

STATUTORY REFORM TO PROTECT MIGRATIONS AS PHENOMENA OF ABUNDANCE

BY

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Animal migrations capture the human mind and heart like few other natural phenomena. Migrations provide ecological, psychological (e.g., aesthetic), cultural, and economic benefits. Increasingly, though, migrations are being recognized as threatened phenomena—that is, spectacular aspects of the life history of animal species often involving large numbers of individuals, but which are threatened with impoverishment or demise, even though the species per se may not be in peril. Migration phenomena are themselves worthy of protection, as a category of biodiversity. Yet, conserving migratory populations and their migrations is particularly problematic. Migratory animals are especially vulnerable to a variety of threats because they come into contact with multiple ecosystems and jurisdictions, tend to congregate in large numbers in discrete and often vulnerable areas, and require considerable fuel for their long-distance journeys. In addition, migration is essentially a phenomenon of abundance—the benefits and values of migrations depend on an abundance of animals taking part—and conserving species’ populations before they become rare has always been an uphill battle. This Article presents an idea for a new federal law that reflects the perspective that conserving migratory behaviors and processes as phenomena of value in and of themselves, and not only of value for species persistence, can provide unique and important benefits. Current conservation laws generally serve the species-based conservation perspective and, with a few exceptions, are not designed or implemented to protect benefits of abundant animal migrations. The existing fragmented framework of laws and authorities also is insufficient to protect most migratory populations against a

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diversity of threats across multiple jurisdictions and broad geographic scales. Our proposed federal law would offer a unified framework, require abundance targets, and authorize a comprehensive set of legal tools, including both carrots and sticks, for conserving a limited set of nationally or regionally “significant” migrations. Such a law would likely improve the current situation for the nation’s most notable migratory populations and generally promote the conservation of all migrations as phenomena of abundance.

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I. INTRODUCTION

It’s a wonderful thing that the American bison (*Bison bison*) managed, narrowly, to avoid extinction. We can see bison at Yellowstone, and in zoos, and that is good. We don’t even have to go very far if we want to buy and eat bison meat. But the American bison, as it historically existed in the United States, is in fact gone. It no longer gathers in herds of thousands or moves across hundreds of miles of unbroken prairie, and it no longer shapes the ecological system that sustained it.¹ We have preserved the species, but we can only respond with wonder—we are indeed willing to do no more than wonder—at what the migration must have been.

Even so, there are other migrations that have thus far survived all of the development, borders, barriers, harvest, and habitat alterations we have

¹ See Eric W. Sanderson et al., *The Ecological Future of the North American Bison: Conceiving Long-Term, Large-Scale Conservation of Wildlife*, 22 CONSERVATION BIOLOGY 252, 253–54 (2008) (discussing the American bison’s effect on ecology and its subsequent near-extinction).

thrown in their way. It may be that we are willing to make the necessary commitments so that those migrations might make our children, and ourselves, marvel. It may be that we are willing to do more than merely see that the species survives. It is worth hoping that we are willing to conserve the extraordinary natural spectacle, the ecological force, and the natural wonder of some species in full natural context: we may be willing to conserve migrations themselves, and in this article, we hope to enrich the discussion that has begun on that proposition.

We define migration simply as the cyclical, predictable, round-trip movement of the entire population, or any geographically separate part of the population of any species or subspecies of animals.² Ranging, dispersal, and certainly foraging are not “migration” for purposes of our discussion.³ This broad and simplistic definition of migration suits our purpose in this article, which is to focus on the conservation of behaviors and processes related to the migration cycle. Such behaviors and processes may be part of the movement phase—active movement as well as stopover activities—or the stationary phase—e.g., breeding, nesting, and overwintering—of the migration cycle. In fact, we will frequently use the terms “migration” and “migration phenomena” as shorthand for all of the migration-related behaviors and processes exhibited by a particular population.

Our conceptual perspective in this article is that migration-related behaviors and processes are themselves phenomena worthy of protection, as a category of biodiversity. Lincoln Brower has employed the concept of an “endangered phenomenon” as an alternative to the predominant conservation paradigm, which focuses on diminishing species diversity, minimum viable populations, and the demise of habitats and populations that leads species to extinction.⁴ Brower defined an endangered phenomenon as “a spectacular aspect of the life history of an animal or plant species involving large numbers of individuals that are threatened with impoverishment or demise; the species per se need not be in peril; rather,

² We construct our definition in part from the definition for “migratory species” found in the 1979 Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). See Convention on the Conservation of Migratory Species of Wild Animals, art. 1, June 23, 1979, 1651 U.N.T.S. 358, available at http://www.cms.int/documents/convtxt/cms_convtxt_english.pdf.

³ For distinctions between these terms, see Hugh Dingle & V. Alistair Drake, *What Is Migration?*, 57 *BIOSCIENCE* 113, 114 (2007), and Vicky J. Meretsky, Jonathon W. Atwell & Jeffrey B. Hyman, *Migration and Conservation: Frameworks, Gaps, and Synergies in Science, Law, and Management*, 41 *ENVTL. L.* 447, 456 (2010). Dispersal has been defined as “travel by individuals beyond their home range boundaries when they do not return (at least in the short term) as they would after brief excursions; individual movements out of an area larger than a home range with no predictable return; and one-way movement by a population with no predictable direction.” C. CORMACK GATES ET AL., *THE ECOLOGY OF BISON MOVEMENTS AND DISTRIBUTION IN AND BEYOND YELLOWSTONE NATIONAL PARK: A CRITICAL REVIEW WITH IMPLICATIONS FOR WINTER USE AND TRANSBOUNDARY POPULATION MANAGEMENT* 7 (2005) (citations omitted), available at <http://www.nps.gov/yell/parkmgmt/upload/2.pdf>.

⁴ Lincoln P. Brower & Stephen B. Malcolm, *Animal Migrations: Endangered Phenomena*, 31 *AM. ZOOLOGIST* 265, 265 (1991).

the phenomenon it exhibits is at stake,” and he referred to the migration of the monarch butterfly as an example of such an endangered phenomenon.⁵ Similarly, the monarch’s winter roosts in Mexico and California were designated as threatened phenomena by the International Union for Conservation of Nature (IUCN) in 1983, reflecting the recognition that a migratory phenomenon can be imperiled even though the species as a whole is not in danger of extinction.⁶ Professor David Wilcove’s writings on migrations as “phenomena of abundance,”⁷ as well as Professors Fischman and Hyman’s article on the legal components of migration protection, also rely on this theme of biological phenomena worthy of protection.⁸ Most recently, David Quammen wrote about animal migration as awe inspiring and “a phenomenon far grander and more patterned than animal movement.”⁹ This perspective of migration as a “phenomenon” shines a spotlight on notable behaviors and processes, such as mass movements of animals, movements through ancient pathways, and mass aggregations at wintering, breeding, and stopover sites. Protecting such life-history phenomena adds to the biodiversity conservation agenda.¹⁰

Migration phenomena can provide ecological, psychological (e.g., aesthetic), cultural, and economic benefits.¹¹ Ecological benefits include seed dispersal, nutrient transport, and pollination.¹² In some instances, as was true in the case of the bison, migration shapes the landscape and thus, in some respects, the ecology of the areas in which it occurs. Additionally, the opportunity to observe large numbers of animals congregating or moving together has important cultural and psychological value to humans; images

⁵ See *id.* at 265–66.

⁶ See COMM’N FOR ENVTL. COOPERATION, NORTH AMERICAN MONARCH CONSERVATION PLAN 28 (2008), available at http://www.cec.org/Storage/62/5431_Monarch_en.pdf.

⁷ David S. Wilcove, *Animal Migration: An Endangered Phenomenon?*, 24 ISSUES SCI. & TECH. (2008), available at <http://www.issues.org/24.3/wilcove.html>; David S. Wilcove & Martin Wikelski, *Going, Going, Gone: Is Animal Migration Disappearing?*, 6 PLOS BIOLOGY 1361, 1363 (2008), available at http://www.cfr.washington.edu/classes/esrm.150/readings/is_migration_disappearing.pdf.

⁸ DAVID S. WILCOVE, NO WAY HOME: THE DECLINE OF THE WORLD’S GREAT ANIMAL MIGRATIONS 199 (2008); Robert L. Fischman & Jeffrey B. Hyman, *The Legal Challenge of Protecting Animal Migrations as Phenomena of Abundance*, 28 VA. ENVTL. L.J. 173, 178 (2010).

⁹ David Quammen, *Great Migrations*, NAT’L GEOGRAPHIC, Nov. 2010, available at <http://ngm.nationalgeographic.com/2010/11/great-migrations/quammen-text>.

¹⁰ See Fischman & Hyman, *supra* note 8, at 177–78. The phenomenon of migration is threatened in several senses. First, many migratory populations are declining in abundance due to human impacts at all phases of their migratory cycles, and so each of those migrations is individually threatened with demise. Second, if only a small percentage of the migrations that historically existed persist, then the phenomenon itself is threatened even if the few surviving migrations are individually healthy. Third, a diversity of migratory behaviors and taxa exists—bird, mammal, reptile, amphibian, fish, and insect migrations, trans-hemispheric migrations, and multi-generational migrations—and this diversity of the migration phenomenon is threatened. WILCOVE, *supra* note 8, at 1–12, 68, 197–200.

¹¹ Fischman & Hyman, *supra* note 8, at 176–77.

¹² Heather L. Reynolds & Keith Clay, *Migratory Species and Ecological Processes*, 41 ENVTL. L. 371, 375 tbl.1 (2011).

of salmon leaping over waterfalls on their way upriver, enormous “Vs” of Sandhill cranes (*Grus canadensis*) flying south in the fall, and whale pods plying coastal waters, are iconic. Imagine seeing, as some did as late as 1871 in southern Kansas, a herd of bison the main body of which was estimated to be fifty miles deep and twenty-five miles wide.¹³ Some migrations in our country are part of our heritage not unlike properties that are protected by the National Historic Preservation Act.¹⁴ Migrations and migratory species also provide economic benefits including harvest and sales of harvesting equipment, nature oriented tourism and recreation, and travel to the locations in which such activities can be pursued.¹⁵ With the loss of migration phenomena comes the loss of values and benefits associated with those phenomena, even if the species itself is not in peril.

The migration-as-phenomenon perspective does not supplant the traditional paradigm of species-based conservation, and the two

¹³ S.C. GWYNNE, *EMPIRE OF THE SUMMER MOON: QUANAH PARKER AND THE RISE AND FALL OF THE COMANCHES, THE MOST POWERFUL INDIAN TRIBE IN AMERICAN HISTORY* 5 (2010). Numerous sources speak about the cultural and psychological values of migrations. See Nat'l Park Serv., Dep't of the Interior, Migration Basics, <http://www.nps.gov/akso/ParkWise/Students/ReferenceLibrary/general/MigrationBasics.htm> (last visited Apr. 10, 2011) (teaching students about migration, the U.S. Department of Interior states: “Migration is a fascinating aspect of animal ecology. Migration inspires us”); see also WILCOVE, *supra* note 8, at 12 (“[A]lmost every aspect of migration inspires awe: the incredible journeys migratory animals undertake and the hardships they face along the way; the complex mechanisms they use to navigate across the land and through the skies and seas”); D. J. Aidley, *Questions About Migration*, in *ANIMAL MIGRATION* 1, 7 (D. J. Aidley ed., 1981) (“But perhaps the main reason for the interest of zoologists in migration is less logical but more pervasive. Migrants are often beautiful, they may journey great distances to faraway places, they act as though they were adventurous, intrepid, free, as though they solved their problems by taking action. They stir the imagination.”); Doug Perrine, *South Africa, Sardine Run: Pelagics at Fever Pitch—the Sardine Run*, in *DIVING WITH GIANTS: THE WORLD’S BEST PELAGIC DIVES* 74, 74–75 (Jack Jackson & Rod Baker eds., 2006) (discussing human fascination with and emotional attraction to sardine migrations off the South African coast); Sergio Cristancho & Joanne Vining, *Culturally Defined Keystone Species*, 11 *HUM. ECOLOGY REV.* 153, 153–55 (2004) (discussing conservation priorities based on spiritual or symbolic value); Lawrence St. Leger, *Health and Nature—New Challenges for Health Promotion*, 18 *HEALTH PROMOTION INT’L* 173, 174 (2003) (explaining that exposure to nature and viewing flora and fauna can enhance psychological health); Press Release, Holt Introduces Bill to Protect Wildlife Corridors: Corridors are Vital to Hunting and Wildlife Watching Industries (Apr. 21, 2010), http://www.house.gov/apps/list/press/nj12_holt/0421wildlife.html (last visited Apr. 10, 2011) (quoting U.S. Representative Rush Holt of New Jersey as saying: “The lives of the American people always have been interwoven with the movement of wildlife. Today, wildlife corridors are vital to the outdoor traditions that are a central part of our national character”). See generally PETER H. KAHN, JR., *THE HUMAN RELATIONSHIP WITH NATURE: DEVELOPMENT AND CULTURE* 13–17 (1999) (summarizing research demonstrating improvements in psychological well-being resulting from exposure to natural landscapes and affiliation with animals).

¹⁴ National Historic Preservation Act, 16 U.S.C. §§ 470 to 470x-6 (2006 & Supp. III 2010).

¹⁵ For example, almost five million people participated in whale watching in the United States in 2008. INT’L FUND FOR ANIMAL WELFARE, *WHALE WATCHING WORLDWIDE: TOURISM NUMBERS, EXPENDITURES AND EXPANDING ECONOMIC BENEFITS, A SPECIAL REPORT FROM THE INTERNATIONAL FUND FOR ANIMAL WELFARE* 5 (2009). This whale watching is largely tied to migration patterns. *Id.* at 6.

perspectives are complementary. Ensuring the existence of a species is essential for protecting the migration-related behaviors and processes that constitute the phenomena proclaimed by Brower, Wilcove, and Quammen as worthy of protection. On the flip side, for obligate migrants, ensuring the existence of the migration is essential for protecting the species.¹⁶ In particular, protecting migrations while the species' populations are still relatively abundant, and the ecological, psychological, cultural, and economic benefits of migration are still forthcoming, is a proactive approach that can keep species from reaching the dire straits that requires emergency room intervention.

