Advising Noah:A Legal Analysis of Assisted Migration

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- Editors' Summary –

Climate change will likely lead to dramatic transformations of habitats critical to many species. One proposed solution to this problem is assisted migration. No federal agency has yet developed any rules specifically regarding assisted migration in response to climate change. However, the existing laws, regulations, and policies do provide guidance that would affect any federally sponsored or permitted assisted migration program. This Article examines those laws, regulations, and policies currently in place that may challenge or facilitate assisted migration programs. Given this legal structure, we find that assisted migration is a legal option on most federal lands under certain circumstances.

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S cientific modeling and monitoring suggest that humaninduced climate change may be occurring more swiftly than was initially anticipated by scientists.¹ One result of such change will likely be rapid, dramatic transformations of habitats critical to many species. As the climate changes, the ecological niches on which many species depend may disappear or shift in location. Many species, however, will not be able to shift with them for a variety of reasons, and one proposed solution to this problem may be assisted migration, also referred to as assisted colonization. This analysis will focus on those laws, regulations, and policies currently in place that may impede or challenge the legality of deliberately introducing species to areas in which they are not native, as well as those laws that would encourage or facilitate such endeavors.

The purpose here is only to analyze how assisted migration may fit into our existing legal framework. This Article does not attempt to evaluate the ecological or ethical virtues of assisted migration, nor does it consider agency management priorities or budgetary constraints. As of this writing, no federal agency has explicitly developed any rules specifically regarding assisted migration in response to climate change. However, there are many existing laws, regulations, and policies that do guide agencies, and would affect any attempted assisted migration that was either carried out by a federal agency, or that utilized federally managed lands or funds. Our hope is that biologists, land managers, and others who are currently debating the ethics, utility, and feasibility of assisted migration can use this legal analysis as part of that dialogue.

I. What Is Assisted Migration and Why Is Everyone Talking About It?

Over the next several decades, as the effects of global climate change are realized, the suitable habitats for many plant and animal species will shift to higher latitudes or altitudes, and many species may not be able to follow on their own.² "Compelling evidence suggests that climate change will be a significant driver of extinction."³ Assisted migration is simply the action of picking up and moving certain individuals or populations of species that either cannot or will not be able to migrate on their own in response to the rapidly changing climatic conditions expected over the next several decades.⁴ This failure to migrate may be due to the nature of the species itself (for example, the species may not be vagile or may be highly philopatric) or because the habitat has become so fragmented

^{1.} Carl Zimmer, A Radical Step to Preserve a Species: Assisted Migration, N.Y. TIMES, Jan. 23, 2007, available at http://www.nytimes.com/2007/01/23/ science/23migrate.html.

Bob Holmes, Assisted Migration: Helping Nature to Relocate, New SCIENTIST, Oct. 6, 2007, at 46.

^{3.} Jason S. McLachlan et al., A Framework for Debate of Assisted Migration in an Era of Climate Change, 21CONSERVATION BIOLOGY 297, 297 (2007).

^{4.} See Holmes, supra note 2.

due to human development that migration to new suitable areas is impossible.⁵ Assisted migration efforts may also include the less invasive method of creating new migratory corridors through which species could migrate independently. It has been estimated that 22 to 52% of the world's species will need to relocate in order to survive.⁶ At least 10% of all species will not be able to disperse to new locations on their own.⁷ The scientific community continues to be divided over whether assisted migration could be a useful tool or another hubristic mistake, but the idea is being taken seriously in scientific literature.⁸ While scientists debate the ecological utility of this tool, some have also recognized that the current legal framework may be an additional obstacle to assisted migration.⁹ Some scientists consider the matter urgent. For instance, Jason McLachlan and his colleagues state, "the magnitude of impending climate-driven extinctions requires immediate action."10 The legal community needs to weigh in on what those actions ought to look like and why. To a large extent, the legal viability of such a program will depend on where the species are moved to, which species they are, and who will do and/or fund the moving. We will address each of these issues in turn.

II. Where Will Species Be Moved?

Federal land management is not a uniform system; each land management agency has its own unique legal responsibilities. Private lands on the other hand, assuming the owners are willing participants, will be far less restricted in their decision to accept species relocated through assisted migration. State land use regulations will vary widely across the country. Intuition suggests that states that currently have more rigorous regimes in place to thwart the advance of exotic species will be less easily accessed by assisted migration programs than other states, but each state's laws would have to be examined individually, something that is beyond the scope of this Article. Here, we will focus on the laws and policies that affect federal public lands.

A. National Park Service Lands

Management of National Park Service (NPS) lands is governed primarily by two statutes, the National Park Service Organic Act and the General Authorities Act and its amendments. The

9. Holmes, *supra* note 2, at 47-48.

Organic Act states that the purpose of the park system is to: "Conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them *unimpaired* for the enjoyment of future generations."¹¹

The 1978 Redwood Amendments to the General Authorities Act state that:

The Authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall *not be exercised in derogation* of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.¹²

The NPS, as stated in its *Management Policies 2006*, has determined that the Organic Act's "no impairment" language and the Redwood Amendment's "no derogation" language together represent a single standard for park land management.¹³

The NPS defines impairment as an impact that would harm the integrity of park resources or values. Whether an impact meets this definition depends on the particular resources and values in question, as well as the relevant characteristics of the impact.¹⁴ Furthermore, the NPS regards the park resources that are subject to the "no impairment" standard as including all aspects of the parks' natural systems and communities.¹⁵ The NPS takes a precautionary approach to these issues. "In cases of uncertainty as to the impacts on park natural resources, the protection of natural resources will predominate."16 Finally, in the absence of apparent human impacts or unusual risks (like the presence of endangered or threatened species), the NPS strives to avoid meddling in the natural systems that it protects, preferring to rely on natural processes to maintain the communities in its care.¹⁷ The NPS, therefore, has adopted a broad understanding of its mission to maintain park resources unimpaired and takes a very conservative position on the question of human interference.

Malcom L. Hunter Jr., Climate Change and Moving Species: Furthering the Debate on Assisted Colonization, 21 CONSERVATION BIOLOGY 1356, 1356 (2007).

Chris D. Thomas et al., *Extinction Risk From Climate Change*, 427 NATURE 145, 145 (2004) (estimating a minimum range of 22% species extinction without dispersal in a conservative climate change model, and a maximum range of 52% species extinction without dispersal in a severe climate change model).

^{7.} Holmes, *supra* note 2, at 47 (quoting Dov Sax of Brown University).

^{8.} Id. at 49 (citing several scientists on both sides of the debate and stating "most of the ecologists thinking about assisted migration believe it deserves a place in the conservationist's tool kit—if only as a last resort"); see also Douglas Fox, When Worlds Collide, CONSERVATION, Jan.-Mar. 2008, at 28, 30 (quoting Richard Primack, a plant ecologist at Boston College, who says: "When you go to meetings, people are talking about this . . . [s]ome people think it's a good idea, and other people become quite angry when I mention this.").

^{10.} McLachlan et al., *supra* note 3, at 301.

^{11. 16} U.S.C. §1 (2007) (emphasis added).

^{12. 16} U.S.C. §1a-1 (2007) (emphasis added).

NAT'L PARK SERV. (NPS), U.S. DEP'T OF THE INTERIOR (DOI), MANAGEMENT POLICIES 2006, at 10 (2006), *available at* http://www.nps.gov/policy/MP2006. pdf [hereinafter MANAGEMENT POLICIES].

^{14.} *See id.* at 12. Such a determination will depend on "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." *Id.*

^{15.} The NPS defines "park resources and values," in part, as: the park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; natural visibility, both in daytime and at night; natural landscapes; natural sundscapes and smells; water and air resources; soils; geologic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals.

Id.

^{16.} Id. at 36.

^{17.} *Id.* at 44 (stating that, "[w]henever possible, natural processes will be relied upon to maintain native plant and animal species and influence natural fluctuations in populations of these species").

