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

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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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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. 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.”

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.” The Refuge System is the only federal land that is managed chiefly for wildlife conservation. Today, it includes more than 560 national wildlife refuges spanning across 150 million acres. 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. Nearly 400 threatened and endangered plants and animals occur on refuge lands and millions of birds use refuges during their annual migrations. The Refuge System receives more than 45 million visitors each year. Each state has at least one refuge, and there is one within an hour’s drive of every major metropolitan area in the country.

The evolution of the Refuge System has not followed a clear trajectory in the service of wildlife protection. In particular, the establishment of individual refuges has not always focused on achieving a connected network of conservation lands. 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, but its roots can be traced back to presidential proclamations beginning in the 1860s. 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. 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. Following successful efforts by the American Ornithologists Union and (what is now) the National Audubon Society to persuade Florida to pass a


16 U.S.C. §668dd(a)(2). (2)


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

9. Id.


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.


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."28

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 Refuges 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 Refuges 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 existing instances in which uses of refuges were interfering with wildlife conservation, including overgrazing of upland sagebrush and recreational disturbances

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, https://www.fws.gov/refuge/Pathfinder/about.html (last visited Nov. 18, 2016).
21. Id.
22. See BEAN & ROWLAND, supra note 6, at 284.
23. Id. at 284; FISCHMAN, supra note 6, at 37.
25. FISCHMAN, supra note 6, at 37.
26. Id. at 37; 39; see also FREYFOGLE & GOBLE, supra note 14, at 210.
to wildlife. After passage of the National Environmental Policy Act (NEPA) in 1970, FWS prepared an environmental impact statement (EIS) for a proposed management plan for the Refuge System in 1976. 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 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.
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.
49. 16 U.S.C. §§668dd, 668ee.
sary to correct or mitigate these problems. CCPs must also identify opportunities for compatible wildlife-dependent recreational uses. 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.

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.” 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.”

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, 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, 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.

Biological reserves have played a critical role in protecting biodiversity from human exploitation, habitat loss, and exotic and invasive species in the United States. As E.O. Wilson explains, America’s conservation movement—born during the 19th and early 20th centuries—came late, but “mercifully not too late.” 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.

Unfortunately, the anchor-based approach of protecting independent, spatially separated reserves has only been partially successful. Existing reserves are too few and too small to protect biodiversity in the face of ongoing natural resource exploitation, habitat loss, and climate change. 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. 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. Many national parks are also not large enough to sustain viable populations of larger mammals. Further, parks and other reserves are often not buffered from more intensive surrounding land uses.

62. Id. §668dd(3)(2)(F).
63. Id. §668dd(d)(3).
64. Id. §668dd(a)(3)(A).
65. Id. §668dd(a)(4)(D).
66. See Fischman, supra note 46, at 622.
68. See A Plan for Strategic Growth, supra note 27.
71. Id.
72. Id. at 74.
73. Reed E. Noss & Allen Cooperrider, Saving Nature's Legacy: Protecting and Restoring Biodiversity 71 (1994); Wilson, supra note 70, at 74.
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.
Given these limitations, existing reserves may help slow species loss, but not be enough to stop it.  

Most scientists agree that reserves are critical to conservation and that more reserves should be created.  These reserves must be larger, located in the right places, and better managed.  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, and in many instances the lack of political support, it may not always be possible to increase the size of existing reserves as the surrounding natural lands are too fragmented.  Further, a reserve approach that emphasizes stasis and natural stability may be inadequate given the potential for climate change to significantly alter existing ecosystems.  Simply increasing the size and number of biological reserves may be insufficient to conserve the nation’s biodiversity, given these challenges.  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.

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.  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.  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.  Thus, smaller remote islands have fewer species than large islands closer to the mainland, as they receive fewer immigrants and experience more extinctions.

The theory has been extremely important to scientists seeking to understand how extinction occurs and how to prevent it.  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.  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.

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.  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.  Maintaining or restoring habitat connectivity between large contiguous reserves and across large landscapes should be a priority.  In sum, these design principles seek to maintain large, contiguous blocks of habitat containing

78. Michael L. Rosenzweig, Beyond Set-Aside: 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 635-38 (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. Glickman & Graeme S. Cumming, Landscape Level Management of Parks, Refuge, 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 E. Noss et al., BOLDER THINKING FOR CONSERVATION, 26 CONSERVATION BIOLOGY 1, 3 (2011).
89. Noss & Cooperrider, supra note 73, at 220; 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.
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

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

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.


