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NEWS & ANALYSIS

Legal Tools That Provide Direct Protection for Elements of Biodiversity¹

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Editors' Summary: An array of regulatory and planning tools for protecting biodiversity is available to federal, state, and local governments. In this Article, Robert McKinstry Jr., James McElfish, Michael Jacobson, and Derald Hay examine these tools along with their strengths and limitations. The authors provide examples by way of several case studies of state laws and programs, exposing gaps that these state regulations leave in biodiversity protection. The authors argue that states can best fill these regulatory gaps by exercising their broad authority for planning, which allows for integration and coordination of regulatory mechanisms.

I. Introduction: The Historical Development of Direct Protection of Biodiversity

The most powerful tool available to states seeking to protect biodiversity is to use their regulatory powers to protect elements of biodiversity directly. The federal government and all 50 states have enacted a variety of laws to protect wildlife, fish, threatened and endangered animals and plants, and other elements of biodiversity. These laws have evolved in three waves, starting with a series of laws emerging out of the Conservation Movement at the turn of the 19th and 20th centuries.

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In this first wave, the federal government and most states enacted hunting and fishing laws to protect fish, game, and wildlife from overhunting that had reduced many large species, such as the buffalo and even the white-tailed deer, to a point where they would be considered endangered today.² During this time, federal and state fish and game agencies were created to enforce and administer new fish and game laws that used the states' regulatory powers and ownership rights in fish and wildlife to protect these species directly. For example, the Pennsylvania Game Commission was created in 1895.³ This period also saw the development of laws addressing weeds that, although aimed to protect agriculture, also addressed threats from invasive species.

The second and most far-reaching wave of regulatory activity occurred during the environmental decade of the 1970s, during which time the basic structure of American environmental law emerged. Many of these laws addressed threats to biodiversity, such as air pollution, water pollution,

1. Some of the discussion in this Article has been adapted from an analysis of laws prepared by James McElfish, an analysis of methods for land protection prepared by Robert B. McKinstry Jr. and Michael Jacobson, and an analysis of best management practices and best stewardship practices prepared by McKinstry, Emily B. Schwartz, and Curtis P. Wagner for the Pennsylvania Biodiversity Partnership (PBP) and the Pennsylvania Department of Conservation and Natural Resources (PDCNR) and is used by their permission. The three articles are identified on the PBP website at <http://www.pabiodiversity.org> and will be posted on the website in the future. The views expressed here are solely those of the authors and should not be deemed to represent the views of either the PBP or the PDCNR.
2. See, e.g., WILLIAM T. HORNADAY, *OUR VANISHING WILD LIFE: ITS EXTERMINATION AND PRESERVATION* (New York Zoological Society, William T. Hornaday ed., 1913) (surveying status of species and state game laws).
3. See Daniel W. Brauning, *Biodiversity Conservation in Pennsylvania: A View From the Pennsylvania Game Commission*, in *BIODIVERSITY CONSERVATION HANDBOOK* 519 (Robert B. McKinstry Jr. et al. eds., 2006).

and improper waste disposal, and extended protection to biodiversity by commandments to establish emissions limitations that protected the environment, including habitat and biota. This period also witnessed the expansion of laws using regulatory powers to protect endangered species directly, through the enactment of the Endangered Species Act (ESA),⁴ as well as a variety of laws directly protecting important habitats, such as the Coastal Zone Management Act⁵ or §404 of the Clean Water Act (CWA), protecting wetlands.⁶ As a result of these two waves of environmental and natural resource legislation, five distinct types of regulatory laws emerged that protect biodiversity directly: (1) fish and wildlife laws; (2) endangered species laws; (3) laws protecting special habitats using a regulatory structure; (4) environmental assessment laws, modeled on the National Environmental Policy Act (NEPA)⁷ but having substantive content; and (5) laws regulating particular threats to health and the environment, such as the CWA,⁸ that protect biodiversity pursuant to a more general mandate to protect the environment.

The modern era has involved efforts to coordinate these strategies internationally with a view toward protecting multiple examples of habitat types, characterized by the strategy contemplated by the United Nations Convention on Biological Diversity,⁹ international environmental group strategies, and many state laws described in this book that seek to employ a variety of coordinated strategies including direct protection to identify and protect the widest variety of species and habitats. The newest wave of laws has also entailed attempts to address emerging threats to biodiversity, such as those posed by invasive species, adding a sixth category of laws protecting biodiversity directly. This Article, using Pennsylvania as an example where possible, will focus on the three categories of laws aimed most directly at biodiversity protection—fish and wildlife laws, endangered species laws, and laws relevant to invasive species control—and then will touch briefly on laws for the protection of special habitats and environmental assessment laws.

II. Fish and Wildlife Laws

The first category of laws whereby states assert direct regulatory authority to protect biodiversity includes laws that were originally developed to protect wildlife and fish and to regulate hunting and fishing.¹⁰ All states have these laws, which generally require permits for fishing, hunting, and other activities adversely affecting fish, game, and wildlife

and authorize the state fish and wildlife agencies to adopt rules and regulations governing these permit systems and otherwise protecting fish, game, and wildlife. These laws are backed by provisions authorizing the revocation of licenses and the imposition of civil and criminal penalties.

A. Administration of Laws Protecting Fish and Wildlife

A variety of governmental agencies, including fish and wildlife agencies, natural resource agencies, agriculture agencies, and agencies responsible for environmental protection generally, administer and enforce provisions for the direct protection of biodiversity. By way of example, the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) administer the ESA and other fish- and wildlife-related laws.¹¹ The U.S. Environmental Protection Agency administers laws relating to pollution, wetlands, and other threats to the environment. Other responsibilities are scattered through a wide variety of other federal agencies.

All states have fish and wildlife agencies. In many cases, these agencies have been incorporated into a broader agency responsible for environmental and natural resource protection generally. In Pennsylvania, five different agencies administer and enforce laws protecting biodiversity: (1) the Pennsylvania Game Commission (PGC), with responsibility for administering game and wildlife laws; (2) the Pennsylvania Fish and Boat Commission (Fish Commission), with responsibility for administering laws relating to protection of aquatic organisms and herptiles; (3) the Pennsylvania Department of Conservation and Natural Resources (PDCNR), with responsibility for administering laws protecting rare plants; (4) the Pennsylvania Department of Environmental Protection, with responsibility for administering pollution and wetlands laws; and (5) the Pennsylvania Department of Agriculture (PDA), with responsibility for administering laws relating to pests, plant diseases, and invasive plants.¹² The principal responsibility for administering laws related to the protection of animal species rests with the PGC and the Fish Commission. Although Pennsylvania is unique among the 50 states because it divides responsibility for fish and game protection between two agencies,¹³ the powers of the two commissions are not dissimilar from those afforded fish and wildlife agencies in other states.

B. Protection of Biodiversity Pursuant to Laws Governing Fish and Wildlife

Virtually all states protect both endangered and threatened species and wildlife. Unlike many states, Pennsylvania lacks a separate state endangered species act. Nevertheless, the PGC and the Fish Commission have broad authority to regulate human activities directly affecting birds, mammals, fish, aquatic organisms, reptiles, and amphibians, whether located on private or public lands and waters, typi-

4. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

5. *Id.* §§1451-1465, ELR STAT. CZMA §§302-319.

6. 33 U.S.C. §1344.

7. 42 U.S.C. §§4321-4370f, ELR STAT. NEPA §§2-209.

8. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

9. Convention on Biological Diversity of the United Nations Conference on the Environment and Development, art. 6(a), *opened for signature* June 5, 1992, U.N. Doc. DPI/1307, *reprinted in* 31 I.L.M. 818 (1992), *available at* <http://www.biodiv.org/convention/articles.asp> (last visited Dec. 11, 2006). The United States has signed, but remains one of the few nations of the world and the only major nation which has not ratified the convention. (The others are Andorra, Brunei, the Holy See, Iraq, Somalia, and Timor-Leste.) *See generally* BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, for a description of the convention and international implementation efforts.

10. These laws are generally described in Susan George, *The State of the States: An Overview of State Biodiversity Programs*, in BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, at 51.

