact, coordinate, cooperate, and collaborate with state fish and wildlife agencies regarding acquisition and management of refuge lands.¹⁵³

D. The Role of Working Lands in the National Wildlife Refuge System

One of the biggest challenges in implementing landscape-level initiatives may be identifying the conservation role ranches and other working lands should play in the Refuge System. The role of working lands has assumed a more prominent role in the discussion of future land use policy in recent years.¹⁵⁴ It has also been the focus of a “new conservationism” that has emerged within the conservation community.

Traditional conservationism values the intrinsic value of biodiversity and prioritizes the preservation of biodiversity through the establishment of reserves.¹⁵⁵ Some prominent biologists have argued that at least 50% of the world should be devoted to wild nature.¹⁵⁶ Others contend that humans have altered earth so much that we are already at the end of the Holocene epoch¹⁵⁷ and entering a new geological epoch known as the “Anthropocene,” in which humans dominate every aspect of the planet’s ecology.¹⁵⁸ Given the degree of human disturbance, they contend that conservation is failing despite the creation of biological reserves around the world and that, despite our best efforts, these reserves will become islands in a sea of human development. Therefore, they say, a new form of conservation must emerge, one that focuses on conserving these human landscapes. Instead of conserving biodiversity for its own sake, there should be greater emphasis on ecosystem productivity and services for the benefit of people.¹⁵⁹

Critics of the “new conservationism” argue that its proponents treat nature as a “commodity,” hold to the erroneous view that extinction of native species will be balanced by alien species introduced by humans around the world, and place too much emphasis on “working landscapes.”¹⁶⁰ The debate has led some scientists to call for a unified approach,¹⁶¹ identifying complementary roles for both viewpoints.¹⁶²

Suggestions and experiences that integrate these different perspectives and could inform a way forward abound. Many traditional conservationists would agree that greater attention should be paid to the role of working lands in larger conservation initiatives.¹⁶³ Biological reserves have become increasingly isolated and connectivity will be critical for the long-term viability of a number of species, particularly for those that may be most affected by climate change. Working lands can help provide the necessary connectivity and protect these core reserves as buffer and transition zones from more intensive development and urbanization.

In places such as Florida, for example, much of the remaining biodiversity that is not managed specifically as conservation land can be found on working ranches where large tracts of native dry prairie still exist.¹⁶⁴ Some vertebrates of high conservation concern use—and even prefer—improved or semi-improved pasture over native grasslands.¹⁶⁵ Two examples are the crested caracara (*Caracara cheriway*) and the burrowing owl (*Athene cunicularia*).

The caracara is a bird of prey that is listed as threatened under the ESA. It occurs within wet and dry prairie habitat, but is also found in pastures with scattered cabbage palms.¹⁶⁶ Pasture constitutes the highest percentage of habitat cover type within the home ranges of breeding caracaras, and FWS has cited conversion of pasture to other uses as a reason for concern.¹⁶⁷ Researchers recently found that 82% of active caracara nest sites studied occurred on privately owned cattle ranches.¹⁶⁸

151. *Id.* §5.8.

152. *Id.* §5.9.

153. *Id.* §5.11.

154. *See, e.g.*, Miller et al., *supra* note 115.

155. *See* Malcolm L. Hunter Jr. et al., *The Complimentary Niches of Anthropocentric and Biocentric Conservationists*, 28 CONSERVATION BIOLOGY 641, 643 (2014).

156. *Id.*; WILSON, *supra* note 70.

157. WILSON, *supra* note 70, at 9.

158. Aquatic biologist Eugene Stoermer may have first coined the term “Anthropocene” in the early 1980s. WILSON, *supra* note 70, at 9. The Dutch chemist Paul Crutzen is also credited for coining and popularizing the word “Anthropocene” to characterize the current, human-dominated geological epoch. *See* ELIZABETH KOLBERT, *THE SIXTH EXTINCTION: AN UNNATURAL HISTORY* 107-10 (2014); WILSON, *supra* note 70, at 9.

159. Peter Kareiva et al., *Conservation in the Anthropocene: Beyond Solitude and Fragility*, BREAKTHROUGH J. (Winter 2012).

160. WILSON, *supra* note 70, at 77-78.

161. Heather Tallis & Jane Lubchenco, *Working Together: A Call for Inclusive Conservation*, 515 NATURE 27-28 (2014).

162. Hunter et al., *supra* note 155, at 641-45.

163. Video: Reed Noss, *Concepts and Themes of Modern Conservation: Can They Be Reconciled?*, Address Before the Natural Areas Association (2016), available at <https://www.youtube.com/watch?v=GfNMb2jVPOg> (stating that there needs to be greater attention to semi-natural landscapes).

164. *Id.* (stating that most remaining biodiversity in the Florida Ecological Greenways Network that is not already in conservation can be found on private, working ranches); Hillary M. Swain et al., *Trade-Offs Among Ecosystem Services and Disservices on a Florida Ranch*, 35 RANGELANDS 75-76 (2013).

165. REED F. NOSS, *FORGOTTEN GRASSLANDS OF THE SOUTH: NATURAL HISTORY AND CONSERVATION* 226 (2013).

166. *See* Joan L. Morrison & Stephen R. Humphrey, *Conservation Value of Private Lands for Crested Caracaras in Florida*, 15 CONSERVATION BIOLOGY 675-84 (2001); U.S. DEPARTMENT OF THE INTERIOR, FWS, *EVERGLADES HEADWATERS CONSERVATION PARTNERSHIP: FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA 130* (2012).

167. FWS, *MULTI-SPECIES RECOVERY PLAN FOR SOUTH FLORIDA: AUDUBON'S CRESTED CARACARA 4-226* [hereinafter *CARACARA RECOVERY PLAN*].

168. Noss, *supra* note 165, at 226 (citing Morrison & Humphrey, *supra* note 166).

Similarly, research has found that the Florida burrowing owl, the only burrowing owl east of the Mississippi River and a species that has historically occurred on native dry prairies,¹⁶⁹ is increasingly relying on pastures, residential areas, and other areas that contain very short grasses.¹⁷⁰ Although the reasons for why these species rely heavily on pasturelands are not entirely clear, coevolution with mega-herbivores and historically more fires across the landscape could be factors.¹⁷¹

FWS has indicated that the conservation of private lands is an important factor in the recovery of both species. FWS' recovery plan for the caracara states that territories on private lands are "critical to the survival and recovery of the caracara" and calls for the protection of these lands through purchase, conservation easements, and other options.¹⁷² Likewise, the Florida Fish and Wildlife Conservation Commission (FWC) has identified the important role that private lands will play in the conservation of the state-listed Florida burrowing owl and how avoiding the conversion of pasture and dry prairie to more intensive land uses and utilizing a selective cattle-grazing regime are likely to improve the status of this species.¹⁷³

While the conservation of working lands, such as ranchlands in Florida, may help connect fragmented landscapes and provide direct benefits to wildlife, including endangered species, great care must be taken in carving out the role these working landscapes play in larger conservation objectives. A blanket endorsement of working landscapes by policymakers and resource managers may pose as many obstacles to conservation as a failure to conserve private lands as part of a larger conservation effort. Overarching acquiescence in a vision of the world that dismisses the possibility of and need for natural lands as biological reserves can be a self-fulfilling prophecy.

First, a growing body of research has pointed to the effectiveness of biological reserves in protecting biodiversity.¹⁷⁴ While existing reserves may not be adequate in their number and size to stave off the "sixth extinction,"¹⁷⁵ they have helped to slow species extinction.¹⁷⁶ To abandon

a reserve-based approach due to cost, political hurdles, or other challenges in favor of only conserving working lands would undermine a century-old track record of conservation success.

Second, as scientists at University of California, Davis explained in a 2011 article in *Conservation Biology*, the concept of pervasive human-caused change may foster a sense of hopelessness for conservationists and may even be an impetus for accelerated changes in land use motivated by profit.¹⁷⁷ If people believe nothing remains intact, it may lead to greater acceptance of invasive species, discourage the use of ecological baselines that help set management goals, encourage more intense land use practices, and deter conservation funding.¹⁷⁸ Many natural ecosystems remain largely intact and retain key ecological functions and species, even amidst significant climate and other human disruption.¹⁷⁹

Third, decades of overgrazing and intensive farming have shown that not all kinds of working landscapes help achieve conservation goals, and management of working landscapes is complicated. The Refuge Improvement Act was enacted, after all, in response to FWS' failure to adequately manage such uses. Moreover, even well-managed working landscapes offer mixed benefits and harms. For example, improved and semi-improved pastures may provide certain ecological "services and disservices."¹⁸⁰ In addition to providing habitat for native plants and wildlife, services in Florida may include carbon sequestration and the maintenance of fire in a fire-dependent landscape; disservices may include loss of native plant diversity through conversion of native and semi-improved habitats to improved pastures, negative changes to plant communities, secondary impacts to soils,¹⁸¹ the introduction of invasive species, and water quality degradation.¹⁸²

Notwithstanding these challenges and trade offs, the preservation of ranchlands as open, undeveloped landscapes will likely be essential for establishing and preserving connectivity between reserve areas and facilitating movement for large animals. This is particularly true in many parts of the eastern United States, where very little land is owned by the federal or state governments.¹⁸³ In south-central Florida, much of the remaining undeveloped land located between conservation lands is privately owned, with only 22% under conservation management (public or private).¹⁸⁴ In the southern portion of the Everglades headwaters region, land use is 70% agriculture, most

169. FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION, A SPECIES ACTION PLAN FOR THE FLORIDA BURROWING OWL (*ATHENE CUNICULARIA FLORIDANA*)—FINAL DRAFT 1 (2013), available at <http://myfwc.com/media/2720097/Burrowing-Owl-Species-Action-Plan-Final-Draft.pdf> [hereinafter BURROWING OWL ACTION PLAN].

170. NOSS, *supra* note 165, at 226.

171. *Id.* at 226. See also Morrison & Humphrey, *supra* note 166 (noting that since the early 1500s, cattle have been a dominant influence on the landscape of south-central Florida).

172. CARACARA RECOVERY PLAN, *supra* note 167, at 4-233.

173. BURROWING OWL ACTION PLAN, *supra* note 169, at 9.

174. Hance, *supra* note 69; Coetzee et al., *supra* note 69.

175. Scientists and writers have referred to present species extinction rates as the "sixth extinction." See WILSON, *supra* note 70, at 8; KOLBERT, *supra* note 158, at 265. Overall, the current rate is estimated to be between 100 and 1,000 times higher than it was before humans populated the earth. WILSON, *supra* note 70, at 54-55. The current rate of extinction has also been referred to as the "Holocene extinction" or the "Anthropocene extinction." See KOLBERT, *supra* note 158, at 265. See also QUAMMEN, *supra* note 76, at 605-08 (comparing the background level of extinctions throughout time to the rate of extinction over the past few thousand years, beginning with the first Neolithic voyages across the open seas).

176. See Rosenzweig, *supra* note 78, at 262-63.

177. Tim Caro et al., *Conservation in the Anthropocene*, 26 CONSERVATION BIOLOGY 185-88 (2011).

178. *Id.*

179. *Id.*

180. See Swain et al., *supra* note 164.

181. The impacts of grazing are some of the most ecologically complex impacts on the natural system. NOSS & COOPERRIDER, *supra* note 73, at 230-40.

182. See Swain et al., *supra* note 164, at 75-76.

183. See U.S. DEPARTMENT OF THE INTERIOR AND U.S. GEOLOGICAL SURVEY, THE NATIONAL ATLAS OF THE UNITED STATES OF AMERICA, FEDERAL LANDS AND INDIAN RESERVATIONS, at http://nationalmap.gov/small_scale/printable/images/pdf/fedlands/fedlands3.pdf.

184. Swain et al., *supra* note 164, at 76.

of which are ranchlands.¹⁸⁵ The conversion of these lands to industrial, commercial, or residential development, or even more intense forms of agriculture, would likely result in permanent barriers to wildlife movement and foreclose the opportunity to establish connectivity between natural areas.¹⁸⁶ Residential development near biological reserves can have additional ecological consequences including edge effects and the loss of buffer zones, thereby reducing the effectiveness of biological reserves to conserve wildlife.¹⁸⁷

E. *The Emergence of Landscape-Level Conservation Approaches in the National Wildlife Refuge System*

The AGO and FWS' subsequent strategic planning efforts emphasize the role that undeveloped, rural lands have in protecting wildlife as buffers, corridors, or in some cases directly providing habitat for wildlife. In the face of ongoing habitat loss, habitat fragmentation, economic forces, and climate change, FWS has shifted from viewing refuges as "anchor points" toward a view that refuges can serve as "starting points" for broader landscape conservation efforts.¹⁸⁸ FWS has adopted a new sense of focus and urgency in looking beyond traditional reserve areas and connecting public and private lands through a network of conservation lands, working ranches, and farms. In April 2016, Secretary of the Interior Sally Jewell called for a "course correction" in the conservation of our nation's public lands. She remarked that with climate change and ongoing development surrounding our nation's public lands, "[i]t's simply not enough to protect a few isolated places." "If we stay on this trajectory, 100 years from now, national parks and wildlife refuges will be like postage stamps of nature on a map."¹⁸⁹

To this end, FWS has established several new refuges and "conservation areas" aimed at conserving working landscapes. Unlike traditional public lands held by FWS in fee simple, these "conservation areas" remain in private ownership but carry with them conservation easements intended to remove development rights on the property.¹⁹⁰ One of the primary purposes of these new

refuges and conservation areas is protecting large swaths of wildlife habitat and preserving functional ecological corridors, which may otherwise not be possible if these lands are developed.

