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Opportunities for Regulation of Land Use and Development as a Legal Tool to Protect Biodiversity[1]

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Editors' Summary: Development and urban sprawl threaten biodiversity by displacing and fragmenting habitat with roads, commercial structures, and private homes. In this Article, authors Robert B. McKinstry Jr., James McElfish, Michael Jacobson, and Coreen Ripp look at the potential for using land use law and laws regulating development activities to address these threats to biodiversity. Using examples taken from Pennsylvania law and a 50-state survey conducted by the Environmental Law Institute and Defenders of Wildlife, the authors examine regulatory and other legal tools with the potential to protect biodiversity.

I. Introduction

Land development and sprawl represent one of the most significant threats to biodiversity in the United States. These activities threaten biodiversity by displacing functional habitat and fragmenting habitat with roads, homes, commercial buildings, and lawns. They also introduce predators, such as domestic cats and dogs, and they often facilitate the introduction of invasive or opportunistic species, such as cowbirds, raccoons, and a wide variety of invasive plants. Construction and maintenance of developed landscapes can further adversely impact biodiversity by introducing pollutants that contaminate water and degrade aquatic habitat.

All states have laws governing the development and use of land and their associated activities. These laws are most typically administered by local governments. Most land use laws can be applied toward biodiversity conservation. Moreover, much biodiversity conservation can occur effectively at the local level, particularly with respect to plants and animals with restricted ranges.[2] While local governments are increasingly using these laws to protect biodiversity or values, such as open space that can assist biodiversity conservation, most land use law regulation is not used for this purpose. This represents a significant lost opportunity.

This Article will first examine the land use regulation tools that are available in most states, such as comprehensive plans, official maps, and subdivision and zoning ordinances, and their potential use for biodiversity conservation. The Article will next examine the legal tools that are available to regulate development activities that can adversely impact aquatic habitats. Examples will be taken both from Pennsylvania law and from a 50-state survey of state land use law conducted by the Environmental Law Institute (ELI) and Defenders of Wildlife (ELI/Defenders Study).[3]

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1. Portions of this Article have 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 will be posted on the PBP website at http://www.pabiodiversity.org. 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. Portions of this Article have also been taken from a Master's Thesis by Coreen Ripp evaluating the use of measures to protect natural resources in leading municipalities across Pennsylvania. Coreen Ripp, Use of Regulatory Authority for Natural Resource Protection by Pennsylvania Municipalities (2005) (Master of Science Thesis, the Pennsylvania State University School of Forest Resources) (a copy of the thesis is on file in the office of the Penn State School of Forest Resources).

2. Daniel Press et al., *The Role of Local Government in the Conservation of Rare Species*, 10 Conservation Biology 1538 (1996).

3. Linda Breggin & Susan George, *Planning for Biodiversity: Sources of Authority in State Land Use Laws*, 22 Va. Envtl. L.J. 81, 105-07 (2003); ELI & Defenders of Wildlife, Planning for Biodiversity: Authorities in State Land Use Laws (2003), *available at* http://www.elistore.org/reports_detail.asp?ID=10917&topic=Biodiversity. The discussion will also draw heavily on James M. McElfish, Nature-Friendly Ordinances (Envtl. L. Inst. 2004).

II. The Elements of Municipal Land Use Regulation

Municipal land use regulations provide the rules under which land is planned, zoned, and subdivided or conserved and maintained. Land use regulation can be very effective at steering development away from lands necessary for conservation of biological diversity. All states authorize some form of land use planning and regulation. Under the municipal land use laws of most states, local governments can adopt comprehensive plans and zoning that provide for the conservation of contiguous habitat areas, connections between such areas, and the protection of waters, wetlands, and other features important for biodiversity conservation while meeting their other development goals. They can influence land development and land use to meet these conservation goals using a variety of other tools through subdivision regulation and zoning.