100. Id. at 1093, 1110.

101. Id. at 1093, 1109-10.


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.


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.


111. Id. at xii.

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

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

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. 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. 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.

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. 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. 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.

An LCD is developed by one of 22 landscape conservation cooperatives (LCC). 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. 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.

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). 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.

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. 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. The report contains several goals, which include supporting landscape conservation through economic incentives, technical assistance, and targeting federal expenditures toward conservation of working lands.

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.” Citing a “growing awareness among federal agencies that protecting large landscapes,
wildlife and watersheds requires collaborative management across ownerships.\textsuperscript{130} It calls on federal land managers to “partner beyond their boundaries” to achieve landscape-level benefits, including the creation of wildlife migration corridors,\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.”\textsuperscript{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, \textit{Conserving the Future: Wildlife Refuges and the Next Generation}.\textsuperscript{135}

2. \textbf{Conserving the Future: Wildlife Refuges and the Next Generation}

In conjunction with the AGO, FWS issued a new vision statement in 2011 entitled \textit{Conserving the Future: Wildlife Refuges and the Next Generation}.\textsuperscript{136} Citing population growth, troubles with the nation’s economy, increased climate change concerns, and additional habitat losses and fragmentation since the publication of \textit{Fulfilling the Promise},\textsuperscript{137} \textit{Conserving the Future} emphasizes a landscape-level approach to conservation and working on facilitating conservation benefits beyond refuge boundaries.\textsuperscript{138} Explaining that FWS had previously focused primarily on what occurred within refuge boundaries “in isolation from the landscape around them,” FWS states, “[W]e realize we must view and manage refuge lands as pieces of fabric woven into a landscape-level tapestry of conservation.”\textsuperscript{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.”\textsuperscript{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.”\textsuperscript{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.\textsuperscript{142} To guide decisionmaking, the plan calls for increased collaboration with state and wildlife agencies\textsuperscript{143} and guidance from state wildlife plans,\textsuperscript{144} and highlights the use of newly developed LCCs to lead biological planning and conservation design.\textsuperscript{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.\textsuperscript{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.”\textsuperscript{147}

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

3. \textbf{2014 National Wildlife Refuge Strategic Growth Policy}

Following its release of \textit{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 \textit{Conserving the Future}.\textsuperscript{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.\textsuperscript{149}

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

\textsuperscript{130} Id.
\textsuperscript{131} Id.
\textsuperscript{132} Id. at 56.
\textsuperscript{133} Id. at 61.
\textsuperscript{134} Id.
\textsuperscript{135} FWS, \textit{Conserving the Future—Progress Report 1} (2012).
\textsuperscript{136} Id. at 9.
\textsuperscript{137} Id. at 17, 31, 39.
\textsuperscript{138} Id. at 31.
\textsuperscript{139} Id.
\textsuperscript{140} Id. at 39.
\textsuperscript{141} Id. at 40.
\textsuperscript{142} Id.
\textsuperscript{143} Id. at 12.
\textsuperscript{144} Id. at 30.
\textsuperscript{145} Id. at 31.
\textsuperscript{146} Id. at 40.
\textsuperscript{147} Id. at 42-43.
\textsuperscript{148} FWS, Strategic Growth Policy, 602 FW §5.5 (Sept. 4, 2014).
\textsuperscript{149} Id.
\textsuperscript{150} Id.
North American Waterfowl Management Plan, and conserving migratory birds of conservation concern.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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 of 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.\textsuperscript{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.\textsuperscript{155} Some prominent biologists have argued that at least 50% of the world should be devoted to wild nature.\textsuperscript{156} Others contend that humans have altered earth so much that we are already at the end of the Holocene epoch\textsuperscript{157} and entering a new geological epoch known as the “Anthropocene,” in which humans dominate every aspect of the planet’s ecology.\textsuperscript{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.\textsuperscript{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.”\textsuperscript{160} The debate has led some scientists to call for a unified approach,\textsuperscript{161} identifying complementary roles for both viewpoints.\textsuperscript{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.\textsuperscript{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.\textsuperscript{164} Some vertebrates of high conservation concern use—and even prefer—improved or semi-improved pasture over native grasslands.\textsuperscript{165} Two examples are the crested caracara (\textit{Caracara cheriway}) and the burrowing owl (\textit{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.\textsuperscript{166} Pasture constitutes the highest percentage of habitat cover type found within the home ranges of breeding caracaras, and FWS has cited conversion of pasture to other uses as a reason for concern.\textsuperscript{167} Researchers recently found that 82% of active caracara nest sites studied occurred on privately owned cattle ranches.\textsuperscript{168}