This Article takes a closer look at how the landscape-level approach taken by the Everglades Headwaters National Wildlife Refuge and Conservation Area may significantly advance the mission of the Refuge System by creating an ecologically connected network of conservation lands, preserving biological diversity through the establishment of wildlife corridors, and helping restore America's Everglades.

III. **The Everglades Headwaters: Advancing the Mission of the National Wildlife Refuge System and Realizing Its Restoration Potential**

In enacting the Refuge Improvement Act nearly 20 years ago, Congress brought much-needed structure, direction, and vision for the Refuge System. This vision includes an interconnected network of functional conservation lands that supports biodiversity and seeks to restore ecological processes where possible.¹⁹¹ This section explores how the Everglades Headwaters National Wildlife Refuge and Conservation Area advances these principles. With its focus on protecting and restoring "one of the greatest grassland and savanna landscapes of eastern North America," supporting a more connected and functional landscape, and addressing the threats of habitat fragmentation and altered ecological processes,¹⁹² the establishment of the Refuge and Conservation Area marks a significant step toward realizing the vision of the Refuge Improvement Act. The Everglades could serve as a model for future refuge proposals elsewhere in the United States.

A. *The Everglades Landscape*

The Kissimmee River Basin lies in the headwaters of the Greater Everglades ecosystem and is recognized as a nationally important landscape and area of biological diversity.¹⁹³ The region contains a diverse array of habitats, including dry prairie, freshwater forested wetlands, high pine, scrub, sandhill, mesic and hydric pine flatwoods and scrubby flatwoods, mesic temperate hammock, wet prairie,

185. *See id.* at 76.

186. *See* Alisa A. Wade & David M. Theobald, *Residential Development Encroachment on U.S. Protected Areas*, 24 CONSERVATION BIOLOGY 151, 152 (2009) (identifying the potential loss of linkages between publicly owned or managed core areas as a result of residential development).

187. *Id.* Edge effects are the ecological effects resulting from the boundaries or transitions between two adjacent landscape patches or land cover types. These effects may include changes in the distribution of and interaction between species. In a fragmented and patchy landscape, these effects can pervade the entire landscape. Lauren M. Porensky & Truman P. Young, *Edge-Effect Interactions in Fragmented and Patchy Landscapes*, 27 CONSERVATION BIOLOGY 509 (2013).

188. CONSERVATION IN TRANSITION, *supra* note 116, at 6; FWS, STRATEGIC HABITAT CONSERVATION: A LASTING FISH & WILDLIFE HABITAT LEGACY 8 (2012).

189. *See The Next 100 Years of American Conservation*, *supra* note 115.

190. These conservation areas include the Dakota Grassland Conservation Area, Blackfoot Valley Conservation Area, Flint Hills Conservation Area, and the Everglades Headwaters National Wildlife Refuge and Conservation Area. *See* FWS, LAND PROTECTION PLAN, DAKOTA GRASSLAND CONSERVATION

AREA, NORTH DAKOTA, SOUTH DAKOTA v (2011); FWS, LAND PROTECTION PLAN, BLACKFOOT VALLEY CONSERVATION AREA EXPANSION 1 (2011); U.S. Fish & Wildlife Service, *Flint Hills National Wildlife Refuge, Kansas—Flint Hills Legacy Conservation Area*, https://www.fws.gov/refuge/flint_hills/partnerships/flint.html (last visited Nov. 18, 2016); U.S. DEPARTMENT OF THE INTERIOR, FWS, EVERGLADES HEADWATERS CONSERVATION PARTNERSHIP: LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA 1 (2012).

191. *See* discussion *infra* Part I.D.

192. Establishment of Everglades Headwaters National Wildlife Refuge and Conservation Area, *supra* note 4.

193. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 1.

open water, and freshwater marshes.¹⁹⁴ The region provides the last remaining habitat for the highly endangered Florida grasshopper sparrow,¹⁹⁵ serves as an essential linkage between subpopulations of the Florida black bear,¹⁹⁶ and will be instrumental in recovering the endangered Florida panther. Populations of these species and many others are becoming increasingly isolated, and the preservation of significantly large and interconnected blocks of habitat is necessary for their long-term survival.

The wildlife and the habitats in the Kissimmee River Basin occur throughout a patchwork of public and private lands. These lands include an Air Force range, several state parks, state forests, state wildlife management areas, and The Nature Conservancy's Disney Wilderness Preserve,¹⁹⁷ as well as hundreds of thousands of acres of ranchlands.¹⁹⁸

Ranching is a predominant land use in the headwaters of the Everglades¹⁹⁹ and has a long history in Florida.²⁰⁰ In 1521, the Spanish conquistadors introduced the first cattle to the United States in present-day Florida.²⁰¹ Some of the earliest ranchers were Native Americans, including the Seminole tribe, who still raise large herds of Brangus cattle on reservations throughout the state, including the 36,000-acre Brighton Reservation near Okeechobee.²⁰² Today, the state ranks 10th in the nation for number of beef cattle herds²⁰³ and two-thirds of the state's cattle are found throughout the Greater Everglades ecosystem.²⁰⁴

Most large ranches in central Florida in the dry prairie ecosystem landscape are mosaics of native grasslands, and semi-improved and improved pastures.²⁰⁵ Some of these ranches still contain thousands of acres of native prairie, although there is continuing fragmentation and an overall reduction in the area of high-quality dry prairie. Furthermore, even fewer in number are sites with a continuous fire history and little human disturbance.²⁰⁶ The future of

the dry prairie landscape is largely dependent on protecting and managing the remaining native rangelands on cattle ranches in south-central Florida.²⁰⁷

This region is facing and will continue to face significant development pressure.²⁰⁸ A 2006 report by Dr. Paul Zwick and Margaret Carr at the University of Florida's GeoPlan Center found that Florida's population is expected to double from 17.8 million to 35.8 million people by 2060.²⁰⁹ Using a population distribution model to illustrate predicted land use patterns, Zwick and Carr found that without policy changes, the land devoted to urban use will also more than double, resulting in the conversion of seven million acres of land to urban areas, including 2.7 million acres of existing agricultural land and 2.7 million acres of native habitat.²¹⁰

Most notable, perhaps, is that the central Florida region from Marion County southward through Osceola County is predicted to be "explosive" and "will be almost entirely urbanized."²¹¹ Further, during the past 70 years, Florida has experienced 8 to 16 inches of sea-level rise²¹² and communities in coastal South Florida are already expecting another 14 to 26 inches of sea-level rise by 2060.²¹³ Seas could rise by five feet by the end of the 21st century.²¹⁴ As a result, development patterns may shift more inland.²¹⁵

Building upon the Zwick and Carr report, the FWC released a report, *Wildlife 2060: What's at Stake for Florida?*, detailing the implications of such growth on the state's conservation lands and wildlife.²¹⁶ The report found that two million of the seven million acres at risk of development by 2060 are within a mile of existing public conservation lands.²¹⁷ The development of these areas will cause the state's wildlife management areas, parks, forests, and pre-

194. *Id.* at 9.

195. *Id.* at 95.

196. See FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION, FLORIDA BLACK BEAR MANAGEMENT PLAN, *URSUS AMERICANUS FLORIDANUS* 14 (2012).

197. See FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 3.

198. *Id.* at 46.

199. Swain et al., *supra* note 164, at 76.

200. See Morrison & Humphrey, *supra* note 166, at 681 (noting that since the early 1500s, cattle have been a dominant influence on the landscape of south-central Florida).

201. See Rob S. Kalmbacher et al., *Managing South Florida Range for Cattle, in* FLORIDA FORAGE HANDBOOK 5 (J. Vendramini ed., University of Florida, IFAS Extension 2002); Jacki Lyden, *South Florida's Seminole Cowboys: Cattle Is "In Our DNA,"* NPR, Aug. 21, 2016, <http://www.npr.org/sections/codeswitch/2016/08/21/488673962/south-floridas-seminole-cowboys-cattle-is-in-our-dna>.

202. See Lyden, *supra* note 201.

203. See *id.*

204. See U.S. DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURAL STATISTICS SERVICE, LIVESTOCK, COUNTY ESTIMATES (2007), available at http://www.nass.usda.gov/Statistics_by_State/Florida/Publications/County_Estimates/2007/lvce0507.pdf.

205. Noss, *supra* note 165, at 225.

206. FWS, MULTI-SPECIES RECOVERY PLAN FOR SOUTH FLORIDA, DRY PRAIRIE 3-279 to 3-346, 3-301.

207. *Id.* at 3-279 to 3-346, 3-304.

208. See FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 138-40 (citing PAUL D. ZWICK & MARGARET H. CARR, FLORIDA 2060: A POPULATION DISTRIBUTION SCENARIO FOR THE STATE OF FLORIDA (2006)).

209. ZWICK & CARR, *supra* note 208, at 2.

210. *Id.*

211. *Id.* at 2, 11. In September 2016, Zwick and Carr released a second report with updated future development scenarios. The report similarly finds that the central Florida region will experience the greatest growth of any region due to substantial increases in population and lower development densities, allowing for greater development. As a result, there is the potential for a substantial loss of agricultural land by 2070. The authors suggest investing in wildlife corridors and the conservation of agricultural lands and working landscapes to protect the state's natural resources from future development. MARGARET H. CARR & PAUL D. ZWICK, FLORIDA 2070: MAPPING FLORIDA'S FUTURE-ALTERNATIVE PATTERNS OF DEVELOPMENT IN 2070, at 20, 25 (2016).

212. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 104.

213. See SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT SEA LEVEL RISE WORK GROUP, UNIFIED SEA LEVEL RISE PROJECTION FOR SOUTHEAST FLORIDA 1 (2015), available at <http://www.southeastfloridaclimatecompact.org/wp-content/uploads/2015/10/2015-Compact-Unified-Sea-Level-Rise-Projection.pdf>.

214. See *id.*

215. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 104.

216. SUSAN CERULEAN, FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION, *WILDLIFE 2060: WHAT'S AT STAKE FOR FLORIDA?* (2008).

217. *Id.* at 8.

serves to become increasingly isolated from one another.²¹⁸ These disconnected habitat fragments will support fewer species that will become more vulnerable to extinction as their genetic viability decreases.²¹⁹ The increase in development will carry with it more roads, putting wildlife at even greater risk of injury and mortality.²²⁰ It will also become more difficult for land managers to manage exotic species that often establish more quickly in disturbed areas and to use prescribed fire on conservation lands that are surrounded by development and roads.²²¹

The state's projected growth and conversion of natural areas and agricultural lands may also have profound implications at the species level in south-central Florida. With more inland growth patterns, the headwaters region may become increasingly more fragmented, further limiting the ability of wildlife species and plant communities to adapt.²²² This is particularly true for large carnivores and other mammals that require large swaths of habitat across a larger landscape, such as the Florida black bear.²²³ The FWC report found that Florida black bears may lose 2.3 million acres of habitat by 2060.²²⁴ For a species that is already relegated to seven disjunct and increasingly isolated subpopulations,²²⁵ additional habitat loss and fragmentation will likely exacerbate threats from genetic isolation and road mortality.²²⁶

The FWC report identifies several conservation strategies to help address these threats to conservation lands and wildlife, including large land acquisitions, conservation easements, tax incentives, large landscape-level planning, and continued agriculture.²²⁷ Despite these recommendations, the state has cut funding for its premier land acquisi-

tion program—Florida Forever²²⁸—by 94% since 2008.²²⁹ Moreover, in 2014, Florida voters approved an amendment to the state constitution that provides an annual funding mechanism to acquire lands for conservation through fee simple and less-than-fee mechanisms.²³⁰ In its first year, however, the Florida Legislature dedicated 3% of the approximately \$550 million available under the program to land conservation programs under Florida Forever.²³¹ The Florida Department of Agriculture's recent investments in conserving ranchlands through its Rural and Family Lands Protection Program²³² are encouraging,²³³ but far more needs to be done across the Everglades headwaters region. The Refuge and Conservation Area could serve as the first significant step as part of a larger collaborative effort to help save what remains of wild Florida.