NEWS & ANALYSIS

39 ELR 10415

Also relevant to this analysis, the NPS has pledged to "prevent the introduction of exotic species into units of the national park system."¹⁸ The *Management Policies* define native species as "all species that have occurred, now occur, or may occur as a result of *natural processes* on lands designated as units of the national park system."¹⁹ On the other hand, exotic species are defined as "those species that occupy or could occupy park lands directly or indirectly as the result of deliberate or accidental human activities."²⁰ As such, the NPS has stated that, "[b]ecause an exotic species did not evolve in concert with the species native to the place, the exotic species is not a natural component of the natural ecosystem at that place."²¹

The Management Policies generally prevent exotic species from being deliberately introduced onto park system lands.²² However, exceptions are possible "in rare situations" to meet "identified management needs" if at least one of a list of specific criteria have been met.²³ The most relevant of these criteria include exotic species that are "a closely related race, subspecies, or hybrid of an extirpated native species," or exotic species that are "an improved variety of a native species in situations in which the natural variety cannot survive current, humanaltered environmental conditions."24 Thus, it is possible that the NPS could identify assisted migration as a management need resulting from climate change-related species threats in the case of species very similar to or closely related to native park species that cannot tolerate the new climatic conditions. Similarly, the NPS generally strives to restore extirpated species to parks where they disappeared as a result of humaninduced factors.25

In general, the courts have given the NPS and its *Management Policies* a great deal of deference in the matter of defining impairment and applying that definition to actual situations. For instance, in *Southern Utah Wilderness Alliance v. National Park Service*, the court held that the Agency's *Management Policies* are "procedurally similar to formal regulations" that bind the agency, and are therefore "not a general statement of policy, but prescribe substantive rules" that deserve deference under the test laid out by the U. S. Supreme Court in *Chevron v. NRDC.*²⁶ Courts are therefore likely to support well-rea-

Id.
Id. at 43-44.

soned NPS determinations that are based on the prescriptions laid out in the *Management Policies*.²⁷

Together, these policy statements make it clear that the NPS is interested in assisted migration programs that are intended to reintroduce species extirpated from park lands by humans or well-documented human-created factors.²⁸ It is also clear that the NPS already welcomes new species that migrate into the park through natural processes, as this is part of a naturally dynamic ecosystem.²⁹ In light of this, the NPS might consider acquiring corridors to facilitate natural species migration onto NPS lands. Furthermore, it seems probable that the NPS would be willing to consider the introduction of species new to park lands, where these species are substantially related to species that were extirpated due to human-induced changes to park conditions.³⁰ The effects of climate change may well include changes to habitat that render it inhospitable for some native species. However, it does not seem likely, based on the NPS' current interpretations of law, that the NPS would be willing to consider the introduction of wholly new species into park ecosystems. Such species are currently labeled as exotic by the NPS and are therefore unwelcome, as they are not "natural components" of the "natural ecosystem," as those terms are currently defined. The NPS' pledge to maintain natural populations and natural processes, as well as its commitment to prevent the establishment of exotic species, appear contrary to the purposeful introductions of species entirely new to park lands. However, efforts that facilitate natural species migrations or the replacement of extirpated native species are consistent with current law and policy.

B. National Wildlife Refuge System

The U.S. Fish and Wildlife Service (FWS) manages the National Wildlife Refuge System pursuant to the National

Natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities. The Service will not attempt to solely preserve individual species (except threatened or endangered species) or individual natural processes; rather, it will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems. Just as all components of a natural system will be recognized as important, natural change will also be recognized as an integral part of the functioning of natural systems.

^{18.} Id. at 43.

^{19.} Id. (emphasis added).

^{22. &}quot;In general, new exotic species will not be introduced into parks." *Id.* at 47. There are specific narrow exceptions for fish stocking into "constructed large reservoirs or other significantly altered large water bodies" to provide for recreational fishing or to protect a treaty right. *Id.*

^{23.} Id.

^{24.} Id.

^{25.} Id. at 45. "The Service will strive to restore extirpated native plant and animal species to parks" whenever certain criteria are met. Id. (emphasis added). These criteria include the requirements that "[t]he species disappeared or was substantially diminished as a direct or indirect result of human-induced change to the species population or to the ecosystem," and "[t]he genetic type used in restoration most nearly approximates the extirpated genetic type." Id.; see also id. (stating that "[t]he Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act" (emphasis added)).

S. Utah Wilderness Alliance v. Nat'l Park Serv., 387 F. Supp. 2d 1178, 1187-89 (D. Utah 2005) (referring to Chevron U.S.A. v. Natural Resources Defense Council, 467 U.S. 837 (1984)); see also Davis v. Latschar, 202 F. 3d 359, 365 (D.C. Cir. 2000) (finding that since "the Organic Act is silent as to the specifics

of park management, the Secretary has especially broad discretion on how to implement his statutory mandate").

^{27.} See Sierra Club v. Mainella, 459 F. Supp. 2d 76, 100-01 (D.D.C. 2006) (holding that the NPS' impairment analysis does not deserve deference in this case because it did not include a well-articulated connection between the facts found and the conclusion reached; but supporting the NPS' reliance on the standards laid out in the *Management Policies*).

See MANAGEMENT POLICIES, supra note 13, at 39 (stating that the NPS will seek to restore areas disturbed by humans to their natural conditions and processes, including the restoration of native plants and animals).

^{29. &}quot;The Service will adopt park service resource preservation, development, and use management strategies that are intended to maintain the natural population fluctuations and processes that influence the dynamics of individual plant and animal populations, groups of plant and animal populations, and migratory animal populations in parks." *Id.* at 43. The NPS also states that:

Id. at 36.

^{30.} *See id.* at 47. On the other hand, the Agency is unlikely to support the introduction of closely related species capable of competing with species already present in the park.

ENVIRONMENTAL LAW REPORTER

5-2009

Wildlife Refuge System Improvement Act,³¹ the U.S. Fish and Wildlife Service Manual,³² and Refuge System Manual.³³ The Improvement Act states that the refuge system's mission is "to administer a national network of lands and waters for the 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."³⁴

To achieve this refuge system mission, the Improvement Act further specifies that the Secretary must, among other things:

(A) provide for the conservation of fish, wildlife, and plants, and their habitats within the System;

(B) ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans; . . .

(D) ensure that the mission of the System . . . and the purposes of each refuge are carried out, except that if a conflict exists between the purposes of a refuge and the mission of the 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.³⁵

Each of these requirements is pertinent to the discussion of assisted migration and will be analyzed in turn.

Under (A), the Improvement Act stipulates that: "The terms 'conserving,' 'conservation,' 'manage,' 'managing,' and 'management,' mean to sustain and, where appropriate, restore and enhance, healthy populations of fish, wildlife, and plants "36 The statute lays out several methods through which this can be accomplished, including "live trapping and transplantation."37 This demonstrates that the U.S. Congress recognized active management techniques as being appropriate for use to benefit species. Additionally, the Improvement Act provides authority to the Secretary to "temporarily suspend, allow, or initiate *any* activity in a refuge" if the Secretary decides that such action is "necessary to protect the health and safety of the public or *any* fish or wildlife population."38 Therefore, if an emergency were to be declared, such as an imminent extinction, the Secretary can undertake any activity deemed scientifically necessary to aid species, presumably including assisted migration.³⁹

In response to the mandate to maintain biological integrity, diversity, and environmental health (goal (B) above), the FWS authored the Biological Integrity, Diversity, and Environmental Health policy.⁴⁰ This policy "…clearly establishes that wildlife conservation is the singular National Wildlife Refuge System mission,"⁴¹ and states:

We may find it necessary to modify the frequency and timing of natural processes at the refuge scale to fulfill refuge purpose(s) or to contribute to biological integrity at larger landscape scales. For example, under historic conditions, an area may have flooded only a few times per decade. Migratory birds dependent upon wetlands may have used the area in some years, and used other areas that flooded in other years. However, many wetlands have been converted to agriculture or other land uses, the remaining wetlands must produce more habitat, more consistently, to support wetland-dependent migratory birds. Therefore, to conserve these migratory bird populations at larger landscape scales, we may flood areas more frequently and for longer periods of time than they were flooded historically.⁴²

Relative to the landscape context of each refuge, the policy states:

Biological integrity, diversity, and environmental health can be described at various landscape scales from refuge to ecosystem, national, and international In pursuit of refuge purposes, individual refuges may at times compromise elements of biological integrity, diversity, and environmental health at the refuge scale in support of those components at larger landscape scales.⁴³

Finally, this policy stresses that maintaining biological integrity may entail managing for a single species or community at some refuges and combinations of species or communities at other refuges. For example, a refuge may contain critical habitats for an endangered species. Maintaining that habitat (and, therefore, that species), even though it may reduce biological diversity at the refuge scale, helps maintain biological integrity and diversity at the ecosystem or national landscape scale.⁴⁴

These references emphasize that a refuge should not consider its resources in isolation, but rather in the context of the larger landscape. This indicates a strong potential for the use of assisted migration as a management tool on refuges to ensure landscape-scale ecological integrity.