Furthermore, conserving any phase of a species's migration cycle as a phenomenon requires protecting the animals during all phases of the cycle—at the breeding grounds, at locations inhabited and used during other stationary phases, during movement, and at stopovers. For example, identifying and protecting the breeding and wintering grounds of migratory birds is clearly important to ensuring population persistence.¹⁷ Yet migratory birds spend approximately 25%–33% of their annual cycle in transit between breeding and wintering areas, and survival challenges encountered on these journeys, including mortality at stopover sites, may be responsible for a majority of annual adult mortality in land birds.¹⁸ In short, all phases of the migration cycle must be maintained to ensure that any one phase of the cycle persists.

Yet the traditional species-based perspective of conservation, with its focus on declines in abundance, rarity, reactive conservation actions, and minimum viable populations, is limited and will usually produce different priorities for conservation and scientific research than the migration-as-phenomenon perspective.¹⁹ The species-based perspective focuses our attention first and foremost on the persistence of the species. The United States appears to have accepted the notion that the loss of species as compositional elements of biodiversity is a serious problem.²⁰ The concept of extinction is readily grasped. Certainly, as mentioned above, for those populations that must migrate to survive, conserving migratory behavior and avoiding population extinction are two sides of the same coin. A minimalist approach would seek merely to maintain the smallest number of individuals

¹⁶ Jonathan W. Atwell, Dawn M. O'Neal & Ellen D. Ketterson, *Animal Migration as a Moving Target for Conservation: Intra-Species Variation and Responses to Environmental Change, as Illustrated in a Sometimes Migratory Songbird*, 41 ENVTL. L. 289, 297 (2011).

¹⁷ See Peter P. Marra, David Hunter & Anne M. Perrault, *Migratory Connectivity and the Conservation of Migratory Animals*, 41 ENVTL. L. 317, 319 (2011).

¹⁸ David N. Bonter et al., *Characteristics of Important Stopover Locations for Migrating Birds: Remote Sensing with Radar in the Great Lakes Basin*, 23 CONSERVATION BIOLOGY 440, 441 (2008).

¹⁹ See *infra* Part II.

²⁰ See, e.g., J.B. Ruhl, *Biodiversity Conservation and the Ever-Expanding Web of Federal Laws Regulating Nonfederal Lands: Time for Something Completely Different?*, 66 U. COLO. L. REV. 555, 601 (1995) (listing the Endangered Species Act as an example of a species-by-species protection approach the United States has taken toward biodiversity conservation).

necessary to accomplish the migratory behavior and avoid extinction—the minimum viable migration or population. But the only benefits of migration maintained by this strategy, other than the survival of the species, are whatever benefits accrue from that minimum number of animals. The benefits of minimal populations may not include many of the ecological, psychological, cultural, and economic benefits associated with migration phenomena, which typically require higher abundances than minimum viable populations. This is why we speak of migration as a “phenomenon of abundance.”²¹ Thus, restoring and maintaining relatively high abundances—e.g., historic levels or carrying capacity—are conservation and research priorities for the migration-as-phenomenon perspective, but are not necessarily priorities for the species-based conservation perspective.

This Article presents an idea for a new federal law that reflects the perspective that conservation of migratory behaviors and processes as phenomena of value in and of themselves, and not only of value for species persistence, can provide unique and important benefits. Such a perspective would fill a gap in the existing scheme of conservation laws. Existing conservation policy generally serves the species-based conservation perspective and, with the notable exception of laws targeting North American waterfowl and marine mammals, is not designed and implemented to effectively protect the benefits and values of abundant animal migrations. The Endangered Species Act (ESA),²² the Migratory Bird Treaty Act (MBTA),²³ and the 1979 Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention),²⁴ while offering protections for species that migrate, are not fundamentally concerned with protecting the functional benefits and values derived from the process of migration. Rather, these laws are generally concerned with protecting the benefits that flow from the existence of the species populations, and deal with cross-boundary movements because dealing with the movements is necessary for the species conservation purpose.²⁵ If migratory populations could be better

²¹ See WILCOVE, *supra* note 8, at 10 (“A more fundamental problem may be that migration at its best is essentially a phenomenon of abundance. Just as one swallow does not a summer make, one warbler or one Monarch does not constitute a migration—not, at least, in our hearts.”); Fischman & Hyman, *supra* note 8, at 177–78; Wilcove & Wikelski, *supra* note 7, at 1361 (“Protecting the abundance of migrants is the key to protecting the ecological importance of migration. As the number of migrants declines, so too do many of the most important ecological properties and services associated with them.”); see also Reynolds & Clay, *supra* note 12, at 371 (explaining that animal migrations are clear examples of the phenomena of abundance).

²² Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2006).

²³ Migratory Bird Treaty Act, 16 U.S.C. §§ 703–712 (2006).

²⁴ Convention on the Conservation of Migratory Species of Wild Animals, *supra* note 2.

²⁵ To the extent that the purposes of laws such as the ESA extend their concern to ecosystem protection and the role that species play ecologically, this concern overlaps with our concern for the ecological benefits of migration. See 16 U.S.C. § 1531(b) (2006) (stating that the fundamental purpose of the ESA is “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved”). However, the fact that the ESA is triggered only after a species is reduced to critically low abundance works against

conserved by reducing or eliminating the migratory behavior, the purposes of these laws, which generally are to prevent scarcity and extinction, would still be served.

Our proposed federal law to protect migrations as phenomena of abundance would authorize a comprehensive set of legal tools, including both carrots and sticks, applied to a limited set of nationally or regionally “significant” or “important” migrations. To be sure, such a comprehensive approach is a worthy long-term goal for all migratory populations—including, for example, populations of songbirds,²⁶ tree bats,²⁷ turtles,²⁸ fishes,²⁹ and insects³⁰—regardless of their national or regional “significance.” Migratory animals are especially vulnerable to a variety of threats because they are exposed to multiple ecosystems and jurisdictions, tend to congregate in large numbers in discrete and often vulnerable areas, and require a large amount of fuel for their long-distance movements.³¹ In terms of the benefits of migration mentioned above, many of the migratory populations that currently may lack national or regional significance serve important ecological roles at local geographic scales and are highly valued by one or another subset of the public for scientific or other reasons. By focusing on a limited set of nationally and regionally significant migrations, however, we stand a reasonable chance of having the law introduced into Congress.³² If such a law were enacted, we could use it to learn about the costs and benefits likely to result from applying various mixtures of legal approaches to migration protection in general.³³

any effort to maintain the species’ ecological role, which likely requires substantially higher abundances.

²⁶ See generally Marra, Hunter & Perrault, *supra* note 17, at 327 (discussing migratory connectivity of songbirds and the importance of this information for long-term conservation of migratory species).

²⁷ See generally Paul M. Cryan, *Wind Turbines as Landscape Impediments to the Migratory Connectivity of Bats*, 41 ENVTL. L. 355 (2011) (discussing bat mortality caused by wind turbines and challenges of developing conservation strategies for migratory species that are not well understood or protected by law).

²⁸ John H. Roe & Arthur Georges, *Heterogeneous Wetland Complexes, Buffer Zones, and Travel Corridors: Landscape Management for Freshwater Reptiles*, 135 BIOLOGICAL CONSERVATION 67, 71, 73–74 (2007).

²⁹ See generally Kathleen A. Miller, *Conservation of Migratory Species in a Changing Climate: Strategic Behavior and Policy Design*, 41 ENVTL. L. 573, 590 (2011) (discussing the effects of harvesting on Atlantic bluefin tuna).

³⁰ See Richard A. Holland, Martin Wikelski & David S. Wilcove, *How and Why Do Insects Migrate?*, 313 SCIENCE 794, 796 (2006) (discussing the importance of insect migrations and the difficulty of tracking them).

³¹ Meretsky, Atwell & Hyman, *supra* note 3, at 525.

³² Our intent is not to weigh in on which migrations are nationally or regionally significant—whether a particular migration or migratory population is considered nationally or regionally significant is an empirical question that cannot be answered outside of the administrative, judicial, political, and scientific process.

³³ See Hedley S. Grantham et al., *Effective Conservation Planning Requires Learning and Adaptation*, 8 FRONTIERS ECOLOGY & ENV’T 431, 434 (2010).

Part II argues that a new and comprehensive federal law to protect nationally or regionally significant migrations as phenomena of abundance is needed. The existing fragmented framework of laws and authorities is insufficient to protect most migratory populations against a diversity of threats across multiple jurisdictions and broad geographic scales. Part II.A sets out three migration stories—the *rufa* subspecies of the American Red Knot (*Calidris canutus*), the Grand Teton population of the pronghorn antelope (*Antilocapra americana*), and the eastern North American population of the monarch butterfly (*Danaus plexippus*)—that will be used to explore and illustrate our ideas for law reform geared toward protecting migrations. Part II.B examines why a migration law should authorize and apply a comprehensive set of legal approaches. Part II.C summarizes the shortcomings of existing conservation laws for protecting migrations as phenomena of abundance. In Part II.D, we examine how a migration protection law might have advanced the conservation of the case-study populations over what has occurred to date, and how it might contribute to their conservation in the future. Finally, in Part II.E, we point out, as a caveat, that some migratory populations would not likely benefit from a new law at this time.

Part III then outlines the central elements of our proposal for a federal migration protection law. We first consider the purposes of such a law in Part III.A, and in Part III.B we suggest alternative methods for nominating and listing “nationally or regionally significant” migrations. We also suggest criteria for selecting such migrations. Part III.C reviews the legal approaches most useful for our proposed law as a function of the health of the listed migration. Then, in Part III.D, we briefly outline some first steps toward conserving the many migrations not likely to be deemed “significant” and thus not covered by the comprehensive approach applied to “significant” migrations.

II. THE NEED FOR LAW REFORM TO PROTECT MIGRATIONS AS PHENOMENA OF ABUNDANCE

Several United States statutes and international agreements have been set in place to conserve species that migrate. For example, statutes include the MBTA and Marine Mammal Protection Act (MMPA),³⁴ mentioned above, as well as the Migratory Bird Conservation Act,³⁵ Neotropical Migratory Bird Conservation Act,³⁶ Marine Turtle Conservation Act,³⁷ and North Pacific Anadromous Stocks Act.³⁸ International agreements include the Inter-

³⁴ Marine Mammal Protection Act of 1972, 16 U.S.C. §§ 1361–1421h (2006).

³⁵ Migratory Bird Conservation Act, 16 U.S.C. §§ 715–715s (2006).

³⁶ Neotropical Migratory Bird Conservation Act, 16 U.S.C. §§ 6101–6109 (2006).

³⁷ Marine Turtle Conservation Act of 2004, 16 U.S.C. §§ 6601–6607 (2006).

³⁸ North Pacific Anadromous Stocks Act of 1992, 16 U.S.C. §§ 5001–5012 (2006).

American Convention for the Protection and Conservation of Sea Turtles,³⁹ the bilateral Migratory Bird Treaties,⁴⁰ and the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.⁴¹ These statutes and agreements as well as others have spawned multiple programs and initiatives for migratory species, such as the Migratory Bird Program,⁴² North American Waterfowl Management Plan,⁴³ United States Shorebird Conservation Plan,⁴⁴ North American Waterbird Conservation Plan,⁴⁵ Partners in Flight,⁴⁶ the North American Bird Conservation Initiative,⁴⁷ Western Hemisphere Shorebird

³⁹ Inter-American Convention for the Protection and Conservation of Sea Turtles, art. II, Dec. 13, 1996, S. TREATY DOC. NO. 105-48 (1998) (entered into force May 2001).

⁴⁰ Convention Between the United States and Great Britain for the Protection of Migratory Birds, U.S.-Gr. Brit., Aug. 16, 1916, Papers Relating to the Foreign Relations of the United States, U.S. State Dept. (1925), 1916 U.S.T. LEXIS 14; Convention Between the United States and the United Mexican States for the Protection of Migratory Birds and Game Mammals, U.S.-Mex., Feb. 7, 1936, 50 Stat. 1311; Convention Between the Government of the United States of America and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction, and Their Environment, U.S.-Japan, 25 U.S.T. 3329; Convention Between the United States of America and the Union of Soviet Socialist Republics Concerning the Conservation of Migratory Birds and Their Environment, U.S.-U.S.S.R., Nov. 19, 1976, 29 U.S.T. 4647.

⁴¹ Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, art. 2, Sep. 5, 2000, T.I.A.S. No. 13,115.

⁴² See U.S. Fish & Wildlife Serv., Migratory Bird Program: Conserving America's Birds, <http://www.fws.gov/migratorybirds/dmbmdbhc.html> (last visited Apr. 10, 2011) (describing program goals); see also CRAIG WATSON ET AL., THE SOUTH ATLANTIC MIGRATORY BIRD INITIATIVE—AN INTEGRATED APPROACH TO CONSERVATION OF “ALL BIRDS ACROSS ALL HABITATS” 267 (2004) (describing the goals of the South Atlantic Migratory Bird Initiative).

⁴³ See U.S. Env'tl. Prot. Agency, Bird Conservation Initiatives, <http://www.epa.gov/owow/birds/bird.html> (last visited Apr. 10, 2011) (describing initiative goals); U.S. Fish & Wildlife Serv., North American Waterfowl Management Plan, <http://www.fws.gov/birdhabitat/nawmp/index.shtm> (last visited Apr. 10, 2011) (describing goals of the management plan).

⁴⁴ See U.S. Fish & Wildlife Serv., Overview of the U.S. Shorebird Conservation Plan and Council, <http://www.fws.gov/shorebirdplan/USShorebird/Overview.htm> (last visited Apr. 10, 2011) (describing the U.S. Shorebird Conservation Plan as a cooperative effort among state and federal agencies and nongovernmental organizations to develop a “scientific framework to determine species, sites and habitats that most urgently need conservation action”); U.S. Env'tl. Prot. Agency, *supra* note 43 (describing the North American Bird Conservation Initiative as a broad “umbrella” organization for many existing conservation initiatives, including the U.S. Shorebird Conservation Plan).