B. Toward a More Connected and Functional Conservation Landscape

In enacting the Refuge Improvement Act, Congress made it the mission of the Refuge System to administer an interconnected and functional network of conservation lands across a broader landscape.²³⁴ Establishing and preserving connections between conservation lands is tremendously important in south-central Florida. Conservation lands make up approximately 23% of the region's hundreds of thousands of acres, yet they are interspersed amongst cattle ranches, scattered homesites, citrus groves and farms, and small communities.²³⁵

In 2010, FWS initiated discussions amongst a number of ranchers and other stakeholders in the region to find ways to conserve the landscape of the headwaters region. This led to the formation of the Greater Everglades Partnership Initiative aimed at conserving wildlife and habitats, protecting corridors linking established conservation lands, and conserving a working cattle-ranching landscape and heritage in the Kissimmee River Basin of south-cen-

218. *Id.*

219. *Id.*

220. *Id.*

221. *Id.*

222. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 104.

223. A Florida black bear has a home range of 25,000 acres and, as an umbrella species that utilizes an array of habitats, those same 25,000 acres may provide a home for 60 bobcats, 165 foxes, 580 deer, 1,250 quail, 2,000 cardinals, 2.5 million trees, and a staggering 6,975 trillion insects. CERULEAN, *supra* note 216, at 5.

224. *Id.* at 4.

225. See Jeremy D. Dixon et al., *Genetic Consequences of Habitat Fragmentation and Loss: The Case of the Florida Black Bear* (*Ursus americanus floridanus*), 8 CONSERVATION GENETICS 455-64 (2007).

226. CERULEAN, *supra* note 216, at 8-10. Small, isolated populations face several uncertainties that can jeopardize the existence of a species and eventually result in extinction. These include demographic stochasticity, environmental stochasticity, natural catastrophes, and genetic stochasticity. Demographic stochasticity includes accidental variations in birth rate, death rate, and sex ratios. Environmental stochasticity includes changes in food supply, weather, and populations of predators, competitors, parasites, and disease. A natural disaster such as a flood or fire can be sudden and unexpected, and can decimate a particular population. Genetic stochasticity can include a small population experiencing harmful recessive alleles (e.g., the variant forms of a given gene) through inbreeding. QUAMMEN, *supra* note 76, at 515-19, 542 (citing the work of Mark Shaffer, who studied the insularized population of grizzly bears in the Greater Yellowstone ecosystem and later concluded in subsequent research on minimum viable populations that given these uncertainties, the size and number of nature reserves are not enough to provide long-term security for some mammals, especially those that are large and rare).

227. See CERULEAN, *supra* note 216, at 4.

228. See FLA. STAT. §259.105.

229. See Matt Dixon, *Florida Forever Funding Cut 94% Since 2008*, TC PALM, June 15, 2015, available at <http://www.tcpalm.com/news/florida-forever-funding-cut-94-since-2008-ep-1137241031-332549492.html>.

230. FLA. CONST. art. X, §28.

231. 2015 Fla. Laws ch. 232 (Appropriation No. 1569A).

232. See FLA. STAT. §570.71.

233. See Jeremy Wallace, *State Makes Record Purchase to Preserve Farmland in Central Florida*, TAMPA BAY TIMES, May 10, 2016 (discussing the preservation of 3,200 acres of ranchlands in Osceola County—the state's largest acquisition under the Rural and Family Lands Protection Program since it began in 2001).

234. See discussion *infra* Part I.D. See also FREYFOGLE & GOBLE, *supra* note 14, at 217 (arguing that “[o]ne of the [Act’s] most prominent elements was its instructions to the secretary of the interior to take into account the ways that wildlife refuges promote wildlife populations, and sustain ecological processes, in larger landscapes”); Fischman, *supra* note 48, at 619 (asserting that in broadly defining “conservation” to include plants and directing FWS to conserve “habitats,” the Refuge Improvement Act supports a broader view toward ecosystem management); FISCHMAN, *supra* note 6, at 207 (discussing how the Refuge Improvement Act marked a transformation in the Refuge System’s mission “from wildlife protection to true ecological conservation as we understand it today”).

235. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 103.

tral Florida.²³⁶ The following year, then-Secretary of the Interior Ken Salazar proposed the establishment of the Everglades Headwaters National Wildlife Refuge and Conservation Area at the annual conference of the Everglades Coalition.²³⁷ The stated vision of the Refuge and Conservation Area is:

To conserve, protect, and manage one of the greatest grassland and savanna landscapes of eastern North America for current and future generations and to protect the important wildlife and habitats of the working rural landscape of central Florida's Kissimmee River Basin that is home to abundant fish and wildlife resources, is vital to the restoration and protection of the water quality and quantity for the Everglades ecosystem, is resilient to the effects of global climate change, and offers outdoor recreational opportunities important to the region's economy.²³⁸

Building upon the working landscape approach identified in the AGO and *Conserving the Future*, FWS intends to purchase up to 50,000 acres from willing sellers in fee simple to create a new refuge and up to 100,000 acres of conservation easements to create a conservation area within a 1.8 million-acre study area.²³⁹ A series of public meetings followed the initial proposal, eliciting more than 38,000 written comments,²⁴⁰ and FWS reduced the former study area to an approximately 745,000-acre conservation partnership area.²⁴¹ FWS prepared a draft environmental assessment (EA) for the project under NEPA and a draft LPP in 2011. FWS released a final EA and LPP in 2012²⁴² and the Refuge and Conservation Area was formally established with a 10-acre donation of land from The Nature Conservancy.²⁴³ Since the Refuge's establishment in 2012, its implementation has progressed rather slowly, with FWS having acquired a little more than 4,000 acres in conservation easements and approximately 1,500 acres in fee simple to date.²⁴⁴

In enacting the Refuge Improvement Act, Congress made it the mission of the Refuge System to administer an interconnected and functional network of conservation lands across a broader landscape.²⁴⁵ The Everglades Headwaters Refuge and Conservation Area presents one of the greatest opportunities to advance the mission of the Refuge System and address the threats identified in the Zwick and Carr and FWC reports, by creating a more connected and functional conservation landscape in the headwaters region of the Everglades ecosystem. Through fee simple land acquisition and conservation easements, FWS has both the control and flexibility to develop a network of lands that contains both core areas and buffer zones to help mitigate impacts from more intense neighboring land uses.²⁴⁶ With its emphasis on working with willing private landowners, this bottom-up approach allows for an inclusive and collaborative process toward ecological recovery.

The core areas—the “Headwaters Refuge”—would be created through fee simple acquisition of up to 50,000 acres within a 130,000-acre “Conservation Focal Area.”²⁴⁷ The lands that FWS has identified within the Conservation Focal Area include significantly large tracts adjacent to Kissimmee Prairie Preserve State Park, which could provide a nearly 95,000-acre block of habitat.²⁴⁸ Additionally, the acquisition of more than 9,000 acres within the northern boundary of the Conservation Focal Area could connect Kissimmee Prairie Preserve State Park, Allen David Broussard Catfish Creek Preserve State Park, and Disney Wilderness Preserve.²⁴⁹ By connecting and effectively increasing the size of these large blocks of habitat, the Headwaters Refuge furthers the Refuge Improvement Act's mission of establishing a truly connected network of conservation lands.²⁵⁰

FWS is also creating an additional 100,000-acre conservation area as part of the Everglades Headwaters Refuge and Conservation Area. This “conservation area” would be created through the purchase of conservation easements on private lands in the “Everglades Headwaters Conservation Partnership Area,” which includes several large tracts adjacent to lands identified for possible inclusion in the Headwaters Refuge as well as lands that abut the Kissimmee River Restoration Project.²⁵¹ By removing the devel-

236. *Id.* at 1.

237. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 37.

238. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 4.

239. Press Release, FWS, America's Great Outdoors: Salazar Unveils Proposed Everglades Headwaters National Wildlife Refuge and Conservation Area (Sept. 7, 2011), available at https://www.fws.gov/news/ShowNews.cfm?ref=america-s-great-outdoors-salazar-unveils-proposed-everglades-headwaters-na&_ID=30741; LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 6.

240. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 10.

241. *Id.* at 2.

242. See *id.*; LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190.

243. Remy Melina, *New US Wildlife Refuge Established in Florida*, LIVE SCI., Jan. 19, 2012, <http://www.livescience.com/18022-everglades-headwaters-national-wildlife-refuge-established.html>.

244. See National Wildlife Refuge Association, *Celebrating Success at the Everglades Headwaters National Wildlife Refuge and Conservation Area*, Mar. 24, 2016,

<http://refugeassociation.org/2016/03/celebrating-success-at-the-everglades-headwaters-national-wildlife-refuge-and-conservation-area/>.

245. See discussion *infra* Part I.D.; see also *supra*, note 234.

246. See Wade & Theobald, *supra* note 186 (describing an ideal conservation system as consisting of “protected conservation ‘cores’ surrounded by ‘buffer zones’ of relatively unaltered land-use types that protect the cores from external threats, effectively expanding and providing connections between them”) (internal citations omitted).

247. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 4.

248. See *id.* at 164. Many of these lands are also located between State Road 60 and the range and state park. See *id.* at 102. State Road 60 runs from Tampa near Florida's Gulf Coast to Vero Beach along the state's Atlantic coastline.

249. *Id.* at 164.

250. See 16 U.S.C. §668dd(a)(2); FREYFOGLE & GOBLE, *supra* note 14, at 217.

251. See FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 125. Additional lands within the Conservation

opment potential of these properties through conservation easements, these lands could serve as necessary “buffer areas” and mitigate the effects of more intense land uses on ecologically sensitive areas.²⁵² The establishment of a new national wildlife refuge through fee simple acquisition and buffer areas through the use of conservation easements shows a path to connect and preserve the region’s federal, state, and local conservation lands.²⁵³

The preservation of a large interconnected network of conservation lands is critically important for species such as the Florida grasshopper sparrow. Perhaps the most endangered bird in the continental United States,²⁵⁴ and listed as endangered since 1986, this non-migratory grasshopper sparrow subspecies is endemic to the dry prairie of central and southern Florida.²⁵⁵ Approximately 90% of the bird’s native dry prairie habitat has been lost, mostly due to its conversion to improved pasturelands²⁵⁶ and agriculture.²⁵⁷ A habitat specialist, the Florida grasshopper sparrow relies on fire every two to three years to maintain its habitat.²⁵⁸ The loss of suitable habitat from overgrazing, improper fire regimes, and flooding of nesting sites may also be impacting the population.²⁵⁹

In recent years, the grasshopper sparrow population has declined precipitously, with fewer than 150 remaining in the wild. Surveys in 2012 indicated the lowest number of male birds ever detected on public lands²⁶⁰ and the preliminary numbers for the 2016 breeding season are looking “bleak.”²⁶¹ The majority of the population is relegated to just a few federal and state lands: Three Lakes Wildlife

Management Area, Kissimmee Prairie Preserve State Park, and Avon Park Air Force Range.²⁶² Once considered the strongest, the population at Avon Park has dramatically declined and may be functionally extirpated.²⁶³ As a result of the bird’s decline, FWS has initiated a captive breeding program, with the first chicks hatching in 2016.²⁶⁴

While the cause or causes of the population decline remain unclear, the bird requires significantly more habitat because habitat suitability for breeding, and to some extent wintering, can shift radically from year to year and season to season, due largely to variability in fire history and hydroperiod.²⁶⁵ Thus, in any given year, a relatively small portion of the landscape may be suitable habitat.²⁶⁶ Because of these factors, a very large natural landscape is likely necessary for the species’ long-term viability.²⁶⁷ FWS has identified several measures that must be taken to recover the species, including developing and implementing the most appropriate fire and hydrological regimes on public lands and providing incentives for private landowners to restore or maintain prairie habitat.²⁶⁸

Presently, FWS is working with ranchers in the region to restore and enhance Florida grasshopper sparrow habitat,²⁶⁹ and the Refuge and Conservation Area provides a significant opportunity to build upon this work and conserve this critically imperiled species. By acquiring and restoring dry prairie near the three remaining population cores as well as restoring improved pasture and other remnant patches of native prairie habitat in the region,²⁷⁰ FWS could increase the spatial extent of native prairie and establish a new breeding population,²⁷¹ ultimately linking currently isolated populations.²⁷²

Partnership Area include lands adjacent to Lake Kissimmee State Park and Disney Wilderness Preserve, Kissimmee Prairie (State) Preserve, Lake Arbuckle State Forest, and privately owned lands surrounding Lake Conlin. *Id.* at 121-26.

252. See NOSS & COOPERRIDER, *supra* note 73, at 100. See also Adena R. Rissman et al., *Conservation Easements: Biodiversity Protection and Private Use*, 21 CONSERVATION BIOLOGY 709, 716 (2007) (noting that working landscapes are generally expected to function as buffers to core areas).

253. The use of a large conservation focal area and conservation partnership area may also maximize the options available to FWS in assembling a regionally connected landscape. As FWS explains in its environmental assessment for the project, the Lake Wales Ridge National Wildlife Refuge may serve as a cautionary tale. At the time, FWS had initially identified an approximately 20,000-acre refuge acquisition boundary. Today, however, FWS owns less than 2,000 acres, with much of the remainder being sold to private interests. A conservation focal area that is significantly larger than the acquisition boundary may provide FWS with the flexibility to conserve the necessary acreage of lands in the event that some of these lands are later not available for conservation. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 127.