\begin{thebibliography}{9}
\bibitem{151} Id. \textsection5.8.
\bibitem{152} Id. \textsection5.9.
\bibitem{153} Id. \textsection5.11.
\bibitem{154} See, e.g., Miller et al., \textit{ supra note 115}.
\bibitem{156} Id.; \textit{Wilson}, supra note 70.
\bibitem{157} \textit{Wilson}, supra note 70, at 9.
\bibitem{158} Aquatic biologist Eugene Stoermer may have first coined the term “Anthropocene” in the early 1980s. \textit{Wilson}, supra note 70, at 9. The Dutch chemist Paul Crutzen is also credited for coming and popularizing the word “Anthropocene” to characterize the current, human-dominated geological epoch. See Elizabeth Kolbert, \textit{The Sixth Extinction: An Unnatural History} 107-10 (2014); \textit{Wilson}, supra note 70, at 9.
\bibitem{159} Peter Kareiva et al., \textit{Conservation in the Anthropocene: Beyond Solitude and Fragility, Breakthrough J.} (Winter 2012).
\bibitem{160} \textit{Wilson}, supra note 70, at 77-78.
\bibitem{162} Hunter et al., \textit{ supra note 155}, at 641-45.
\bibitem{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=GlNMBzVPOg (stating that there needs to be greater attention to semi-natural landscapes).
\bibitem{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., \textit{Trade-Off Among Ecosystem Services and Disservices on a Florida Ranch}, 35 Rangelands 75-76 (2013).
\bibitem{165} Reed F. Noss, \textit{Forgotten Grasslands of the South: Natural History and Conservation} 226 (2013).
\bibitem{167} FWS, \textit{Multi-Species Recovery Plan for South Florida: Audubon’s Crested Caracara} 4-226 [hereinafter Caracara Recovery Plan].
\bibitem{168} Noss, \textit{ supra note 165}, at 226 (citing Morrison & Humphrey, \textit{ supra note 166}).
\end{thebibliography}
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, is increasingly relying on pastures, residential areas, and other areas that contain very short grasses. Although the reasons for why these species rely heavily on pasturelands are not entirely clear, coevolution with megaherbivores and historically more fires across the landscape could be factors.

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. 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.

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 is a self-fulfilling prophecy.

First, a growing body of research has pointed to the effectiveness of biological reserves in protecting biodiversity. While existing reserves may not be adequate in their number and size to stave off the “sixth extinction,” they have helped to slow species extinction. 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. 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. Many natural ecosystems remain largely intact and retain key ecological functions and species, even amidst significant climate and other human disruption.

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.” 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, the introduction of invasive species, and water quality degradation.

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. 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). In the southern portion of the Everglades headwaters region, land use is 70% agriculture, most


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).


174. Hance, supra note 69; Coeetze 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.


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 & COOPERBREEDER, supra note 73, at 230-40.

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


184. Swain et al., supra note 164, at 76.
of which are ranchlands. 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. 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.

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. 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.”

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. 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. 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, 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. 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,
open water, and freshwater marshes.\textsuperscript{194} The region provides the last remaining habitat for the highly endangered Florida grasshopper sparrow,\textsuperscript{195} serves as an essential linkage between subpopulations of the Florida black bear,\textsuperscript{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,\textsuperscript{197} as well as hundreds of thousands of acres of ranchlands.\textsuperscript{198}

Ranching is a predominant land use in the headwaters of the Everglades\textsuperscript{199} and has a long history in Florida.\textsuperscript{200} In 1521, the Spanish conquistadors introduced the first cattle to the United States in present-day Florida.\textsuperscript{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.\textsuperscript{202} Today, the state ranks 10th in the nation for number of beef cattle herds\textsuperscript{203} and two-thirds of the state’s cattle are cattle to the United States in present-day Florida.\textsuperscript{200}

Today, the state ranks 10th in the nation for number of beef cattle herds,\textsuperscript{203} and two-thirds of the state’s cattle are found throughout the Greater Everglades ecosystem.\textsuperscript{204}

Most large ranches in central Florida in the dry prairie ecosystem landscape are mosaics of native grasslands, and semi-improved and improved pastures.\textsuperscript{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.\textsuperscript{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.\textsuperscript{207}