11. The FWS has compiled an inventory of federal resource laws related to protection of biodiversity at http://www.fws.gov/laws/laws_digest/resource_laws.htm (last visited Dec. 11, 2006).

12. *See generally* BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3.

13. All other states have a single combined fish and wildlife agency and, in many cases, that agency is part of a larger environmental protection and natural resources agency.

cal of those given to fish and wildlife agencies in most states. The laws under which these agencies function provide the authority to regulate biodiversity directly through two mechanisms. These laws include direct statutory prohibitions on taking fish and wildlife without necessary permits and, in the case of the Fish Commission, a prohibition against adversely affecting the habitat of aquatic organisms. The laws employ the second tool of providing authority to adopt regulations to protect fish and wildlife, coupled with permitting provisions and civil and criminal penalties. The Fish Commission's regulations govern the terms and conditions under which these creatures can be taken, killed, collected, or conveyed. However, neither has promulgated regulations governing habitat modification or destruction. No agency has asserted jurisdiction over management of terrestrial invertebrates.

It is the PGC's duty to "protect, propagate, manage and preserve the game or wildlife of Pennsylvania."¹⁴ These terms are defined to be bird and mammal species.¹⁵ The PGC administers "all laws of this Commonwealth relating to the encouragement, promotion and development of game or wildlife conservation interests and the protection, propagation, distribution, and control over game and wildlife."¹⁶ The PGC has broad rulemaking authority over "game or wildlife and hunting or furtaking."¹⁷ As a result, it can adopt rules and regulations to provide for protection of both game and nongame bird and mammal species, to close certain areas to hunting and trapping, and to adjust hunting and trapping regulations to regulate animal populations. The PGC also serves an information function, annually reviewing hundreds of land development permit applications for roads, bridges, and building construction, and recommending ways to reduce or eliminate wildlife conflicts.

Under the Pennsylvania Fish and Boat Code,¹⁸ the Fish Commission is directed to protect, preserve and manage fish, herptiles, other aquatic plants and animals, and aquatic habitat generally.¹⁹ The Fish and Boat Code broadly authorizes the Fish Commission to promulgate rules concerning "fish and fishing in the waters of, and elsewhere in, [Pennsylvania], including regulations concerning the protection, preservation and management of fish and fish habitat."²⁰ This grant of authority extends to reptiles, amphibians, and all aquatic organisms, by virtue of the definition of fish.²¹ It also provides broad authority to protect all aquatic organisms and their habitat from a variety of threats, since the term "fishing" is defined as the act or attempt of "tak[ing]" any fish (or reptile) "by any means or method for any purpose whatsoever."²² The Fish and Boat Code also provides

direct statutory protection against activities that directly harm fish or their habitat, providing that "[n]o person shall alter or disturb any stream, stream bed, fish habitat, water or watershed in any manner that might cause damage to, or loss of, fish without the necessary permits."²³

Pursuant to the authority to regulate fishing activities and fish populations, the Fish Commission, like the fish and game agencies in other states, establishes seasons and limits, promulgates rules, designates closed and open areas, and engages in stocking of state waters. The Fish Commission has the authority to require fish passages on dams.²⁴ The Fish Commission's rules and regulations concerning fishing must "aid in the better protection, preservation and management of fish."²⁵ In its regulation of fisheries, "[t]he commission may designate certain water areas for specific purposes and promulgate such rules and regulations as are deemed necessary to protect and manage the fishery therein."²⁶ The Fish Commission is specifically authorized to designate nursery waters²⁷ and refuge waters.²⁸

The Fish Commission also has jurisdiction over actions directly affecting herptiles—reptiles and amphibians.²⁹ The Fish Commission has established seasonal and daily possession limits for herptiles.³⁰ Taking herptiles for sale (except snapping turtles) and damaging or taking any reptile eggs is prohibited. By regulation, habitat may not be destroyed in pursuit of a reptile or amphibian.³¹ Scientific collection permits are required to take herptiles on state lands designated as natural areas.³² Other permits are required for certain other hunts, captures, or killing on private lands. Thus, individuals who hunt, take, catch, or kill timber rattlesnakes must have an individual permit for the activity.³³ Organized competitive reptile and amphibian hunts must be conducted under permits.³⁴

The Fish Commission has jurisdiction over other aquatic organisms, defined as "any plant or animal that grows or lives in or upon the water."³⁵ This provides authority to regulate aquatic invertebrates as well as plants and all other biota.³⁶

The Fish Commission's boating rules govern the management and operation of boats and preempt local regulation of boating.³⁷ The Fish Commission has authority to make and enforce special boating regulations for particular areas of water "limiting, restricting or prohibiting the operation or navigation of boats thereon to promote the interests of the public or to preserve aquatic life."³⁸ This last clause

14. See 34 PA. CONS. STAT. ANN. §§2102(a), 2161(a) (Westlaw 2005).

15. *Id.* §102 ("game" is defined as game animals and game birds; "wildlife" is defined as wild birds and wild mammals).

16. *Id.* §2101.

17. *Id.* §2102.

18. 30 PA. CONS. STAT. ANN. §§101-7314.

19. *Id.* §321.

20. *Id.* §2102; see also *id.* §322.

21. *Id.* §102 (defining "fish" as "all game fish, fish bait, bait fish, amphibians, reptiles, and aquatic organisms").

22. *Id.* Because "take" is not defined within the statute, it is likely that the word could be interpreted similar to the "take" definition under the ESA, which includes an "incidental take" of a fish. This would mean "take" also includes activities that do not have the purpose to harm, harass, injure, or kill wildlife but result in such an action. 16 U.S.C. §1539(a)(1)(B).

23. 30 PA. CONS. STAT. ANN. §2502.

24. 58 PA. ADMIN. CODE chs. 61, 63 et seq.

25. 30 PA. CONS. STAT. ANN. §322(a).

26. *Id.* §2307(a).

27. 58 PA. ADMIN. CODE §67.1.

28. 30 PA. CONS. STAT. ANN. §2306; 58 PA. ADMIN. CODE §67.2.

29. 58 PA. ADMIN. CODE ch. 77.

30. *Id.* §77.6.

31. *Id.* §77.3(a).

32. *Id.* §77.1(b).

33. *Id.* §77.2(b).

34. *Id.* §77.2(c).

35. 30 PA. CONS. STAT. ANN. §102.

36. Terrestrial invertebrates do not fall within the jurisdiction of any agency in Pennsylvania.

37. 30 PA. CONS. STAT. ANN. §322.

38. 58 PA. ADMIN. CODE §57.81(b).

provides authority to use boating regulation to protect biological resources.

This division of authority impairs the commonwealth's overall protection of biodiversity because it does not allow for an integrated approach to biodiversity conservation, thereby leaving important gaps. For example, although the PDCNR has limited jurisdiction to protect rare plants, as discussed below, no agency has overall authority to protect terrestrial invertebrates, protists, or fungi.

Most other states have a similar suite of laws. Although these laws, like those of Pennsylvania, were originally devised to address fish and game and to regulate hunting and fishing, they have broadened in purpose. Moreover, the laws are frequently written in a way to provide broader authority to protect biodiversity and habitats than fish and wildlife agencies may assert. For example, the power under the Pennsylvania Fish and Boat Code to protect fish habitat and to regulate watersheds provides broad authority to regulate terrestrial habitat and activities outside of the water that affect the quality of aquatic habitat, but this authority is often not used.

III. Threatened and Endangered Species Laws and Programs

Both the federal and state governments also include at least some provisions in their fish and wildlife laws protecting rare, threatened, and endangered species. In fact, the protection of rare, threatened, and endangered species represents the dominant model for both federal and state biodiversity programs. In some cases, states, like the federal government, have independent endangered species laws. In other cases, the general fish and game laws will include special provisions requiring additional protection for endangered species. Endangered species may also be protected by regulations adopted under the general authority to protect fish and game and their habitat.