254. NOSS, *supra* note 165, at 150 plate 8.

255. FWS, MULTI-SPECIES RECOVERY PLAN FOR SOUTH FLORIDA, FLORIDA GRASSHOPPER SPARROW 4-371, available at <https://www.fws.gov/verobeach/MSRPPDFs/FloridaGrasshopperSparrow.pdf>.

256. Dr. Paul Gray (Personal Communication with author).

257. MULTI-SPECIES RECOVERY PLAN FOR SOUTH FLORIDA, FLORIDA GRASSHOPPER SPARROW, *supra* note 255, at 4-371, 4-379.

258. *Id.* at 4-371.

259. See *id.* at 4-378 to 4-383.

260. Florida Fish and Wildlife Conservation Commission, *Florida’s Resident Grasshopper Sparrow*, <http://myfwc.com/research/wildlife/birds/florida-grasshopper-sparrow/information/> (last visited Nov. 18, 2016).

261. Report, FWS, First Captive-Bred Florida Grasshopper Sparrow Chicks Hatched (May 11, 2016), available at https://www.fws.gov/news/ShowNews.cfm?ref=first-captive-bred--florida-grasshopper-sparrow-chicks-hatched-&_ID=35664.

262. *Florida’s Resident Grasshopper Sparrow*, *supra* note 260.

263. *Id.*

264. First Captive-Bred Florida Grasshopper Sparrow Chicks Hatched, *supra* note 261.

265. Dr. Paul Gray (Personal Communication with author); Noss, *supra* note 165, at 230-31.

266. *Id.*

267. *Id.*

268. MULTI-SPECIES RECOVERY PLAN FOR SOUTH FLORIDA, FLORIDA GRASSHOPPER SPARROW, *supra* note 255, at 4-383.

269. See Joe Milmo, *Ranchers Partner With Service, Endangered Bird Wins*, FWS, Mar. 4, 2015, https://www.fws.gov/refuges/RefugeUpdate/MarApr_2015/ranchers-partner-with-service.html.

270. Changes in fire and hydrology regimes have likely contributed to increases in tree density in many remnant prairies. Florida grasshopper sparrows will avoid areas with large numbers of trees as they probably represent perches for predators. Land acquisition and conservation should focus on remnant patches of native prairie or areas where hydrologic, fire, and vegetative conditions could be restored to provide necessary habitat. Dr. Paul Gray (Personal Communication with author).

271. See FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 186 (noting that the proximity of the South and Central Prairie Units to existing sparrow populations on the Kissimmee Prairie Preserve State Park will be a major factor in the success of establishing a breeding population although it is difficult to predict how many the refuge and conservation area could support).

272. The Florida grasshopper sparrow may require hundreds of thousands of acres of relatively contiguous and connected dry prairie to maintain a viable population. Noss, *supra* note 165, at 230. FWS estimates there will be up to approximately 83,709 acres of habitat available for protection. See LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 95 (identifying opportunities for conservation easements

C. *Maintaining, Sustaining, and Restoring Biological Integrity and Diversity Through Wildlife Corridors*

The Refuge Improvement Act directs the Secretary of the Interior to “ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans.” In 2001, FWS finalized policies interpreting this provision. Biological diversity is defined by FWS as “the variety of life and its processes, including the variety of living organisms, the genetic differences among them, and communities and ecosystems in which they occur.”²⁷³ Biological integrity is the “biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities.”²⁷⁴ Environmental health is defined as the “composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.”²⁷⁵ FWS’ implementing policies direct it to consider managing biological integrity, diversity, and environmental health across various multiple landscape scales and to restore them at the refuge scale and other landscape scales where feasible and supportive of the refuge purpose.²⁷⁶

In recent years, many have written about the importance of establishing connectivity through ecological corridors,²⁷⁷ and the creation and protection of wildlife corridors has become central practice in protecting biodiversity.²⁷⁸ Corridors have become increasingly necessary to allow for movement of organisms and gene flow, such as providing for the migratory and dispersal movements of large animals and distributional shifts of species due to climate change.²⁷⁹ Corridors can help diminish isolation among populations and increase opportunities for biological interactions.²⁸⁰ Perhaps the largest and most ambitious multistate and cross-boundary effort is the Yellowstone to Yukon Conservation Initiative, which envisions an interconnected system of wild lands and waters stretching across this 2,000-mile region.²⁸¹

The Refuge and Conservation Area presents a unique opportunity to serve as a model for advancing a statewide ecological corridor in Florida. The concept of a statewide ecological corridor in Florida dates back to the mid-1980s

with the work of Noss and Harris who called for the establishment of several regional ecological networks across Florida.²⁸² In 1994, Noss set forth a proposed statewide network consisting of conservation areas, buffers, and corridors in the book *Saving Nature’s Legacy: Protecting and Restoring Biodiversity*.²⁸³

Building upon the work of Noss and Harris, several environmental and conservation organizations developed the Florida Greenways Initiative calling for a statewide network of recreational trails and ecological greenways.²⁸⁴ These efforts led to the Florida Legislature establishing the Florida Greenways program and the Florida Ecological Greenways Network (FEGN).²⁸⁵ The FEGN is continually updated and serves as the foundation for landscape-level conservation priorities within the state’s Florida Forever land acquisition program.²⁸⁶

The “Florida Wildlife Corridor” campaign was established to communicate the vision of the critical linkages identified in the FEGN to a wider audience.²⁸⁷ A nonprofit organization later formed, and in 2012, an expedition team inspired by the travels of the black bear known as M34 completed a 1,000-mile, 100-day journey and public awareness campaign from Everglades National Park to Okefenokee National Wildlife Refuge.²⁸⁸ The expedition team completed a second, equally long trek from the Everglades headwaters to Gulf Island National Seashore in the Florida Panhandle.²⁸⁹

The Refuge and Conservation Area is uniquely positioned and created to serve as a critical component of the Florida Wildlife Corridor by conserving a vast stretch of habitat that lies within the heart of Florida’s peninsula. Located between Lake Okechobee, Big Cypress National Preserve, and Everglades National Park to the south and the Ocala National Forest and the St. John’s River Watershed to the north, the region was identified by Noss in an early Florida reserve design proposal as part of a corridor and buffer zone extending from Everglades National Park to Ocala National Forest and other reserves to the north.²⁹⁰ The footprint of the Conservation Partnership Area is also within a “critical linkage” identified by the FEGN.²⁹¹ By

and restoration of improved pasture to provide linkages between these isolated populations).

273. FWS, Biological Integrity, Diversity, and Environmental Health, 601 FW §3.6 (Apr. 16, 2001).

274. *Id.*

275. *Id.*

276. *Id.* §3.7.

277. Anastasia Telesetsky, *Ecscapes: The Future of Place-Based Ecological Restoration Laws*, 14 Vt. J. ENVTL. L. 493, 543 (2013).

278. Joel Berger & Steven L. Cain, *Moving Beyond Science to Protect a Mammalian Migration Corridor*, 28 CONSERVATION BIOLOGY 1142-50 (2014).

279. See Noss et al., *supra* note 87.

280. Berger & Cain, *supra* note 278, at 1142, 1149.

281. See Yellowstone to Yukon Conservation Initiative, *Vision & Mission*, <https://2y.net/vision/vision-mission> (last visited Nov. 18, 2016).

282. TOM HOCTOR ET AL., THE HISTORY OF FLORIDA WILDLIFE CORRIDOR SCIENCE AND PLANNING EFFORTS 1 (2015), available at <http://floridawildlifecorridor.org/about/history/>.

283. *Id.* at 3.

284. *Id.* at 5.

285. *Id.* at 6.

286. *Id.*

287. *Id.* at 6-7.

288. *Id.* at 7.

289. *Id.* at 7.

290. See NOSS & COOPERRIDER, *supra* note 73, at 158.

291. See FLORIDA WILDLIFE CORRIDOR, SCIENTIFIC BASIS FOR THE FLORIDA WILDLIFE CORRIDOR, COURTESY OF THE FLORIDA ECOLOGICAL GREENWAYS NETWORK AND THE CONSERVATION TRUST FOR FLORIDA, available at <http://www.floridawildlifecorridor.org/wp-content/uploads/2011/12/Background-Greenways.pdf>; FLORIDA ECOLOGICAL GREENWAYS NETWORK PRIORITIES ADOPTED BY FLORIDA GREENWAYS AND TRAILS COUNCIL (2013), available at https://www.dep.state.fl.us/gwt/FGTS_Plan/PDF/New_FEGN_Priorities_Map_Adopted12-2013_byFGTC.pdf; FLORIDA ECOLOGICAL GREENWAYS NETWORK: CRITICAL LINKAGES (2013), available at http://conserveflorida.org/wp-content/uploads/2014/12/CTF_Critical_Linkages_Letter_Landscape.pdf.

incorporating these centrally connected lands and critical linkages into its 150,000-acre footprint, the Refuge and Conservation Area would help link contiguous ecological corridors throughout the state.

The establishment of ecological corridors is essential for the long-term viability of the Florida black bear.²⁹² The planning area for the Refuge and Conservation Area includes bears in one of the seven state subpopulations.²⁹³ This “Highlands-Glades” subpopulation provides the only potential functional linkage between bears in South Florida (the Big Cypress subpopulation) and all other bear populations to the north.²⁹⁴ The travels of black bear M34 further reveal that enough intact habitat remains in the region to allow bears to move through the landscape, integrate with an additional subpopulation to the north (Ocala), and recolonize former habitat.²⁹⁵

Researchers have identified a series of bear corridors (up to two miles wide) that could be created based on a least-cost path analysis.²⁹⁶ One of these corridors would run through the Conservation Partnership Area and would split into an eastern and western corridor near the Disney Wilderness Preserve.²⁹⁷ From there, researchers have documented the potential for a functional corridor linking the Ocala population with the Osceola population in northern Florida and providing for gene flow between the two populations.²⁹⁸ The Refuge and Conservation Area has the potential to significantly advance this important conservation goal by prioritizing and integrating these corridor designs into the planning and land acquisition process and preserving and restoring quality bear habitat within these corridors.²⁹⁹

Ecological corridors will also be extremely important tools in recovering the endangered Florida panther. Under the Florida Panther Recovery Plan, a viable panther population for purposes of recovery is one in which there is a 95% probability of persistence for 100 years. Delisting will only be considered when there are three viable, self-sustaining populations of at least 240 individuals each that have been established and maintained for a minimum of 12 years, and sufficient habitat quality, quantity, and spa-

tial configuration to support these populations is secured for the long term.

To accomplish this, FWS has identified several necessary measures, including (among others) maintaining, restoring, and expanding the panther population and its habitat in South Florida, expanding the breeding portion of the population in South Florida to areas north of the Caloosahatchee River, identifying potential reintroduction areas within the species’ historic range, and reestablishing viable panther populations outside of south and south-central Florida within the historic range.³⁰⁰ While young male panthers are known to disperse north into the headwaters region, it was only in November that FWC confirmed the discovery of the first female panther having dispersed out of South Florida in 40 years.³⁰¹ A corridor could be established within the headwaters region to facilitate the movement of panthers from South Florida to habitats to the north.³⁰²

D. Advancing the Refuge System’s Role in Ecological Restoration

In addition to supporting a connected network of conservation lands across a larger landscape and providing corridors to support biological diversity, the Refuge Improvement Act supports the restoration of fish and wildlife populations, as well as the restoration of ecosystems in coordination with other federal and state agencies’ work toward the same goal.³⁰³ The Refuge and Conservation Area advances the Act’s restorative role in ecosystem management by supporting two joint federal-state projects: the Comprehensive Everglades Restoration Plan (CERP) and the restoration of the Kissimmee River.

I. CERP

The Greater Everglades ecosystem stretches from the Kissimmee River and associated floodplain south to Lake Okeechobee and into Everglades National Park and Florida Bay.³⁰⁴ The historical Everglades has been reduced to one-half of its original size as a result of flood control practices beginning in the late 1800s and intensifying with the establishment of the Central and South Florida Project in the 1940s.³⁰⁵ These activities resulted in more than 1,000 miles of levees, 720 miles of canals, and nearly 200 water

292. See Marty R. Stratman et al., *Long Distance Movement of a Florida Black Bear in the Southeastern Coastal Plain*, 12 *URSUS* 55-58 (2001) (discussing the long-distance movements of one Florida black bear from Eglin Air Force Base in Florida’s Panhandle to Baton Rouge, Louisiana, and how travel corridors may provide a means for bears to move between disjunct populations and provide a buffer against increasing human development and habitat fragmentation).

293. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 95; see also FLORIDA BLACK BEAR MANAGEMENT PLAN, *supra* note 196.

294. Tom Hoctor, *Keep Bears on the List*, TAMPA BAY TIMES, June 25, 2011.

295. *Id.*

296. See TOM HOCTOR, UPDATING THE FLORIDA ECOLOGICAL GREENWAYS NETWORK, FINAL REPORT 51 (2013).

297. See *id.*

298. See Jeremy D. Dixon et al., *Effectiveness of a Regional Corridor in Connecting Two Florida Black Bear Populations*, 20 *CONSERVATION BIOLOGY* 155-62 (2006).