This region is facing and will continue to face significant development pressure.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.”\textsuperscript{211} Further, during the past 70 years, Florida has experienced 8 to 16 inches of sea-level rise\textsuperscript{212} and communities in coastal South Florida are already expecting another 14 to 26 inches of sea-level rise by 2060.\textsuperscript{213} Seas could rise by five feet by the end of the 21st century.\textsuperscript{214} As a result, development patterns may shift more inland.\textsuperscript{215}

Building upon the Zwick and Carr report, the FWC released a report, \textit{Wildlife 2060: What's at Stake for Florida?}, detailing the implications of such growth on the state’s conservation lands and wildlife.\textsuperscript{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.\textsuperscript{217} The development of these areas will cause the state’s wildlife management areas, parks, forests, and pre-
serves to become increasingly isolated from one another.120 These disconnected habitat fragments will support fewer species that will become more vulnerable to extinction as their genetic viability decreases.121 The increase in development will carry with it more roads, putting wildlife at even greater risk of injury and mortality.122 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.123

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.124 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.125 The FWC report found that Florida black bears may lose 2.3 million acres of habitat by 2060.126 For a species that is already relegated to seven disjunct and increasingly isolated subpopulations,127 additional habitat loss and fragmentation will likely exacerbate threats from genetic isolation and road mortality.128

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.129 Despite these recommendations, the state has cut funding for its premier land acquisition program—Florida Forever130—by 94% since 2008.131 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.132 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.133 The Florida Department of Agriculture’s recent investments in conserving ranchlands through its Rural and Family Lands Protection Program134 are encouraging,135 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.136 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.137

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-

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220. See FWS, supra note 121, at 13.
221. Id. at 14.
222. 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).
223. 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. QUAMMIN, supra note 76, at 515-19, 542 (citing the work of Mark Shaffer, who studied the inbreeding 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).
224. See CERULEAN, supra note 216, at 4.
central 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.
241. Id. at 1.
250. 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.
251. See Suprainfra Part L.D.; see also supra, note 234.
omption 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. 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.

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, and listed as endangered since 1986, this non-migratory grasshopper sparrow subspecies is endemic to the dry prairie of central and southern Florida. Approximately 90% of the bird’s native dry prairie habitat has been lost, mostly due to its conversion to improved pasture lands and agriculture. A habitat specialist, the Florida grasshopper sparrow relies on fire every two to three years to maintain its habitat. The loss of suitable habitat from overgrazing, improper fire regimes, and flooding of nesting sites may also be impacting the population.

In recent years, the grasshopper sparrow population has declined precipitously, with fewer than 150 remaining in conservation lands is critically important for species such as the Florida grasshopper sparrow. Perhaps the most endangered bird in the continental United States, and listed as endangered since 1986, this non-migratory grasshopper sparrow subspecies is endemic to the dry prairie of central and southern Florida. Approximately 90% of the bird’s native dry prairie habitat has been lost, mostly due to its conversion to improved pasture lands and agriculture.

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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 lands and the preliminary numbers for the 2016 breeding season are looking “bleak.” 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.

Once considered the strongest, the population at Avon Park has dramatically declined and may be functionally extirpated. As a result of the bird’s decline, FWS has initiated a captive breeding program, with the first chicks hatching in 2016.

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. Thus, in any given year, a relatively small portion of the landscape may be suitable habitat. Because of these factors, a very large natural landscape is likely necessary for the species’ long-term viability. 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.

Presently, FWS is working with ranchers in the region to restore and enhance Florida grasshopper sparrow habitat, 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, FWS could increase the spatial extent of native prairie and establish a new breeding population, ultimately linking currently isolated populations.
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 living organisms, the genetic differences among them, and communities and ecosystems in which they occur.” Biolog-ical 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.” 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.” 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.

In recent years, many have written about the importance of establishing connectivity through ecological corridors, and the creation and protection of wildlife corridors has become central practice in protecting biodiversity. 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. Corridors can help diminish isolation among populations and increase opportunities for biological interactions. 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.

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. 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.

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. These efforts led to the Florida Legislature establishing the Florida Greenways program and the Florida Ecological Greenways Network (FEGN). The FEGN is continually updated and serves as the foundation for landscape-level conservation priorities within the state’s Florida Forever land acquisition program.

The “Florida Wildlife Corridor” campaign was established to communicate the vision of the critical linkages identified in the FEGN to a wider audience. 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. The expedition team completed a second, equally long trek from the Everglades headwaters to Gulf Island National Seashore in the Florida Panhandle.