In fact, some forms of assisted migration have already occurred within the refuge system, albeit for different underlying purposes. For instance, at St. Vincent National Wildlife Refuge (NWR) in Florida, endangered red wolves are raised on the refuge as part of the recovery program for the species.⁴⁵ In 1990, the wolves were put onto an island within the refuge where there are no historic records of wolf habitation, although the refuge lies within the historic range of the spe-

See National Wildlife Refuge System Act of 1997 §§1-9, 16 U.S.C. §668dd-668ee (2007) (amending the National Wildlife Refuge System Administration Act of 1966, Pub. L. No. 89-669, 80 Stat. 926 (1966)).

^{32.} See U.S. FISH & WILDLIFE SERV. (FWS), U.S. DOI, USFWS MANUAL: LAND USE AND MANAGEMENT SERIES, SERIES 600 (2008), available at http://www.fws. gov/policy/manuals (click hyperlink for Series 600).

See U.S. FWS., U.S. DOI, NATIONAL WILDLIFE REFUGE SYSTEM MANUAL 1-9 RM (on file with author).

^{34. 16} U.S.C. §668dd(a)(2).

^{35.} Id. §668dd(a)(4)(A)-(D).

^{36.} Id. §668ee(4).

^{37.} Id.

^{38.} Id. §668dd(k) (emphasis added).

^{39.} Following the initiation of emergency assisted migration efforts, compliance with alternative authorities would be necessary to continue the program.

See U.S. FWS., U.S. DOI, USFWS MANUAL: LAND USE AND MANAGEMENT SERIES: BIOLOGICAL INTEGRITY, DIVERSITY, AND ENVIRONMENTAL HEALTH, 601 FW 3 (2001), available at http://www.fws.gov/policy/601fw3.pdf.

^{41.} Id. 601 FW 3.7(A).

^{42.} Id. 601 FW 3.10(A)(5)

^{43.} Id. 601 FW 3.7(C).

^{44.} Id. 601 FW 3.10(A)(3).

U.S. FWS., U.S. DOI, RED WOLF RECOVERY/SPECIES SURVIVAL PLAN 17-20 (1990), *available at* http://ecos.fws.gov/docs/recovery_plan/901026.pdf.

NEWS & ANALYSIS

39 ELR 10417

cies.⁴⁶ The purpose for this relocation was to create a captive breeding colony in support of recovery goals in a wild setting, allowing for easy monitoring with little human interference and interaction. Wolves born on the island are later relocated to Alligator River NWR in eastern North Carolina to further the species' recovery in the wild.⁴⁷

What this case study demonstrates is the refuge system's efforts to comply with dual mandates, including "the declared national policy of saving endangered species,"⁴⁸ and the need to ensure biological integrity, diversity, and environmental health at a landscape level.⁴⁹ The goal is, therefore, to retain species representation across the landscape, and the policy supports this system-scale philosophy. However, implementing a system-scale philosophy can result in conflicting priorities. The FWS explains its priorities in this manner:

Unless we determine that a species was present in the area of a refuge under historic conditions, we will not introduce or maintain the presence of that species for the purpose of biological diversity. We may make exceptions where areas are essential for the conservation of a threatened or endangered species and suitable habitats are not available elsewhere. In such cases, we strive to minimize unnatural effects and to restore or maintain natural processes and ecosystem components to the extent practicable without jeopardizing refuge purpose(s).⁵⁰

So, in general, the refuge system does not permit the introduction of non-native species to a refuge in recognition of the requirement to maintain ecological integrity.⁵¹ However, this policy is readily overridden when the future of an endangered species is at risk. These references and the red wolf case study also demonstrate that the FWS allows for habitat alteration to draw species to a refuge to compensate for habitat losses elsewhere, especially where it will benefit recovery of an endangered or threatened speciesFinally, in goal (D) above, the Improvement Act specifies that refuges must be managed first and foremost in pursuit of achieving their legally defined purposes. Most refuges have relatively broad purposes, such as the conservation of migratory birds and/or endangered species, but a handful of refuges have species-specific purposes. For example, one purpose of the Coachella Valley NWR in southern California is to protect the federally threatened and state endangered Coachella Valley fringe-toed lizard.⁵² If climate change results in adverse changes to this species' habitat, both the Endangered Species Act (ESA)⁵³ and the Improvement Act direct the FWS to act. Such action could include the expansion of the refuge through acquisition to accommodate the species' migratory needs,⁵⁴ or the exploration of alternate sites to relocate this species.⁵⁵ Such relocations could move species onto nearby refuges or other protected lands to ensure land-scape-scale ecological integrity is maintained.⁵⁶ Additionally, as development continues to degrade the limited habitat of the fringe-toed lizard and it becomes increasingly fragmented, the refuge could consider assisting migration among these fragmented, island habitats to retain genetic integrity. Thus, use of assisted migration as a management tool is a legally viable option from this perspective, though it has yet to be tested.

The Improvement Act mandates that all uses on refuge lands be "compatible" with the purposes of the individual refuge and the mission of the refuge system.⁵⁷ The statute defines a compatible use as one that "will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge."⁵⁸ Only externally generated requests trigger a need for a compatibility determination,⁵⁹ and while many requests for assisted migration on a refuge will be generated internally, external requests are also likely.

A compatibility determination by the refuge manager is required before any activity can be permitted within a refuge. However, if [an external entity] should introduce wildlife onto refuge lands as a partner with the Service as a "refuge management activity" the compatibility determination would no longer be a major factor.⁶⁰

It therefore does not seem likely, that a compatibility determination will be a central feature of decisions regarding assisted migration in most cases, nor is it likely to present a major obstacle. If species migrate on their own to refuges where they were not previously occurring, however, the Manual states:

We require no action to reduce or eradicate self-sustaining populations of non-native, noninvasive species (e.g., pheasants) unless those species interfere with accomplishing refuge purpose(s). We do not, however, manage habitats to increase populations of these species unless such habitat management supports accomplishing refuge purpose(s).⁶¹

Hence, independently migrating species are welcome as long as they do not interfere with the refuge's legally defined purpose. As with the NPS, this could lead the refuge system to explore the possibility of the acquisition of corridors to assist migration.

What about species needing to be relocated outside of their historic range to ensure survival from global climate changes?

- The definition of the term "ecological integrity" has never been limited to the species' known historic range. U.S. FWS, *supra* note 40, 601 FW 3.
- 57. 16 U.S.C. §668dd(a)(3)(A).
- 58. Id. §668ee(1).
- 59. U.S. FWS, supra note 51, 603 FW 2.10(A).
- Letter from Thomas Melius, Alaska Regional Director, U.S. FWS, to McKie Campbell, Commissioner, Alaska Department of Fish and Game (Nov. 2, 2006) (on file with author).
- 61. U.S. FWS, supra note 40, 601 FW 3.16(B).

U.S. FWS, U.S. DOI, ENDANGERED RED WOLVES (1997), available at http:// library.fws.gov/Pubs4/endangered_red_wolves.pdf.

E-mail from Thom Lewis, Wildlife Biologist, Division of Migratory Birds, U.S. FWS, to Nell Fuller, U.S. FWS (May 30, 2008) (on file with author).

^{48.} Tenn. Valley Auth. v. Hill, 437 U.S. 153, 185 (1978).

^{49.} U.S. FWS, supra note 40, 601 FW 3.7(C).

^{50.} Id. 601 FW 3.11(C).

^{51.} The term "ecological integrity" is used in lieu of biological integrity, diversity, and environmental health. U.S. FWS, U.S. DOI, USFWS MANUAL: LAND USE AND MANAGEMENT SERIES: COMPATIBILITY, 603 FW 2.5(A) (2000), *available at* http://www.fws.gov/policy/603fw2.pdf.

Web page, U.S. FWS, Coachella Valley Fringe-Toed Lizard, http://www.fws. gov/saltonsea/Coachella/CV_endspecies.html.