299. See LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 95 (identifying an opportunity to link the Highlands-Glades subpopulation to the larger Ocala-St. Johns subpopulation).

300. FWS, FLORIDA PANTHER RECOVERY PLAN, 3D REVISION xi-xiii (2008), available at <https://www.fws.gov/uploadedFiles/Panther%20Recovery%20Plan.pdf>.

301. See Jenny Staletovich, *Rare River Crossing Raises Hopes for Boost in Florida Panther Population*, MIAMI HERALD, Nov. 14, 2016, <http://www.miamiherald.com/news/local/environment/article114742298.html>.

302. See HOCTOR, *supra* note 296, at 58.

303. See discussion *infra* Part I.D.

304. NATIONAL ACADEMY OF SCIENCES, PROGRESS TOWARD RESTORING THE EVERGLADES: THE FIFTH BIENNIAL REVIEW ix (2014); Florida Department of Environmental Protection, *Brief History of the Everglades*, <http://www.dep.state.fl.us/evergladesforever/about/default.htm> (last visited Nov. 18, 2016).

305. *Id.*

control structures.³⁰⁶ These drainage projects have significantly altered the system by diverting much of the water that historically flowed south and redirecting it east and west and eventually out to tide.³⁰⁷

The result has been increasing flows to receiving waters during wet periods and the unavailability of water during periods of drought.³⁰⁸ These increased flows have resulted in harmful and damaging algal blooms in coastal estuaries.³⁰⁹ These hydrologic alterations have also had significant impacts on the composition, distribution, and abundance of wading birds throughout the Everglades ecosystem³¹⁰ and the water that remains in the system is heavily polluted by phosphorus and other contaminants from agriculture and urbanization.³¹¹

CERP—approved by Congress in December 2000 after many years of planning—aims to protect and restore the Everglades while providing for water supply and flood control.³¹² The \$13.5 billion project is managed by the Corps and the South Florida Water Management District and was originally envisioned as a 30- to 40-year plan consisting of 68 projects to restore the hydrologic characteristics of the Everglades while serving the needs of both the natural and human systems of South Florida.³¹³

As identified in the Central and Southern Florida Project Comprehensive Review Study, known as the 1999 Restudy, the Lake Okeechobee Watershed Project component of CERP envisioned storing approximately 250,000 to 300,000 acre-feet of water upstream of Lake Okeechobee to improve the timing and magnitude of inflows.³¹⁴ After seeing only modest improvements in lake levels with those amounts, further modeling projected as much as 900,000-1.3 million acre-feet of storage in the Lake Okeechobee Watershed might be needed.³¹⁵ This amount of storage appeared to exceed what CERP funding could support and water managers have sought additional methods of finding water storage capacity.

The primary purposes of the Refuge and Conservation Area include contributing to “water quality, water quantity, and water storage capacity of the upper Everglades watershed” and supporting “Everglades restoration goals and objectives and water quality and supply for central and south Florida.”³¹⁶ Through land acquisition and conservation easements, FWS has the potential to restore more than 30,000 acres of wetlands.³¹⁷ These wetlands include seasonal, short-hydroperiod wetlands—which are extremely important for the federally listed wood stork and other wading bird populations—long-hydroperiod wetlands, and cut-throat seepage wetlands. By removing shallow ditches and reestablishing the original surface contours of the area, these restoration activities can provide greater water storage in the Okeechobee Watershed, allowing for slower water discharge, groundwater recharge, and nutrient uptake.³¹⁸

Small-scale water management projects in the Refuge and Conservation Area could further support Everglades restoration by controlling and slowing the amount of water running off ranchlands and into the system. Dispersed water management projects provide shallow water storage, retention, and detention through the use of structures such as weirs, berms, and culverts.³¹⁹ Water is retained on-site and naturally dissipates through evaporation, transpiration, or seepage underground.³²⁰ Results from a six-year pilot project known as the Florida Ranchlands Environmental Services Project showed that these projects can support larger-scale restoration projects such as storage reservoirs and treatment areas.³²¹ These shallow water retention areas can also provide habitat for various species from amphibians to wading birds³²² and in some instances may provide certain water quality benefits.³²³

These projects are funded through a variety of mechanisms, including a payment for an environmental services program that pays ranchers for retaining water on ranchlands as well as cost-share programs with federal, state, or local governments, including the USDA’s Natural Resource Conservation Service.³²⁴ By partnering with other federal and state agencies to implement these small-scale water management projects, the Refuge and Conservation Area can provide additional on-site ecological benefits while also

306. *Everglades Restudy a Huge Challenge*, SUNSENTINEL, July 3, 1999, http://articles.sun-sentinel.com/1999-07-03/news/9907021014_1_restoration-efforts-florida-everglades-restoration-concept.

307. See NATIONAL ACADEMY OF SCIENCES, *supra* note 304, at ix, 20-21.

308. Swain et al., *supra* note 164, at 83 (describing how ditches and canals in central Florida have resulted in rapid runoff, contributing to harmful peak flows downstream during the wet season and the loss of regional water storage during the dry season).

309. See Les Neuhaus, *Reeking, Oozing Algae Closes South Florida Beaches*, N.Y. TIMES, July 1, 2016 (discussing the closure of beaches resulting from discharges into the St. Lucie estuary).

310. NATIONAL ACADEMY OF SCIENCES, *supra* note 304, at 20-21.

311. *Id.* at ix.

312. *Id.*

313. *Id.* at 1.

314. See UNIVERSITY OF FLORIDA WATER INSTITUTE, *OPTIONS TO REDUCE HIGH VOLUME FRESHWATER FLOWS TO THE ST. LUCIE AND CALOOSAHATCHEE ESTUARIES AND MOVE MORE WATER FROM LAKE OKEECHOBEE TO THE SOUTHERN EVERGLADES* 58 (2015) (citing U.S. ARMY CORPS OF ENGINEERS, *CENTRAL AND SOUTHERN FLORIDA PROJECTS COMPREHENSIVE REVIEW STUDY, FINAL INTEGRATED FEASIBILITY REPORT AND PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT* (1999)).

315. *Id.* at 43 (citing SOUTH FLORIDA WATER MANAGEMENT DISTRICT, *NORTHERN EVERGLADES AND ESTUARY PROTECTION: LAKE OKEECHOBEE WATERSHED CONSTRUCTION PROJECT, PHASE II TECHNICAL PLAN* (2008), available at https://www.sfwmd.gov/sites/default/files/documents/lakeo_watershed_construction%20proj_phase_ii_tech_plan.pdf).

316. Establishment of Everglades Headwaters National Wildlife Refuge and Conservation Area, *supra* note 4.

317. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 132.

318. *Id.*

319. SOUTH FLORIDA WATER MANAGEMENT DISTRICT, OFFICE OF THE INSPECTOR GENERAL, *AUDIT OF DISPERSED WATER MANAGEMENT PROGRAM 1* (2014).

320. *Id.*

321. *Id.* at 2, 6.

322. *Id.* at 2; Dr. Paul Gray (Personal Communication with author).

323. See FLORIDA RANGLANDS ENVIRONMENTAL SERVICES PROJECT FIELD TEAM, *NUTRIENT REMOVAL AT LYKES BROS. INC. WEST WATERHOLE MARSH WATER MANAGEMENT ALTERNATIVE, 2008-2014* (2015) (documenting an 88% retention rate of total phosphorus inflow and 56% retention rate of nitrogen inflow). See PAUL GRAY & CHARLES LEE, *RELATIVE COSTS AND BENEFITS OF DISPERSED WATER MANAGEMENT 4* (2015) (stating that project results have been mixed and more analysis is needed to determine overall phosphorus removal).

324. AUDIT OF DISPERSED WATER MANAGEMENT PROGRAM, *supra* note 319, at 7-8.

contributing to larger water management goals of Everglades restoration.

2. Kissimmee River Restoration

The Kissimmee River is the focus of a decades-old 40-square-mile restoration project by the Corps and South Florida Water Management District.³²⁵ In the late 1960s, the Corps channelized this once naturally meandering river to reduce flooding to surrounding properties. As a result, 90% of the waterfowl disappeared, fundamentally changing local fish communities.³²⁶ To undo this damage, Congress authorized a nearly \$1-billion restoration project under the Water Resources Development Act in 1992. After acquiring more than 100,000 acres of land, backfilling canals, and performing other restorative measures, the project is nearly complete and will soon restore 43 miles of meandering oxbows and wetlands.³²⁷

The Kissimmee River restoration project has been determined a great success. A 2014 National Academy of Sciences report found “measurable natural system benefits” with even more benefits anticipated once final control structures are completed and a water control schedule is implemented.³²⁸ These hydrologic and ecological benefits include the reestablishment of numerous species of wetlands plants, a substantial increase in native fish populations, the return of eight shorebird species, and increased waterfowl abundance.³²⁹ The Corps (the lead agency charged with implementing the project) noted, “the river and its floodplain have improved in remarkable ways, surpassing at times the anticipated environmental response.”³³⁰ Although not a component of CERP, the restoration of the Kissimmee River and associated floodplain is critically important to the restoration of the Greater Everglades ecosystem.³³¹ By preserving 150,000 acres within this watershed, the Refuge and Conservation Area will help protect this nearly \$1-billion investment from the impacts of development, which would likely include increased water consumption and stormwater runoff.³³²

325. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 20.

326. South Florida Water Management District, *Kissimmee River*, <https://www.sfwmd.gov/our-work/kissimmee-river> (last visited Nov. 18, 2016).

327. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 20; U.S. ARMY CORPS OF ENGINEERS, KISSIMMEE RIVER RESTORATION PROJECT, FACTS AND INFORMATION (2016), *available at* http://www.saj.usace.army.mil/Portals/44/docs/FactSheets/Kissimmee_FS_April2016_web.pdf; South Florida Water Management District, *supra* note 326.

328. NATIONAL ACADEMY OF SCIENCES, *supra* note 304, at 102-03.

329. *Id.*

330. U.S. Army Corps of Engineers, *Kissimmee River Restoration Project*, <http://www.saj.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/6106/Article/479988/kissimmee-river-restoration-project.aspx> (last visited Nov. 18, 2016).

331. See Jeff Klinkenberg, *Kissimmee River Rediscovered Its Origins*, TAMPA BAY TIMES, Jan. 24, 2009, *available at* <http://www.tampabay.com/features/humaninterest/kissimmee-river-rediscovered-its-origins/970054> (as biologist Paul Gray explains, “You can’t fix the Everglades without fixing the Kissimmee River first.”).

332. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 131, 184.

IV. Working With Multiple Stakeholders to Achieve a Shared Conservation Mission

As discussed above, a landscape-level conservation approach provides significant opportunities for connecting fragmented habitats, preserving wildlife corridors, and advancing restoration projects. In addition to consistent funding through the Land and Water Conservation Fund and other federal programs,³³³ achieving these conservation goals will require effective collaboration amongst multiple federal, state, and local governmental stakeholders, various landowners, and numerous local communities across multiple spatial and temporal scales.³³⁴ Using the Everglades Headwaters National Wildlife Refuge and Conservation Area as an example, this Article will offer several recommendations for maximizing conservation across a broader landscape.

A. Think Big and Small

Successful implementation of a landscape-level conservation initiative like the Refuge and Conservation Area will require managing refuge lands and monitoring and responding to external threats at multiple scales.

At the regional level, water supply planning that allows for the use of surface waters to meet projected demands can harm aquatic species and their habitats. Such withdrawals could further frustrate federal and state restoration efforts and conflict with state-mandated water reservations.³³⁵ The federal and state interests need to work together to avoid such conflicts and protect their significant financial and ecological investments in the region.

333. Established in 1965, the Land and Water Conservation Fund invests up to \$900 million annually in national parks, wildlife refuges, and historic sites. The program is funded entirely through a portion of the royalties the United States receives from offshore oil and gas development. See U.S. DOI, *Land and Water Conservation Fund—LWCF Overview*, <https://www.doi.gov/lwcf/about/overview> (last visited Nov. 18, 2016).

334. See Carina Wyborn & Patrick Bixler, *Collaboration and Nested Environmental Governance: Scale Dependency, Scale Framing, and Cross-Scale Interactions in Collaborative Conservation*, 123 J. ENVTL. MGMT. 58-67 (2013) (discussing challenges that emerge from different spatial and temporal scales driving social and ecological processes).