⁴⁵ See JAMES A. KUSHLAN ET AL., WATERBIRD CONSERVATION FOR THE AMERICAS: NORTH AMERICAN WATERBIRD CONSERVATION PLAN, VERSION 1, at 4 (2002), *available at* http://www.pwrc.usgs.gov/nacwcp/pdfs/plan_files/complete.pdf (providing a “continental-scale framework for the conservation of 210 species of waterbirds”).

⁴⁶ See Partners in Flight—U.S., What Is Partners in Flight (PIF)?, <http://www.partnersinflight.org/description.cfm> (last visited Apr. 10, 2011) (“The central premise of Partners in Flight (PIF) has been that the resources of public and private organizations in North and South America must be combined, coordinated, and increased in order to achieve success in conserving bird populations in this hemisphere.”).

⁴⁷ See U.S. N. Am. Bird Conservation Initiative Comm., North American Bird Conservation Initiative—U.S., <http://www.nabci-us.org/main2.html> (last visited Apr. 10, 2011) (“The Committee’s strategy is to foster coordination and collaboration on key issues of concern, including bird monitoring, conservation design, private lands, international collaboration, and

Reserve Network,⁴⁸ Western Hemisphere Migratory Species Initiative,⁴⁹ and Wildlife Without Borders.⁵⁰

Several of these laws and management initiatives have at least the potential to protect some migratory populations at relatively high abundances. In particular, an objective of the MMPA is to restore and maintain marine mammals at “optimum sustainable” levels.⁵¹ Unlike the MMPA, the MBTA does not specify any objective for population abundance, but neither does it contain on its face any limit on abundance, so the MBTA

state and federal agency support for integrated bird conservation.”); U.S. Env'tl. Prot. Agency, *supra* note 43.

⁴⁸ See W. Hemisphere Shorebird Reserve Network, <http://www.whsmn.org/western-hemisphere-shorebird-reserve-network> (last visited Feb. 20, 2011) (stating the mission of the Western Hemisphere Shorebird Reserve Network “is to conserve shorebirds and their habitats through a network of key sites across the Americas”).

⁴⁹ See U.S. Fish & Wildlife Serv., Division of Int'l Conservation, Western Hemisphere Migratory Species Initiative, http://www.fws.gov/international/dic/WHMSI/whmsi_eng.html (last visited Apr. 10, 2011) (“The Western Hemisphere Migratory Species Initiative (WHMSI) seeks to contribute significantly to the conservation of the migratory species of the Western Hemisphere by strengthening communication and cooperation among nations, international conventions and civil society, and by expanding constituencies and political support.”).

⁵⁰ See U.S. FISH & WILDLIFE SERV., WILDLIFE WITHOUT BORDERS: MULTINATIONAL SPECIES CONSERVATION FUNDS (2006), available at http://www.fws.gov/international/dic/pdf/MNSCF_Brochure_06_reprint.pdf. (“The Service’s *Wildlife Without Borders* program awards grants to projects aimed at conserving globally-valued endangered species found outside U.S. borders.”)

⁵¹ The Marine Mammal Protection Act of 1972 includes the element of protecting an “optimum sustainable population” that is a “significant functioning element” in the ecosystem of which it is a part, 16 U.S.C. § 1361(2) (2006), and thus introduces an idea that may be useful for conserving migrations containing an abundance of animals. In part, the MMPA congressional findings and declaration of policy state:

(1) certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man’s activities; (2) such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and, consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population. Further measures should be immediately taken to replenish any species or population stock which has already diminished below that population. . . . (6) marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic, and it is the sense of the Congress that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem. Whenever consistent with this primary objective, it should be the goal to obtain an optimum sustainable population keeping in mind the carrying capacity of the habitat.

Id. § 1361(1)–(2), (6). “Optimum sustainable population” is defined as “the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.” *Id.* § 1362(9).

could be used to maintain migratory bird populations at historic abundances if that target were politically and ecologically feasible.⁵²

Yet, as we point out in this Part, even these laws are inadequate as templates for the kind of law that is needed to conserve migratory populations and the benefits derived from their migrations. Although these laws may address the need to maintain abundances above minimum viable levels, they attempt to achieve the desired results by relying primarily on limited and not very flexible legal approaches. In this Part we examine the need for a new migration protection law that employs a range of legal approaches to address the diversity of threats that migratory populations face. To assist in that task, we reflect upon the stories of three migratory populations that are nationally well known.

A. Three Case Studies of Migration

Throughout this Part we use three case studies to explain and justify the need for law reform to protect migration phenomena: the *rufa* subspecies of the American Red Knot (*Caladris canutus rufa*), a shorebird that has been declining due in part to reductions in its food supply, horseshoe crab eggs, at its main stopover site at Delaware Bay; a population of about 200 pronghorn antelope (*Antilocapra americana*) that summers in Grand Teton National Park and which faces obstacles along its ancient 170-mile migratory corridor between the Tetons and its winter range in the Upper Green River basin in western Wyoming; and the eastern North American population of 100–500 million monarch butterflies (*Danaus plexippus*), which overwinter in dense clusters on the boughs and trunks of fir trees at a handful of high-elevation sites in a small area of central Mexico. All three populations are currently recipients of varied conservation efforts. The primary threat for the Red Knot, the pronghorn, and the monarch populations occur during the stopover, movement, and overwintering stage, respectively, but impacts at other stages of the migration cycle also threaten these migratory populations.

⁵² For example, the U.S. Shorebird Conservation Plan, a cooperative planning effort authorized in part by the MBTA, establishes population targets to meet its national goal to “stabilize populations of all shorebird species known or suspected of being in decline due to limiting factors occurring within the United States, while ensuring that common species are also protected from future threats.” MANOMET CTR. FOR CONSERVATION SCIS., U.S. SHOREBIRD CONSERVATION PLAN 5 (2d ed. 2001), available at <http://www.fws.gov/shorebirdplan/USShorebird/downloads/USShorebirdPlan2Ed.pdf>. For shorebird populations known or thought to be declining, but not listed under the ESA, the long-term target is to restore the population to the level estimated to have existed in the early 1970s. *Id.* at 24. For populations not declining, the long-term goal is to maintain the population at current levels, even if that target is thought to be at historic (i.e., pre-1800) levels. *Id.*

1. Red Knot

The accounts of the *rufa* Red Knot frequently begin with a statement of wonder at the 30,000-kilometer annual migration, “one of the longest-distance migrations in the animal kingdom.”⁵³ Red Knots, which are “jump migrants,” fly thousands of kilometers without stopping: a large part of the population breeds in the Canadian Arctic and winters in South America.⁵⁴ Although Red Knots spread across a large area of the Arctic during the breeding season, for the rest of the year they occur mainly in large flocks at a limited number of key coastal sites.⁵⁵ The Delaware Bay area (in Delaware and New Jersey) is the final known spring migration stopover on the journey north.⁵⁶ The Red Knots concentrate in the Delaware Bay area from the middle of May to early June, corresponding to the spawning season of horseshoe crabs (*Limulus polyphemus*).⁵⁷ The Knots feed on horseshoe crab eggs, rebuilding energy reserves needed to complete the migration to the Arctic and arrive on the breeding grounds in good condition.⁵⁸

The primary threat to the Red Knot is destruction and modification of its habitat, particularly the reduction in food supply resulting from declines in horseshoe crab populations along the Atlantic coast.⁵⁹ Horseshoe crabs are harvested primarily for use as bait and secondarily to support the biomedical industry.⁶⁰ Commercial harvest of horseshoe crabs increased substantially in the 1990s.⁶¹ Various harvest restrictions imposed during this decade may have stabilized the decline in horseshoe crab abundance,⁶² but egg abundance continues to be suppressed,⁶³ and scientists do not know

⁵³ LAWRENCE J. NILES ET AL., COOPER ORNITHOLOGICAL SOC'Y, STUDIES IN AVIAN BIOLOGY NO. 36, STATUS OF THE RED KNOT (*CALADRIS CANUTUS RUFÀ*) IN THE WESTERN HEMISPHERE 28 (2008); Petition to list Red Knot (*Caladris canutus rufà*) from Delaware Riverkeeper Network et al., to U.S. Fish & Wildlife Serv. 13 (Aug. 2, 2005).

⁵⁴ NILES ET AL., *supra* note 53, at 28; Petition to list Red Knot (*Caladris canutus rufà*), *supra* note 53, at 12.

⁵⁵ NILES ET AL., *supra* note 53, at 15–17.

⁵⁶ Petition to list Red Knot (*Caladris canutus rufà*), *supra* note 53, at 16.

⁵⁷ NILES ET AL., *supra* note 53, at 33.

⁵⁸ Petition to list Red Knot (*Caladris canutus rufà*), *supra* note 53, at 14.

⁵⁹ NILES ET AL., *supra* note 53, at 95.

⁶⁰ The horseshoe crab is itself a migratory species that makes a seasonal spawning migration between the continental shelf and breeding beaches. See, e.g., Mark L. Botton & John W. Ropes, *Populations of Horseshoe Crabs, Limulus polyphemus, on the Northwestern Atlantic Continental Shelf*, 85 FISHERY BULL. 805, 805–06, 809 (1987).

⁶¹ Ecological Research & Dev. Grp., The Horseshoe Crab: Conservation, <http://www.horseshoecrab.org/info/conservation.html> (last visited Apr. 10, 2011).

⁶² ROBERT A. FISHER & DYLAN LEE FISHER, VIMS MARINE RESOURCE REPORT NO. 2006-10, THE USE OF BAIT BAGS TO REDUCE THE NEED FOR HORSESHOE CRAB AS BAIT IN THE VIRGINIA WHELK FISHERY 3 (2010); Md. Dep't of Natural Res., Horseshoe Crabs Conservation, <http://www.dnr.state.md.us/education/horseshoecrab/hscmanagement.html> (last visited Apr. 10, 2011).

⁶³ Brian T. Murray, *Birds' Knotty Trouble: The Decline of Crab Eggs*, THE STAR-LEDGER (N.J.), Feb. 10, 2008, http://blog.nj.com/ledgerarchives/2008/02/birds_knotty_trouble_the_decl.html (last visited Apr. 10, 2011).

whether horseshoe crab populations will rebuild or how long a lag time there may be before an increase in availability of eggs.

Other identified threats to the Red Knot at Delaware Bay include habitat destruction due to beach erosion and shoreline projects that are affecting areas used by migrating Knots for foraging; human disturbance, which disrupts the birds' feeding; and competition with other species for limited food resources.⁶⁴ Also, the concentration of Red Knots in Delaware Bay and at a limited number of overwintering areas makes the species vulnerable to potential large-scale events such as oil spills or severe weather. In response to a petition to list the Red Knot under the ESA, the United States Fish and Wildlife Service (FWS), in 2006, found listing the *rufa* Red Knot was "warranted but precluded by other, higher priority activities."⁶⁵

2. Pronghorn Antelope

Prior to the 1850s, more than a million pronghorn lived in Wyoming and around fifty million existed in the western United States.⁶⁶ By 1900, hunting had nearly driven the pronghorn to extinction, and Wyoming, in 1909, enacted legislation to temporarily ban hunting of pronghorn.⁶⁷ Today there are approximately 450,000 pronghorn in Wyoming, many of which migrate.⁶⁸ None, however, migrate as far as the few hundred pronghorn that make the roughly 170-mile journey from wintering grounds in the Upper Green River Basin in western Wyoming along the single remaining route to summer habitat in Grand Teton National Park.⁶⁹ Because the deep snow in the Tetons during winter forces the pronghorn to leave, this migration prevents local extirpation of pronghorn in the park.⁷⁰

Navigation of the migration corridor by the Grand Teton pronghorn necessitates passage through at least four geographical bottlenecks, two of

⁶⁴ NILES ET AL., *supra* note 53, at 96.

⁶⁵ Press Release, U.S. Fish & Wildlife Serv., Red Knot Named Candidate for Endangered Species Act Protection (Sept. 12, 2006), *available at* <http://www.fws.gov/news/newsreleases/showNews.cfm?newsId=A26DAA75-DFC1-18FC-1DF52CD3E63D886F>; *see also* Annual Notice of Findings on Resubmitted Petitions, 71 Fed. Reg. 53,756, 53,770 (Sept. 12, 2006) (to be codified at 50 C.F.R. pt. 17) (explaining that the agency "reviewed the current status of and threats to the [Red Knot and other candidate species and] . . . have found listing . . . to be warranted-but-precluded").

⁶⁶ David N. Cherney & Susan G. Clark, *The American West's Longest Large Mammal Migration: Clarifying and Securing the Common Interest*, 42 POL'Y SCI. 95, 97 (2009).

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.* ("[The] pronghorn that make this migration are considered part of a larger management unit called the Sublette Antelope Herd of approximately 45,000 animals."). Most of the pronghorn routes were lost because of habitat conversion for agriculture, roads, or reservoirs through canyons. Joel Berger, Steven L. Cain & Kim Murray Berger, *Connecting the Dots: An Invariant Migration Corridor Links the Holocene to the Present*, 2 BIOLOGY LETTERS 528, 530 (2006).

⁷⁰ Cherney & Clark, *supra* note 66, at 97.

which are as narrow as about 328 feet.⁷¹ These restricted areas of the migratory route are highly vulnerable to disturbance compared with areas in which animal movements are not so restricted. Of the bottlenecks, the southernmost bottleneck at Trappers Point Historical Monument is considered the most critical from the standpoint of conservation.⁷² Historically, Trappers Point was 5250 feet (1.6 km) wide, bounded by rivers, but housing developments and roadways have reduced the effective width—the area available for travel—of this bottleneck by about fifty percent.⁷³ Obstacles to pronghorn migration in the Green River Basin wintering grounds and along the migratory route include fences that block pronghorn movements and fatally ensnare pronghorns that attempt to pass; highways, with associated road kill and fences; and land development, such as housing subdivisions and oil and gas wells and infrastructure, with attendant human disturbance, as well as direct loss of habitat.⁷⁴

3. Monarch Butterfly

The North American monarch butterfly engages in long-distance, multi-generational round-trip migrations. Current monarch research describes two not entirely distinct populations of butterflies: one that breeds east of the Rocky Mountains and overwinters in the Sierra Madre Mountains in central Mexico, and a smaller population that breeds west of the Rockies and overwinters on the California coast.⁷⁵ The eastern population overwinters

⁷¹ See Joel Berger, *The Last Mile: How to Sustain Long-Distance Migration in Mammals*, 18 CONSERVATION BIOLOGY 320, 324 (2004) (describing the four bottlenecks, two of which can be as narrow as 100 meters, or 328 feet).