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 Okeechobee, 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. The footprint of the Conservation Partnership Area is also within a “critical linkage” identified by the FEGN.

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 & Cooper, supra note 73, at 158.
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.\textsuperscript{292} The planning area for the Refuge and Conservation Area includes bears in one of the seven state subpopulations.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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 spatial 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.\textsuperscript{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.\textsuperscript{301} A corridor could be established within the headwaters region to facilitate the movement of panthers from South Florida to habitats in the north.\textsuperscript{302}

\section*{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.\textsuperscript{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.

\section*{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.\textsuperscript{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.\textsuperscript{305} These activities resulted in more than 1,000 miles of levees, 720 miles of canals, and nearly 200 water

\begin{itemize}
\item \textsuperscript{292} See Mary R. Stratman et al., \textit{Long Distance Movement of a Florida Black Bear in the Southeastern Coastal Plain}, 12 \textit{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).
\item \textsuperscript{293} \textit{Land Protection Plan for the Establishment of the Everglades Headwaters National Wildlife Refuge and Conservation Area}, supra note 190, at 95; \textit{see also Florida Black Bear Management Plan}, supra note 196.
\item \textsuperscript{294} Tom Hctor, \textit{Keep Bears on the List}, \textit{Tampa Bay Times}, June 25, 2011.
\item \textsuperscript{295} Id.
\item \textsuperscript{296} \textit{See Tom Hctor, Updating the Florida Ecological Greenways Network, Final Report 51} (2013).
\item \textsuperscript{297} \textit{See id.}
\item \textsuperscript{298} \textit{See Jeremy D. Dixon et al., Effectiveness of a Regional Corridor in Connecting Two Florida Black Bear Populations}, 20 \textit{Conservation Biology} 155-62 (2006).
\item \textsuperscript{299} \textit{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).
\item \textsuperscript{302} \textit{See Hctor, supra note 296, at 58.}
\item \textsuperscript{303} \textit{See discussion infra Part I.D.}
\item \textsuperscript{304} \textit{National Academy of Sciences, Progress Toward Restoring the Everglades: The Fifth Biennial Review} ix (2014); \textit{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).
\item \textsuperscript{305} Id.
\end{itemize}
control structures.\textsuperscript{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.\textsuperscript{307}

The result has been increasing flows to receiving waters during wet periods and the unavailability of water during periods of drought.\textsuperscript{308} These increased flows have resulted in harmful and damaging algal blooms in coastal estuaries.\textsuperscript{309} These hydrologic alterations have also had significant impacts on the composition, distribution, and abundance of wading birds throughout the Everglades ecosystem\textsuperscript{310} and the water that remains in the system is heavily polluted by phosphorus and other contaminants from agriculture and urbanization.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.


\textsuperscript{307} See National Academy of Sciences, supra note 304, at ix, 20-21.

\textsuperscript{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).

\textsuperscript{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).

\textsuperscript{310} National Academy of Sciences, supra note 304, at 20-21.

\textsuperscript{311} Id. at ix.

\textsuperscript{312} Id.

\textsuperscript{313} Id. at 1.


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.”\textsuperscript{316} Through land acquisition and conservation easements, FWS has the potential to restore more than 30,000 acres of wetlands.\textsuperscript{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 cutthroat 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.\textsuperscript{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.\textsuperscript{319} Water is retained on-site and naturally dissipates through evaporation, transpiration, or seepage underground.\textsuperscript{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.\textsuperscript{321} These shallow water retention areas can also provide habitat for various species from amphibians to wading birds\textsuperscript{322} and in some instances may provide certain water quality benefits.\textsuperscript{323}

These projects are funded through a variety of mechanisms, including a payment for a environmental services program that pays ranchers for retaining water on range-lands as well as cost-share programs with federal, state, or local governments, including the USDA’s Natural Resource Conservation Service.\textsuperscript{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

\textsuperscript{316} Establishment of Everglades Headwaters National Wildlife Refuge and Conservation Area, supra note 4.

\textsuperscript{317} Final Environmental Assessment for the Establishment of the Everglades Headwaters National Wildlife Refuge and Conservation Area, supra note 166, at 132.

\textsuperscript{318} Id.


\textsuperscript{320} Id.

\textsuperscript{321} Id. at 2, 6.