335. Recently, state water management agencies prepared a new 20-year water supply plan for the region. ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, SOUTH FLORIDA WATER MANAGEMENT DISTRICT & SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, CENTRAL FLORIDA WATER INITIATIVE, REGIONAL WATER SUPPLY PLAN, VOLUME I, PLANNING DOCUMENT (2015), *available at* http://cfwiwater.com/pdfs/plans/CFWI_RWSP_VolI_Final_2015-12-16.pdf. The plan identifies surface water withdrawals (including from the Kissimmee River) as potential sources of water to make up for a projected water supply deficit. *Id.* at 108-15. Presently, a water reservation is under development for the Kissimmee River Basin. See Tom Palmer, *Public Gets Preview of Steps to Come on Water Reservation Rules for Kissimmee River*, LEDGER, July 31, 2014, *available at* <http://www.theledger.com/news/20140730/public-gets-preview-of-steps-to-come-on-water-reservation-rules-for-kissimmee-river>. Under state law, water managers establish water reservations to determine the amount of water required to protect fish and wildlife or the public health and safety and reserve that water so it is not available for consumptive use. FLA. STAT. §373.223(4). The water reservation could help protect flows to the Headwaters Refuge and Conservation Area. See Kevin Spear, *Kissimmee River Battle Looms: Water for Fish or Cities?*, ORLANDO SENTINEL, July 27, 2014, *available at* <http://www.orlandosentinel.com/news/politics/os-kissimmee-river-water-protected-20140727-story.html>.

FWS should also work closely with local governments to ensure that the Refuge and Conservation Area is considered in local comprehensive planning and zoning decisions. Changes in the intensity, density, and pattern of development could have implications for the design of biological reserves, corridors, and buffer and transition zones. Sprawling residential development and associated infrastructure (i.e., roads) could sever essential connections between conservation lands and contribute to the increased isolation of wildlife populations, such as the Florida black bear.³³⁶ State law requires local governments to establish a conservation element in their local comprehensive land use plans and goals, objectives, and policies for conserving wildlife.³³⁷ The Refuge and Conservation Area provides a tremendous opportunity to help local communities support and advance local conservation efforts.

Ranchers must also be engaged to ensure their operations and management practices are consistent with wildlife conservation goals. FWS will need to carefully consider how the grazing practices, invasive species management, and prescribed fire programs commonly found in individual ranch plans and integrated into the terms and conditions of conservation easements all fit into the larger conservation planning for the Refuge and Conservation Area. As explained below, there needs to be sufficient flexibility to modify these practices as the need arises through adaptive management.

Protecting the Refuge and Conservation Area from threats at these multiple scales necessitates awareness and consideration of regional, local, and site-specific plans in the design and implementation of FWS' management plans for the Everglades Headwaters Refuge and Conservation Area.³³⁸ It also demands FWS' active engagement in the ongoing planning processes of the relevant regional and local agencies to shape their plans to reflect the needs and goals of the Refuge System. The Refuge Act encourages close coordination with state, local, and private interests and FWS' refuge manual provides the tools to help achieve FWS' conservation goals.³³⁹

B. Find Common Ground and Implement a Shared Vision

Successful collaboration amongst stakeholders will be essential in achieving the landscape connectivity goals of the Everglades Headwaters Refuge and Conservation

Area.³⁴⁰ The Partnership Area portion of the Refuge and Conservation Area contains more than 60 conservation lands across five counties, totaling 391,805 acres.³⁴¹ These include, among many others, an Air Force range, state forests, state parks, state wildlife management areas, restored lands along the Kissimmee River, and several county-managed environmental and recreation lands.³⁴² These lands are managed by various federal, state, and local agencies such as DOD, Florida Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, and FWC.³⁴³ While some of these agencies may have primary wildlife conservation missions,³⁴⁴ many do not.³⁴⁵ Moreover, these public and privately held lands were created under various federal, state, and local laws and are managed for multiple purposes and uses.³⁴⁶

Yet, the conservation of these lands is important to all involved interests. In the case of the military, the conservation of native habitat provides an extensive buffer between military operations and urban development.³⁴⁷ For ranchers, the conservation of native rangelands that in many instances have been owned and operated by the same family for several generations preserves a connection to the natural beauty of a landscape.³⁴⁸ For cities and counties, national wildlife refuges and the wildlife-dependent activities they offer can help support local economies.³⁴⁹ In the case of the Federal Highway Administration and Florida Department of Transportation, conservation practices that divert animals away from transportation corridors help

340. See Berger & Cain, *supra* note 278, at 1142-50 (discussing the significant role stakeholder collaboration had in creating the "Path of the Pronghorn"—the first federally protected migration corridor in the United States).

341. FINAL ENVIRONMENTAL ASSESSMENT FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 166, at 211-14.

342. *Id.*

343. *Id.* at 8.

344. See FLA. CONST. art. 4, §9 (stating that the Florida Fish & Wildlife Conservation Commission "shall exercise the regulatory and executive powers of the state with respect to wild animal life and fresh water aquatic life").

345. See, e.g., FLA. STAT. §570.07 (setting forth the agricultural-based mission of the Florida Department of Agriculture and Consumer Services).

346. See, e.g., FLA. STAT. §253.034 (defining single use, multiple-use, and conservation lands); FLA. STAT. §589.04 (charging the Florida Forest Service to provide direction for the multiple-use management of state forests); FLA. STAT. §379.212 (establishing the Land Acquisition Trust Fund and directing the Fish & Wildlife Conservation Commission to manage lands acquired through the trust fund for the primary purpose of maintaining and enhancing their habitat value for fish and wildlife).

347. See Mike Vogel, *Home on the (Bombing) Range*, FLA. TREND, Aug. 28, 2014, available at <http://www.floridatrend.com/article/17516/home-on-the-bombing-range> (describing that only a "fraction" of the range consists of areas impacted mostly by inert bombs, with the rest of the 106,034-acre lands serving as buffers).

348. See Swain et al., *supra* note 164, at 84; Michael Kruse, *Florida Rancher's Wish: A Legacy of His Land Pristine Forever*, TAMPA BAY TIMES, Jan. 4, 2015.

349. A 2009 study by DOI found that more than 40 million people per year visit national wildlife refuges and the Refuge System contributes more than \$2 billion annually to the national economy. See U.S. DOI, ECONOMIC IMPACT OF THE DEPARTMENT OF INTERIOR'S PROGRAMS AND ACTIVITIES, PRELIMINARY REPORT (2009), available at http://www.doi.gov/news/pressreleases/upload/DOI_Economic-Impacts-Report.pdf. In addition, a 2006 study revealed that the Southeast Region (which includes Florida) had the greatest number of refuge visitors. See ERIN CARVER & JAMES CAUDILL, BANKING ON NATURE 2006: THE ECONOMIC BENEFITS TO LOCAL COMMUNITIES OF NATIONAL WILDLIFE REFUGE VISITATION (2007).

336. See Jeremy D. Dixon et al., *Genetic Consequences of Habitat Fragmentation and Loss: The Case of the Florida Black Bear* (*Ursus americanus floridanus*), 8 CONSERVATION GENETICS 455-64 (2007).

337. See FLA. STAT. §163.3177(6)(d).

338. See Fischman, *supra* note 106 (arguing for the integration of landscape-level planning initiatives into refuge unit plans).

339. See discussion *infra* Part I.D. FWS' refuge manual encourages refuge managers to address events occurring off refuge lands or waters that may injure or destroy biological integrity, diversity, and environmental health of a refuge. These policies provide a suggested procedure that emphasizes cooperative resolutions. Where direct or collaborative discussions fail, refuge managers may seek resolution through planning and zoning boards or state administrative and regulatory agencies. See FWS, Biological Integrity, Diversity, and Environmental Health, 601 FW §3.20 (Apr. 16, 2001).

protect the public's safety.³⁵⁰ Fostering the recognition that conservation of ecosystems and natural landscapes is a shared value can help ensure successful collaboration among property owners in the Partnership Area.³⁵¹

Collaborative work built on shared values should include programs that maximize the conservation benefits of the Refuge and Conservation Area, serve to avoid future conflicts among wildlife and human activities, and harness the collective resources and abilities of all interested stakeholders. Such programs may include working with ranchers in establishing grazing practices that are most supportive of wildlife conservation, partnering with transportation agencies in creating wildlife underpasses and overpasses,³⁵² and working with multiple agencies in advancing a landscape-level endangered species conservation program.³⁵³ These and other programs can help foster a sense of ownership and achievement amongst stakeholders while furthering the conservation (i.e., recovery) of federally listed species across the larger landscape.³⁵⁴

350. See U.S. DOT, Federal Highway Administration, *Critter Crossings: Linking Habitats and Reducing Roadkill*, http://www.fhwa.dot.gov/environment/critter_crossings/ (last visited Nov. 18, 2016) [hereinafter *Critter Crossings*].

351. See Fischman, *supra* note 106, at 47. As Fischman explains, landscape-level planning requires collaboration that builds trust across jurisdictional boundaries. Successful conservation efforts can be linked to strong relationships among scientists, land managers, and stakeholders. See also Noss, *supra* note 163 (stating that collaboration starts with shared values).

352. Vehicles kill millions of animals a year on the nation's roads. See Melissa Gaskill, *Rise in Roadkill Requires New Solutions*, SCI. AM., May 16, 2013, available at <http://www.scientificamerican.com/article/roadkill-endangers-endangered-wildlife/>. Roads adversely modify animal behavior and can serve as permanent physical barriers, which fragment populations and their habitats. See Stephen C. Trombulak & Christopher A. Frissell, *Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities*, 14 CONSERVATION BIOLOGY 18-30 (2000). Vehicular collisions are one of the leading causes of death for bears and panthers in Florida. See Florida Fish and Wildlife Conservation Commission, *Bear Biology Facts—Life Expectancy and Mortality*, <http://myfwc.com/wildlifehabitats/managed/bear/facts/life-expectancy/> (last visited Nov. 18, 2016) (stating that in an average year, more than 200 bears are killed on Florida roads). The Everglades Headwaters Refuge and Conservation Area provides a unique opportunity for DOT to develop a conservation program in cooperation with FWS to protect dispersing panthers, bears, and other species through the strategic placement of wildlife underpasses or overpasses between refuge and other conservation lands. At Banff National Park in Canada, significant efforts have been made to reduce wildlife-vehicle collisions on the Trans-Canada Highway through the construction of wildlife crossing structures. Since fencing and crossing structures were first constructed, collisions have decreased by 80%. Animals documented using these structures include grizzly bears, cougars, wolves, as well as numerous small and mid-size animal species. Banff has the longest ongoing wildlife crossing research and monitoring program in the world. See Parks Canada, *Banff National Park—Wildlife Crossing Structures and Research*, <http://www.pc.gc.ca/eng/pn-np/ab/banff/plan/transport/tch-rtc/passages-crossings.aspx> (last visited Nov. 18, 2016). The Florida Fish & Wildlife Conservation Commission and Florida Department of Transportation have designed an underpass for black bears on State Route 46 in Lake County and similar crossings for panthers on Interstate 75 in South Florida. See *Critter Crossings*, *supra* note 350.

353. For example, §7(a)(1) of the ESA provides that all federal agencies “shall, in consultation with and with the assistance of the Secretary [of Commerce or the Interior], utilize their authorities in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered and threatened species.” 16 U.S.C. §1536(a)(1). The Act defines “conservation” as “the use of all methods and procedures, which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary.” *Id.* §1532(3).

354. The “Endangered Species Act’s definition of conservation speaks to the recovery of a threatened or endangered species.” *Sierra Club v. United States Fish & Wildlife Serv.*, 245 F.3d 434, 441-42, 31 ELR 20500 (5th Cir. 2001).

Just as refuge management planning across multiple scales is important, so too is providing a stakeholder process for identifying and establishing connections between site-specific activities (e.g., protecting and restoring native habitat on a particular ranch), FWS’ conservation goals for the Refuge, and statewide ecological initiatives (e.g., the Florida Wildlife Corridor).³⁵⁵ A coordinating council consisting of landowners, federal and state agency representatives, conservation organizations, and researchers could be established to act as a clearinghouse for information, facilitate learning amongst stakeholders, and help coordinate actions around a shared vision.³⁵⁶

C. Preserve a Sense of Place and Make Lasting Connections

The success of any landscape-level conservation initiative will likely depend in large part on community support. This is particularly true in more populated areas and in the Everglades, where people have had a long connection to the lands and waters in the region. Knowing the local community—its values, traditions, and relationship with the land—and developing a tailored approach for each community is important in creating a refuge that has the long-term support of the local community.

People have inhabited the Everglades and used its resources for more than 2,000 years beginning with the Tequesta and Calusa Tribes, followed by the Seminole and Miccosukee Tribes in the 18th century, and later European pioneers who settled, farmed, ranched, and hunted the land beginning in the late 1800s.³⁵⁷ The last group includes the “Gladesmen,” early settlers in southern Florida who, like the Native Americans before them, survived by living off the land and had strong ties to the Everglades.³⁵⁸ As anthropologist Laura Ogden explains, one way of seeing the Everglades is as a “hunter’s landscape,” where relations between humans and the landscape have been shaped in part by the cultural practices and economic incentives of rural hunting in South Florida.³⁵⁹ For many hunters, backcountry camps are sites for important community and family events.³⁶⁰ They hold social importance as they help maintain a sense of com-

355. See Wyborn & Bixler, *supra* note 334.

356. *Id.*

357. Dissertation: Rebecca I. Garvoille, *Sociocultural Complexities of Ecosystem Restoration: Remaking Identity, Landscape, and Belonging in the Florida Everglades* 61-75 (2013) (unpublished Ph.D. dissertation, Florida International University), available at <http://digitalcommons.fiu.edu/etd/841>.