⁷² David N. Cherney, *Securing the Free Movement of Wildlife: Lessons From the American West's Longest Land Mammal Migration*, 41 ENVTL. L. 599, 606 (2011) (highlighting the location and importance of this bottleneck to conservationists); Hall Sawyer, Fred Lindzey & Doug McWhirter, *Mule Deer and Pronghorn Migration in Western Wyoming*, 33 WILDLIFE SOC'Y BULL. 1266, 1271 (2005) (emphasizing that Trapper's Point is the bottleneck of most critical concern).

⁷³ Cherney, *supra* note 72, at 606; Sawyer, Lindzey & McWhirter, *supra* note 72, at 1271 (noting the natural river and riparian boundaries of the bottleneck).

⁷⁴ Cherney, *supra* note 72, at 606, 609–10 (multiple pages) (noting the housing and commercial development obstacles to migration, as well as the possible fatal consequences that fencing may pose to pronghorn); Cherney & Clark, *supra* note 66, at 104 (noting that oil and gas drilling may displace pronghorn); see Sawyer, Lindzey & McWhirter, *supra* note 72, at 1270–72 (emphasizing potential obstacles in the migration route and wintering grounds, including direct habitat loss, and human disturbance associated with fences, road networks and highways, and increased development). Pronghorn are managed as game animals, but such an approach does nothing for the Grand Teton pronghorn migration phenomenon. See generally ABBY MELLINGER ET AL., WYO. OPEN SPACES INITIATIVE, IMPROVING BIG GAME MIGRATION CORRIDORS IN SOUTHWEST WYOMING 1 (2010), available at <http://www.uwyo.edu/openspaces/docs/Ruckelshaus%20Institute%20Open%20Spaces.pdf> (listing pronghorn as among “big game” animals in Wyoming, and noting the obstacles that make this migration more difficult); Wyo. Game & Fish Dep't, Pronghorn Working Group Homepage, <http://gf.state.wy.us/wildlife/pronghorn%20working%20group/index.asp> (last visited Apr. 10, 2011) (demonstrating that pronghorn are managed by the Wyoming Game & Fish Department).

⁷⁵ U.S. DEP'T OF AGRIC., MONARCH BUTTERFLY: NORTH AMERICA'S MIGRATING INSECT 4–5 (2008), available at http://www.fs.fed.us/wildflowers/pollinators/documents/Monarch_

from October to March in high elevation fir and pine forests in a dozen or so colonies within a relatively small area in central Mexico.⁷⁶ The fir-pine forest provides an ideal microclimate for overwintering—sufficiently cool to maintain the insects in a state of slowed metabolism and sufficiently warm to avoid freezing.⁷⁷

During March, the eastern overwintering monarchs mate and begin the journey northward out of Mexico.⁷⁸ These monarchs lay their eggs in northern Mexico and the southern United States, and the resulting first generation hatches out as larvae.⁷⁹ This first generation, after metamorphosis, migrates further northward and produces a second generation of monarch larvae.⁸⁰ This second generation of monarchs then transforms into adults, and along with survivors of the first generation migrates even further northward, fanning out across the monarch's eastern geographic range as they go.⁸¹ Thus, each successive new generation, along with the relatively few survivors from previous generations, reaches further and further northward—like a relay race, each generation passes the baton to the next generation. It takes three to four successive generations during the year to complete the journey northward to the Midwest and northern United States and southern Canada.⁸² The final generation of the year then funnels from its northern breeding range back southward, through Texas, to the forests in central Mexico to overwinter, starting the migration cycle again.⁸³ The monarchs that travel south to the overwintering sites thus are descendants three or more generations removed from the migrants that initially migrated north from Mexico.

Butterfly.pdf; Ctr. for Sonoran Desert Studies, Ariz.-Sonora Desert Museum, Migratory Pollinators Program, <http://www.desertmuseum.org/pollination/Monarchs.php> (last visited Apr. 10, 2011) (describing the two populations and their respective overwintering sites).

⁷⁶ Lincoln P. Brower et al., *Quantitative Changes in Forest Quality in a Principal Overwintering Area of the Monarch Butterfly in Mexico, 1971–1999*, 16 CONSERVATION BIOLOGY 346, 347–48 (2002) (noting that the eastern North America population of Monarch butterflies overwinters for five months on twelve mountains in central Mexico on a small, high-elevation boreal forest area); U.S. DEP'T OF AGRIC., *supra* note 75, at 4 (noting that the butterflies overwinter in Mexico from October to March).

⁷⁷ Brower et al., *supra* note 76, at 348 (emphasizing the ideal nature of the microclimate in preventing the butterflies from freezing); see U.S. DEP'T OF AGRIC., *supra* note 75, at 4 (explaining that the cool microclimate is not cold enough to force the butterflies to use their fat reserves); Lincoln P. Brower, Linda S. Fink & Peter Walford, *Fueling the Fall Migration of the Monarch Butterfly*, 46 INTEGRATIVE & COMPAR. BIOLOGY 1123, 1124 (2006) (explaining that the butterflies do little feeding while overwintering, and instead rely on metabolizing lipid reserves).

⁷⁸ See U.S. DEP'T OF AGRIC., *supra* note 75, at 4, 6 (noting that the butterflies reproduce and then head north at the end of the overwintering period in March).

⁷⁹ WILCOVE, *supra* note 8, at 60–61; R. L. Koch et al., *Predicted Impact of an Exotic Generalist Predator on Monarch Butterfly (Lepidoptera: Nymphalidae) Populations: A Quantitative Risk Assessment*, 8 BIOLOGICAL INVASIONS 1179, 1180 (2006).

⁸⁰ WILCOVE, *supra* note 8, at 61–63.

⁸¹ *Id.*

⁸² *Id.*

⁸³ *Id.* at 59–60, 63; Brower et al., *supra* note 76, at 1123–25.

Each successive generation of monarch adults lays its eggs exclusively on milkweed (*Asclepias syriaca*), and the monarch caterpillars that hatch feed on those milkweeds.⁸⁴ Nectar-producing plants also are critical to monarch survival and migration. During the northward migration from Mexico, and before and during the southward migration back to Mexico, adult monarchs feed on a variety of nectar-bearing flowers.⁸⁵ Nectar corridors—migratory routes that pollinators follow in order to take advantage of sequential blooming and senescence of flowering plants along a geographic gradient—provide stopover sites for refueling during the spring and fall migrations.⁸⁶ The locations of monarch migration pathways and stopover habitats are not well understood and are just beginning to be identified.

The eastern monarchs face multiple threats. Although key overwintering sites in Mexico are included in a designated biosphere reserve and covered by a ban on logging, deforestation of the sites continues and they are far from secure.⁸⁷ Climate change may increase rainfall or modify winter temperatures in the fir-pine forests, changing the microclimate and making the existing overwintering sites unsuitable for the monarchs.⁸⁸ The loss of milkweeds in the United States and Canada due to agricultural practices, development, and intentional eradication—some milkweed species are considered noxious because they can be poisonous to livestock⁸⁹—is a direct threat, for milkweeds are necessary for reproduction. Agricultural insecticides also are a direct threat to monarch survival.⁹⁰ Moreover, agricultural practices and development reduce available nectar

⁸⁴ See, e.g., Brower et al., *supra* note 76, at 1124; Koch et al., *supra* note 79, at 1180; Jay Withgott, *Pollination Migrates to Top of Conservation Agenda: A Collaborative Effort on Migratory Pollinators Aims to Increase Research, Education, and Conservation Efforts*, 49 *BIOSCIENCE* 857, 859 (1999); Ctr. for Sonoran Desert Studies, *supra* note 75.

⁸⁵ See Brower et al., *supra* note 76, at 1123; Ctr. for Sonoran Desert Studies, *supra* note 75.

⁸⁶ Many Monarchs are lipid deprived upon reaching their overwintering grounds and subsequently die. Ctr. for Sonoran Desert Studies, *supra* note 75.

⁸⁷ The Monarch Butterfly Special Biosphere Reserve was created in 1986 by national decree to protect overwintering sites for the Monarch. Catherine M. Tucker, *Community Institutions and Forest Management in Mexico's Monarch Butterfly Reserve*, 17 *SOC'Y & NAT. RESOURCES* 569, 570 (2004). The reserve imposed boundaries on land belonging predominately to indigenous communities. *Id.* While these indigenous communities retained formal land titles, they lost most of their rights to use the forests that had long been their common property. *Id.* Although much progress has been made to further protect the overwintering sites since the reserve's inception, illegal logging of the reserve's forests continues to be a serious problem. J. Honey-Rosés, *Disentangling the Proximate Factors of Deforestation: The Case of the Monarch Butterfly Biosphere Reserve in Mexico*, 20 *LAND DEGRADATION & DEV.* 22, 29 (2009); WILCOVE, *supra* note 8, at 65–67.

⁸⁸ Conditions predicted by climate change models suggest that the current overwintering sites will not be suitable for Monarchs in 2055. See *COMM'N FOR ENVTL. COOPERATION*, *supra* note 6, at 27.

⁸⁹ See *id.* at 23–24.

⁹⁰ See *id.* at 27.

resources and have deleterious effects on monarchs' ability to accumulate energy for migration and overwinter survival.⁹¹

B. Why Is a Comprehensive Legal Approach Needed?

Existing federal conservation laws employ one or more of five legal approaches discussed by Professor Vicky Meretsky et al.: 1) providing funding and assistance for conservation projects and fostering coordination and information generation and exchange, 2) providing incentives for state-level conservation planning, 3) acquiring, designating, and managing habitat, 4) controlling the "take" of species' individuals through prohibitions and harvest restrictions, and 5) establishing and implementing standards and management practices to avoid harm to species' individuals and populations.⁹² Each of these approaches by itself has strengths and limitations.⁹³ It seems to us that a comprehensive strategy authorizing a mixture of these five legal approaches is needed to effectively protect migrations as phenomena of abundance, for four reasons.

First, a mix of legal approaches can be useful when targeted populations differ dramatically in abundance. Depending on the species, the level of threat, and the migration benefits sought to be maintained, the abundance of the protected migratory population may be somewhere between carrying capacity—or possibly historical—levels and minimum viable levels. Applying the same legal approach to every migratory population regardless of its current or desirable abundance may well be both inefficient and ineffective. Regulations such as take prohibitions may be most politically acceptable, and most needed, for populations that are in decline or well below their target abundances. Purely voluntary or incentive-based programs, on the other hand, may be sufficient to sustain those few populations already averaging near their target abundances.

Second, a mix of legal approaches can be useful for conserving populations that cross multiple jurisdictions and use an assortment of resource types. Migrating animals may travel between nations, between states, and between public and private lands. Migrating animals also may have contact with multiple agency jurisdictions with potentially conflicting mandates, either by crossing physically between, say, land and ocean or forest and agriculture, or by feeding on animals or plants that are under a different agency jurisdiction than the migrants. Any given legal approach is not likely to work equally well in each of these different jurisdictional settings. For instance, the will and ability of the federal government to control land uses on private land and in foreign countries is quite limited, and a funding or incentivized planning approach is likely to dominate in

⁹¹ The western population of North American Monarchs faces similar threats. In particular, many of the overwintering sites on the California coast consist of stands of pines and eucalyptus trees on private property subject to real estate development. WILCOVE, *supra* note 8, at 67.

⁹² Meretsky, Atwell & Hyman, *supra* note 3, at 471–72.

⁹³ *Id.*

those situations. Conversely, federal control is most acceptable on public lands such as wildlife refuges, where acquisition and land management mandates are fitting. Also, each federal agency has different constraints related to its legal mandate and authority, history, and the types of resources managed, and legal approaches must be harmonized with these constraints. Thus, for example, protecting the Red Knot's food supply of horseshoe crab eggs—under joint National Oceanic and Atmospheric Administration (NOAA) and state jurisdiction⁹⁴—primarily requires take restrictions and interstate coordination, whereas protecting the birds' foraging habitat—under FWS and state jurisdiction⁹⁵—primarily requires project funding, take prohibitions, and habitat acquisition.

Third, a mix of legal approaches can be useful when the migratory population faces a diversity of threats. The application of technical standards and best management practices would be essential for correcting barriers to migratory movement, such as those caused by roads, wind turbines, towers, buildings, oil drilling infrastructure, and dams. Land acquisition and designation, in addition to best management practices, are most useful for ameliorating habitat fragmentation. Take prohibitions and restrictions are an appropriate approach for regulating harvest.

Fourth, there are political reasons for combining regulatory and incentive-based approaches. Professor Steven Yaffee has argued that incentive-based cooperative approaches frequently do not succeed without a regulatory motivation, and thus combining carrots and sticks can be synergistic.⁹⁶ Professor John Echeverria has raised a concern that widespread use of voluntary, government-financed approaches to land protection may undermine the viability of regulation when the latter is the most effective approach, making it more difficult to protect the environment, in part by creating entrenched expectations in the public.⁹⁷ The same concern might be raised regarding migration protection. Thus, a focus on voluntary and incentive-based approaches to the exclusion of regulation may create a political and legal environment that undermines discovery of solutions to problems. But a focus on regulation is not the answer, either. Professor J.B. Ruhl has opined that a focus on coercive regulatory approaches to biodiversity conservation is no longer politically viable.⁹⁸ These analyses taken together suggest that a sensible strategy from a political and pragmatic perspective is to authorize a range of legal approaches for protecting migrations and to tailor their application for different circumstances.

⁹⁴ See Petition to list Red Knot (*Caladris canutus rufa*), *supra* note 53, at 1, 5, 20, 36–37, 44.

⁹⁵ See *id.*

⁹⁶ Steven L. Yaffee, *Collaborative Strategies for Managing Animal Migrations: Insights from the History of Ecosystem-Based Management*, 41 ENVTL. L. 657, 668–69 (2011).