A. Dominant Federal Model: The Endangered Species Act

The principal federal strategy for protecting biodiversity is embodied in the provisions of the ESA³⁹ and its implementing regulations. The ESA adopts the "fine-filter" approach of protecting biodiversity by focusing its efforts on protecting nationally threatened or endangered species or subspecies and their critical habitat. The ESA's stated purpose of conserving "the ecosystems upon which endangered species and threatened species depend,"⁴⁰ implies a strategy of using endangered and threatened species much like a "mine canary," that is, as indicators of threats to endangered ecosystems. By preserving these species and their critical habitat, the ESA seeks to preserve the biodiversity contained in that threatened habitat/ecosystem. This strategy has been incorporated into most state regulations comprising a part of a program involving federal delegation or approval. Accordingly, the federal program is paralleled by most state laws in numerous respects and applies in all states. As such, it represents the centerpiece of each state's toolbox for direct protection of biodiversity.

The ESA accomplishes its goal through a variety of tools. It protects the individuals within threatened and endangered

species directly, through its prohibition against "taking"⁴¹ and its requirement for the development and implementation of recovery plans for the species. "Taking" is broadly defined to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct."⁴² A take occurs whether an endangered species is intentionally harmed or harmed inadvertently by someone carrying on an otherwise lawful activity such as land development, agriculture, or forestry. ESA §10 authorizes the Secretary of the Interior to issue an "incidental take permit" authorizing a take in the course of otherwise lawful activity, provided that the applicant submits a habitat conservation plan (HCP) for that species, identifying the activity's impacts on the species, the steps taken to minimize or mitigate those impacts, including the establishment of mitigation areas, and alternatives to the activity.⁴³

The ESA also seeks to protect land constituting critical habitat for endangered species through three mechanisms. First, it requires that critical habitat be designated.⁴⁴ Second, it requires that each federal agency aid in the conservation of endangered species⁴⁵ and assure that programs that it administers, including grant, permit, construction, and management programs, will not jeopardize the continued existence of threatened or endangered species or "result in the destruction or adverse modification of" their critical habitat.⁴⁶ Third, the ESA requires both the U.S. Forest Service and the U.S. Department of the Interior (DOI) to develop a broader program to conserve "fish, wildlife, and plants including those which are endangered species or threatened species" and authorizes them to acquire land as a part of that program.⁴⁷ This strategy, thus, prioritizes the conservation of lands supporting nationally threatened and endangered species through the use of regulatory controls and prohibitions, grant and programmatic restrictions, planning, and land acquisition and management.

The ESA is administered by the FWS and NOAA Fisheries. The FWS has implemented a number of programs to implement these regulatory programs while reducing frictions created by the regulatory aspects of the ESA programs. These programs include the administration of its consultation program, the HCP program, the candidate conservation program, the administration of its recovery program, and the establishment of mechanisms such as safe-harbor agreements and habitat banking.⁴⁸

Through the consultation program, as required under ESA §7,⁴⁹ the FWS will consult with other federal agencies to ensure that the actions that they fund, authorize, permit, or otherwise carry out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. To reduce frictions with the potentially reg-

41. *Id.* §1538.

42. *Id.* §1532(19).

43. *Id.* §1539(a).

44. *Id.* §1533(a)(3).

45. *Id.* §1536(a)(1).

46. *Id.* §1536(a)(2); see *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 173, 8 ELR 20513 (1978).

47. 16 U.S.C. §1534.

48. These mechanisms are described more fully in Melinda E. Taylor, *Moving Away From Command and Control: The Evolution of Incentives to Conserve Endangered Species on Private Lands*, in *BIODIVERSITY CONSERVATION HANDBOOK*, *supra* note 3, at 441.

49. 16 U.S.C. §1536.

39. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

40. *Id.* §1531(b).

ulated community, the FWS also works with private landowners, state and local governments, Indian tribes, and other nonfederal organizations to develop the HCPs that authorize the incidental take of listed species.

The FWS' candidate conservation program seeks to encourage proactive activity that can eliminate the need for listing species, thereby triggering regulatory controls. The program is directed to species for which the FWS has sufficient biological information to indicate that listing the species as threatened or endangered is warranted. In the program, the FWS works with public agencies, private organizations, and landowners to encourage them to undertake measures that will reduce the threats to these declining species with the objective of avoiding listing. The FWS works with these "partners" to identify threats to candidate species and to plan measures needed to stabilize and conserve them. It also seeks to identify willing landowners and to develop and to implement conservation measures with them. The program further involves monitoring to evaluate the effectiveness of these measures.

The requirements and procedures a landowner must follow under the candidate conservation program are incorporated into enforceable candidate conservation agreements (CCAs).⁵⁰ Since these are agreements rather than rules and regulations, they can be individually crafted to meet the needs of the species and the landowners. "CCAs with assurances" assure nonfederal landowners that they can continue activities specified in the agreement even if the species covered by the agreement is listed in the future; the landowner can thereby avoid future regulatory controls and reduce the uncertainty that might otherwise arise from listing. These assurances therefore provide an incentive for the landowners to participate early in conservation activities. For example, a landowner might volunteer to implement activities such as installation of watering facilities, modification of irrigation facilities to restore a nature hydrologic regime, fencing, grazing, and replanting or maintaining native vegetation. CCAs with assurances provide landowners with a binding commitment that if they implement such actions to benefit candidate species, they will not be required to implement further measures or be subject to additional restrictions on the use of their land or water if the species is eventually listed.

The FWS has introduced a number of programs to reduce regulatory tension arising from restrictions on private property due to the listing of endangered species and the designation of critical habitat. These include mechanisms such as safe-harbor agreements and habitat banking. Safe-harbor agreements encourage landowners to enhance or protect habitat and provide them with some assurances that they will be able to continue carrying on existing activities. The FWS has also issued guidance for habitat banking.⁵¹ The habitat banking guidance is based on a program developed by the state of California and widely implemented

there. Under the federal banking program, private entrepreneurs or conservation organizations may conserve or improve habitat and generate credits that can be used by those requiring incidental take permits in lieu of individual mitigation. This allows for more effective conservation of habitat, in that larger, higher quality habitat areas will be conserved and managed and thereby make species survival and recovery more likely.

The ESA recovery program requires the development and implementation of plans to conserve listed species under ESA §4(f).⁵² The first step in the recovery process is the preparation of the recovery plan. The recovery plan must outline a comprehensive recovery strategy, including a prioritized list of conservation measures that are needed to address threats, to reverse declines, and to achieve recovery. The first steps in recovery planning involve the identification of stakeholders and development of partnerships so that creative ways of implementing recovery actions can be accomplished. Ecological requirements, such as those for feeding, breeding, sheltering, and nurturing, are often not fully understood when a species is listed. In addition, the threats to the species and their effects are often unknown. Accordingly, recovery plans frequently also call for research as an initial activity. After sufficient knowledge is obtained, implementation can begin. Implementation may involve a variety of actions. These can include managing threats through habitat protection and restoration or augmenting a severely depleted population with captive breeding.

The regulatory approach adopted by the ESA is a powerful one for the protection of land supporting biodiversity. However, the difficulties encountered under the federal act reflect the many limitations of a uniform regulatory strategy. Adopting a flat prohibition or an across-the-board restriction requires a great deal of initial study, which limits the speed with which critical areas can be identified for protection and limits the areas that will be protected. The listing process involves considerable backlog. Even when identified, the identification must be stated in broad terms, which may sweep properties into a regulation that will not serve the regulation's objective and may miss important areas. A flat prohibition may not account for site specific differences of concern to the habitat being protected or the individual landowner or community affected. This approach, therefore, can be both overbroad and underbroad. Focusing on species rather than rare habitats results in the Act missing less prominent species, rare genotypes, and locally rare or threatened species whose preservation is critical to biodiversity at the state or ecoregional scale. Focusing on threatened and endangered species may also miss local stronghold species, which are locally common, but may be globally rare and still under threat because of a limited range. Nevertheless, a focus on something readily ascertainable, such as an endangered species, may be necessary in employing a flat regulatory prohibition applicable throughout the nation.⁵³

50. See 64 Fed. Reg. 32726 (June 17, 1999).

51. U.S. FWS, GUIDANCE FOR THE ESTABLISHMENT, USE, AND OPERATION OF CONSERVATION BANKS (2003), available at <http://www.fws.gov/endangered/policies/conservation-banking.pdf> (last visited Dec. 11, 2006) (also available from the ELR Guidance & Policy Collection, ELR Order No. AD04868); see also Marybeth Bauer et al., *Landowners Bank on Conservation: The U.S. Fish and Wildlife Service's Guidance on Conservation Banking*, 34 ELR 10717 (Aug. 2004). Banking is also discussed further in Taylor, *supra* note 48, at 441.