A. General Authority and Elements of Land Use Regulation

The ELI/Defenders Study found that in all states, the land use regulatory authority took the form of land use planning enabling statutes.[4] In addition,13 states have adopted growth management laws providing more far-reaching authority to protect biodiversity.[5] These state laws are derived from various model acts,[6] two of which were developed in the 1920s: the Standard City Planning Enabling Act and the Standard State Zoning Enabling Act.[7] States have since significantly updated their laws, with some relying upon the American Law Institute's Standard State Zoning Enabling Law.[8] Although there are significant differences among the various states' land use laws, they all either require or authorize the preparation of comprehensive land use plans governing land use within the government unit responsible for land use regulation.[9] These plans specify where various land uses and infrastructure may be located. In many cases, the laws call for an official map. Neither the plans nor the maps are self-implementing. They are typically implemented through the two other principal land use tools, subdivision approvals and zoning. The authorization for subdivision and zoning ordinances are also set forth in these model laws.[10]

Thus, the four principal land use tools provided in the model acts are: (1) comprehensive planning; (2) an official map; (3) subdivision approvals; and (4) zoning. The land use law of Pennsylvania contains all of these elements, and the discussion below examines Pennsylvania as the principal example for applying land use law concepts to the protection of biodiversity.

The comprehensive plan sets forth the goals and objectives for land use; the strategy for growth, development, and open space conservation; and, oftentimes, the areas where each of these activities will occur. The plan guides development and, sometimes, the application of the official map, subdivision approvals, and zoning. The various state jurisdictions differ in their requirements for comprehensive plans, but there are three basic approaches.[11] In some, there is an option to regulate land use, but if that option is exercised, planning is mandatory. In others, both the decision to regulate and to develop a plan are discretionary. Finally, in a few jurisdictions, the development of a comprehensive plan is mandatory. Many adopt a hybrid approach.[12] Pennsylvania provides an example of the latter. Comprehensive planning is governed by Article III of the Pennsylvania Municipalities Planning Code (PAMPC).[13] All counties are required to adopt comprehensive plans. However, county comprehensive plans are not binding on zoning or land use regulation by municipalities within the county that undertake their own planning and zoning. Rather, the PAMPC encourages general consistency of municipal land use regulation with the county plan.[14] Municipalities are encouraged but not required to prepare a comprehensive plan, and, as of 2000, approximately 58% of Pennsylvania municipalities had a comprehensive plan.[15] A comprehensive plan is required only if a municipality wants to enact a transportation impact fee ordinance or if it wants to enact joint zoning with another municipality.

The second common element of land use law is the official map. The PAMPC, like the laws of most other states, authorizes municipalities to adopt an "official map" covering all or any portion of the municipality. The official map is used to designate existing and proposed rights-of-way, parks, open space areas, flood ways and flood control areas, and other public lands and facilities. The designation of lands on an official map is a legislative decision of the municipality, but it does not result in condemnation or acquisition of the lands. However, reservations made on an official map lapse one year after an owner of the mapped property submits written notice of intent to build, subdivide, or otherwise develop the land. The purpose of the official map is to provide guidance for the community on where public lands will be needed when future development occurs, and to provide an opportunity for the municipality to acquire them.[16]

The third common element of land use law are subdivision ordinances, which are often referred to as subdivision and land development ordinances. Subdivision ordinances control how land is subdivided into smaller parcels and how development may occur.[17] For example, they impose basic requirements on building setbacks and locations. Subdivision ordinances are the most common form of land use control in most of Pennsylvania and throughout the nation. In Pennsylvania, subdivision ordinances may be adopted