^{53. 16} U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

U.S. FWS, U.S. DOI, USFWS MANUAL: LOGISTICS: POLICY & RESPONSIBILI-TIES, 341 FW 1.4(B) (1996), *available at* http://www.fws.gov/policy/341fw1. html.

^{55.} See supra note 45 and accompanying text.

ENVIRONMENTAL LAW REPORTER

5-2009

While the Improvement Act and the FWS Manual provide flexibility that would allow for assisted migration as a management tool, there are some policy gaps that could be stumbling blocks for assisted migration proponents. For example, the terms "native" and "exotic" are defined in the Refuge System Manual. Exotic species are defined as "[a]ll species of plants or animals (including fish) not native to the United States and not presently or historically occurring in the United States except through the intervention of man, intentional or otherwise. A non-indigenous species." 62 While native species are defined as "[w]ith respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem." 63 Neither definition covers the circumstance of a species native to the United States but not native to a particular location within the United States. These non-"exotic" non-"native" species could be treated simply as "native" under this policy, which would ease the possibility of their translocation in the refuge system. Alternatively, they could be treated as "exotic" if the separate phrase "A non-indigenous species" is understood broadly;⁶⁴ a decision that could make such translocations more difficult. It is not yet clear how the FWS will interpret these definitions in order to deal with such situations.

Limitations on the introduction of exotic species already exist within refuge policy. These introductions are to be restricted to biological controls, i.e., using exotic species to control or eliminate undesirable species, and strong cautions are raised against such introductions.⁶⁵ Since each native species has evolved to fill its own ecological niche, an introduced species should not be placed in direct competition with a presently occurring species. In situations in which there is no immediate or recognizable direct competition, there is still the threat of future population expansion and danger of the introduced species transmitting parasites or disease to susceptible native species.

The great mobility of avian species assures that most existing niches for these are filled. Most successful bird introductions have been either at the expense of native species or the introduced species has filled a niche artificially created by man through land use changes and settlement. With the exception of the mobility factor, the same principles apply to the introduction of many plants.⁶⁶

While these limitations may present obstacles to assisting migration of non-natives to refuges, there is an established process for proposing the introduction of exotic species. As part of this process, managers are required to "remember that [the exotic species'] relationship to presently occurring species is of critical importance."⁶⁷ The following factors must be considered: "suitability of available habitat, possible areas of competition, disease potential, and predation spread potential."⁶⁸ In addition, the Manual provides several other restrictions and considerations:

A. Exotic species that were previously established in a given habitat but have been extirpated because of land use changes, competition from other species, or other factors will not be reintroduced.

B. Research on exotic species that are expanding their range through natural dispersal should be encouraged to determine if the invading species will cause a detrimental effect on native species or approved exotic species and to evaluate the long-term implications

D. Release of exotic birds in the vicinity of the refuge will be prevented or discouraged, where possible.

E. Established exotic plants are often now difficult to distinguish from natives. Such plant species may be utilized if their management is consistent with policy . . . and it has been demonstrated that they are better adapted than native species to the accomplishment of approved objectives.⁶⁹

The introduction process includes evaluating whether a species is native, what the extent of its historic range is, and the cause of extirpation. An example of the application of these considerations is the external request to introduce wood bison to the Yukon Flats NWR in Alaska. While the bison is thought to have historically occurred within the refuge, the request was denied on the basis of uncertainty regarding extirpation⁷⁰ (it is not clear if the extirpation occurred naturally or as a result of overharvesting by indigenous people) and the need to proceed with "a cautionary approach."⁷¹ Consequently, while the mechanism to accept introductions exists, the policies in place do act as checks.

While native biological diversity receives the utmost priority, in those rare and limited situations where a biological need is presented that does not compromise the purpose(s) for which a refuge was established, assisted migration could be facilitated on refuge system lands through the process established for exotic species introduction and management. The Improvement Act and Biological Integrity, Diversity, and Environmental Health policy are not complete barriers to assisted migration, but rather provide management limitations and opportunities for maximum adaptability to meet the refuge system's conservation needs over time. The Improvement

^{62. 7} RM 8.4(A).

^{63.} U.S. FWS, supra note 40, 601 FW 3.6(E).

^{64. &}quot;Indigenous" is defined in part as "not introduced directly or indirectly according to historical record or scientific analysis into a particular land or region or environment from outside . . . originating or developing or produced naturally in a particular land or region or environment," and the synonym provided is "native." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1151 (Philip Babcock Gove ed., 1968).

^{65. 7} RM 8.

^{66. 7} RM 8.5.

^{67. 7} RM 8.6B.

^{68. 7} RM 8.6B.

^{69. 7} RM 8.7.

^{70.} U.S. FWS, *supra* note 40, 601 FW 3.14(F). Thomas Melius states that: [w]here practical, we support the reintroduction of extirpated native species. We consider such reintroduction in the context of surrounding landscapes. We do not introduce species on refuges outside their historic range or introduce species if we determine that they were naturally extirpated, unless such introduction is essential for the survival of a species and prescribed in an endangered species recovery plan, or is essential for the control of an invasive species and prescribed in an integrated pest management plan.

Letter from Thomas Melius, supra note 60.

^{71.} Letter from Thomas Melius, *supra* note 60. The letter also states that "[t]he potential for unintended consequences cannot be dismissed." *Id*.

NEWS & ANALYSIS

Act and the ESA together provide the FWS with powerful, enforceable reasons to consider assisted migration as a management tool.

The affirmative mandates imposed on the FWS by both the ESA and the Improvement Act, coupled with policies that enable such efforts and precedents that take advantage of these policies, put the refuge system in a position to accept assisted migration as a viable tool for addressing climate change impacts. In fact, Dan Ashe, the current Science Advisor to the Director of the FWS and formerly the chief of the refuge system, states that when it comes to addressing global climate change, "We don't want to take anything out of our toolbox."⁷² To that end, the FWS held its first workshop on assisted migration in August 2008. This clearly demonstrated the FWS' willingness to engage in the process of evaluating assisted migration as a potential tool for addressing landscape changes.

C. Multiple Use Lands

The U.S. Forest Service (USFS) and the Bureau of Land Management (BLM) manage land under multiple use mandates. The primary governing legislation, the National Forest Management Act (NFMA) for the USFS and the Federal Lands Policy Management Act (FLPMA) for BLM, require those agencies to manage their lands in ways that accommodate multiple uses over the landscape.⁷³ These uses include intensive extractive activities like logging, mining, grazing, and so on, as well as less intensive uses like wildlife and watershed protection, recreation, wilderness, and others. Multiple use lands have much broader purposes than the lands of the national park or wildlife refuge systems. Therefore, BLM and the USFS are vested with the responsibility to satisfy diverse constituencies.⁷⁴

These multiple use goals have necessarily led to agencies that not only tolerate non-native species, but on occasion welcome them. For instance, domestic cattle and sheep grazing is a protected multiple use on both USFS and BLM lands.⁷⁵ Furthermore, non-native fish stocking to support recreational fisheries and non-native wildlife introductions to support recreational hunting opportunities are recognized as legitimate uses of these lands.⁷⁶ For example, wild turkeys have been

75. 16 U.S.C. §1604(e); 43 U.S.C. §1702(c).

introduced into national forest lands in the western United States, though they are not native to those areas.⁷⁷ Finally, the deliberate planting of non-native vegetation has occurred for many reasons on BLM and USFS lands.⁷⁸ Both agencies have traditionally carried out their wildlife management programs in cooperation with the individual states, whereby the states take the lead in matters of wildlife, while BLM and the USFS concentrate their efforts on habitat management.⁷⁹ This is not to suggest, however, that the agencies' ability to move species around the landscape or to accept non-native species onto their lands is unlimited.