52. 16 U.S.C. §1533(f).

53. In saying this, we recognize that the critical habitat is always identified. However, the regulation and its prohibitions must be established in a system that applies nationally.

B. State Endangered Species Laws

Because ESA §7 requires that each federal agency design its programs consistent with the federal law and because most state environmental programs are either delegated federal programs or require federal approval, the requirements of the ESA, including its underlying strategy for conserving biodiversity, have been incorporated in multiple provisions of most state environmental and fish and wildlife laws.⁵⁴ The innovations recently adopted under the ESA also are available nationwide. Yet while most states include these federal requirements in their state laws and regulations, many states go beyond the federal government in protecting rare, threatened, and endangered species. These states often protect species that are endangered or threatened in the state but not nationally, or species that have simply not yet been listed under the ESA. Forty-two states either have their own state endangered species act or express statutory authorization in their fish and game laws for the protection of rare, threatened, and endangered species.⁵⁵

1. Pennsylvania's Program

Pennsylvania presents an example of a state that provides some additional protections to federally listed species and to species listed by Pennsylvania agencies as threatened, endangered, rare, or otherwise of special concern. Three Pennsylvania agencies have jurisdiction over separate categories of rare, threatened, and endangered species. The PGC has jurisdiction over birds and mammals, the Fish Commission has jurisdiction over fish, amphibians, reptiles, and other aquatic organisms, and the PDCNR has jurisdiction over threatened or endangered terrestrial invertebrates that do not fall under the jurisdiction of the other two.

Pennsylvania laws do not require state agencies to adopt habitat protection requirements, nor do they mandate the preparation and implementation of recovery plans. However, restoration activities may be carried on by the agencies having jurisdiction, and some of these activities have also been supported by grants from the Wild Resources Conservation Fund administered by the PDCNR.

The PGC has jurisdiction over threatened and endangered birds and animals listed as needing protection in Pennsylvania.⁵⁶ The PGC regulations prohibit possession, capture, taking, harming, killing, and other actions against threatened and endangered birds⁵⁷ and mammals.⁵⁸

The Fish Commission has listed some reptiles, amphibians, fish, and aquatic organisms as endangered, threatened, or candidate species. With respect to threatened and endangered species, "the catching, taking, killing, possessing, importing to or exporting from this Commonwealth, selling, offering for sale or purchasing of any individual of these species, alive or dead, or any part thereof, without a special

permit from the Executive Director is prohibited."⁵⁹ Candidate species are those that "could achieve endangered or threatened status in the future."⁶⁰ They are subject to seasons, size, bag, and possession limits, but are less strictly protected; "[a] person who catches these species is encouraged to release them immediately and unharmed to the waters or other area from which they were taken."⁶¹ As noted above, the Fish Commission has the general authority to protect fish habitat under the Fish and Boat Code.

The Wild Resources Conservation Act provides the PDCNR with jurisdiction over rare and endangered plants.⁶² It directs the PDCNR to classify plants, and it authorizes wild plant management permits for the transplant and management of threatened and endangered plants, the designation of private wild plant sanctuaries, and the acquisition of lands or aquatic habitat where necessary for a public wild plant sanctuary. Regulations apply "to vulnerable plants, to naturally occurring wild plants native to this Commonwealth and to activities and persons associated with them."⁶³ However, landowners and others with interests in land are not prohibited from destroying or removing state-listed plant species from their own lands.⁶⁴ Nevertheless, the regulations prohibit any person to "transport with the intent to sell, sell or export plants classified as Pennsylvania Endangered or Pennsylvania Threatened."⁶⁵ "Vulnerable plants" are subject to very similar restrictions.⁶⁶ The regulations also prohibit anyone from disturbing, picking, or taking any "wild plants" from state parks and forest lands except as provided by law.⁶⁷

The PDCNR may designate sites as private wild plant sanctuaries upon request.⁶⁸ While this does not give significant additional protection, it does give recognition to these sites and does provide for transplant and propagation of listed species. "A person, other than the landowner or a person having a bona fide property interest in the affected land, may not willfully adversely alter or destroy the local ecosystem of a private wild plant sanctuary."⁶⁹

2. New Jersey's Program

New Jersey presents an example of a state with the express statutory authority to protect endangered species, and it has used this authority to protect biodiversity more generally, using a predominantly regulatory approach. New Jersey adopted a state Endangered and Nongame Species Conser-

59. *Id.* §§75.1 and 75.2.

60. 58 PA. ADMIN. CODE §75.3(a); the species are specifically identified at 58 PA. ADMIN. CODE §75.3(b)(fish) and 75.3(c) (reptiles and amphibians).

61. 58 PA. ADMIN. CODE §75.3(a).

62. 32 PA. STAT. ANN. §§5301-5311.

63. 17 PA. ADMIN. CODE §45.1.

64. This is also significant for purposes of the ESA, whose prohibition on the destruction of threatened and endangered plants by private activity on private property applies only where the destruction is "in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law." 16 U.S.C. §1538(a)(2).

65. 17 PA. ADMIN. CODE §45.31(b).

66. *Id.* §45.33.

67. *Id.* §45.32.

68. *Id.* §45.81.

69. *Id.* §45.34.

54. This process is exemplified by the Pennsylvania state environmental laws discussed in Richard P. Mather Sr., *Biodiversity Conservation in Pennsylvania: View From the Department of Environmental Protection*, in BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, at 489.

55. See Christopher A. Amato & Robert Rosenthal, *Endangered Species Protection in New York After State v. Sour Mountain Realty, Inc.*, 10 N.Y.U. ENVTL. L.J. 117, 131 n.62 (2001).

56. 34 PA. CONS. STAT. ANN. §32167, 2924.

57. 58 PA. ADMIN. CODE §133.21.

58. *Id.* §133.41.

vation Act⁷⁰ administered by the New Jersey Department of Environmental Protection (NJDEP), a unified state environmental protection, natural resource, and fish and game agency. The Act provides express authority for developing and implementing wildlife management plans and listing endangered species.⁷¹ The statute includes broad prohibitions against takings and authorizes promulgation of regulations to implement these prohibitions.⁷² Although the Endangered and Nongame Species Conservation Act does not include express authorization for habitat protection other than through acquisition, its authority is supplemented by a variety of specific laws⁷³ that protect areas in the state with unique and valuable natural characteristics, such as the coastal zone,⁷⁴ the Pinelands region,⁷⁵ and the Highlands region,⁷⁶ and each of these laws protect threatened and endangered species and their habitat, as well as unusual or valuable habitat areas.

Under this broad authority, the NJDEP has initiated the Landscape Project to develop a broader and more systematic approach to biodiversity conservation.⁷⁷ The project has the express goal of “protect[ing] New Jersey’s biological diversity by maintaining and enhancing imperiled wildlife populations within healthy, functioning ecosystems.”⁷⁸ It identifies rare and valuable habitat as well as the most critical habitat areas, based on occurrences of rare, threatened, and endangered species, maps those areas, and designates critical areas for conservation based on principles of conservation biology.⁷⁹ These designations are backed by the broad powers to protect and manage endangered species and to regulate land use in the coastal zone, Pinelands, and Highlands.

IV. Laws and Programs Relevant to Invasive Species Control

Invasive species of plants, animals, and microorganisms represent a significant threat to biodiversity due to their ability to displace native species, to kill native species, and thereby to disrupt the functions of natural ecosystems. By way of example, an invasive fungus largely extirpated the American chestnut as a dominant overstory

plant⁸⁰ with far reaching effects on a host of other species and ecosystems.⁸¹ There is no overarching federal law like the ESA that applies to invasive species, and most states lack a comprehensive regulatory law.

In order to address the problem, the federal government and states have relied on a potpourri of existing laws administered by a variety of agencies. For example, laws addressing agricultural pests, such as noxious weeds, insects, and diseases, are frequently invoked. These responses also seek to coordinate the response of the disparate agencies whose jurisdiction relates to invasive species, including agriculture, forestry, environmental, natural resources, and health agencies.