358. U.S. ARMY CORPS OF ENGINEERS, *ETHNOGRAPHIC STUDY AND EVALUATION OF TRADITIONAL CULTURAL PROPERTIES OF THE MODERN GLADESMEN CULTURE, COMPREHENSIVE EVERGLADES RESTORATION PLAN (CERP), SOUTHERN FLORIDA, “YOU JUST CAN’T LIVE WITHOUT IT”* 4 (2011) [hereinafter *YOU JUST CAN’T LIVE WITHOUT IT*].

359. LAURA OGDEN, *SWAMPLIFE: PEOPLE, GATORS, AND MANGROVES ENTANGLED IN THE EVERGLADES* (2011). See also Garvoille, *supra* note 357, at 75 (describing Everglades National Park prior to its protection as a region “defined by the seasonal rhythms, movements and stories of glades hunters (notably, alligator hunters) as they traversed its wet prairies and tree islands in search of game”).

360. Garvoille, *supra* note 357, at 79.

munity and a strong connection to the Everglades within an increasingly urbanized region.³⁶¹

While sparsely populated until the 1940s,³⁶² the Everglades headwaters region includes a similar cultural connection with the land. The Kissimmee River and Kissimmee Chain of Lakes have traditionally played important roles in the culture of the Gladesmen and many others who have lived in the area for generations and have utilized the waterways and lands for subsistence, transportation, and recreation.³⁶³ It remains one of the most popular recreation areas in southern Florida, with fish camps dating back to the 1920s.³⁶⁴

Preserving a “sense of place” for local residents must be an important consideration for landscape-level initiatives such as the Everglades Headwaters National Wildlife Refuge and Conservation Area, and may be especially important in a region where scholars have observed a marginalization of the local landscape attachments, histories, and practices of rural residents.³⁶⁵ Some scholars have observed that this marginalization may stem from past land preservation efforts,³⁶⁶ including a top-down approach to CERP implementation by bureaucratic agencies that viewed the Everglades as an ecological landscape overlaid with a water management system, detached from the social, cultural, and natural processes that continue to reshape it.³⁶⁷

Indeed, many local residents expressed significant concern during the early public scoping phase that the refuge was another attempt of federal government intrusion, which would limit access and traditional uses such as hunting and fishing, and, thus, opposed the project.³⁶⁸ While many of these concerns have subsided,³⁶⁹ continued efforts should be made to assuage concerns about potential impacts of the acquisition and management of land for conservation purposes on traditional public land uses.³⁷⁰ This is particularly important for the Everglades Headwa-

ters Refuge and Conservation Area, because it, like other landscape-level initiatives, will require extensive cooperation amongst a diverse array of stakeholders.

To help ensure long-term support of the local community, FWS must be sensitive and responsive to the role headwaters landscapes have played in shaping local ways of life, identities, and resources used past and present. Attending to these “social nuances” at the local scale, in a landscape with a rich human history, is a critical variable in achieving conservation success.³⁷¹ As FWS recognizes in the LPP for the Refuge and Conservation Area, hunting and fishing are popular activities in the region and FWS intends to work with stakeholders to develop long-term plans to evaluate and provide opportunities for these uses.³⁷² In addition to preserving wildlife-dependent uses, community participation through a citizens’ advisory council would help provide the local community with a seat at the table, a voice, and a feeling of ownership in this newly established public land. FWS should engage in a continuing dialogue with local communities, one that focuses on the challenges, needs, and values for the landscape.³⁷³

The long-term success of the Refuge and Conservation Area and others like it—efforts seeking to conserve lands across a wide, mostly rural and agrarian region—will also likely depend in part on establishing long-term, multigenerational conservation connections.³⁷⁴ Studies have shown that refuges and other protected areas succeed in protecting biodiversity where local communities understand and embrace conservation measures.³⁷⁵ This requires education that builds social and political support.³⁷⁶

Education can help foster greater community buy-in and support when connections can be drawn between preserving a fully functioning ecosystem and the economic benefits it can provide.³⁷⁷ Environmental education is also important in teaching local communities (including the

361. *Id.* One such place is within the Big Cypress National Preserve. From interviews of self-identified “Gladesmen” and other outdoorsmen, Rebecca Garvoille explains that the backcountry in the Big Cypress National Preserve “continues to be a storied cultural landscape that reverberates with tales of community, hardship, survival, and meaning.”

362. SOUTH FLORIDA WATER MANAGEMENT DISTRICT, KISSIMMEE RIVER MANAGEMENT AREAS TEN-YEAR GENERAL MANAGEMENT PLAN 2014-2024, at 13 (2014).

363. YOU JUST CAN’T LIVE WITHOUT IT, *supra* note 358, at 113.

364. *Id.* at 113, 131.

365. Garvoille, *supra* note 357, at 18, 29.

366. *See id.* at 68-69 (discussing the displacement of Native Americans and rural peoples following the establishment of Everglades National Park in the 1940s followed by the displacement of backcountry hunting camps in the 1970s during the establishment of Big Cypress National Preserve).

367. Laura Ogden, *The Everglades Ecosystem and the Politics of Nature*, 110 AM. ANTHROPOLOGIST 21, 28, 29 (2008).

368. *See* Craig Pittman, *Everglades Refuge Plan in Central Florida Draws Fierce Opposition*, TAMPA BAY TIMES, Feb. 18, 2011, available at <http://www.tampabay.com/news/environment/everglades-refuge-plan-in-central-florida-draws-fierce-opposition/1152468>.

369. Following several public scoping meetings and a public commenting process, FWS refined the Conservation Partnership Area, excluding a particularly contentious area known as “River Ranch,” which includes a private hunting club. Since then, there appears to be overall support of the refuge and conservation area from the community.

370. *See* Testimony of Steve Guertin, Deputy Director, FWS, Department of the Interior, Before the U.S. House of Representatives, Committee on Natural Resources, Subcommittee on Fisheries, Wildlife, Oceans, and Insular Affairs

Regarding H.R. 3109, H.R. 3409, H.R. 5026, and H.R. 5069 (July 23, 2014).

371. *See* Fischman, *supra* note 106 (“collaborative conservation requires deep understanding of the social nuances involved in a project”). *See generally* Garvoille, *supra* note 357, and Ogden, *supra* note 367. *See also* Sara Jo Breslow, *A Complex Tool for a Complex Problem: Political Ecology in the Service of Ecosystem Recovery*, 42 COASTAL MGMT. 308-31 (2014) (studying disputes between salmon habitat restoration and farmland protection in Washington State and arguing that renewal of social trust and cooperation is necessary for ecological restoration).

372. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 109.

373. *See* Christina C. Hicks et al., *Engage Key Social Concepts for Sustainability*, 352 SCI. 38-40 (2016); Breslow, *supra* note 371.

374. *See* Eric T. Freyfogle, *The Wildlife Refuge and the Land Community*, 44 NAT. RESOURCES J. 1027, 1038 (2004) (explaining that “for the Wildlife Refuge System to do its job well it needs to come up with good ways to talk about how refuges benefit surrounding landscapes”).

375. Glicksman & Cumming, *supra* note 83. *See also* Freyfogle, *supra* note 374 (arguing “refuge managers need an ecologically grounded vision of the larger landscape, one that includes the refuge as well as the human-dominated lands that refuges help sustain”).

376. Glicksman & Cumming, *supra* note 83.

377. *Id.* As Robert Glicksman and Graeme Cumming document, Congress has expanded several existing national parks to reconnect fragmented landscapes and these efforts become more viable if local communities see these federal public lands as investments in the local economy.

next generation) about the value of nature in their lives and preserving the importance of our nation's public lands.³⁷⁸ Although FWS currently identifies a lack of support facilities in the region as a limiting factor in the establishment of interpretative programs and environmental education,³⁷⁹ every effort should be made to partner with civic groups, local schools, and conservation organizations to ensure these programs remain a priority throughout the refuge's development.³⁸⁰ FWS should draw on collaborative conservation successes in other landscapes and include experts in collaborative conservation, conservation social science, and community engagement in this effort.³⁸¹

D. Be Willing and Able to Adapt

Climate change will likely impact a wide range of wildlife and habitats on refuge lands in a variety of ways,³⁸² and the geographic isolation and small size of many units present several conservation challenges for FWS in dealing with these effects.³⁸³ FWS will need to better connect conservation areas to allow for species adaptation—for example, by preserving corridors for species to move and disperse across the landscape.³⁸⁴ To those ends, in establishing the Everglades Headwaters Refuge and Conservation Area, the Secretary of the Interior specifically identified the need to support “a more connected and functional conservation landscape that will provide effective habitat connections

between existing conservation areas and allow habitats and species to shift in response to urban development pressures and global climate change.”³⁸⁵

To better understand and respond to the effects of climate change, many of which are still poorly understood, FWS will have to rely on adaptive management.³⁸⁶ Adaptive management is an iterative process in which decision outcomes are continually monitored and evaluated through a “feedback loop” to determine whether objectives are being achieved and, if not, what changes need to occur to achieve the desired outcome.³⁸⁷

Yet, adaptive management may prove challenging in instances where FWS relies on conservation easements—and not fee simple acquisitions—to protect lands.³⁸⁸ In the Headwaters Refuge and Conservation Area, for example, two-thirds of the lands will be protected through these easements. There, because FWS may not have full control over the property, the scope of its management options for these lands depends on how different agreements are structured. Notably, traditional conservation agreements are often entered into with the understanding that the land will be managed in perpetuity to preserve a static landscape.³⁸⁹ This may pose obstacles for managing landscapes where the baseline conditions assessed at the time the conservation easement is executed change as a result of changes in precipitation, temperatures, rising seas, or other factors.³⁹⁰

In view of some of the challenges that traditional conservation easements present in managing a more dynamic landscape, some scholars have advocated for less than permanent options (such as term, term-renewable, or term-terminable conservation agreements).³⁹¹ Additional options may also include later modifying or amending conservation easements as environmental conditions change.³⁹²

378. See EDWARD O. WILSON, *BIOPHILIA 2* (1986) (“to the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves”); Noss, *supra* note 165, at 261-64; Noss, *supra* note 163 (advocating for a return to “natural history” education). See also RICHARD LOUV, *LAST CHILD IN THE WOODS: SAVING OUR CHILDREN FROM NATURE-DEFICIT DISORDER* (2005).

379. LAND PROTECTION PLAN FOR THE ESTABLISHMENT OF THE EVERGLADES HEADWATERS NATIONAL WILDLIFE REFUGE AND CONSERVATION AREA, *supra* note 190, at 110.

380. For instance, local school districts in the Florida Panhandle have recently partnered with the E.O. Wilson Biophilia Center at Nokuse Plantation, the site of a 50,000-acre long-leaf pine restoration project, to provide environmental education programs to local schoolchildren. The Center has also developed a fourth grade curriculum. A 2014 study documented significant growth in the understanding of the components, processes, flora, and fauna of the long-leaf pine ecosystem amongst fourth grade students. Michael W. Dentzau & Alejandro Jose Gallard Martinez, *The Development and Validation of an Alternative Assessment to Measure Changes in Understanding of the Longleaf Pine Ecosystem*, 22 ENVTL. EDUC. RES. 1-24 (2014); see also Video: E.O. Wilson Biophilia Center: In the Grass, On the Reef (2014), available at <https://www.youtube.com/watch?v=jn7aYIDJ1YE>.

381. See Nathan J. Bennett et al., *Mainstreaming the Social Sciences in Conservation*, CONSERVATION BIOLOGY (2016).

382. Brad Griffith et al., *Climate Change Adaptation for the National Wildlife Refuge System*, 44 ENVTL. MGMT. 1043, 1045-46 (2009). The authors discuss several climate-related challenges to the Refuge System, including altered hydrology, sea-level rise, invasive species, disease/parasites, and interaction of climate and non-climate stressors. Many of the effects of climate change will also be difficult to predict. See also J.B. Ruhl, *Climate Change and the Endangered Species Act, Building Bridges to the No-Analog Future*, 88 B.U. L. REV. 1, 23 (2008).

383. Griffith et al., *supra* note 382, at 1044.

384. See *id.* at 1043, 1047. Connectivity is important because in many instances development surrounding public lands may block ecological processes and animal movements. Restoring connectivity helps provide needed resilience. Collaboration across private lands is often necessary to achieve these connections. *Id.* at 51. See also Jaelyn Lopez, *Biodiversity on the Brink: The Role of “Assisted Migration” in Managing Endangered Species Threatened With Rising Seas*, 39 HARV. ENVTL. L. REV. 157 (2015).

385. Establishment of Everglades Headwaters National Wildlife Refuge and Conservation Area, *supra* note 4.

386. See Adena R. Rissman, *Evaluating Conservation Effectiveness and Adaptation in Dynamic Landscapes*, 74 LAW & CONTEMP. PROBS. 145, 152 (2011).