⁹⁷ John D. Echeverria, *Regulating Versus Paying Land Owners to Protect the Environment*, 26 J. LAND RESOURCES & ENVTL. L. 1, 1–2 (2005).

⁹⁸ Ruhl, *supra* note 20, at 647–54.

C. Shortcomings of Existing Federal Laws for Protecting Migrations

Existing federal conservation laws have shortcomings that dilute their potential to protect a set of migrations as phenomena of abundance. Foremost, many of these laws are taxon-specific, narrowly focused on charismatic taxa such as endangered sea turtles, marine mammals, and neotropical migratory birds. Adapting the Marine Turtle Conservation Act or the MMPA to protect migratory populations outside of those taxa would not be an effective strategy. The enactment and implementation of these taxon-specific laws reflect and are supported by the scientific, historical, legal, and political context of each targeted taxon. Marine mammal individuals, for instance, possess significance that individuals of other species, such as pronghorn and monarchs, do not share, and the MMPA's moratorium on take reflects that significance.⁹⁹ Cetaceans such as whales also do not cross between public and private property during their migrations, unlike pronghorn and monarchs.¹⁰⁰ If our goal is to protect a whale migration, then using the MMPA as a template might be sensible. If instead a migration protection law is enacted to protect an open-ended set of "significant" migrations,¹⁰¹ the law must reflect the issues that are common to disparate taxa—whales, butterflies, pronghorn, turtles, and fish—rather than the particulars of each taxon. Existing taxon-specific conservation laws generally are inadequate for that purpose.

Conservation laws that are not taxon-specific, such as the ESA, or not narrowly so, such as the MBTA,¹⁰² are inadequate for protecting migrations as phenomena of abundance because they either cannot conserve abundance or cannot address the suite of threats faced by migratory populations. The ESA can address a diversity of threats to populations, but does not conserve abundance because of its focus on scarcity, reactive measures, and minimum viable populations.¹⁰³ The MBTA, in contrast, has

⁹⁹ Marine Mammal Protection Act of 1972, 16 U.S.C. § 1361 (2006).

¹⁰⁰ U.S. COMM'N ON OCEAN POLICY, PRIMER ON OCEAN JURISDICTIONS: DRAWING LINES IN THE WATER 70–73 (2004), available at http://www.oceancommission.gov/documents/full_color_rpt/000_ocean_full_report.pdf.

¹⁰¹ Even if new migration protection laws were to be enacted population by population, many or most of the migratory populations that would be covered by the new laws—say, pronghorn, Monarchs, and Red Knots—would not be well served by taxon-specific statutes such as the Marine Turtle Conservation Act and MMPA, and so would require new species-specific legislation.

¹⁰² The MBTA today covers over 1000 bird species. Press Release, U.S. Fish & Wildlife Serv., Official Number of Protected Migratory Bird Species Climbs to More than 1000 (Mar. 1, 2010), <http://www.fws.gov/midwest/news/release.cfm?rid=184> (last visited Apr. 10, 2011). At least some of the listed species are not migratory; for example, the Northern Cardinal (*Cardinalis cardinalis*) is a year-round resident throughout its range. Cornell Lab of Ornithology, All About Birds: Northern Cardinal, http://www.allaboutbirds.org/guide/Northern_Cardinal/id (last visited Apr. 10, 2011).

¹⁰³ GRANT G. THOMPSON, NAT'L MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE, NOAA TECHNICAL MEMORANDUM NMFS-F/NWC-198, DETERMINING MINIMUM VIABLE POPULATIONS UNDER THE ENDANGERED SPECIES ACT (1991), available at <http://www.nwfsc.noaa.gov/publications/techmemos/tm198/body.html>.

the potential to conserve abundance, but relies on a singular take prohibition¹⁰⁴ that does not address the wide array of hazards that block migrants' movements, reduce and fragment suitable habitat, and compromise the timely availability of resources. FWS can leverage its enforcement discretion under the MBTA to address a variety of hazards to migratory birds,¹⁰⁵ but the success of such an approach is unpredictable. Laws that provide only funding or only acquisition have similar limitations.¹⁰⁶

One possible strategy for conserving a migratory population is to piece together a package of existing statutes and treaties that, although limited in themselves, can authorize an array of approaches to address multiple threats. In this way, a diversity of tools, such as cross-border project funding, interstate planning and coordination, acquisition of key habitats, prohibitions on take, and implementation of standards and practices, may be applied to a particular migratory population. Unfortunately, with the possible exception of migratory waterfowl and ESA listed species, such a diversity of legal approaches cannot be assembled out of existing authorities for most migratory populations.

D. What Would a New Migration Protection Law Offer?

A fair question to ask of any proposal for law reform is how the proposed law would change the status quo under existing laws. For example, would the outcome for a particular migratory population be different from the one we see today if our proposed migration protection law had been enacted, say, twenty years ago? Moreover, would the proposed law add anything in the future if enacted today? We consider these questions for each of our case studies.

For the *rufa* Red Knot, enactment of a migration protection law twenty years ago would likely have modified the conservation outcome seen today. The FWS recently observed that “the inadequacy of existing regulatory mechanisms” is a threat to the Red Knot’s persistence.¹⁰⁷ A proactive and comprehensive approach to the Red Knot migration may be precisely what has been missing from the efforts to protect the Knots and their Delaware Bay stopover habitat.

¹⁰⁴ Migratory Bird Treaty Act, 16 U.S.C. § 703(a) (2006). See Meretsky, Atwell & Hyman, *supra* note 3, at 481–86.

¹⁰⁵ See U.S. FISH AND WILDLIFE SERVICE, DRAFT LAND-BASED WIND ENERGY GUIDELINES 3–4, 13 (2011), available at <http://www.fws.gov/habitatconservation/wind.html>.

¹⁰⁶ See, e.g., Migratory Bird Hunting and Conservation Stamp Act, 16 U.S.C. §§ 718a–718j (2006) (requiring hunters sixteen years of age or older to purchase Migratory Bird Hunting and Conservation Stamps, which provides money for the Migratory Bird Conservation Fund to acquire migratory bird refuge areas, in addition to funding the engraving, printing, and issuing of stamps).

¹⁰⁷ Annual Notice of Findings on Resubmitted Petitions, 75 Fed. Reg. 69,222, 69,242 (Nov. 10, 2010) (to be codified at 50 C.F.R. pt. 17); Annual Notice of Findings on Resubmitted Petitions, 74 Fed. Reg. 57,804, 57,825 (Nov. 9, 2009) (to be codified at 50 C.F.R. pt. 17).

Scientists and managers seem to agree that two primary threats to Red Knot persistence are the decline of horseshoe crab egg densities below levels sufficient to meet shorebird needs in Delaware Bay, and the disturbance of the birds' habitat by human activities.¹⁰⁸ The harvest of horseshoe crabs along the northeast coast of the United States, and the associated reduced availability of their eggs as food for migrating shorebirds, was identified as a serious threat by the mid-1990s.¹⁰⁹ The population of horseshoe crabs in Delaware Bay fell by about 85% between 1990 and 1998, and while some restrictions were imposed, the intensive harvest of horseshoe crabs continued.¹¹⁰ The decline in the Red Knot population was certainly identified by the late 1990s.¹¹¹ Yet the efforts to put both the Red Knot and horseshoe crabs on an upward trajectory have been unsuccessful to date, and the shortcomings of existing legal mechanisms are at least partly responsible.¹¹²

At the federal level, *rufa* Red Knot is currently not listed under the ESA and so does not benefit from take prohibitions or a recovery plan. The MBTA protects the Red Knot against direct take of birds, nests, and eggs, but other than for nesting sites, which are not located in the United States, the MBTA provides no mandate, and arguably no authority, for protection of habitat or food resources. The Delaware Bay is a Western Hemisphere Shorebird Reserve Network site, but this designation does not mandate any conservation actions and provides no legal authority to protect the Red Knots or their food resources.¹¹³ The horseshoe crabs are under the legal jurisdiction of the Atlantic States Marine Fisheries Commission (ASMFC), which is overseen by the NOAA Fisheries Service.¹¹⁴ Although ASMFC has

¹⁰⁸ See NILES ET AL., *supra* note 53, at 33–36, 95–96, 105–07; U.S. FISH & WILDLIFE SERV., RED KNOT (*CALADRIS CANUTUS RUFUS*) SPOTLIGHT SPECIES ACTION PLAN 1–5 (2010).

¹⁰⁹ NILES ET AL., *supra* note 53, at 24.

¹¹⁰ *Id.*

¹¹¹ *Id.* at 63–64.

¹¹² *Id.* at 102–05, 133–37; Annual Notice of Findings on Resubmitted Petitions, 75 Fed. Reg. at 69,241; Annual Notice of Findings on Resubmitted Petitions, 74 Fed. Reg. at 57,825.

¹¹³ See W. Hemisphere Shorebird Reserve Network, WHSRN List of Sites, <http://www.whsrn.org/sites/list-sites> (last visited Apr. 10, 2011) (listing Delaware Bay as one of its sites and highlighting the group's function to “bring[] attention to sites that are vital for the conservation of the hemisphere's longest-distance migrants”); see also W. Hemisphere Shorebird Reserve Network, *Funding: Hemispheric Red Knot Conservation*, WHSRNEWS, Sept. 10, 2010, <http://www.whsrn.org/news/article/funding-hemispheric-red-knot-conservation> (last visited Apr. 10, 2011) (describing new funding for projects to be conducted through Manomet's Shorebird Recovery Project, with the goal to double the Red Knot population from 30,000 to 60,000 individuals within 10 years).

¹¹⁴ See Atlantic Coastal Fisheries Cooperative Management Act, 16 U.S.C. §§ 5102(3), 5103(a) (2006); Atlantic States Marine Fisheries Comm'n, Horseshoe Crab, <http://www.asmfc.org/horseshoeCrab.htm> (last visited Apr. 10, 2011); Nat'l Marine Fisheries Serv., Nat'l Oceanic & Atmospheric Admin., State/Federal Liaison Branch (Grants), <http://sero.nmfs.noaa.gov/grants/grants.htm> (last visited Apr. 10, 2011) (demonstrating NOAA's cooperative link to the Atlantic Coastal Fisheries Cooperative Management Act). The Atlantic States Marine Fisheries Commission was established by the 15 Atlantic coast states (Maine through Florida, including Pennsylvania) in 1942 through an interstate compact consented to and approved by Congress in

authority to set quotas for adoption by the states, without an ESA mandate to protect the food resources of the Red Knot, the ASMFC may weigh other demands for the horseshoe crab—for bait, the biomedical industry, and as a food source for the federally listed loggerhead turtle (*Caretta caretta*)—as higher priorities.

At the state level, a lack of consistency and coordination across states in management efforts to protect the Red Knots at Delaware Bay has hampered conservation. For example, in the early and mid-1990s, New Jersey, Delaware, and Maryland instituted their own harvest restrictions on horseshoe crabs, but did so without coordinating with the other states.¹¹⁵ This lack of uniformity allowed horseshoe crab fishermen to exploit differences in the restrictions among states, until landings of the crab harvests finally were uniformly regulated coast-wide under an umbrella management plan.¹¹⁶

The incrementally increasing protections for both the horseshoe crab and Red Knot populations may yet halt and reverse their declines; it is too soon to tell. A variety of efforts to protect Red Knots have been cobbled together, and as the *rufa* Red Knot has declined toward an ESA listing, motivation to reverse the decline has increased.¹¹⁷ The problem with Red Knot conservation is not a simple lack of attention; rather, the problem is better characterized as a lack of proactive conservation objectives, insufficient coordination of conservation efforts once population declines started, a lack of clear federal authority for FWS to implement necessary conservation actions, and a lack of information, particularly about the horseshoe crab fishery. The regulatory response to the Red Knot's troubles has thus been piecemeal, reactionary, and tentative. Fragmented jurisdiction—among the Atlantic coast states, between the federal government and the states, and between the federal agencies—over the

Public Laws 77-539 and 81-721. 16 U.S.C. § 5102(3) (2006); Atlantic States Marine Fisheries Comm'n, About Us, <http://www.asmfc.org/aboutUs.htm> (last visited Apr. 10, 2011). Each of the 15 states is represented on the ASMFC by three commissioners, including the director for the state's marine fisheries management agency, a state legislator, and a state governor appointed individual representing fishery interests. *Id.* The ASMFC's Interstate Fisheries Management Program "promote[s] the cooperative management of marine, estuarine, and anadromous fisheries in state waters of the East Coast through interstate fishery management plan[]" development. Atlantic States Marine Fisheries Comm'n, Interstate Fisheries Management, <http://www.asmfc.org/interstate.htm> (last visited Apr. 10, 2011). The program was first developed in response to passage of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). See Office of Sustainable Fisheries, NOAA Fisheries, State-Federal Fisheries: The Atlantic Coastal Fisheries Management Act, http://www.nmfs.noaa.gov/sfa/state_federal/State-Federal-WEB/acfcmafs.htm (last visited Apr. 10, 2011) (describing the expansion that the ACFCMA caused in the program's development). The U.S. Fish and Wildlife Service supports the fishery management efforts of the ASMFC. *Id.*

¹¹⁵ NILES ET AL., *supra* note 53, at 104-05.

¹¹⁶ *Id.*

¹¹⁷ See Petition to List Red Knot (*Caladris canutus rufa*), *supra* note 53, at 22; Renewed Emergency Petition to List the Red Knot (*Caladris canutus rufa*) from Defenders of Wildlife et al., to U.S. Fish & Wildlife Serv. 3 (Feb. 27, 2008); see also U.S. FISH & WILDLIFE SERV., *supra* note 108, at 1.

threats to the Red Knot's habitat and to its primary food supply likely has slowed implementation of effective protections for the birds. The lack of information and uncertainties about the horseshoe crab fishery likely contributed to the tentative and incremental harvest restrictions implemented by the states.¹¹⁸ And without an ESA listing or some other law to provide regulatory motivation, Red Knot conservation has been slow to rise to a priority position relative to competing demands.