A. Federal Approach to Invasive Species

The federal response to the problem of invasive species is typical of the approach seen in most states, although it is somewhat broader, since the federal government has authority to regulate interstate and foreign commerce. In the absence of a comprehensive federal law, Presidents Jimmy Carter and William J. Clinton each issued Executive Orders on this issue. The first, issued by President Carter in 1977, directed, in pertinent part:

(a) Executive agencies shall, to the extent permitted by law, restrict the introduction of exotic species into natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration; and, shall encourage the States, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.

(b) Executive agencies, to the extent they have been authorized by statute to restrict the importation of exotic species, shall restrict the introduction of exotic species into any natural ecosystem of the United States.⁸²

This Executive Order, lacking an implementation mechanism, was largely unimplemented. It was also flawed in that it defined exotic species as those outside of the United States rather than those exotic to an ecoregion; focused only on introductions into natural ecosystems, excluding horticultural introductions; and focused primarily on new introduced species rather than all harmful introduced species.

In 1999, President Clinton issued Executive Order No. 13112,⁸³ creating a federal Invasive Species Council com-

70. N.J. STAT. ANN. §§23:2A-1 to -14 (Westlaw 2005).

71. *Id.* §§23:2A-4, :2A-7.

72. *Id.* §§23:2A-5 to :2A-6.

73. These laws are discussed at length in Robert B. McKinstry Jr. et al., *Coordination and Planning Tools That Can Be Applied to Biodiversity Conservation*, in BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, at 203.

74. See New Jersey Coastal Area Facilities Review Act, N.J. STAT. ANN. §§13:19-1 et seq.

75. See New Jersey Pinelands Protection Act, N.J. STAT. ANN. §§13:18A-1 et seq.

76. See New Jersey Highlands Water Protection and Planning Act, N.J. STAT. ANN. §§13:20-1 et seq.

77. L.J. NILES ET AL., NEW JERSEY’S LANDSCAPE PROJECT, VERSION 2.0 (New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Endangered and Nongame Species Program 2004), available at http://www.njfishandwildlife.com/enspl/landscape/lp_report.pdf (last visited Dec. 11, 2006).

78. New Jersey Division of Fish & Wildlife, *New Jersey’s Landscape Project*, at <http://www.state.nj.us/dep/fgw/enspl/landscape/> (last visited Dec. 11, 2006).

79. The methods for the mapping are discussed more fully in McKinstry, *supra* note 73.

80. In 1904 the fungus *Cryphonectria parasitica* (Murrill) Barr, was introduced from Asia to the Bronx New York, causing the chestnut blight. The blight rapidly spread throughout the range of the American chestnut, killing 50 to 99% of American chestnut trees by 1940. S.W. Oak, *From the Bronx to Birmingham: Impact of Chestnut Blight and Management Practices on Forest Health Risks in the Southern Appalachian Mountains*, 16 J. AM. CHESTNUT FOUND. 32-41 (2002).

81. See Robert B. McKinstry Jr., *Ecosystem Restoration and Federal Land Policy: Reexamination in Light of the American Chestnut Restoration Effort*, in PROCEEDINGS OF A CONFERENCE AND WORKSHOP ON RESTORATION OF CHESTNUT TO FOREST LANDS WITHIN THE NATIONAL PARK SYSTEM, THE NORTH CAROLINA ARBORETUM, ASHEVILLE, NORTH CAROLINA (May 4-6, 2004) (John Carlson & Kim Steiner eds., Natural Resources Report NPS/NCR/CUE/NRR-2006/001, National Park Service, 2006), available at <http://chestnut.cas.psu.edu/nps.htm>.

82. Exec. Order No. 11987, 3 C.F.R. 116 (1978), ADMIN. MAT. 45015, quoted in Marc L. Miller, *The Paradox of U.S. Alien Species Law*, in HARMFUL INVASIVE SPECIES: LEGAL RESPONSES 146 (Marc L. Miller & Robert N. Fabian eds., 2004).

83. Exec. Order No. 13112, 64 Fed. Reg. 6183 (Feb. 3, 1999), ADMIN. MAT. 45105.

prised of cabinet officials with responsibilities related to invasive species⁸⁴ and directing the following:

Each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,

- (1) identify such actions;
- (2) subject to the availability of appropriations, and within Administrative budgetary limits, use relevant programs and authorities to:
 - (i) prevent the introduction of invasive species;
 - (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
 - (iii) monitor invasive species populations accurately and reliably;
 - (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
 - (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and
 - (vi) promote public education on invasive species and the means to address them; and

(3) Note authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere⁸⁵

This Executive Order addressed many of the deficiencies of the earlier one by establishing the Invasive Species Council, redefining alien species as those not native to an ecosystem, and focusing on all introductions—past, present, and future.⁸⁶ Pursuant to Executive Order No. 13112, the Invasive Species Council issued the *National Management Plan*,⁸⁷ identifying pertinent available mechanisms, establishing goals identifying major invasive species problems, and addressing those problems through regulation.

The council and the plan rely on a wide variety of laws relating to weeds, introduced plants, and aquatic nuisances as well as environmental laws such as the ESA and the CWA.⁸⁸ While none of these laws provides an overarching regulatory framework for control of invasive species, several are targeted at invasive species particularly. For example, the Nonindigenous Aquatic Nuisance Prevention and Control Act⁸⁹ creates a comprehensive federal program to prevent the introduction of harmful aquatic species. That law established an interagency task force known as the Aquatic Nuisance Task Force⁹⁰ and charged that force with the task of “develop[ing] and implement[ing] a program for waters of the United States to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such

species; and to disseminate related information.”⁹¹ The Act further called for the development and submission to the Task Force for approval of state aquatic nuisance management plans; approval of a plan makes the state eligible for federal grants of up to 75% the cost of implementing the plan.⁹² The Act also calls for the development of federal guidelines and regulations for the prevention of the introduction of aquatic invasive species from discharges of ballast water.⁹³

B. Overview of State Invasive Species Programs

Without a federal framework, state laws lack uniformity. A variety of approaches to invasive species prevails among the states, with many adopting the federal approach of establishing an invasive species council to coordinate diverse authority.⁹⁴ Virtually all states have developed programs or activities to deal with the growing problem of invasive species. There are, however, significant limitations to current state regulation of invasive species: (1) state programs and activities are highly variable across the country; (2) they are often controlled by multiple actors within each state; (3) and, as a group, state programs are currently undergoing significant and rapid changes in funding and design.

1. Variability of State Programs and Activities

State programs and activities affecting invasive species are significantly varied, both in range of coverage and depth of effort. Some states, especially states that have experienced significant impacts from infestations of invasive species, operate highly evolved and sophisticated programs. Other states engage in very little activity with regard to invasive species and lack the financial resources and intrastate coordination to run their programs adequately.

2. Diffuse Nature of Programs and Activities Within a State

States rarely have a single agency controlling invasive species regulation. Thus, even if one becomes familiar with a particular state program or activity, the regulation of invasive species within the states remains extremely difficult to generalize. Usually, several agencies are involved in the regulation or response to invasive species. These include:

- State Park and Forestry Departments;
- Departments of Natural Resources;
- Departments of Environmental Protection;
- Departments of Boats and Waterways;
- Departments of Agriculture;
- Departments of Fish and Wildlife;
- State Land Departments;
- Independent Commissions; and
- Governors' offices.

84. The Secretaries of State, Treasury, Defense, the Interior, Agriculture, Commerce, and Transportation and the Administrator of EPA. *Id.* §3.

85. *Id.* §2.

86. Miller, *supra* note 82, at 148-49.

87. NATIONAL INVASIVE SPECIES COUNCIL, NATIONAL MANAGEMENT PLAN: MEETING THE INVASIVE SPECIES CHALLENGE (2001), available at <http://www.invasivespeciesinfo.gov/council/nmptoc.shtml> (last visited Dec. 11, 2006).

88. These laws are collected on the Invasive Species Council website at <http://www.invasivespeciesinfo.gov/laws/fedacts.shtml> (last visited Dec. 11, 2006).

89. 16 U.S.C. §§4701-4751.

90. *Id.* §4721.

91. *Id.* §4722.