\textsuperscript{322} Id. at 2; Dr. Paul Gray (Personal Communication with author).

\textsuperscript{323} Florida Ranchlands 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).

\textsuperscript{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. 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. 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.

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. 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. 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.” 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. 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.

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, 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. 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. The federal and state interests need to work together to avoid such conflicts and protect their significant financial and ecological investments in the region.

332. Establishment of 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).


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 recreational 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

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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).
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 inure 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).
340. See Berger & Cain, supra note 278, at 114-50 (discussing the significant role stakeholder collaboration had in creating the “Path of the Pronghorn”—the first federally protected migration corridor in the United States).
342. Id.
343. Id. at 8.
344. See Fla. Const. art. I, §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.
protect the public's safety. 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). 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.

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. 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. 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.

For many hunters, backcountry camps are sites for important community and family events. They hold social importance as they help maintain a sense of community and other programs can help foster a sense of ownership among property owners in the Partnership Area. 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, and working with multiple agencies in advancing a landscape-level endangered species conservation program. 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.


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 (statting 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.sciencemag.com/article/roadkill-endangers-enderged-wilde. 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 Territorial 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/bea. (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/en/gpn/ba/banff/transport/chc-rtc/rapises-crossing.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 Secretary of the Interior, as appropriate, 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(4).

354. The “protected” species appears in 16 CFR 674.12 (notably, alligator hunters) as they traversed its wet prairies and tree islands in search of game.

355. See Wyborn & Bixler, supra note 334.

356. Id.


359. See 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.\footnote{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.”}

While sparsely populated until the 1940s,\footnote{362}{South Florida Water Management District, Kissimmee River Management Areas Ten-Year General Management Plan 2014-2024, at 13 (2014).} 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.\footnote{363}{Id.} It remains one of the most popular recreation areas in southern Florida, with fish camps dating back to the 1920s.\footnote{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. Some scholars have observed that this marginalization may stem from past land preservation efforts, 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.}

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.\footnote{365}{Id. at 18, 29.} While many of these concerns have subsided,\footnote{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).} 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.\footnote{367}{Laura Ogden, The Everglades Ecosystem and the Politics of Nature, 110 Am. Anthropologist 21, 28 (2008).}

This is particularly important for the Everglades Headwaters 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.\footnote{368}{Id.} 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.\footnote{369}{Studies have shown that refuges and other protected areas succeed in protecting biodiversity where local communities understand and embrace conservation measures. This requires education that builds social and political support. 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. Environmental education is also important in teaching local communities (including the

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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. Studies have shown that refuges and other protected areas succeed in protecting biodiversity where local communities understand and embrace conservation measures. This requires education that builds social and political support.

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

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. 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.

Yet, adaptive management may prove challenging in instances where FWS relies on conservation easements—and not fee simple acquisitions—to protect lands. 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. 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.

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). Additional options may also include later modifying or amending conservation easements as environmental conditions change.

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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).


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=fnJ3YIDJYIE.


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 Neo-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 Jaclyn Lopes, Biodiversity on the Brink: The Role of “Assisted Migration” in Managing Endangered Species Threatened With Rising Seas, 39 HARV. ENVTL. L. REV. 157 (2015).


387. 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 Rismann 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. Risman, et al., Adapting Conservation Easements to Climate Change, 68 CONSERVATION BIOLOGY 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).

388. See generally Jessica Owley, Conservation Easements at the Climate Change Crossroads, 74 LAW & CONTEMP. PROBS. 199 (2011).
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. Therefore, any conservation easement that is not in perpetuity may not be recognized under the law. Likewise, any subsequent attempts to modify or amend the terms of such an easement could be disfavored by the courts. 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.

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, and explain how the management of each property will advance the mission of the Refuge and Conservation Area. Second, the terms should be broad enough to provide flexibility as conditions change. 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. These ranch management plans could also be integrated into the CCP. Lastly, FWS should commit to a rigorous monitoring program to track the impacts of climate change on specific management actions.

Monitoring is both a critically important tool for climate change adaptation and a key component of the Refuge Improvement Act.

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 national wildlife refuge and conservation area. This central, unifying conservation mission is what distinguishes the Refuge System from other federal land management programs, 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 supported by the best science.

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, 53 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 Supp.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 Schwenger v. Secretary of the Interior, 720 F.3d 571 (9th Cir. 1983), ranchers sought a 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 Schwenger 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. 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, 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.”).
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. 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. 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.

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.

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 preemptms 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, 53 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.