I. National Forests

A central requirement of the NFMA is a detailed forest planning effort. As part of that effort, the USFS must ensure that its land management plans "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives⁸⁰ This clause, often referred to as the diversity clause, had historically been interpreted in Agency regulations as a requirement to "provide for diversity of plant and animal communities and tree species consistent with the overall multiple use objectives of the planning area,"⁸¹ and "maintain viable populations of existing native and desired non-native vertebrate species in the planning area."⁸² This interpretation had been strictly enforced by the courts for many years.⁸³

Recently, however, the Agency has amended its regulations and the diversity clause is now implemented by the sustainability criteria laid out in 36 C.F.R. 219.10(b), which states:

The overall goal of the ecological element of sustainability is to provide a framework to contribute to sustaining native ecological systems by providing appropriate ecological conditions to support diversity of native plant and animal species in the plan area.... Procedures developed pursuant to [these regulations] for sustaining ecological systems must be consistent with the following (2) Species diversity. If the responsible official determines that provisions in plan components ... are needed to provide appropriate ecological conditions for specific threatened and endangered species, species-ofconcern, and species-of-interest, then the plan must include additional provisions for these species, consistent with the

species desired by the public. 4. Favor native or desirable non-native species over new exotic species in stocking and introductions. *Id. See also* BLM., U.S. DOI, BUREAU OF LAND MANAGEMENT MANUAL \$1745

(1992) [hereinafter BLM MANUAL] (regarding the circumstances under which the BLM may move native and non-native species around the landscape).

- See 36 C.F.R. §241.2 (2008); 43 C.F.R. §24.4(d) (2008). See also Michael J. Bean & Melanie J. Rowland, The Evolution of National Wildlife Law 372 (3d ed. 1997).
- 80. 16 U.S.C. §1604(g)(3)(B) (2007).
- 81. 36 C.F.R. \$219.26 (2000).

 See, e.g., Seattle Audubon Soc'y v. Espy, 998 F.2d 699 (9th Cir. 1993); Seattle Audubon Soc'y v. Evans, 952 F.2d 297 (9th Cir. 1991).

Telephone Interview by Nell Fuller with Dan Ashe, Science Advisor to Director of U.S. FWS (Apr. 30, 2008).

^{73.} NFMA, 16 U.S.C. §1607 (2007); FLPMA, 43 U.S.C. §1732(a) (2007).

^{74.} Managing National Park System Resources: A Handbook on Legal Duties, Opportunities and Tools 121-22 (Michael A. Mantell ed., 1990).

^{76.} See USFS, USDA, FOREST SERVICE MANUAL §2640.3 (1995) [hereinafter FS MANUAL]. The Forest Service Manual states:

It is Forest Service policy to: 1. Provide habitat for stocked species and assist in stocking and introduction operations to restore locally extinct indigenous species, to recover threatened and endangered species, and to introduce new species in coordination with State and Federal agencies. 2. Provide a variety of fishing, hunting, trapping, viewing, studying, and photographing opportunities and experiences in cooperation with the State fish and wildlife agencies. 3. Emphasize the protection, enhancement, and maintenance of habitats for production of wildlife and fish. Introductions or stocking of species may be made to restore resources following environmental changes, to provide recreation opportunities where reproduction is insufficient to meet demand, or to introduce new

^{77.} FS MANUAL, supra note 76, §2642.

^{78.} For example, see *id.* §2070.3(2), which lists examples of situations in which non-native plant material may be used for revegetation, restoration, and rehabilitation of National Forest System lands; *see also* 43 C.F.R. §4180.2(f)(2)(ix-x) (2008) (describing when non-native plants can be used in grazing management activities).

^{82. 36} C.F.R. §219.19 (2000).

ENVIRONMENTAL LAW REPORTER

5-2009

limits of Agency authorities, the capability of the plan area, and overall multiple use objectives.⁸⁴

Therefore, the USFS has moved toward explicitly interpreting the diversity requirement to mean that the Agency must ensure adequate habitat to maintain native species; language regarding the preservation of desired non-native species has been removed. However, regulation defines species-of-interest as "species for which the responsible official determines that management actions may be necessary or desirable to achieve ecological or other multiple use objectives."⁸⁵ The potential range of ecological or other multiple use objectives is not defined.⁸⁶ This certainly leaves open the possibility that the Agency could determine that species in need of assisted migration programs, whether native or non-native, are species-of-interest for which the USFS can make special accommodations through the official planning process.

The USFS, however, is extremely sensitive to the dangers of invasive species. The USFS has developed a National Strategy and Implementation Plan for Invasive Species Management, the goal of which is to "[r]educe, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all landscapes and ownerships."87 The Plan includes a short-term action plan, the fourth element of which is "Rehabilitation and Restoration." One of the steps laid out in order to meet this action item is: "Develop and implement national Forest Service policy that incorporates the best available science on using native or desired nonnative species for restoration and rehabilitation."88 Furthermore, the Plan states that "[e]xamples of the results of effective Forest Service partnerships include: ... Shifting restoration projects from using exotic species, such as smooth brome and timothy, to employing *native species and more desirable nonnative species*."89 So, while the USFS is serious about excluding invasive species, the Agency is still willing to permit the introduction of useful, non-invasive, non-native species.

2. BLM Lands

BLM faces even fewer restrictions in this arena than the USFS. For instance, the FLPMA contains nothing similar to the NFMA's diversity requirement.⁹⁰ Of all the traditional land management agencies, BLM appears to possess the greatest legal flexibility with regard to the kinds of assisted migration programs it may participate in. BLM Manual 1745 explicitly deals with the introduction of non-native species. The most relevant limitations on such introductions are the responsibilities to:

(1) Ensure that management of native, naturalized and exotic species enhances, restores, and does not reduce the biological and genetic diversity of natural ecosystems and provides for the protection of soil resources; (2) Ensure that the introduction of exotic species is ecologically sound and will not adversely impact natural ecosystems and their biological diversity; . . . (4) Ensure full compliance with applicable State and Federal laws, Executive Orders, and regulations.⁹¹

The Manual also mandates that the Agency "cooperate with the [FWS] and appropriate State agencies in planning and providing for the recovery of [threatened and endangered] species," including their reestablishment or release.⁹² The Agency even provides its own means for permitting the transplant of a threatened or endangered species outside of its historic range for those species "for which remaining historical habitat has been destroyed or otherwise rendered unsuitable."⁹³ Like the USFS, BLM must meet land use planning requirements, and the decision to make an introduction must be made as part of the land use planning process.⁹⁴ BLM also maintains a strict policy of prohibiting the planting of noxious or invasive plant species, but accepts the possibility of planting non-native species under certain circumstances. BLM recognizes that "not all non-native species are invasive."⁹⁵

Finally, FLPMA requires that "regulations and plans for the protection of public land areas of critical environmental concern be promptly developed."⁹⁶ Areas of critical environmental concern are areas where "special management attention is required . . . to protect and prevent irreparable damage to . . . fish and wildlife resources or other natural systems or processes."⁹⁷ The concept has been used infrequently⁹⁸ but could potentially pose some limitations to assisted migration programs wishing to utilize these specific areas. Outside of areas of critical environmental concern, the rules governing BLM land use appear to contain a great deal of latitude regarding species introductions.

In general, the laws and policies governing the USFS and BLM provide much greater flexibility in the area of species introductions than do the rules governing the NPS or refuge system lands. It seems likely that the USFS and BLM would be amenable to all types of assisted migration programs, as long as the introductions are consistent with multiple use management, and do not result in the introduction of invasive species.

^{84. 36} C.F.R. §219.10(b) (2008).

^{85. 36} C.F.R. §219.16 (2008).

^{86.} The NFMA (16 U.S.C. \$1604(e) (2008)) as well as the regulations (36 C.F.R. \$219.12(a)(1) (2008)) only broadly state that suitable multiple uses include outdoor recreation, range, timber, watershed, and wildlife and fish purposes. The Forest Service Handbook does list sources that the Agency should review in its search for species-of-interest, and among these is "species that are hunted or fished and other species of public interest." USFS, USDA, FOREST SERVICE HANDBOOK 1909.12 \$43.22c (2006), available at http://www.fs.fed.us/im/directives/.

USFS, USDA, NATIONAL STRATEGY AND IMPLEMENTATION PLAN FOR INVASIVE SPECIES MANAGEMENT 3 (2004), *available at* http://www.fs.fed.us/invasivespecies/documents/Final_National_Strategy_100804.pdf.

^{88.} *Id.* at iii, (emphasis added).

^{89.} Id. at 10, (emphasis added).

^{90.} BEAN & ROWLAND, supra note 79, at 386.

^{91.} BLM MANUAL, *supra* note 74, §1745.02.

^{92.} Id. §1745.06.J.

^{93.} Id. §1745.3.

^{94.} Id. §1745.11.A.

^{95.} BLM., U.S. DOI, HANDBOOK NO. H-1742-1, BURNED AREA EMERGENCY STA-BILIZATION AND REHABILITATION 64 (2007), *available at* http://www.blm.gov/ wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/blm_handbooks. html (click URL hyperlink for H-1742-1).