4. Breggin & George, *supra* note 3, at 88-89.
5. *Id*. at 91-92.
6. *Id*. at 88-89.
7. *Id.*
8. *Id.*
9. *Id.*
10. McElfish, *supra* note 3, at 31.
11. Breggin & George, *supra* note 3, at 95-96.
12. *Id.; see also* McElfish, *supra* note 3, at 35.
13. The PAMPC, 53 Pa. Stat. Ann. §§10101 et seq. (West 2005), governs land use planning and zoning by most Pennsylvania municipalities, but it does not apply to Philadelphia or Pittsburgh. *Id.* §10107 (defining "municipality"). These urban jurisdictions' powers are very similar to those laid out in the PAMPC.
14. *Id.* §10301(c).
15. Governor's Center for Local Government Services, 2001 Annual Report on Land Use 13 (2002). That number had risen from 57% in 1998. Governor's Center for Local Government Services, Land Use Trends in Pennsylvania A-45 to -46 (2000) [hereinafter Land Use Trends]. Both reports can be found at http://www.newpa.com/default.aspx?id=228#Trends%202000.
16. 53 Pa. Stat. Ann. §§10401-408.
17. McElfish, *supra* note 3, at 78; *see also* 53 Pa. Stat. Ann. §10501.

without a comprehensive plan or zoning or they may implement the comprehensive plan and zoning. About 93% of Pennsylvania's municipalities regulate the subdivision of land or are covered by county subdivision ordinances.[18]

Zoning, the fourth common element of land use law, governs the location and type of land development and land use permitted in a municipality.[19] While subdivision and land development ordinances apply to new development, zoning will apply to both new development and existing development. In some states, comprehensive planning may be a prerequisite to zoning, which must be consistent with the county plan, but in Pennsylvania this is not the case. Approximately 64% of Pennsylvania municipalities have enacted zoning or have agreed to be covered by county zoning regulations.[20] Most municipalities without zoning are rural; and they comprise only about 10% of the commonwealth's population.[21] When a municipality enacts zoning, the entire municipality must be zoned.[22]

B. Administration of Land Use Law

In the United States, regulation of land use is a matter primarily left to local governments. In all but one state, local governments are given significant authority and, in the overwhelming majority, local governments are given virtually all authority.[23]

While the primacy of local government is the rule, there is no consistency as to which particular local governmental entity is given planning authority. The structure of local governments differs in the various states and the locus of authority for land use regulation differs. In most southern, western, and midwestern states, the county is given primary authority for land use regulation, but that authority will devolve to incorporated cities and towns after incorporation. In the Northeast and upper Midwest, smaller units of government, typically consisting of unincorporated towns or townships as well as incorporated cities, boroughs, and towns, are given primary authority, while the larger counties are given more limited powers. By way of example, Pennsylvania's 2,568 local governments have primary authority over land use planning, zoning, and subdivision regulation. New Jersey has a similar structure, and in New York and all New England states, the town is given primary authority. In Arizona, California, and Delaware, as in most states, the county is given primary authority unless an area has been incorporated.

Land use law is administered by a variety of entities. A planning commission will usually be created by the model laws to plan land use and to help administer the zoning laws.[24] Planning commissions or planning boards may be responsible for a variety of functions, including plan development, application review, and, in some cases, approvals. The governing body of the local government (municipal or county) must adopt the comprehensive plan and most ordinances and will frequently approve some applications for land development or zoning changes or variances. Zoning hearing boards frequently will hear certain types of applications or challenges. There are also special advisory boards that may be created. For example, in Pennsylvania, as in many other states, Environmental Advisory Councils may be created by any municipality or group of municipalities. In Pennsylvania, these advisory bodies of three to seven members appointed for three-year terms help municipalities by inventorying natural resources, identifying environmental problems, recommending plans and programs to municipalities, obtaining information on open space lands, making recommendations about such lands, and advising municipal governments on land acquisitions.[25]