A comprehensive migration protection law could have provided the impetus to raise the priority of Red Knot conservation before, or at least during, the early stages of decline. Such a law could have made a range of legal approaches proactively available to benefit both the Red Knots and horseshoe crabs, including funding for research, federal incentives for uniform state habitat protections, federal habitat designation and acquisition, take prohibitions for vulnerable and important shore areas, and development of standards and best management practices for shoreline projects and coastal development. The law also could have set high-priority objectives with regard to the horseshoe crab as an important food source of the Red Knot or even as a significant migration in itself. Moreover, the law could have required targets for Red Knot abundance, so that FWS would have had a clear understanding of the desired thresholds.

The Grand Teton pronghorn also would likely have benefited had a migration protection law existed for the past several decades. In addition, such a law, if enacted today, might improve the current situation. The pronghorn's migration is critically limited by movement barriers: fences, subdivision development, and natural gas wells and infrastructure.¹¹⁹ A large proportion of these threats occur on both government and private lands.¹²⁰ To date, any actions intended to relieve the threat posed by these barriers have been voluntary.¹²¹

We agree with David Cherney that policy solutions that are technically elegant but politically untenable will ultimately be unsuccessful in practice;¹²² that there have been some qualified successes for pronghorn conservation recently on national forest land—designation of a pronghorn migration corridor—and private lands—conversion of existing fencing to wildlife-friendly fences;¹²³ and that early attempts to impose a national

¹¹⁸ See Lawrence J. Niles et al., *Effects of Horseshoe Crab Harvest in Delaware Bay on Red Knots: Are Harvest Restrictions Working?*, 59 *BIOSCIENCE* 153, 153–54 (2009).

¹¹⁹ Cherney, *supra* note 72, at 601.

¹²⁰ *Id.* at 601.

¹²¹ *Id.* at 604–10.

¹²² *Id.* at 614–15.

¹²³ *Id.* at 608–10. Cherney discusses two successes. The first is the Bridger-Teton National Forest amended forest management plan that requires “[a]ll projects, activities, and infrastructure authorized in the designated Pronghorn Migration Corridor will be designed, timed and/or located to allow continued successful migration of the pronghorn that summer in Jackson Hole and winter in the Green River basin.” Decision Notice & Finding of No Significant Impact: Pronghorn Migration Corridor Forest Plan Amendment, Carole ‘Kniffy’ Hamilton, Forest Supervisor, U.S. Forest Serv. 1 (May 31, 2008). The second is the Corridor Conservation

migration corridor on the region likely ignored contextual political and social factors necessary for long-term conservation success.¹²⁴ We would not agree, however, with a suggestion that lawmaking and scientific management inherently ignores contextual political and social factors. Indeed, the ability to adaptively tailor a response to conservation threats using an array of legal approaches is the primary strength of the migration protection law we propose in this article. A comprehensive law need not stand in contrast to bottom-up collaboration. Rather, a law that authorizes a variety of legal approaches—for example, the five legal approaches discussed above—can support bottom-up actions as part of a multi-pronged strategy.

As Cherney points out, the conservation actions to date are incomplete. The majority of obstacles to the pronghorn migration do not occur within the newly designated national forest corridor,¹²⁵ and nothing prevents either further land development or newly erected non-wildlife-friendly fencing on private lands.¹²⁶ Designating the entire migratory corridor as a “protected” area would be unlikely to have much impact in itself; the hard work is instituting politically acceptable actions that stand up to competing demands within such a delineated corridor.¹²⁷ A federal migration law that funds and leverages private conservation actions, authorizes land acquisition of corridor areas and winter range, directs the land management agencies to protect the migration, and provides incentives for state and local implementation of standards and practices for fencing, roads, and development—and that coordinates these approaches—might have advanced the conservation of the Grand Teton pronghorn faster than the voluntary, “bottom-up” process that has dominated thus far. As Professor Steven Yaffee points out, regulations that establish management bottom lines are often critical to the success of cooperative conservation efforts between governmental and private entities by providing the motivation to

Campaign, initiated by the Upper Green River Valley Land Trust in 2008, which converted 80 miles of fence to pronghorn-friendly fencing in 2009 at no cost to landowners. Cherney, *supra* note 72, at 609–10.

¹²⁴ See Cherney, *supra* note 72, at 608–09.

¹²⁵ A significant limitation of the Pronghorn Migration Corridor amendment is that the Forest Plan governs only National Forest System land, whereas the pronghorn’s migration route includes lands under many jurisdictions. U.S. FOREST SERV., DECISION NOTICE AND FINDING OF NO SIGNIFICANT IMPACT: PRONGHORN MIGRATION CORRIDOR FOREST PLAN AMENDMENT 1–2 (2008), available at http://wyomingoutdoorcouncil.org/html/what_we_do/wildlife/pdfs/PronghornMigrationCorr-ROD.pdf. The Forest Plan does not apply to activities on private land, including private land within the forest boundary. *Id.* For the pronghorn, this means that critical places on their migration route are not covered by any meaningful protection program.

¹²⁶ Cherney, *supra* note 72, at 610.

¹²⁷ The concept of designated migration corridors is appropriate for migratory populations like the Grand Teton pronghorn, at least on public land. Corridor designation may not be an effective approach for other migratory taxa, particularly where migration pathways involve a large proportion of private lands and migration fronts are spatially diffuse, as with the eastern population of Monarch butterflies.

develop solutions.¹²⁸ We know how to reduce the barriers to pronghorn movement.¹²⁹ A new law that respects the utility of multiple and contextual solutions in the complex political landscape, while also providing federal coordination, motivation, and minimum standards for such solutions, could help move pronghorn conservation forward from where it is today.

Monarchs also would likely benefit if the comprehensive law proposed here were enacted today. Most efforts to conserve monarchs have been directed toward attempting to protect their overwintering habitat in Mexico, and as discussed above those attempts have achieved mixed success. Reliance on habitat reserves as a flagship conservation strategy is risky in a time of climate change. Moreover, there is a growing recognition that protection of the overwintering sites is necessary but not sufficient to maintain the monarch migration phenomenon as we now know it. This phenomenon may not persist unless the threats to monarch host plants (milkweeds), fuel sources (in nectar corridors especially), and breeding and stopover habitats—threats that occur largely on United States soil—are reduced.

A large proportion of the United States' role in monarch conservation consists of efforts by universities, colleges, and private organizations, some with financial and technical assistance from the Department of Agriculture's Natural Resources Conservation Service.¹³⁰ The governments of Canada,

¹²⁸ Yaffee, *supra* note 96, at 670.

¹²⁹ The standard barbed wire fence is a major impediment to pronghorn movement because pronghorn rarely jump fences and their primary means to cross fences is to move underneath them. HALL SAWYER & BILL RUDD, PRONGHORN ROADWAY CROSSINGS: A REVIEW OF AVAILABLE INFORMATION AND POTENTIAL OPTIONS 4 (2005), available at http://www.westinc.com/reports/pronghorn_report_final.pdf. An antelope-friendly fence has a space on the bottom of the fence. *Id.* Pronghorn generally require, at minimum, sixteen inches of space between the ground and the bottom wire of the fence to maneuver underneath; however, state wildlife agencies often recommend eighteen inches for pronghorn-friendly fencing. *Id.* The vast majority of fences constructed on western rangelands have been designed with bottom wires approximately ten inches off the ground. *Id.* at 5; see also AntelopeGatefreeParadise.org, Home, <http://www.antelopegp.org/> (last visited Apr. 10, 2011) (explaining that a "normal fence out west has four horizontal barbed wires." If the bottom two wires are removed, and the upper one of those wires is replaced with a non-barbed wire, leaving an empty space where the fourth wire was, the fence becomes "antelope friendly."). Road crossings are another obstacle for pronghorns. According to Sawyer and Rudd, as narrow, single-lane roadways with low to moderate traffic volumes change to wider, multi- or divided-lane roadways with high traffic volumes, the ability for pronghorn to cross at grade-level will decrease or possibly be eliminated, and these changes make it increasingly important to identify structural options to facilitate pronghorn movements across roadways. SAWYER & RUDD, *supra*, at 5; see also R.E. AUTENRIETH ET AL., PRONGHORN MANAGEMENT: 2006 (21st Pronghorn Workshop & N.D. Game & Fish Dep't 2006), available at <http://gf.nd.gov/multimedia/pubs/prong-mgmt-guide-pdf-ndx.html>. The authors recommend underpasses associated with large open-span bridge structures, approximately twenty-four feet in height, with no or pronghorn-friendly fencing, limited human-related disturbance in the area of the crossing, and for those structures that cross hydrologic features or riparian habitat, lengthened bridges that include a portion of the uplands. SAWYER & RUDD, *supra*, at 20.

¹³⁰ Projects include development of milkweed propagation methods and plans; development of instructions for creating habitat for Monarchs; identification and assessment of western

Mexico, and the United States also are active in monarch conservation, mostly in a supportive and planning role. The FWS, through its Wildlife Without Borders—Mexico Program, has sponsored and funded initiatives such as reforestation projects at overwintering sites, education projects, and research conferences.¹³¹ Between 1995 and 2006, FWS awarded almost \$800,000 in grants for monarch projects—about ninety-four percent of the funds were for projects to develop the capacity of the local communities of the Monarch Butterfly Biosphere Reserve to sustainably manage their natural resources.¹³² The Commission for Environmental Cooperation, a treaty organization between the United States, Canada, and Mexico,¹³³ published the North American Monarch Conservation Plan (Plan) in 2008, which summarizes the decline of monarchs and establishes a plan for their conservation.¹³⁴ Specifically, the Plan sets forth prioritized actions to address deforestation on overwintering habitat; threats of habitat loss and degradation in the flyway; threats of loss, fragmentation, and modification of breeding habitat; sustainable livelihoods for local populations in Mexico; and

Monarch overwintering sites in California; and research, education, and monitoring. Monarch Joint Venture, Projects, <http://Monarchjointventure.org/projects.htm> (last visited Apr. 10, 2011). Private landowners also may tap into financial support from the NRCS under 2002 Farm Bill Programs such as the Wildlife Habitat Incentives Program (WHIP) to protect butterfly habitat and to plant wildflower gardens, roadsides, and idle areas with nectar-producing plants. Private Landowner Network, Wildlife Habitat Incentives Program (WHIP), <http://www.privatelandownernetwork.org/yellowpages/resource.aspx?id=1664> (last visited Apr. 10, 2011).

¹³¹ See News Release, U.S. Fish & Wildlife Serv., Wildlife Without Borders—Mexico Program: Summary of Approved Projects, *available at* <http://www.fws.gov/news/NewsReleases/pdf/WildlifeWithoutBorders08.pdf> (summarizing projects that FWS has funded in Mexico to protect Monarch habitats).

¹³² COMM'N FOR ENVTL. COOPERATION, *supra* note 6, at 28.

¹³³ See Comm'n for Env'tl. Cooperation, About the Commission, http://www.cec.org/Page.asp?PageID=1226&SiteNodeID=310&BL_ExpandID=154 (last visited Apr. 10, 2011). The Commission for Environmental Cooperation (CEC) implements the 1993 North American Agreement on Environmental Cooperation. *Id.* The governments of Canada, Mexico, and the United States are signatories to a number of other treaties and conventions that provide for bilateral, trilateral, or multilateral cooperation related to the conservation of species and ecosystems including the 1916 Convention Between the United States and Great Britain for the Protection of Migratory Birds, the 1936 Treaty for the Protection of Migratory Birds and Game Mammals, between Mexico and the United States, the 1940 Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, the 1971 Convention of Wetlands of International Importance Especially as Waterfowl Habitat, the 1973 Convention on International Trade of Endangered Species of Wild Fauna and Flora, and the 1992 Convention on Biological Diversity. See U.S. Fish & Wildlife Serv., Digest of Federal Resource Laws, Migratory Bird Treaty Act of 1918, <http://www.fws.gov/laws/lawsdigest/MIGTREA.HTML> (last visited Apr. 10, 2011); George Cameron Coggins & Anne Fleishel Harris, *The Greening of American Law? The Recent Evolution of Federal Law for Preserving Floral Diversity*, 27 NAT. RESOURCES J. 247, 266–67 (1987); U.S. FISH AND WILDLIFE SERV., RAMSAR CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE 1–2, *available at* www.fws.gov/international/dic/global/pdf/Ramsarfactsheet_2008.pdf; The Convention on Biological Diversity, Country Profiles, <http://www.cbd.int/countries/> (last visited Apr. 10, 2011).

¹³⁴ See COMM'N FOR ENVTL. COOPERATION, *supra* note 6 (summarizing the decline of Monarchs and establishing a prioritized action plan for conservation and recovery).

education, outreach, research, and monitoring.¹³⁵ These actions call for, among other things, threat assessment, technical assistance, land acquisition, and the development of conservation plans, guidelines, and recommended management practices. An additional governmental player in monarch conservation is the Trilateral Committee for Wildlife and Ecosystem Conservation and Management (Trilateral Committee), established in 1996 and headed by the directors of the Canadian Wildlife Service, FWS, and the Ministry of Environment and Natural Resources of Mexico.¹³⁶ Among other actions such as hosting conferences and facilitating coordination, the Trilateral Committee has initiated a project to establish a network of sister protected areas throughout North America.¹³⁷ In the United States, the sister areas are national parks and national wildlife refuges.¹³⁸

The monarch clearly is a high profile species that has garnered much attention from the conservation community. Monarch conservation is on the agenda of a multitude of governmental and nongovernmental players, and this multiplicity can be a strength so long as conservation efforts are adequately coordinated and ensured. Yet there is currently no special legal status at the federal level for monarch butterflies or their habitat in the United States.

A federal migration protection law could make several contributions to existing conservation efforts. The law could provide federal incentives for states to include monarch protections in state conservation plans.¹³⁹ Incentivized state planning and associated project funding could be an effective approach to monarch protection; the threats to monarchs off of the overwintering sites are geographically widespread and involve a large amount of private land, circumstances that make regulation particularly challenging. In addition, the law could authorize and fund acquisition of key habitats in Texas and other places. Finally, the law could accelerate the development and implementation of uniform land management practices to

¹³⁵ *Id.* at 38–42.