92. *Id.* §4724.

93. *Id.* §4711.

94. A table summarizing the status of state laws as of 2004 can be found in Miller, *supra* note 82, at 158-59. The information contained in this section is taken both from the Miller chapter and ENVIRONMENTAL LAW INSTITUTE (ELI), HALTING THE INVASION: STATE TOOLS FOR INVASIVE SPECIES MANAGEMENT (2002).

In addition, many states coordinate invasive species programs and activities with the private sector, including nongovernmental organizations and universities. In some states, significant invasive species activity occurs at the county government level. Also, in some states, significant work is done in partnership with federal agencies, such as the FWS, the U.S. Army Corps of Engineers, or the U.S. Department of Agriculture.

3. Transitional Nature of Existing State Invasive Species Programs

State invasive species programs and activities are constantly in a state of flux. This is especially the case at this point in time, when invasive species are a “hot issue.” For example, some state programs with very little current programmatic support expect increased levels of funding from their respective state governments or from the Aquatic Nuisance Species Task Force when their aquatic nuisance species management plans have been completed. Constant change also typifies state programs because they tend to be reactive. States often develop new programs or change existing programs when a new species is discovered or an infestation becomes significantly more problematic. Moreover, the continuous scientific developments in invasive species prevention, control, and management creates rapid changes in state programs and activities.

4. Invasive Species Councils

Several states have comprehensive invasive species programs or have created invasive species task forces or invasive species councils. Unified comprehensive invasive species programs are rare; they are often located in states that are just beginning work in regulating invasive species and have yet to develop necessary subprograms or to involve multiple state agencies. More common than comprehensive invasive species programs are invasive species task forces and councils. These councils and task forces typically involve a variety of parties including state natural resources, wildlife, and agriculture agencies; governors’ offices; interstate coordinating committees; universities; trade associations for fishing and boating; and nongovernmental organizations (such as Trout Unlimited or The Nature Conservancy). Oregon’s Invasive Species Council, for example, works with agencies that are involved in invasive species to identify and fill in gaps, and provides information about invasive species to state agencies that do not yet deal with invasive species. As of 2005, only 16 states had comprehensive state invasive species councils, but the number is gradually rising.

5. Hawaii’s Comprehensive Approach

Hawaii’s program represents an exception to the general rule in that its program provides comprehensive authority to take a unified approach to invasive species. Hawaii hosts more endangered and threatened species than any other state, and many of these species owe their threatened and endangered status to alien, invasive species. Hawaii’s indigenous island flora and fauna developed in isolation from continental systems and is particularly vulnerable to invasive species. Hawaii’s invasive species laws, which have been suggested as a

model piece of legislation,⁹⁵ include a ban on the importation of animals unless they have been first evaluated and permitted or conditionally permitted.⁹⁶ Hawaii’s program also requires that the state Department of Agriculture maintain “a constant vigilance for incipient infestations of specific noxious weeds,” control those weeds to prevent infestation, investigate methods to eradicate or control infestations, and notify landowners whose lands are the site of infestations and then either enter into a cooperative agreement with the landowner to eradicate the infestation or undertake eradication itself.⁹⁷

6. Programs Directed at Specific Species or Categories⁹⁸

States often have programs and activities specific to a category or subset of invasive species, such as aquatic nuisance species programs, aquatic plant programs, aquatic animal programs, exotic pest eradication programs, and weed boards. For example, Montana and South Carolina have aquatic nuisance species programs that are engaged in a wide range of activities such as education and outreach, coordination, prevention, monitoring, and early response and detection.⁹⁹ Nevada has a weed action committee that works primarily in education and outreach with county members and landowners.¹⁰⁰ Some category-specific programs target certain audiences that tend to actively transport invasive species, such as boaters and hunters, which is a fairly common approach toward responding to invasive species. Only through the trend toward use of invasive species councils are states beginning to broaden their overall response.

Some states have programs and activities that are specific to single taxa, such as Eurasian watermilfoil, purple loosestrife, nutria, or water hyacinth. Minnesota¹⁰¹ and South

95. *Id.* at 156-57.

96. HAW. REV. STAT. §150A-6 (Thompson/West 2005).

97. *Id.* §152-6.

98. The descriptions of state programs set forth in this section are derived from a series of ELI staff interviews with state regulators in the course of a research project to determine the status of state biodiversity programs [hereinafter ELI Interview]. The results of these interviews appear in ENVIRONMENTAL LAW INSTITUTE (ELI), HALTING THE INVASION: STATE TOOLS FOR INVASIVE SPECIES MANAGEMENT (2002).

99. ELI Interview, *supra* note 98; see also MONTANA AQUATIC NUISANCE SPECIES (ANS) TECHNICAL COMMITTEE, MONTANA AQUATIC NUISANCE SPECIES (ANS) MANAGEMENT PLAN, FINAL (2002), available at <http://fwp.state.mt.us/content/getItem.aspx?id=3258> (last visited Dec. 11, 2006) (this plan proposes a broader program with an invasive species council); Montana Fish, Wildlife & Parks Commission, *Aquatic Nuisance*, at <http://fwp.state.mt.us/fishing/fishingmontana/ANS/default.html> (last visited Dec. 11, 2006); SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES (SCDNR), 2005 SOUTH CAROLINA AQUATIC PLANT MANAGEMENT PLAN (2005), available at <http://www.dnr.sc.gov/water/envaff/aquatic/plan.html> (last visited Dec. 11, 2006); SCDNR, *Aquatic Nuisance Species Program*, at <http://www.dnr.sc.gov/water/envaff/aquatic/illegal1.html> (last visited Dec. 11, 2006).

100. ELI Interview, *supra* note 98; see also NEVADA WEED ACTION COMMITTEE, NEVADA’S COORDINATED INVASIVE WEED STRATEGY (2002), available at http://agri.nv.gov/nwac/PLANT_NoWeedPlan.htm. The Nevada weed control laws make eradication and control the responsibility of every landowner and provide for cost recovery if the state takes action where the landowner fails to do so. NEV. REV. STAT. §§555.150, .160, .170, .180, .202 to .208.

101. ELI Interview, *supra* note 98; see also MINN. STAT. §84D.02, subdiv. 2 (2004). This program was established pursuant to a specific invasive species act calling for the establishment of “a statewide program to prevent and curb the spread of invasive species of aquatic plants and wild animals.” *Id.* §84D.02, subdiv. 1; see *id.*

Dakota¹⁰² have elaborate biocontrol distribution and application programs for purple loosestrife. Arizona has a program dedicated to the removal of giant salvinia on the Colorado river.¹⁰³ California has numerous species-specific programs including the water hyacinth control program; the *Egeria densa* control program for the Delta; and the Mediterranean Fruit Fly exclusion program for San Diego County.¹⁰⁴ Some states have single activities that are dedicated to a specific species; for example, Wyoming is working on a baseline distribution and monitoring study on the New Zealand mud snail (*Potamopyrgus antipodarum*).¹⁰⁵

Some states, e.g., Georgia, do not have programs or specific activities for dealing with invasive species, but instead respond to invasive species problems on a case-by-case basis through such activities as monitoring, containment, and removal.

Each of these types of programs may be involved in multiple aspects of invasive species regulation, including education and outreach, coordination among agencies and with other states, prevention and early detection, monitoring, control and management, eradication, and research, or in only a few. Thus, even a state with an invasive species council may not be engaged in the full array of response activities. Conversely, a state focusing on particular species may be using any or all of the available tools.

7. A Typical State Approach: Pennsylvania's Invasive Species Program

Pennsylvania's invasive species program is typical of other state programs, and an in-depth examination of the authorities employed in that state is instructive of the types of authority found in other states. Like the federal program and those of many other states for controlling invasive species, Pennsylvania's program shows a patchwork pattern of jurisdiction and control. Although many laws may apply to the control of invasive species, they are intended to protect values other than biodiversity, such as agricultural protection. Nevertheless, this patchwork provides significant authority to address a variety of threats from invasive species.