State attention to local land use decisions is particularly important for biodiversity conservation. The most effective biodiversity conservation will operate on regional scales that can consider connections and cover the ranges of key species. While ecoregional boundaries do not coincide with political boundaries, a program operating on a statewide or regional scale is more likely to encompass the important ecoregion or connections. In 10 of the states with growth management laws, some or, in one case, all of the authority for land planning rests with the state,[26] even where approvals and zoning may occur at the local level. Pennsylvania is more typical in that state involvement in land use control is limited. In fact, in Pennsylvania, the Governor directed all state agencies, including the Pennsylvania Department of Environmental Protection (PADEP), to assure that all state programs and policies support the implementation of local land use ordinances.[27] The PADEP has issued guidance documents and revised its permit application forms to assure that both permits and PADEP grants for facilities and infrastructure include consideration of local land uses and comprehensive plans.[28] Permit guidance requires applicants to

18. LAND USE TRENDS, *supra* note 15, at A-47.

19. MCELFISH, *supra* note 3, at 38.

20. LAND USE TRENDS, *supra* note 15.

21. *Id.*

22. In Pennsylvania, unless the municipality has engaged in joint zoning or collaborative planning and zoning with another municipality, it is generally presumed that the zoning ordinance must allow for *all* land uses. A landowner may seek and obtain a curative amendment, by court order if necessary, to allow a use that is not provided for in the zoning ordinance.

23. Breggin & George, *supra* note 3, at 105.

24. *Id.* at 91.

25. 53 PA. CONS. STAT. ANN. §§2322-2329. (Environmental Advisory Councils Law, enacted 1973).

26. According to the Defenders of Wildlife/ELI study, all planning authority lies with the state in Hawaii. Breggin & George, *supra* note 3, at 105 (citing HAW REV. STAT. ANN. §226-52 (Michie 2001)). The statutes in Florida, FLA. STAT. ANN. §§163.3161 -.3204, .3177(9)(c) (West 2000 & Supp. 2003); Maryland, MD. CODE ANN. STATE FIN. & PROC. §§5-402, -403, -602(a)-(b) (2001); New Jersey, N.J. STAT. ANN. §52-18A-199 (West 2001); and Rhode Island, R.I. GEN. LAWS §45-22.2-9 (1999), require the development of statewide plans establishing goals that direct state-level actions and guide local actions. *Cited in* Breggin & George, *supra* note 3, at 105. The statutes in California, CAL. GOV'T CODE §§65040.1- .11 (West 1997 & Supp. 2003); Delaware, DEL. CODE ANN. tit. 9, §§2657(b), 4957(b), 6957(b) (Supp. 2002); Maine, ME. REV. STAT. ANN. tit. 30-A, §4312(3) (West 2002); Oregon, OR. REV. STAT. §§197.005-.860 (1999); Vermont, VT. STAT. ANN. tit. 24, §4302(b)(1)-(4) (Supp. 2002), *id.* §§4345a(5), 4381 (1992); and Washington, WASH. REV. CODE ANN. §§36.70A.010, A.103 (West 2003), do not require statewide plans but merely the establishment of statewide goals to guide local planning. *Cited in* Breggin & George, *supra* note 3, at 105.

27. PADEP, *DEP Makes Land Use Part of Its Review of Permits*, ENVTL. PROTECTION UPDATE (Sept. 1, 2000), http://www.dep.State.pa.us/newsletter/default.asp?NewsletterID=121&SubjectID= (last visited Oct. 31, 2005).

28. PADEP, FINAL REVISION OF POLICY FOR CONSIDERATION OF LOCAL COMPREHENSIVE PLANS AND ZONING ORDINANCES IN DEP REVIEW OF PERMITS FOR FACILITIES AND INFRASTRUC-

give notice to local governments and to disclose relationships of the project to existing land use planning and regulations on a general information form. PADEP's "Land Use Review" questionnaire includes: determining whether the proposed project will change existing use of the land; determining whether it will develop an undeveloped site; determining the existing planning and zoning; determining consistency with existing planning and zoning; and comments by the local government with jurisdiction.[29]

States frequently influence local land use decisions by providing guidance or monetary assistance. For example, the Pennsylvania Land Use Planning Technical Assistance Program program administered by the Governor's Center for Local Government Services in the Pennsylvania Department of Community and Economic Development awards grant funding on a competitive basis to municipalities seeking to prepare or update comprehensive plans. This program attempts to encourage regional approaches to land use regulation by giving preference to municipalities engaging in cooperative planning with adjacent municipalities.