¹³⁶ See Trilateral Comm. for Wildlife & Ecosystem Conservation & Mgmt., Current Table Co-Chairs, <http://www.trilat.org/about-the-trilateral/current-table-co-chairs> (last visited Apr. 10, 2011) (listing representatives from FWS, the Canadian Wildlife Service, and the Mexican Ministry of Environment and Natural Resources as forming the executive table of the committee). The Trilateral Committee, which was established by a Memorandum of Understanding among the wildlife agencies of the three nations, facilitates cooperation and coordination among the agencies in conservation projects and programs. Trilateral Comm. for Wildlife & Ecosystem Conservation & Mgmt., Background: About the Trilateral Committee, <http://www.trilat.org/about-the-trilateral> (last visited Apr. 10, 2011).

¹³⁷ See COMM'N FOR ENVTL. COOPERATION, *supra* note 6, at 29.

¹³⁸ *Id.* at 30.

¹³⁹ See *id.* at 31 (“In California, current legal protections involve a patchwork of city ordinances, coastal zone management plans and state law. In 1987, the California legislature passed Assembly Bill #1671, to recognize the Monarch’s migration and winter aggregation as a natural resource and to encourage the protection of its winter habitat. . . . A small number of Californian cities and counties have enacted ordinances that prohibit activities that disturb Monarchs and their winter roost trees. Of the ordinances currently in place, many apply these prohibitions only when Monarchs are present.”).

reverse the loss of overwintering habitat, milkweeds, and nectar-producing plants. The Plan, for example, recommends that parties develop sustainable farming and forestry practices in the overwintering areas of Mexico, develop and disseminate guidelines to conserve and enhance migration habitat and nectar sources, and develop highway and other roadside mowing regimens compatible with monarch breeding.¹⁴⁰ The Plan gives some of these actions indeterminate time frames, and their completion relies on voluntary efforts. Our proposed law could require the agencies, or incentivize the states, to develop these practices and guidelines, and could use federal incentives to encourage the states and private individuals to implement them.

In general, our proposed migration protection law would provide four things that have been missing in past attempts to conserve Red Knots, pronghorn, and monarchs. First, and foremost, the law would send a legislative signal that these migratory populations and their migrations are of high national priority relative to competing demands. This would be an important advance in itself. Second, the law would authorize the lead agencies to bring to bear a diversity of legal approaches to the problems, thus allowing a more effective, efficient, and politically sensitive tailoring of conservation solutions. The alternative is to continue to rely on cobbling together authorities, legal tools, and funding from the fragmented set of existing conservation laws. Third, the law would speed up solutions that may eventually emerge from voluntary, cooperative conservation approaches, but which often do not emerge in time to prevent dramatic declines in population abundance or geographic range. By the time such approaches find their legs and all of the necessary components of conservation solutions, declines in abundance and in geographic range may have advanced to a point where they are difficult or impossible to reverse. Fourth, even where the migration is recognized as significant and important, a migration protection law would clarify the reasons why the phenomenon is worthy of protection.

E. What Migrations Would Benefit Least and Most from Law Reform

In each of our case studies involving migratory animals, the existing legal framework has limited capability to effectively conserve the target populations. We have argued that a new law could help us do better. Although the law we propose would apply only to nationally or regionally significant migrations, the migratory populations likely to be covered would not benefit equally from a new law. Migratory populations that lack existing legal protections would likely receive the largest and most rapid surge of benefit from the passage of a migration protection law. Migratory populations listed under the ESA would likely benefit the least.

The North American monarch, one of our case-study migrations, is not at this time thought to be at any significant risk of extinction, and that status

¹⁴⁰ See *id.* at 38–39.

is reflected in the lack of federal law to protect the monarch specifically. Although monarchs face multiple threats, including climate change,¹⁴¹ there are millions of them still widely distributed across the United States. This is thus the appropriate time to evaluate the benefits of the monarch's migration phenomena, set abundance targets, and establish state planning incentives and other legal approaches in an effort to ensure that the monarch does not eventually end up like the *rufa* Red Knot—one step away from an ESA listing.

For the Red Knot, the time window for reaping the main advantages of a migration protection law may be closing as the Knots get closer to an ESA listing, at which time comprehensive regulations will be imposed on the system. A migration protection law, had it been in place twenty years ago, might have prevented the predicament the Red Knot is in today. At this point, a migration protection law will be useful only if the Department of Interior continues to avoid an ESA listing.

In general, once the critical issue is avoiding extinction rather than preserving or restoring abundance, the migratory population would not benefit much from a new conservation law, at least in the short term. For example, we have known that North Atlantic Right Whales (*Eubalaena glacialis*) have been in trouble for more than eighty years, and the species has been listed as endangered under the ESA since the modern statute's inception in 1973.¹⁴² Right Whales are the rarest of all large whale species: there are only about 300–400 in the North Atlantic.¹⁴³ So few Right Whales now migrate that the migration does not at this time provide any of the benefits of migration.¹⁴⁴ The Right Whale may be a good candidate for a “significant” migration, but unless and until the Right Whale recovers to the point that migration recovers its rightful ecological and aesthetic characteristics, migration will remain a conservation issue for Right Whales only because the animal moves from place to place, thus complicating conservation efforts. Protecting the benefits of the migration phenomenon must take a back seat to saving the species, and a migration protection law would not add substantial protections not already provided by the ESA.

¹⁴¹ *Id.* at 4, 27.

¹⁴² List of Endangered Foreign Fish and Wildlife, 35 Fed. Reg. 18,319, 18,320 (Dec. 2, 1970) (codified at 50 C.F.R. pt. 17 app. A); *see also* Endangered Status for North Pacific and North Atlantic Right Whales, 73 Fed. Reg. 12,024 (Mar. 6, 2008) (to be codified at 50 C.F.R. pt. 224) (listing the previously listed “northern right whale” as two separate species—the North Atlantic Right Whale (*Eubalaena glacialis*) and the North Pacific Right Whale (*Eubaleana japonica*)); Office of Protected Res., Nat'l Oceanic & Atmospheric Admin., North Atlantic Right Whales (*Eubalaena glacialis*), http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/rightwhale_northeastatlantic.htm (last visited Apr. 10, 2011) (describing the characteristics, habitat, threats, and recovery plan of the North Atlantic Right Whale, as well as providing a link to relevant federal regulations). The North Atlantic Right Whale is also designated as depleted under the MMPA. *Id.*

¹⁴³ Office of Protected Res., *supra* note 142.

¹⁴⁴ *See, e.g.*, Mark F. Baumgartner et al., *Associations Between North Atlantic Right Whales and Their Prey, Calanus finmarchicus, Over Diel and Tidal Time Scales*, 264 MARINE ECOLOGICAL PROGRESS SERIES, Dec. 15, 2003, at 155, 164 (evaluating predator-prey relationships as one example of the ecological significance of Right Whales).

Whooping Cranes (*Grus americana*) also fall into this category of migratory species now on life support.¹⁴⁵ Once a migratory species is viable and extinction risk is reduced below the threshold for ESA listing, or before it becomes so rare, the migration can be the focus of conservation efforts, and a migration conservation law could be helpful.

III. DESCRIPTION OF A PROPOSED MIGRATION PROTECTION ACT

This Part outlines some possible structural components of a federal Migration Protection Act (Proposed Act). We suggest “findings and purposes” for the Act, consider the scope and applicability of the law, and then provide some preliminary consideration of the legal approaches to be implemented under the Act. We end with first steps for conserving migrations not covered by the “nationally or regionally significant” category.

A. Findings and Purposes

Our proposed congressional findings reflect the benefits and values of migrations as well as the challenges facing migrations.¹⁴⁶ We expect Congress would find that nationally and regionally significant migrations (NRSMs) are of ecological, cultural, psychological, aesthetic, inspirational, recreational, historic, and economic value to the nation. Such a statement that NRSMs are to receive high priority or coequal status relative to competing demands would itself be a significant advance over the current situation. Congress also would recognize that NRSMs face threats including habitat loss and fragmentation, human-created obstacles, overexploitation, pollution and contamination, and climate change. Additionally, Congress would acknowledge that NRSMs are not well protected by existing environmental and wildlife protection laws because existing laws respond to scarcity, whereas the values and benefits of migration often depend upon abundance. Finally, Congress would find that migrations present special conservation challenges because they often involve long-distance movements that cross large geographic scales and multiple jurisdictional boundaries.

The purposes section of the Act would reflect the key components that make the Act different from other conservation laws: conserving the process of migration as a phenomenon of abundance, maintaining the benefits and values of migrations, and utilizing a range of legal approaches in order to

¹⁴⁵ See U.S. Fish & Wildlife Serv., Species Profile for Whooping Crane (*Grus americana*), <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003> (last visited Apr. 10, 2011) (“The total population of wild and captive whooping cranes in July, 2010, was 535.”); Endangered Species, 32 Fed. Reg. 4001, 4001 (Mar. 11, 1967) (listing Whooping Cranes under the Endangered Species Preservation Act of Oct. 15, 1966).

¹⁴⁶ See WILCOVE, *supra* note 8, at 4–5; Fischman & Hyman, *supra* note 8, at 175 (discussing “the distinguishing attributes of animal migrations, why they are important to biodiversity conservation, and the legal challenges posed by migration conservation”).

implement a comprehensive protection strategy. The primary purpose would be to identify—initially by Congress, and subsequently through the Departments of Interior and Commerce—and protect those migrations that are NRSMs based on their national or regional ecological, psychological, cultural, or economic significance. Providing financial resources or other incentives for migration conservation initiatives in the United States and internationally is another purpose of the Act.

B. Applicability

One of the key sections of the Act would be the “applicability” section, which would have to specify a procedure for determining what migrations will be designated as NRSMs and thus receive protections under the law. We suggest two processes, not mutually exclusive, for determining coverage under the Act. The first process is for Congress to provide an initial list of NRSMs at the time of enactment. Three possible candidates are the migratory populations discussed as case studies above: the *rufa* Red Knot, the pronghorn antelope, and the North American monarch.¹⁴⁷

An advantage to congressional listing is that it supersedes the often contentious step of an agency listing and the associated need to assemble a litigation-proof case that a migration phenomenon meets a particular definition or set of criteria. Congressionally designated migrations—to the extent any survive the battle associated with legislative listing—would not be subject to the type of litigation that has beset FWS under the ESA. If congressional designation were the only path to listing, one might reasonably judge Congress more willing to support migration protection legislation. A serious drawback to congressional listing, however, at least as the sole method of determining NRSMs, is that each new migration to be protected would require an amendment to the Act, which might involve years of congressional debate and rehashing of the value of the Act.

In our judgment, then, the Act ought to establish a second process for identifying and approving migrations to which it is applicable. Two alternatives are possible. The first option is to add NRSMs under the Act via a listing process similar to that used under the ESA.¹⁴⁸ Petitions to list particular migrations would be accepted from the public and also generated within the responsible agencies. If a petition were submitted, the agency would grant or deny it based on criteria in the Act and in associated agency regulations. This path to listing offers the attractive prospect of involving the public in determining the applicability of the Act, but inevitably introduces the prospect of litigation over agency decisions on whether or not to list nominated migrations. A second option is for the Act to commit the listing process to agency discretion by law, and not allow public input into the

¹⁴⁷ See *supra* Part II.A.

¹⁴⁸ The ESA listing process is contained in section 4 of the Endangered Species Act of 1973, 16 U.S.C. § 1533(c) (2006).

listing process. While this option would reduce litigation, we consider public input into the listing process as essential to properly evaluate our proposed listing criteria.

We propose that the criteria for approving and listing new NRSMs reflect the benefits of migration discussed above: ecological, psychological, cultural, and economic.¹⁴⁹ The responsible agencies would decide, for migrations nominated internally or through the public petition process, the extent to which these migrations are nationally or regionally significant. This ruling would in turn require an assessment of whether the ecological, psychological, cultural, or economic benefits of the migration are of national or regional significance. Such an assessment will be challenging, no doubt, even in the best of circumstances. If the decision must be justified by quantified scientific or social science data, the decision may be plagued by an overwhelming lack of information. We suggest, therefore, a more qualitative approach to complement any quantitative information that is available. Public input into the listing process would be particularly valuable for assessing psychological and cultural significance, although this assessment would necessarily rely on a variety of scholarly and popular sources. Ecological significance is likely to be highly uncertain for even nationally recognized migrations.¹⁵⁰ Information on economic significance is more likely to be quantified and readily available, at least for broader taxonomic categories, such as birds and mammals. Regardless of the difficulties, however, the Act would need to establish criteria for adding significant and important migration phenomena to the Act's protections, and the benefits we propose are a reasonable choice.

The limited listing of migrations that have national or regional significance differs from the approach taken by statutes and treaties that apply to a wide array of species, such as the ESA and the Bonn Convention. The Bonn Convention has an inclusive philosophy; it focuses on conserving "migratory species."¹⁵¹ Under this coarse screen, any species that is determined to be "migratory" is covered by the Convention.¹⁵² Any species that meets this definition is subject to general, and in some cases aspirational, "fundamental principles."¹⁵³ The Bonn Convention then lists the subset of migratory species that need special attention in two appendices: those species that are endangered¹⁵⁴ and those species that have an

¹⁴⁹ See *supra* text accompanying note 11.

¹⁵⁰ See generally Reynolds & Clay, *supra* note 12, at 376–78 (discussing ecological services provided by migrating species).

¹⁵¹ See Convention on the Conservation of Migratory Species of Wild Animals, *supra* note 2, at 1–2 (defining "migratory species" as "the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries").

¹⁵² *Id.*; see also Elizabeth A. Baldwin, *Twenty-Five Years Under the Convention on Migratory Species: Migration Conservation Lessons from Europe*, 41 ENVTL. L. 535, 535 (2011).

¹⁵³ See Convention on the Conservation of Migratory Species of Wild Animals, *supra* note 2, at 2.

¹⁵⁴ *Id.* at 2; see also *id.* app. 1 at 1–4.

“unfavorable conservation status” and therefore require international agreements for their conservation and management.¹⁵⁵ All migrations covered by the Convention and not listed in one of the appendices are considered to be in favorable status. Unlike the Bonn Convention’s approach to initially include all migratory species and then demarcate those species according to threat level, our proposed Act would cover a limited and select group of migrations and aim to durably secure them by directing that a plan to do so be made using a comprehensive set of legal approaches and protection measures.