Pennsylvania is 1 of the 16 states with an invasive species council. Because divided administrative jurisdiction over

invasive species left significant gaps in protection and made coordination essential, in 2004, Gov. Edward G. Rendell (D-Pa.) issued an Executive Order establishing the Governor's Invasive Species Council comprised of the heads of all of the agencies having jurisdiction over areas relevant to control of invasive species.¹⁰⁶ The order specifies that the council was created to:

- a. advise the Governor on and direct the development and implementation of a state invasive species management plan.
- b. provide guidance on prevention, control, and rapid response initiatives.
- c. facilitate coordination among federal, regional, state, and local efforts.¹⁰⁷

The order further directs the council to:

- a. develop and implement a comprehensive invasive species management plan for the Commonwealth of Pennsylvania and revise the plan at regular five year intervals or as needed.
- b. provide guidance on prevention and control of invasive species and rapid response to new infestations.
- c. facilitate coordination among federal, regional, state, and local initiatives and organizations engaged in the management of invasive species.
- d. convene at least quarterly and at the call of the chair of the Council.
- e. adopt rules of procedure consistent with the provisions of this order.¹⁰⁸

In carrying out the order, the agencies may rely upon diverse statutory authority.

The PGC is empowered to prohibit the possession, importation, exportation, or release of any species of birds or mammals that may be considered dangerous or injurious to the general public or to the wildlife of Pennsylvania.¹⁰⁹ It is also unlawful for any person to release exotic wildlife into the wild.¹¹⁰ The Fish Commission has similar authority over fish, reptiles, and amphibians. Fish species may not be transported into Pennsylvania, nor any species transferred from one drainage to another within Pennsylvania "where such species is not always present," without prior express written permission of the Fish Commission.¹¹¹ Further:

It is unlawful for a person to introduce any species of reptile or amphibian into the natural environment of this Commonwealth if that species is not native to or does not occur within this Commonwealth. Persons who import nonnative reptiles or amphibians into this Commonwealth shall institute appropriate safeguards

§§84D.01-.14. The purple loosestrife program is described at Minnesota Department of Natural Resources, *Purple Loosestrife Management Program*, at http://www.dnr.state.mn.us/ecological_services/invasives/plprog.html (last visited Dec 11, 2006).

102. ELI Interview, *supra* note 98; see also SOUTH DAKOTA DEPARTMENT OF AGRICULTURE, PLANT PROTECTION PROGRAM, *Purple Loosestrife Biological Control*, at <http://www.state.sd.us/da/das/PLS.html> (last visited Dec. 11, 2006).

103. ELI Interview, *supra* note 98; see also Arizona Department of Agriculture, *Giant Salvinia*, at http://www.azda.gov/Main/giant_sal.htm (last visited Dec. 11, 2006).

104. ELI Interview, *supra* note 98; see also CAL. HARB. & NAV. CODE §64 (West 2005); California Department of Boating & Waterways, *Aquatic Pest Control*, at <http://dbw.ca.gov/aquatic.asp#APCFact> (last visited Dec. 11, 2006) (water hyacinth and *Egeria densa*); California Department of Food & Agriculture, Pest Exclusion Branch, *Current Fruit Fly Eradication/Quarantine Projects*, at <http://www.cdffa.ca.gov/phpps/pe/fruitfly.htm> (last visited Dec. 11, 2006).

105. ELI Interview, *supra* note 98. These measures are described in a memorandum setting forth Wyoming's management plan to address the decline in cutthroat trout. SUNRISE ENGINEERING, INC., TECHNICAL MEMORANDUM: SNAKE/SALT RIVER BASIN PLAN BASIN WATER USE PROFILE—ENVIRONMENTAL (2002), available at <http://waterplan.state.wy.us/plan/snake/techmemos/enviruse.html> (last visited Dec 11, 2006).

106. Pa. Exec. Order No. 2004-1, Governor's Invasive Species Council (Jan. 27, 2004), available at <http://www.oa.state.pa.us/oac/cwp/view.asp?A=351&Q=180946> (last visited Dec. 11, 2006). The members include the Secretaries of Agriculture, Conservation and Natural Resources, Environmental Protection, Health, and Transportation, and the Executive Directors of the Fish and Boat Commission and the Game Commission. The establishment of an Invasive Species Council was one of the recommendations coming out of the state's biodiversity planning process. See Sue A. Thompson, *Biodiversity Conservation in Pennsylvania: The Pennsylvania Biodiversity Conservation Plan*, in BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, at 569.

107. Pa. Exec. Order No. 2004-1, §1.

108. *Id.* §2.

109. See 34 PA. CONS. STAT. ANN. §2163.

110. *Id.* §2962(c)(2).

111. 58 PA. ADMIN. CODE §73.1.

to prevent their introduction into the environment of this Commonwealth.¹¹²

The PDA has jurisdiction over aquaculture facilities.¹¹³ The Fish Commission, however, must annually deliver to the PDA a list of what species are permitted to be raised in what watersheds. This allows the Fish Commission to assess and control the risk of escape and hazard to the native and stocked fish and other aquatic life in the waters of the commonwealth.¹¹⁴

Invasive plants fall under a different set of laws, administered primarily by the PDA for the primary purpose of protecting agriculture. Other states have a similar suite of laws that could equally be applied to biodiversity protection. In Pennsylvania, these laws include the Noxious Weed Control Law,¹¹⁵ the Plant Pest Act,¹¹⁶ and the Seed Act.¹¹⁷

The Noxious Weed Control Law creates a Noxious Weed Control Committee consisting of the Secretaries of the PDA and the PDCNR, the Executive Director of the PGC, and the chairs of the Agriculture committees of the House and Senate. The Committee may designate plants as noxious weeds if “injurious to public health, crops, livestock, agricultural land, or other property.” Sale or propagation of a listed plant is prohibited, and the PDA Secretary may designate weed control areas after a public hearing and may order landowners to comply with weed removal or control requirements, provided that the order does not impose an unreasonable deadline for compliance or an unreasonable burden on the landowner. The law also allows the Secretary to issue a control order against an individual landowner if noxious weeds are growing on the owner’s property. If a landowner refuses to comply with an order, a municipal government “shall” take any necessary measures and may recover its costs from the landowner. The statute itself identifies four noxious weeds—marijuana, Canadian thistle, Johnson grass, and multiflora rose¹¹⁸—and about one dozen weeds have been added to the list by regulation, including purple loosestrife, several types of thistles, kudzu, mile-a-minute, and jimson weed.¹¹⁹

The Pennsylvania Plant Pest Act defines a plant pest as “an organism, including other plants, causing or capable of causing injury or damage to plants or plant products.”¹²⁰ The PDA may declare a pest a public nuisance and thereby make its existence, maintenance, importation, transfer, or sale unlawful. The PDA also has an array of available enforcement mechanisms. The statutory definition is broad and useful as it does not limit the law’s reach to only “economically valuable” or “agricultural” plants. Thus, the law could be used to control invasive plants, animals, invertebrates, and microorganisms that have adverse effects on native and wild plants in Pennsylvania ecosystems. The PDA is empowered to make rules, conduct inspections, and license dealers in order to control and prevent the introduction or spread of plant pests.

The Pennsylvania Seed Act prohibits the sale of noxious weed seeds and plant parts. This law, too, has potential utility in the control of invasive exotic species.

V. Regulatory Protection of Special Habitat Areas

The regulatory protection of biodiversity can also be achieved by protecting habitat areas valuable to biodiversity. The ESA provides for the designation and subsequent protection of critical habitat for threatened and endangered species. However, other laws are directed more specifically at the protection of habitat valuable to a variety of species. These laws take two forms. First, the federal government and most state governments have enacted special protections for common areas valuable to biodiversity. Most notably, these include wetlands and floodplains. Pennsylvania’s programs for protecting these features are typical of the types of programs that many states have enacted and are described in greater length in the next chapter.