^{96. 43} U.S.C. §1701(a)(11).

^{97. 43} U.S.C. §1702(a).

^{98.} BEAN & ROWLAND, supra note 79, at 376.

NEWS & ANALYSIS

39 ELR 10421

D.Alaska National Interest Lands

There is significantly more federal land in Alaska than in any other state. This, combined with the fact that Alaska is the northernmost state, makes Alaska a very likely target for assisted migration efforts. For public lands in Alaska, an additional layer of legislation exists. The Alaska National Interest Lands Conservation Act (ANILCA)⁹⁹ would be relevant to any assisted migration program involving federal lands in Alaska. Under ANILCA, the federal government must take the additional precaution of ensuring that any action does not negatively impact subsistence activities on federal lands.¹⁰⁰

Before allowing any use or disposal of federal public lands in Alaska, the agency in charge must first determine if that use will "significantly restrict subsistence uses."101 If subsistence uses could be significantly restricted by the use in question, then the agency must: (1) give notice to the state and to the regional council; (2) hold a public hearing in the vicinity of the proposed use; and (3) determine that the significant restriction of subsistence uses is necessary, the proposed activity uses the least amount of public lands possible, and the impacts on subsistence uses and resources are minimized.¹⁰² Therefore, proposals for introductions that are expected to interfere with subsistence hunting, fishing, or gathering, either because the introduced species could become invasive, or because it may remove resources from the availability of important subsistence resources,¹⁰³ would likely provoke one of two responses from federal agencies in Alaska. Either the agencies would not participate in assisted migration efforts for these species, or they would minimize the amount of land used by these species to minimize their potential negative effects on subsistence resources. It is, however, also possible that an introduction could lead to positive results for subsistence users if it means that a new resource is eventually available to subsistence hunters.

The ANILCA further requires the land management agencies to maintain "healthy populations of fish and wildlife,"¹⁰⁴ requires the NPS to maintain "*natural* and healthy populations" of fish and wildlife,¹⁰⁵ and requires the FWS to maintain fish and wildlife populations and habitats in their "natural diversity."¹⁰⁶ This NPS requirement reinforces the NPS' exist-

100. Id. §3112(1) (2007) (stating that "the utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands"). ing tendency to avoid introductions of non-native species as mentioned above. The impact of ANILCA's FWS requirement on potential assisted migration programs is uncertain. The "natural diversity" standard appears to mirror the NPS' focus on native species management and is actually found in the section of ANILCA devoted to outlining the Alaskan refuges' purposes. This may reduce the flexibility allowed through the ecological integrity policy's landscape-scale philosophy by narrowing a refuge's actual purpose to native species management only. The management prescription placed on the other agencies may mean that the USFS and BLM will have to ensure that any introduced species do not compromise the viability of native species, something these agencies are required to protect regardless.

E. Wilderness Areas

The Wilderness Act of 1964¹⁰⁷ created additional protection that overlays many federal lands nationwide. The management mandate for wilderness areas is a requirement to preserve the "wilderness character" of the land.¹⁰⁸ The term wilderness is defined by the statute, in part, as "an area where the earth *and its community of life* are untrammeled by man^{"109} This phrase seems to indicate a requirement to maintain native species in their natural diversities (much like the requirement placed on the NPS by the ANILCA). Therefore, it seems likely that non-native species would not be welcome in wilderness areas. However, since the introduction of non-native species to wilderness areas has never been litigated, this is open to debate.

The closest the courts have come to analyzing this issue was in Wilderness Society v. USFWS. In that case, the Wilderness Society challenged the FWS' permit for a salmon enhancement project by the state of Alaska within the Kenai NWR Wilderness Area.¹¹⁰ The project consisted of the removal of salmon eggs from the wilderness area so that they could be incubated and hatched under controlled conditions and then re-released into the wilderness area in greater numbers than would have occurred naturally.¹¹¹ The U.S. Court of Appeals for the Ninth Circuit did determine that the enterprise violated the Wilderness Act, but only because it was a commercial enterprise and not because it degraded the wilderness character of the area. In fact, the court referred to the project as having a "benign purpose and minimally intrusive impact."¹¹² But ultimately, the court declined to reach the issue of whether or not the project negatively altered natural conditions or the wilderness character of the area.¹¹³

In a later case, a California district court referred to the *Wilderness Society* decision and stated that "the *Wilderness Society* court recognized that the fish-stocking operation,

^{99. 16} U.S.C. §§3101-3233 (2007).

^{101.} Id. §3120(a) (2007).

^{102.} Id. 3120(a)(1)-(3) (2007).

^{103.} For example, between the 1920s and 1960s (pre-ANILCA), several species of non-native mammals were introduced to the area that has since become Kodiak NWR to increase subsistence and recreational opportunities. Eight of these species now commonly occur on the refuge including Sitka black-tailed deer, mountain goats, Roosevelt elk, reindeer, beaver, red squirrel, snowshoe hare, and pine marten. "Some of these also are a source of management concern because of their potential to influence the quality of native fish and wildlife habitats." Web page, USFWS, Kodiak National Wildlife Refuge: Wildlife, http://kodiak.fws. gov/wildlife.htm.

^{104. 16} U.S.C. §3112(1) (2007).

^{105.} Id. §3125(1) (2007) (emphasis added).

^{106.} Id. §668dd (2007) (establishing and redesignating units into the National Wildlife Refuge System). For a detailed explanation of these requirements, see Julie Lurman & Sanford P. Rabinowitch, *Preemption of State Wildlife Law in Alaska:* Where, When, and Why, 24 ALASKA L. REV. 145 (2007).

^{107. 16} U.S.C. §§1131-1136 (2007).

^{108.} Id. §1131(a).

^{109.} Id. §1131(c) (emphasis added).

^{110.} Wilderness Soc'y v. U.S. Fish & Wildlife Serv., 353 F.3d 1051 (9th Cir. 2003) (en banc).

^{111. 353} F.3d at 1058.

^{112. 353} F.3d at 1062.

^{113. 353} F.3d at 1063 n.8, 1069 n.18.

ENVIRONMENTAL LAW REPORTER

5-2009

in and of itself, was not an activity that furthered the goals of the Wilderness Act because the activity was not aimed at preservation of the activities of established populations of fish that were later threatened."¹¹⁴ The implication is that, while programs that enhance native, threatened, and endangered species are allowed, the permissibility of assisted migration programs targeting the relocation of non-native species into wilderness areas is in doubt.

F. Military Lands

The primary statute governing conservation activities on the various types of land managed by the military is the Sikes Act, ¹¹⁵ which states that with assistance from the U.S. Department of the Interior (DOI) and the states, the U.S. Department of Defense is responsible for planning, coordinating, and maintaining conservation and rehabilitation of its lands.¹¹⁶

The Act requires the Secretary of Defense to prepare an integrated natural resources management plan (INRMP) for all military installations with significant natural resources.¹¹⁷ These plans are to be prepared in cooperation with the FWS and the appropriate state fish and wildlife agencies and they "shall reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources."¹¹⁸

While all land uses must be "[c]onsistent with the use of military installations to ensure the preparedness of the Armed Forces," the Secretaries of the military departments are directed to conserve and rehabilitate their natural resources; allow for the "sustainable multipurpose use of the resources," both consumptive and non-consumptive; and provide public access to facilitate this use,¹¹⁹ provided "such use is not inconsistent with the needs of fish and wildlife resources management."¹²⁰

Through the INRMPs, the Secretaries are directed to "provide for—

- A. fish and wildlife management, land management, forest management, and fish and wildlife-oriented recreation;
- B. fish and wildlife habitat enhancement or modifications;
- C. wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife "¹²¹

INRMPs are intended to "ensure that these ecosystem values can be protected and enhanced while allowing these lands to meet the needs of military operations."¹²²

One benefit of having an INRMP with meaningful conservation strategies and an ecosystem focus is that it could pre-

118. Id. §670a(a)(2).

vent a military installation from being designated as critical habitat (for a threatened or endangered species) by the FWS. Pursuant to §4 of the ESA, if an INRMP demonstrates that it "provides a benefit to the species," it can preclude the designation of critical habitat on that military installation.¹²³ This benefit must be shown to require no additional protection or special management, and the military must commit to implementing the management strategies identified and provide assurances that the strategies will be effective.¹²⁴

Provided the INRMPs are prepared to be consistent with the requirements of the Sikes Act, including the requirement to have the FWS and appropriate state fish and wildlife agencies concur with the strategies under their purview, the conservation strategy required is relatively flexible. This flexibility, together with the potential to obviate critical habitat designations by including species-specific provisions in the INRMP, could make military installations amenable to assisted migration as a conservation strategy, provided it did not compromise the military readiness of the installation.