C. Legal Approaches for Listed Migrations

Once a migration is approved and listed under the Act, the agencies would work to create a conservation plan by evaluating the legal approaches to be applied and the conservation measures to be taken for each migration. As discussed above, an important feature of a migration protection law is that it utilizes a range of legal approaches. Although we work largely with the legal approaches in existing conservation laws, we call for changes in the way these approaches are assembled into law and the purposes and objectives for which they are applied.

At one end of the spectrum, migratory populations that are currently healthy might receive the lightest government touch—for example, incentive programs for state and local planning and regulation, funding programs, and collaborative acquisition programs. Our Act would authorize an incentive program, perhaps modeled on the Coastal Zone Management Act,¹⁵⁶ to encourage states and local governments to conserve and protect migrations that pass through their jurisdictions.¹⁵⁷ In addition, our Act would potentially use existing funding programs such as those authorized by the Partnerships for Wildlife Act,¹⁵⁸ Partners for Fish and Wildlife Act,¹⁵⁹ and Interjurisdictional Fisheries Act.¹⁶⁰ Our Act would also establish a new fund specifically targeting migrations that cross national borders, modeled after existing project funding schemes such as used in the Neotropical Migratory Bird Conservation Act¹⁶¹ and the Marine Turtle Conservation Act.¹⁶² Our Act would also authorize an acquisition program, perhaps modeled after the Migratory Bird Conservation Act¹⁶³ and the Wetland Reserve Program.¹⁶⁴

¹⁵⁵ *Id.* at 2–3; *see also id.* app. 2 at 5–10.

¹⁵⁶ Coastal Zone Management Act of 1972, 16 U.S.C. §§ 1451–1466 (2006 & Supp. III 2010); 15 C.F.R. pts. 923, 930 (2010).

¹⁵⁷ 16 U.S.C. § 1451(i) (2006).

¹⁵⁸ Partnerships for Wildlife Act, 16 U.S.C. §§ 3741–3744 (2006).

¹⁵⁹ Partners for Fish and Wildlife Act, 16 U.S.C. §§ 3771–3774 (2006).

¹⁶⁰ Interjurisdictional Fisheries Act of 1986, 16 U.S.C. §§ 4101–4107 (2006 & Supp. III 2010).

¹⁶¹ Neotropical Migratory Bird Conservation Act, 16 U.S.C. §§ 6101(4), 6108(a) (2006).

¹⁶² Marine Turtle Conservation Act of 2004, 16 U.S.C. §§ 6601–6604 (2006 & Supp. III 2010).

¹⁶³ Migratory Bird Conservation Act, 16 U.S.C. §§ 715(a)–(f), (k) (2006).

¹⁶⁴ Conservation Program Improvements Act, 16 U.S.C. §§ 3837–3837f (2006).

At the other end of the spectrum, migratory populations that have already suffered dramatic declines in abundance—the Red Knot, for instance—may require more significant government intervention. Such migratory populations would particularly benefit from regulatory approaches in addition to the funding and incentive-based programs mentioned above. For populations at risk but not listed under the ESA, our Act would authorize a take prohibition for the migratory population. A take prohibition could be modeled after section 9 of the ESA so that habitat destruction and harvesting of food sources could constitute a take,¹⁶⁵ and incidental take permits could be issued.¹⁶⁶ Our Act would also direct the responsible agencies, as part of the conservation plan, to designate key corridors and habitats, to set explicit objectives for acquiring property interests in those delineated areas, and to develop or oversee development of standards and management practices to reduce barriers to migratory movement and to reduce the impacts of land uses.¹⁶⁷

The details of how these legal approaches would be structured within the statute and regulations, and how these approaches would be specifically implemented by the agencies, is beyond our objectives in this article. But several options for structuring and implementing each legal approach are available. For instance, the Act could use one or more mechanisms of cooperative federalism to inject uniform standards and practices into state, local, and private land use decisions.¹⁶⁸ Choices must be made about appropriate incentives to motivate state and local regulation—two options to be considered are straightforward funding grants and the more complicated incentive of offering states relief from current federal regulation. Several options also are available for land acquisition, including eminent domain, purchases from willing landowners, and tax subsidies.¹⁶⁹ These details are important and will require articulation as the Act is drafted.

Finally, the responsible agencies would develop targets of abundance for all of the migratory populations listed under the Act, regardless of their current health and abundance. These targets would be grounded in a consideration of the benefits sought from each migration. Rough estimates and rules of thumb will prevail due to the lack of information to link population abundance with particular benefits, but the setting of

¹⁶⁵ See, e.g., *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687, 696, 700–01 (1995) (holding that an action that would cause the destruction of the habitat of an endangered species may constitute a taking prohibited by section 9 of the ESA). Section 9 is at 16 U.S.C. § 1538 (2006).

¹⁶⁶ Endangered Species Act of 1973, 16 U.S.C. § 1539(a)(1)(B) (2006).

¹⁶⁷ Other non-substantive provisions would be needed to strengthen the effectiveness of these regulatory approaches, such as authorization for enforcement (including citizen suit authority), inclusion of migration in NEPA review, and appropriations of funds.

¹⁶⁸ See generally Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179 (2005) (discussing the operation of cooperative federalism in environmental and natural resources law).

¹⁶⁹ See generally Echeverria, *supra* note 97 (discussing various methods of environmental conservation through governmental land acquisition).

abundance targets is not an empty exercise. Target setting can help clarify and motivate the proactive strategy that is inherent in our proposed Migration Protection Act.

D. First Steps for Non-Listed Migrations

Many species and migrations will fall outside the scope of the statutory reform proposed above for the migrations recognized as nationally or regionally significant. Of those excluded species and migrations, many will be highly valued by one or another community—indeed, many of the bat and bird species considered by authors in this symposium will likely fail to clear the hurdle of the listing criteria we suggest—and many will already be in decline due to human impacts. As we commit to conserving the relatively few great migrations of special importance, we are naturally prompted to inquire about the status of all migrations. What we learn upon such an inquiry is that we have little systematic knowledge about the full range of migrations that touch the United States: the paths migrants take, where they breed and overwinter, their population abundance and dynamics, the specifics of their migratory behavior, and the impacts of humans.¹⁷⁰ In the absence of that systematic knowledge, it would be extraordinary for the nation to make a policy decision to conserve them all at relatively high abundances. But we surely can commit to develop the knowledge we now lack, and to systematically consider the impact of federally funded activities on migrations that may currently be overlooked in planning processes due to the paucity of scientific information. The service of those two relatively modest objectives is the secondary focus of the law reform we recommend.

Thus, we propose that the Act include a provision that directs FWS and NOAA to document the available information on all migrations of mammals, birds, fish, and insects that occur in whole or in part in the United States. This would apply to the nationally and regionally significant migrations as well as those migrations falling outside of that status. The Act would authorize appropriations to fund that documentation as well as needed research on such migrations. The Act would additionally require consideration of the impact of federally funded projects on those documented migrations. This is not to say that consideration of migrations is absent from environmental impact statements now. The National Environmental Policy Act (NEPA)¹⁷¹ regulations require that, when evaluating the impact of a project, officials must consider the effects of the project on endangered species, park lands, wetlands, wild and scenic rivers, ecologically critical areas, and significant scientific and cultural resources.¹⁷² Impacts of projects on migratory populations and their migrations are

¹⁷⁰ See, e.g., John Faaborg et al., *Conserving Migratory Land Birds in the New World: Do We Know Enough?*, 20 *ECOLOGICAL APPLICATIONS* 398, 411 (2010) (acknowledging challenges in fully understanding migratory behavior); Meretsky, Atwell & Hyman, *supra* note 3, at 469.

¹⁷¹ National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321–4347 (2006).

¹⁷² 40 C.F.R. § 1508.27(b) (2010).

clearly within the purview of NEPA evaluations. Such evaluations, however, tend to focus on well-known and highly-visible migrations.¹⁷³ NEPA evaluations may overlook impacts to lesser-known and less-visible migrations that have little scientific documentation, such as migrations of tree bats.¹⁷⁴ For those less-visible migrations, then, an express requirement for NEPA evaluation may be especially useful.

A combination of research funding and NEPA consideration can help the agency develop the most critical information on migrations. A requirement for NEPA evaluation alone may not support the longer-term data gathering necessary to document the lesser-known migrations, and funding for migration research alone may not highlight and produce the type of information most important for decision making.¹⁷⁵ Together, they may set the stage for a national strategy to conserve the migration phenomenon across a broad range of species.

IV. CONCLUSION

Our migration-as-phenomenon perspective and our prescriptions for law reform to conserve migration phenomena share several of the principles embodied in calls for “ecosystem management”: consideration of broad spatial scales, attempts to manage across ownership and administrative boundaries, concern for trophic interconnections and ecosystem functions, use of collaborative decision making, and recognition of human values.¹⁷⁶

¹⁷³ For example, in *Natural Resources Defense Council, Inc. v. Hodel*, 865 F.2d 288 (D.C. Cir. 1988), petitioners claimed that the Environmental Impact Statement (EIS) for the Department of Interior’s offshore oil and gas leasing program failed to consider the cumulative impacts of simultaneous development in the Pacific and Alaskan regions on species, particularly whales and salmon, that migrate through the different planning areas. *Id.* at 297. The court agreed, concluding that although the EIS devoted a few sentences to the inter-regional effects of the program on migrating species, “these snippets d[id] not constitute real analysis; they merely state (and restate) the obvious . . .” *Id.* at 299. The court then suggested that the evaluation could “identify the various migratory species and the full range of their routes of migration, describe the OCS and non-OCS activities along those routes, and state the synergistic effect of those activities on the migratory species. . . . Finally, the Secretary could, consistent with NEPA’s requirement that he consider alternatives to the proposed action, examine alternatives to simultaneous development that would mitigate any synergistic impacts on migratory species, such as staggering development.” *Id.* at 300.

¹⁷⁴ See Cryan, *supra* note 27, at 357–58.

¹⁷⁵ Current NEPA regulations require an agency to determine those situations where either relevant information is missing or scientific uncertainty exists. 40 C.F.R. § 1502.22 (2010). Information relevant to adverse impacts must be included in the EIS whenever it is essential to a reasoned choice among alternatives and the cost of obtaining the information is not exorbitant. *Id.* § 1502.22(a). The unavailability of information typically will not halt the federal action—particularly where the information needed depends on long-term research—but the agency must weigh the cost of proceeding in the absence of sufficient information as one factor in the decision. See, e.g., *Alaska v. Andrus*, 580 F.2d 465, 473–74 (D.C. Cir. 1978); see also *Jicarilla Apache Tribe of Indians v. Morton*, 471 F.2d 1275, 1280 (9th Cir. 1973).

¹⁷⁶ See U.S. GEN. ACCOUNTING OFFICE, GAO/RCED-94-111, ECOSYSTEM MANAGEMENT: ADDITIONAL ACTIONS NEEDED TO ADEQUATELY TEST A PROMISING APPROACH 6–7 (1994); Richard Haeuber, *Ecosystem Management and Environmental Policy in the United States: Open Window of*

One cannot effectively conserve long-distance migrations without considering broad spatial scales, multiple jurisdictions, and landscape components—e.g., patches and corridors—and processes—e.g., fragmentation and source-sink dynamics. Human values and ecosystem functions, key factors in ecosystem management, are integral to our proposed criteria for identifying “significant” migrations. However, our proposed law reform is rooted in the conventional individual natural resource orientation to conservation.¹⁷⁷ Our proposal does not call for or focus explicitly on ecosystem health, integrity, or conservation, or even on biodiversity in general. Like the ESA, our proposed law singles out a few animal populations for special treatment, an approach that might be viewed as the antithesis of ecosystem management.¹⁷⁸

Our proposal is not necessarily inconsistent with ecosystem management. Ecosystem health would likely benefit from applying the legal approaches we delineate and from protecting the migrations that contact those ecosystems.¹⁷⁹ Additionally, our listed migrations would benefit as a consequence of advancing overall ecosystem health. But because our law reform seeks to maintain the abundance of select animal populations, potential conflicts with other human goals can be expected. Actions for conserving a population and its migration for one set of benefits may at times be inconsistent with human populations and enterprise. Transmission of disease from wild to domestic animals, crop depredation, and competition with fisheries are issues that will surely arise for our significant migrations, as they already have for bison, sea birds, and seals.¹⁸⁰ Moreover, actions to protect migrations may at times conflict with other conservation goals.¹⁸¹ For example, maintaining some populations at abundances necessary to provide deeply rooted cultural or economic benefits may create unwanted effects on other protected animals—through disease transfer—or on managed ecosystems—through predation on desirable species. Such problems must be resolved during implementation of the law we propose; the solutions may be guided by a strong congressional statement of policy regarding the value of the protected migrations.

Nonetheless, our proposed law reform advances a worthy goal: namely, to contribute to biodiversity conservation by protecting significant migration phenomena and the benefits they provide to humans and ecosystems. Achieving this goal will require a clear and bold commitment and a shift in focus from the piecemeal and reactive approaches common to existing conservation laws. To conserve most of the things we care about that are

Closed Door?, 40 LANDSCAPE & URB. PLAN. 221, 223 (1998); Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 293, 295 (1994).

¹⁷⁷ See U.S. GEN. ACCOUNTING OFFICE, *supra* note 176, at 39.

¹⁷⁸ See Keiter, *supra* note 176, at 309.

¹⁷⁹ Reynolds & Clay, *supra* note 12, at 387–89.

¹⁸⁰ See *id.* at 377–78.

¹⁸¹ See Mark W. Schwartz, *Conflicting Goals for Conserving Biodiversity: Issues of Scale and Value*, 14 NAT. AREAS J. 213, 215 (1994).

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associated with migrations, particularly in the face of climate and habitat changes, we will have to employ management strategies developed after considering a comprehensive set of available approaches. Our quick look at the conservation status of the *rufa* Red Knot, pronghorn Antelope, and North American monarch begins to suggest the urgency of a law that mandates the creation of such strategies.