Legislation that carves out regions valuable for biodiversity protection and requires special regulatory controls throughout that region constitutes the second form of laws aimed at protecting habitat. New York first adopted this approach in 1885 when it declared the Adirondacks Forest Reserve, much of it privately owned, as a valuable natural area, with a view toward protecting that area’s forests.¹²¹ New York now employs regulatory controls on development¹²² to protect that region’s features under the Adirondack Park Agency Act.¹²³ These include direct development controls,¹²⁴ provisions for the Adirondack Park Agency’s review and approval of certain regional projects,¹²⁵ and requirements for approvals under local land use programs that have been reviewed and approved by the agency.¹²⁶

New Jersey uses regulatory controls to protect three of the regions within that state most valuable for conserving biodiversity resources—the coastal area,¹²⁷ the Pinelands,¹²⁸ and the Highlands.¹²⁹ These laws require the issuance of a state or local permit for most significant developments and actions within the pertinent region.¹³⁰ The laws also make

121. Act of May 15, 1885, 1885 N.Y. Laws ch. 283; see N.Y. COMP. CODES R. & REGS. tit. 9, §3.119; see also New York Adirondack Park Agency, *About the Park*, at http://www.apa.state.ny.us/About_Park/index.html (last visited Dec. 11, 2006) (citing a date of 1892 for the park’s establishment).

122. See McKinstry et al., *supra* note 73.

123. N.Y. EXEC. LAW §§800-820.

124. *Id.* §815.

125. *Id.* §809.

126. *Id.* §§807-808.

127. New Jersey Coastal Area Facilities Review Act (CAFRA), N.J. STAT. ANN. §§13:19-1 to -21. Regulations under the Act appear at N.J. ADMIN. CODE tit. 7, ch. 7E.

128. New Jersey Pinelands Protection Act (Pinelands Act), N.J. STAT. ANN. §§13:18A-1 to -58. Regulations under the Act appear at N.J. ADMIN. CODE tit. 7, ch. 50.

129. Highlands Water Protection and Planning Act (Highlands Act), N.J. STAT. ANN. §§13:20-1 to -37. Regulations under the act appear at N.J. ADMIN. CODE tit. 7, ch. 38.

130. CAFRA requires a permit for most major developments and actions in the coastal zone N.J. STAT. ANN. §13:19-5. The Pinelands Act requires municipalities to revise their municipal master plans and land use ordinances to make them consistent with regulations incorporating the Pinelands Plan, *id.* §13:18A-12, and further requires that all state and local approvals for construction, land disturbance, or finance be consistent with the Pinelands Plan. *Id.* §13:18A-14. The Highlands Act requires municipalities to revise their local municipal

112. *Id.* §77.7.

113. 3 PA. CONS. STAT. ANN. §§4201-4223.

114. *Id.* §4219.

115. *Id.* §§255.1 to 255.11.

116. *Id.* §§258.1 to 258.27.

117. *Id.* §§285-1 et seq.

118. *Id.* §255.8.

119. 7 PA. ADMIN. CODE §110.1.

120. 3 PA. STAT. ANN. §258.2.

the permits contingent on consistency with regulations that establish, inter alia, standards for land use, environmentally sensitive areas, protection of rare and endangered species, protection of habitat, water quality and sensitive environmental areas, and control of exotic species and certain activities with the potential of having an adverse impact on biodiversity.¹³¹

Both approaches—protection of features and protection of regions—have certain advantages and disadvantages. Protecting valuable features will assure that those features are protected wherever they are found. However, a focus on the feature limits the ability to consider regional connections and the ability to protect other parts of the habitat that might be equally valuable for overall biodiversity conservation. For example, species dependent on wetlands may also depend on upland habitat. While some states have addressed this problem through the use of buffers,¹³² these buffers are limited in areal extent and cannot solve the problem of assuring connections between important habitat areas. Protecting the region avoids some of these problems to a degree, but the regional approach also may miss areas valuable to biodiversity falling outside of the region. Use of both approaches, coupled with protection of threatened and endangered species, can support a more comprehensive approach, as New Jersey has undertaken in its Landscape Project, discussed earlier.¹³³

VI. Environmental Assessment Laws

Biodiversity concerns are often implicated in the environmental reviews required under NEPA¹³⁴ and under parallel state environmental protection acts (SEPA).¹³⁵ NEPA requires all government agencies to incorporate environmental considerations into their planning through two mechanisms. First, it requires that each federal agency to use an interdisciplinary approach in their planing and to “include in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on,” inter alia, the environmental impacts, unavoidable adverse environmental effects, and alternatives to the proposed actions.¹³⁶ The central element of the NEPA process is the preparation of an environmental impact statement, which assesses the impacts or “effects” of each action across a range of media and concerns, sets forth

alternatives, and identifies mitigating measures and unavoidable impacts.¹³⁷

The impacts assessed under NEPA include “ecological” effects, such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems,”¹³⁸ as well as cumulative and indirect impacts. As such, NEPA requires all federal actions to assess their impacts on biodiversity.

NEPA only imposes procedural requirements and only applies to federal actions. Many of the SEPA, however, contain substantive content—either expressly or by judicial interpretation—and require that adverse impacts on the environment be minimized.¹³⁹ Because SEPA frequently apply to local as well as state actions, SEPA apply to a far broader range of actions, including most local land use and development approvals.¹⁴⁰ Even where a SEPA may not require local government compliance, local governments may require the preparation of an environmental impact report or statement and minimization of impacts pursuant to the state SEPA or state land use law.¹⁴¹ In these cases, if the state or local government requires the assessment of biodiversity impacts and has the capacity to impose conditions to make development consistent with biodiversity conservation, environmental impact review could be a powerful tool for conserving biodiversity. In many cases, however, this expertise is lacking, and without some larger plan, such as the New Jersey Landscape Project, the Massachusetts BioMap project, or the Maryland GreenPrint program,¹⁴² environmental impact review will be ineffective, even if coupled with substantive requirements for minimization.

VII. Conclusion

Regulatory mechanisms represent a powerful tool to protect biodiversity throughout the United States. In most states, like Pennsylvania, multiple regulatory programs protect biodiversity directly or incidently. As is the case with Pennsylvania, however, the regulatory mechanisms directly protecting biodiversity remain largely limited to protection of endangered and threatened species and traditional fish and game protection. This leaves important gaps in protection. Non-game species that are common to a state but rare or unusual globally may remain unprotected. Many plants, invertebrates, fungi, and microorganisms frequently lack protection. Invasive species programs are often fragmented or even absent. These deficiencies underscore the critical importance of planning to integrate and rationalize regulatory powers and to coordinate the use of available mechanisms with the acquisition and management of critical lands by governments and land trusts. Fortunately, most states have broad authority for planning, and many states are beginning to use that power to coordinate efforts.

plans and land use regulations to conform to regulations incorporating the Highlands Master Plan, *id.* §13:20-14, and that all state and local projects exceeding certain size or impact thresholds be submitted to the Highlands Council for review for consistency with the plan and approval. *Id.* §13:20-16.

131. *See, e.g.,* N.J. ADMIN. CODE tit. 7, chs. 7E (coastal zone), 50 (Pinelands), and 38 (Highlands).

132. *See, e.g.,* 38 ME. REV. STAT. ANN. §490-D-5-A; MD. CODE ANN. ENVIR. §5-906; N.J. STAT. ANN. 13:9B-16.

133. NILES ET AL., *supra* note 77.

134. 42 U.S.C. §§4321-4370f, ELR STAT. NEPA §§2-209.

135. At least 28 states have enacted state laws parallel to NEPA. Philip M. Ferester, *Revitalizing the National Environmental Policy Act: Substantive Law Adaptations From NEPA's Progeny*, 16 HARV. ENVTL. L. REV. 207, 209 n.14 (1992) (citing Nicholas A. Robinson, *SEQRA's Siblings: Precedents From Little NEPAs in the Sister States*, 46 ALB. L. REV. 1155, 1156 (1982)).

136. 42 U.S.C. §4332.

137. 40 C.F.R. §§1501.7 (scoping), 1502.1-1502.25 (requirements for environmental impact statement preparation), 1503.1-1503.4 (public comment and response), and 1505.2 (preparation of record of decision).

138. *Id.* §1508.8.

139. *See* Ferester, *supra* note 135; Kathryn C. Plunkett, *Local Environmental Impact Review: Integrating Land Use and Environmental Planning Through Local Environmental Impact Reviews*, 20 PACE ENVTL. L. REV. 211 (2002).

140. Plunkett, *supra* note 139.

141. *Id.*

142. *See generally* BIODIVERSITY CONSERVATION HANDBOOK, *supra* note 3, for discussions on these programs.