Additionally, land surrounding military bases increasingly is being developed with residential and commercial infrastructure that fragments fish and wildlife habitat and decreases its ability to support a diversity of species.¹²⁵ Acknowledging this, the military can preserve habitat "in a manner thatmay eliminate or relieve current or anticipated environmental restrictions that would or might otherwise restrict, impede, or otherwise interfere, whether directly or indirectly, with current or anticipated military training, testing, or operations on the installation."126 To this end, the U.S. Army created the Army Compatible Use Buffer (ACUB) Program. This allows the Army to work with partners to purchase property adjacent to their installations to prevent problems with encroachment (including noise concerns and distribution of endangered species).¹²⁷ These "ACUBs can coordinate habitat conservation planning at the ecosystem level to ensure that greater benefits are realized towards species and habitat recovery."128 As these lands are designated for conservation purposes, but are relatively flexible beyond that requirement, it is possible that the Army could consider assisted migration within the boundary of an ACUB, particularly if it allows the installation to proceed with operations that would have otherwise been restricted. The military has a mandate for INRMPs and conservation in general, but little beyond that, allowing for great management flexibility. While military readiness is the number one priority, this flexibility means that assisted migration could be a legal option for military lands.

125. 16 U.S.C. §670e-2(1)(C) (2007).

^{114.} High Sierra Hikers Ass'n v. U.S. Forest Serv., 436 F. Supp. 2d 1117, 1133 (E.D.Cal. 2006).

^{115. 16} U.S.C. §§670a-670o (2007).

^{116.} *Id.* §670a.

^{117.} Id. §670a(a)(1)(B).

^{119.} *Id.* §670a(a)(3)(A)-(C).

^{120.} *Id.* §670a(b)(1)(F). 121. *Id.* §670a(b)(1)(A)-(C).

^{122.} Nat'l Military Fish & Wildlife Ass'n Gov't Affairs Сомм., The Sikes Act: As Amended through 2003, at 9, *available at* http://www.fws.gov/ habitatconservation/2004SikesAct%20NMFWA.pdf.

^{123.} Endangered Species Act §4(a)(3)(B) (codified at 16 U.S.C. §1533(a)(3)(B)(i) (2007)).

^{124. 16} U.S.C. §670a(b).

^{126. 10} U.S.C. §2684a(a)(2)(B) (2007).

Web page, U.S. Army, U.S. Army Sustainability: Army Compatible Use Buffer Program (ACUB), http://www.sustainability.army.mil/tools/programtools_acub.cfm.
Id.

NEWS & ANALYSIS

39 ELR 10423

III. Which Species Will Be Moved?

Assisted migration programs will be further affected by various species-specific laws. Certain classes of species, such as endangered species, invasive species, and species that would be moved across borders, will present additional challenges and opportunities for assisted migration.

A. Federally Threatened and Endangered Species

When a species being considered for assisted migration is listed as endangered or threatened under the ESA, many additional legal considerations arise. Unless permitted, picking up an endangered species and removing it from its home range is certainly a "take" within the meaning of §9 of the ESA¹²⁹ and could "jeopardize the continued existence" of the species within the meaning of §7.130 However, both of these concerns may be overcome if the FWS can be convinced that the species will ultimately benefit from this drastic action.¹³¹ Assisted migration programs involving any federal agency that may affect any federally listed species will require a consultation with the FWS under §7 of the ESA.¹³² There is precedent for the FWS to initiate or approve similar actions. For instance, in 1986, all of the remaining wild condors were removed from the wild and bred in captivity.133 The results of this project have been the ultimate release of the raised chicks, slow rehabilitation of that population, and drastically improved understanding of condor biology.¹³⁴ Assisted migration efforts could be treated similarly.

The DOI has "broad power to conserve . . . species."¹³⁵ Furthermore, the ESA contains an affirmative obligation to use "all methods and procedures which are necessary to bring any [listed] species to the point at which the measures provided in this [act] are no longer necessary."¹³⁶ Assisted migration could certainly fall within that rubric.

The case of reintroductions, particularly within the context of the ESA, provides a useful analogy to assisted migration that highlights some obstacles as well as some support for assisted migration efforts. Reintroduction differs from the concept of assisted migration in one important regard; traditionally reintroductions occur within the historic range of the species in question. Endangered species reintroductions are generally implemented under §10 of the ESA, which details the rules for experimental populations.¹³⁷ In the case of reintroductions under the ESA, even when reintroducing species to parts of their historic range, Congress and the FWS have found it necessary to reduce or eliminate many of the protections that would otherwise have been in place for those species. This has been accomplished through the experimental population program. This program eliminates the §7 consultation requirements¹³⁸ and permits the "discretionary removal of section 9 taking prohibitions."139 For instance, grey wolves were only reintroduced into Yellowstone National Park under the ESA's experimental population program. The subsequently issued regulations expressly authorize persons coming into contact with wolves to take actions otherwise prohibited under the ESA. For example, a livestock producer can take any wolf caught in the act of killing, wounding, or biting livestock on his land so long as the incident is reported within 24 hours. The rules also provide a framework within which the FWS can manage "problem" wolves.140 Furthermore, to utilize the experimental population provisions, reestablishment of the population must already have been a goal included in the species' recovery plan.¹⁴¹

If moving already heavily protected species (like those listed as endangered or threatened) into areas which they once occupied has typically required such enormous compromises to those protections, surely moving protected species into areas outside their historic range may prevent the institution of any protections for their benefit at all. On the other hand, such flexibility on the part of managers, which would not exist with classic ESA protections in place, can provide some protection against the possibility of species that have been relocated becoming invasive, as discussed in the next section of this Article. The \$10(j) provisions could allow for a relatively unobstructed process of eradication of a species that becomes invasive in its new home. If full ESA protections remained, such an escape would potentially be uncontrollable and corrective action could come too slowly, if at all. Given the high degree of uncertainty that will surround assisted migrations, lowered or even removed protections may be the best option to appropriately handle that uncertainty, as well as garner local community support.

There has even been precedent for such relocations (outside historic range). The experimental population implementing regulations state that an experimental population must be located outside the current range of the species but inside its *historic* range, unless "the primary habitat of the species has been unsuitably and irreversibly altered or destroyed."¹⁴² The Guam rail has been the only beneficiary so far of this exception. In 1989, a population of Guam rails was designated experimental and relocated to the island of Rota, which is outside its "probable historic range."¹⁴³ The reasoning behind this decision was that the overabundance of brown tree snakes,

^{129. 16} U.S.C. §1538 (2007).

^{130.} Id. §1536.

^{131.} Implementation of the ESA is divided between the FWS and the National Oceanic and Atmospheric Administration. For purposes of convenience, we will simply refer to the FWS, though both agencies are implicated.

^{132. 16} U.S.C. §1536.

^{133.} Jan Hamber & Bronwyn Davey, AC8, AC9, and the Last Days of the Wild California Condors, http://www.fws.gov/hoppermountain/CACO%20Recovery %20Program/PDF%20Fact%20Sheets/AC-8,%20AC9%20and%20the%20 Last%20Days%20of%20Wild%20Califonria%20Condors.pdf.

^{134.} Id.

ENDANGERED SPECIES ACT: LAW, POLICY, AND PERSPECTIVES 360 (Donald C. Baur & Wm. Robert Irvin eds., 2002). See 16 U.S.C. §\$1532(3), 1533(d), (f).
136. 16 U.S.C. §1532(3).

^{137. 16} U.S.C. §1539.

^{138.} The requirements are only eliminated for those populations relocated outside NWRs or National Parks and which have officially been designated as "nonessential"—which has so far always been the case. *See* 16 U.S.C. §1539(j); ENDAN-GERED SPECIES ACT, *supra* note 134, at 359.

^{139.} See 16 U.S.C. §1539(j); ENDANGERED SPECIES ACT, supra note 134, at 359.