387. See Robert L. Fischman & J.B. Ruhl, *Judging Adaptive Management Practices of U.S. Agencies*, 30 CONSERVATION BIOLOGY 268-75 (2015).

388. In those instances where the property is intended to serve as a biological core or reserve, or where restoration could deliver significant environmental benefits, FWS should carefully consider whether a conservation easement is the appropriate land conservation tool. See Rissman et al., *supra* note 252, at 716 (explaining “working landscapes are generally anticipated to function as buffers but may require greater scrutiny for properties providing core habitat protection”). Fee simple ownership will likely provide much greater control over conservation outcomes. Adena R. Rissman et al., *Adapting Conservation Easements to Climate Change*, 8 CONSERVATION LETTERS 68, 73 (2015). See also U.S. GAO, NATIONAL WILDLIFE REFUGES: CONTINUING PROBLEMS WITH INCOMPATIBLE USES CALL FOR BOLD ACTION (1989) (finding that a major cause of incompatible uses is limited FWS jurisdiction over refuge lands).

389. See generally Jessica Owley, *Conservation Easements at the Climate Change Crossroads*, 74 LAW & CONTEMP. PROBS. 199 (2011).

390. See Rissman et al., *supra* note 388; Owley, *supra* note 389, at 199, 203; Rissman, *supra* note 386; Jesse J. Richardson Jr., *Conservation Easements and Adaptive Management*, 3 SEA GRANT LAW & POL'Y J. 31 (2010); Duncan M. Greene, *Dynamic Conservation Easements: Facing the Problem of Perpetuity in Land Conservation*, 28 SEATTLE U. L. REV. 883, 885 (2005).

391. See Rissman, *supra* note 386, at 145, 166 (citing Julia D. Mahoney, *Perpetual Restrictions on Land and the Problem of the Future*, 88 VA. L. REV. 739 (2002); Richardson Jr., *supra* note 390; Nancy A. McLaughlin, *Conservation Easements: Perpetuity and Beyond*, 34 ECOLOGY L.Q. 673, 675 (2007)).

392. See Rissman, *supra* note 386, at 145, 166.

These kinds of “flexibility,” however, also present legal and practical challenges. For instance, Florida (as with a few other states) explicitly requires conservation easements to be in perpetuity.³⁹³ Therefore, any conservation easement that is not in perpetuity may not be recognized under the law.³⁹⁴ Likewise, any subsequent attempts to modify or amend the terms of such an easement could be disfavored by the courts.³⁹⁵ In terms of practical challenges, frequently modifying or amending conservation easements to provide for increased management would likely require significant investments in time and agency resources.³⁹⁶

Given these limitations, permanent conservation easements should be utilized, but they must be carefully drafted to facilitate adaptive management. First, the terms should clearly identify the conservation goals for the property, discuss the specific responsibilities of the landowner and FWS in managing the property,³⁹⁷ and explain how the management of each property will advance the mission of the Refuge and Conservation Area.³⁹⁸ Second, the terms

should be broad enough to provide flexibility as conditions change.³⁹⁹ Third, proposed management actions—as well as rights and responsibilities—should be prescribed in a site-specific management plan, which should be regularly consulted and should set forth a process to allow reassessment and modification of management strategies to ensure consistency with the conservation goals of the Refuge and Conservation Area.⁴⁰⁰ These ranch management plans could also be integrated into the CCP.⁴⁰¹ Lastly, FWS should commit to a rigorous monitoring program to track the impacts of climate change on specific management actions.⁴⁰² Monitoring is both a critically important tool for climate change adaptation⁴⁰³ and a key component of the Refuge Improvement Act.⁴⁰⁴

E. Lead With a Strong Conservation Mission Supported by the Best Science

Finally, the conservation of fish, wildlife, plants, and their habitats must always remain the primary mission of any new national wildlife refuge and conservation area. This central, unifying conservation mission is what distinguishes the Refuge System from other federal land management programs,⁴⁰⁵ and it will be essential in leading a wide and diverse range of conservation partners toward landscape-level conservation goals.

FWS must dutifully apply this principle throughout the refuge planning and management process. As explained above, the Everglades Headwaters National Wildlife Refuge and Conservation Area provides a leading example of how the Refuge System can achieve greater landscape connectivity by being in the position to strategically link several ecologically important conservation areas. It is further poised to preserve biological diversity through the preservation of wildlife corridors based on years of research identifying critical ecological corridors. And the headwaters initiative is well-suited to help restore ecosystems by complementing two of the nation’s (and South Florida’s) most

393. See FLA. STAT. §704.06(2). See also Owley, *supra* note 389, at 199, 221 (identifying California, Hawaii, and Florida as states that all require conservation easements to be perpetual and that could also prohibit amendment).

394. See Owley, *supra* note 389, at 199, 221. Even if term or term-terminable conservation easements were to be considered, the possible sale of a property for development upon expiration of such an easement would likely create an atmosphere of uncertainty for refuge planners and jeopardize the establishment purposes of the refuge. In the context of landscape connectivity, they could lead to a “hole in the donut” situation in which refuge lands surround a more intensely developed inholding. Federal land managers have cited inholdings as obstacles in carrying out their conservation missions. See Denise E. Antolini, *National Park Law in the U.S.: Conservation, Conflict, and Centennial Values*, 33 WM. & MARY ENVTL. L. & POL’Y REV. 851, 870 (2009) (noting there are more than six million acres of private “in-holdings” in the National Park System, which present a major challenge for its preservation mission). See also FLORIDA PANTHER RECOVERY PLAN, *supra* note 300, at 58 (identifying the need to obtain public land inholdings, assure linkages are maintained, and restore degraded and fragmented habitat to recover the Florida panther). Therefore, such approaches should be disfavored in similar initiatives.

395. Modification and amendment may be less of a concern, however, where future modifications are intended to provide for additional management actions that are in furtherance of the conservation purposes of the easement. See Owley, *supra* note 389, at 220-21.

396. FWS policies provide that conservation easements cannot be modified or amended without completing the full acquisition process, which involves meeting appraisal requirements, negotiating to acquire more rights or exchange rights or real property interests, and providing for Office of the Solicitor review. FWS may, in some situations, acquire new conservation easement lands through a formal land exchange. See FWS, Administration of National Wildlife Refuge System Conservation Easements, 601 FW §6.15 (Jan. 12, 2015).

397. See Fischman, *supra* note 106, at 47 (“Adaptive management stumbles when resource managers fail to identify key collaborators, communicate effectively with local (human) communities, and build a consensus based on the concerns and information available to all.”).

398. See Rissman, *supra* note 386, at 145, 170. This may be particularly important in the case of national wildlife refuges that incorporate working lands into their landscape-level conservation strategy. In *Schwenke v. Secretary of the Interior*, 720 F.2d 571 (9th Cir. 1983), ranchers sought declaratory judgment that livestock grazing on the Charles M. Russell National Wildlife Refuge should be administered under the Taylor Grazing Act rather than the Wildlife Refuge Act as a use entitled to equal status with wildlife preservation and that FWS had impermissibly subordinated livestock grazing to wildlife protection. The court was confronted with the question of whether the Executive Order that established the Charles M. Russell National Wildlife Refuge prioritized wildlife or provided equal priority for wildlife and livestock to access rangelands. Opining that the Executive Order could be “read in several ways,” and rejecting

the interpretations advanced by both the ranchers and the Secretary of the Interior, the court determined that the Executive Order established a limited priority for wildlife beyond which grazing and wildlife preservation have equal status. While the issue in *Schwenke* was one of interpreting the Refuge’s establishment purposes, it nevertheless illustrates the importance of drafting conservation easements with clear purposes, rights, and restrictions. See Rissman, *supra* note 386, at 145, 170 (discussing the importance of drafting conservation easements with “clear purposes, rights, restrictions, and a process for adaptive management”).

399. See Rissman et al., *supra* note 388, at 72; Owley, *supra* note 389, at 219-20.

400. See Rissman et al., *supra* note 388, at 72 (stating that management plans must be “carefully bounded within organizational decision processes to ensure that their terms enhance conservation purposes”).

401. See Fischman, *supra* note 106 (arguing for the integration of landscape-level planning initiatives into refuge unit plans). See also Jason Totoiu, *Building a Better State Endangered Species Act: An Integrated Approach Toward Recovery*, 40 ELR 10299 (Mar. 2010) (arguing for an integrated approach to recovering state-listed species).

402. See Fischman, *supra* note 106, at 73 (finding that ecological monitoring is “a major missing link in [conservation easements], despite being necessary for active adaptive management for climate and landscape change”).

403. See *id.*

404. See 16 U.S.C. §668dd(a)(4)(N).

405. See BEAN & ROWLAND, *supra* note 6, at 283; FISCHMAN, *supra* note 6, at 32.

significant ecological restoration projects. In so doing, the Refuge and Conservation Area is positioned to advance several significant conservation objectives and realize the connected conservation network vision of the Refuge System as set forth in the Refuge Improvement Act. This is an example worth replicating.

But replicating this approach in other regions and landscapes throughout the country must be done strategically and with a constant eye toward achieving specific conservation goals. This will require a careful analysis of the services and disservices provided by the working lands being considered for inclusion in a particular initiative, whether such an approach is necessary and appropriate for the region or more suitable alternatives exist, and to what extent the lands should be integrated into the broader conservation landscape.⁴⁰⁶ To this end, it is critically important that FWS adhere to the use of the best available science in identifying future landscape-level approaches.

FWS' use of geographic information system-based habitat-ranking mapping programs that integrate land cover and future land use layers and maps in the development of the Headwaters Refuge is a wise use of technology in the service of restoration. Similar mapping programs should be utilized in future landscape-level refuge initiatives. Moreover, as reflected in FWS' careful consideration of the Zwick and Carr study and others in the development of the Headwaters Refuge, close attention should be paid in assessing the development potential of the affected region, the wildlife resources at risk, and the specific conservation benefits that would be gained in employing a landscape-level conservation approach. By closely adhering to the conservation mission and following the best science, the Everglades Headwaters Refuge and Conservation Area and others like it will be well-positioned to advance the vision of the Refuge System across a broad and ever-changing landscape.

The conservation mission must also be faithfully applied in management decisions for large, landscape-level initiatives. FWS will need to work closely with ranchers to develop management plans to help minimize potential impacts and enhance native grassland communities.⁴⁰⁷ Further, while

every effort should be made to ensure maximum stakeholder support, there may be instances where, despite best efforts, a particular use may be incompatible with the purpose of the Refuge and Conservation Area or the mission of the Refuge System. In these instances, FWS will need to assert its authority under the law to ensure uses remain compatible and do not compromise conservation goals.⁴⁰⁸

V. Conclusion

So, whatever happened to the black bear M34? We may never know. After reaching maximum capacity, the automatic release of the bear's collar was triggered and it was recovered in the field approximately 30 miles from where he began his journey.⁴⁰⁹

Much like the fate of M34, the future of Florida and the many species that call it home remains uncertain. Seemingly relentless development continues to squeeze them into tighter and more fragmented areas with fewer places to go. But there is hope. M34's travels reveal that if we can maintain ecological connectivity, wildlife will not be relegated to islands interspersed in a sea of planned unit developments, big-box stores, and endless roads. The Everglades Headwaters Refuge and Conservation Area and similar landscape-level initiatives are poised to provide us with a long-awaited opportunity to preserve the necessary connections between conservation lands, provide the corridors that are essential for species movement, and restore the lands and waters upon which Florida's wildlife depend.

Successfully implementing and refining this vision will take strong leadership, close collaboration among a diverse group of stakeholders, and a unified commitment among all involved federal and state interests. Doing so will not only realize the mission of the Refuge System set forth in the Refuge Improvement Act nearly 20 years ago, but will also provide countless animals the room to roam that they so desperately need.

406. See Swain et al., *supra* note 164, at 75-76. Also, cattle production carries with it additional environmental impacts associated with distribution and feedlots, to name a few. See *id.*

407. See NOSS & COOPERRIDER, *supra* note 73, at 258-60. Considerations may include the number of cattle grazing at any particular time in a given area as well as the use of prescribed fire and mechanical clearing to maintain optimal grassland conditions. See Noss, *supra* note 165, at 226-27.

408. FWS has authority under the Supremacy and Property Clauses of the U.S. Constitution to protect federal lands where irreconcilable conflicts arise and threaten refuge resources. See *Wyoming v. United States*, 279 F.3d 1214, 1234 (10th Cir. 2002) (finding national wildlife refuge regulation preempts state management of fish and wildlife resources where the two conflict or where state management and regulation "stand as an obstacle to the accomplishment of the full purposes and objectives of the Federal Government"); *National Audubon Soc'y v. Davis*, 307 F.3d 835, 33 ELR 20058 (9th Cir. 2002) (finding Congress has the authority under the Property Clause to preempt state regulation of trapping on refuge lands through the Refuge Improvement Act where state regulations conflict with federal management authority).

409. Florida Wildlife Corridor, *supra* note 1.