^{140.} Wyo. Farm Bureau Fed'n v. Babbitt, 199 F.3d 1224, at 1229 (10th Cir. 2000).

^{141. 16} U.S.C. §1539(j).

^{142. 50} C.F.R. §§17.80(a), .81(a); ENDANGERED SPECIES ACT, *supra* note 134, at 364.

^{143.} ENDANGERED SPECIES ACT, supra note 134, at 372 n.40.

ENVIRONMENTAL LAW REPORTER

5-2009

an exotic invasive predator of rails and the cause of the rail's decline, had spread throughout Guam and rendered the rail's habitat "indefinitely altered."¹⁴⁴ It is likely that in the future, assisted migration proponents could make the argument that global climate change has irrevocably altered or destroyed the primary habitat of the species with which they are working.

While assisted migration of listed species is fraught with legal complications, their status renders them uniquely poised to be assisted migration beneficiaries. Due to existing mandates, federal land managers will likely focus assisted migration on listed species. To some extent, flexibility has been built into the process through critical habitat exemptions, such as INRMPs on military installations, and the ESA §10(j) relaxed reintroduction regulations. While assisting the migration of listed species will pose legal challenges, they may not be insurmountable.

B. Invasive Species

As many scientists have already suggested, assisted migration could potentially lead to a host of problems. No one knows when a threatened species will become a noxious invader upon being relocated. Species could become invasive and overwhelm the ecosystem into which they are introduced. A good example of this phenomenon is the black locust tree, which is native to the Appalachian Mountain region.

[The tree] handily escaped groves that were planted on farmland further north. From New York to Wisconsin, colonies of black locust are pushing aside native plants—in some cases, rare endemic communities. Worse yet, this is happening right where you'd want to move the tree—several hundred kilometers north of its current distribution, where climate models predict it will thrive in 100 years.¹⁴⁵

It is therefore a very real possibility that assisted migration efforts could lead to relocated species becoming invasive and outcompeting native plant or animal communities. It is also possible, however, that relocated species will pose no threat to the ecosystem into which they are introduced. We have been faced with the problem of exotic invasive species for over 100 years and have developed a large network of laws and policies to avoid problems. These laws may make relocating species as part of an assisted migration program much more complicated.¹⁴⁶ Executive Order No. 13112^{147} requires federal agencies to prevent the introduction of invasive species (defined as "alien species whose introduction . . . is likely to cause economic or environmental harm . . .")¹⁴⁸ and prohibits those agencies from authorizing the use of funds for actions that might cause the introduction or spread of invasive species.¹⁴⁹ The Invasive Species Council, which is also established by this Executive Order, is charged, in part, with the duty to "identify, monitor, and interdict pathways that may be involved in the introduction of invasive species.¹¹⁵⁰

To a certain extent, this may not be an impediment to assisted migration programs since it will likely be unclear whether or not a species will cause economic or environmental harm until after the relocation is carried out. Additionally, it seems unlikely, not to mention irresponsible, to relocate those species that are sure to be invasive in their new habitats. Nevertheless, this rule could be used to thwart efforts at assisted migration if proof of non-invasiveness is ever required before a federal agency is able to fund relocation.

C. Cross-Border Species Transfers

In addition to all of the previous requirements, assisted migration programs must meet the specific rules that control the transfer of living species across national and state borders.

I. The Lacey Act

The Lacey Act¹⁵¹ regulates "the interstate and international shipment of wildlife."¹⁵² Specifically, the statute makes it unlawful to "import, export, transport, sell, receive, acquire, or purchase any fish or wildlife or plant" that was "taken, possessed, transported, or sold" in violation of any federal, state, or Indian tribal law, or in violation of any treaty to which the United States is a party.¹⁵³ It is therefore necessary for those involved in assisted migration programs that intend to cross either state or national borders to make sure that all laws are met, including those of the state from which the species are taken and the state to which the species are brought.

2. Convention on International Trade in Endangered Species

For the purposes of this Article, the most relevant international treaty to which the United States is a Party is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).¹⁵⁴ CITES protects those species identified as being in need of protection by being placed in one of the appendices to the Convention (much like the

- 151. Lacey Act Amendments of 1981, Pub. L. No. 97-79, 95 Stat. 1073 (1981) (codified at 16 U.S.C. §\$3371-3378 (2007)).
- 152. DALE D. GOBLE & ERIC T. FREYFOGLE, WILDLIFE LAW: CASES AND MATERIALS 970 (2002).

154. CITES, Mar. 3, 1973, 27 U.S.T. 1087, T.I.A.S. No. 8249.

^{144.} Id. (quoting 54 Fed. Reg. 43966 (Oct. 30, 1989)).

^{145.} Fox, supra note 8, at 30.

^{146.} There are other laws that are pertinent to invasive species but that are not germane to this discussion. For instance, the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C. §§4701-4751 (2007), amended by the National Invasive Species Act of 1996, Pub. L. No. 104-332, 110 Stat. 4073 (1996), which targets only those aquatic invasive species that are *unintentionally* introduced; the Alien Species Prevention and Enforcement Act of 1992, 39 U.S.C. §3015 (2007), which prohibits an "injurious animal" or "plant pest" from being sent through the mail and requires special action by the Secretary of Agriculture to protect Hawaii in particular from such introductions by mail; and the Plant Protection Act, 7 U.S.C. §§7701-7772 (2007), which, in relevant part, prevents the introduction of plant pests except by permit and prevents the introduction or movement of plants if such action is determined to be necessary by the Secretary of Agriculture. *Id.* §§7711-7712.

^{147.} Exec. Order No. 13112, 64 Fed. Reg. 6183 (Feb. 3, 1999).

^{148.} *Id.* §1(f).

^{149.} *Id.* §2(a)(2)-(3).

^{150.} Id. §5(b). See id. §§3-5.

^{153. 16} U.S.C. §3372 (a) (2007).

NEWS & ANALYSIS

39 ELR 10425

threatened or endangered lists of our domestic ESA). The principal substantive provision of CITES is its prohibition of trade in any specimen of a species listed in any of the appendices, except in accordance with CITES provisions.¹⁵⁵ Trade is defined broadly as "export, re-export, import and introduction from the sea."¹⁵⁶

"The single purpose of CITES is to protect endangered and threatened species from overexploitation by international trade. A parallel objective, implicit in the treaty's purpose, is to allow some presumably sustainable level of exploitation of those species . . . To achieve its purpose, the treaty creates a system of permits and certificates to restrict trade and allow it to be monitored by regulating authorities."¹⁵⁷ If an assisted migration program intends to bring foreign species into the United States, or intends to transfer U.S. specimens to foreign soil, the participants must ensure that all of the CITES permit and certification requirements are satisfied.

IV. Conclusion

Scientists, policymakers, and land managers may have to come to a new understanding in the coming years of what is a native versus non-native species. Already the term "neo-native"¹⁵⁸ is coming into use to define a species that was not historically part of an ecosystem but, because of shifting climate patterns, may now be considered native. Such a new understanding will likely eventually result in new agency policies. Until that happens, the existing legal structure and case law are all that can guide us. Given this legal structure, as we have defined and interpreted it, we find that assisted migration is a legal option on most federal lands under certain circumstances.

All federal agencies have legal obstacles in place that could hinder assisted migration efforts, but no agency has an outright prohibition. The NPS is the most conservative regarding the possibility of assisted migration, due to its focus on natural focus and native species. The other agencies seem to have greater legal flexibilities to attempt assisted migration efforts. While assisted migration may be possible on FWS refuge lands, it appears to present greater legal challenges than would be the case on USFS or BLM lands. The greatest flexibility may be on military installations with INRMPs. Finally, all agencies appear to be able to use whatever legal flexibilities exist to pursue species-specific goals, especially where those species are threatened or endangered. Therefore, while future legal and policy changes are likely to further facilitate assisted migration, it is a tool that is currently legally available to all federal agencies. Understanding the legal realities will enhance the possibility of assisted migration efforts actually being implemented and effecting on-the-ground species conservation.

^{155.} *Id.* art. II, §4.

^{156.} *Id.* art. I(c).

^{157.} Endangered Species Act, *supra* note 134, at 497.

Dave L. Peterson, Ph.D., University of Washington/NOAA Climate Impacts Group, presentation entitled Climate Change Effects to Fish and Wildlife Resources—FWS Training (Feb. 12, 2008).