III. Principles Applicable to Biodiversity Conservation in Regulating Land Use

Most state land use laws authorize and, in many cases, require consideration of a variety of natural features important to biodiversity conservation and further authorize or require their protection. The ELI/Defenders Study identified environmental planning and the protection of natural resources, open space, wildlife habitat, and critical and sensitive areas as the most common types of requirements or features that may or must be addressed in land use law.[30] Protection of natural features can be justified even without such a specific requirement or authorization under the general rubric of protecting the general welfare, given the fact that biodiversity serves a wide variety of functions, by, inter alia, providing important ecologic services that promote the economy, appealing to our aesthetic senses, and supporting recreation.[31] Thus, most state land use laws provide local governments with broad authorization to protect biodiversity, using the wide variety of tools discussed in the previous section of this chapter and more specifically in the next section.

However, the best tool set cannot be used without knowledge as to how it should be used. This knowledge can be provided by science. The related sciences known as landscape ecology and conservation biology or conservation ecology examine the relationship of ecosystems and the landscape and apply the knowledge of those relationships to develop principles of management for conservation of biodiversity.

A report by a committee of the Ecological Society of America distilled that science into a set of ecological principles, and from those principles, it developed guidelines for managing the use of land.[32] These principles and guidelines can be applied in structuring land use plans and in making land use decisions, using the tools described below. The five ecological principles deal with "time, place, species, disturbance, and the landscape."[33]

- Ecological processes function at many time scales, some long, some short; and ecosystems change through time.
- Particular species and networks of interacting species have key, broad-scale ecosystem-level effects.
- Local climatic, hydrologic, edaphic, and geomorphologic factors as well as biotic interactions strongly affect ecological processes and the abundance and distribution of species at any one place.
- The type, intensity, and duration of disturbance shape the characteristics of populations, communities, and ecosystems.
- The size, shape, and spatial relationships of landcover types influence the dynamics of populations, communities, and ecosystems.[34]

In regulating land use, one is regulating disturbances to the landscape and determining the shape of the overall landscape over time. These activities have dramatic impacts on species and ecosystems, and because biological systems are dynamic and do not change, a land use decision that, by itself, today may have little impact could ultimately have a significant detrimental effect on biodiversity. For example, a development that leaves a wetland system with a rare, threatened, or endangered species relatively intact but isolates the species could have no immediate effect on the species, but it could ultimately result in the extirpation of the species when conditions change in the wetland or a disturbance occurs, such that the isolated population cannot flee and the wetland system cannot be repopulated.

Seeking to avoid these types of impacts, based on the five scientific principles, the committee also recommended that the following eight guidelines be employed in making decisions related to land use:

(1) Examine the impacts of local decisions in a regional context.

ture (2004) (PADEP Guidance 012-0200-001), *available at* http://164.156.71.80/VWRQ.asp?docid=2087d8407c0e0000000002a7000002a7&context=2&backlink=WXOD.aspx%3ffs%3d2087d8407c0e0000800002a6000002a6%26ft%3d1 (permits); PADEP, Policy for Consideration of Comprehensive Plans and Zoning Ordinances in DEP Review of Grants and Funding for Facilities and Infrastructure (2004) (PADEP Guidance 012-0200-002), *available at* http://164.156.71.80/VWRQ.asp?Docid=2087d8407c0e0000000004df000004df&context=2&backlink=WXOD.aspx%3ffs%3d2087d8407c0e0000800004de000004de%26ft%3d1 (grants for facilities and infrastructure).

29. PADEP, General Information Form-Authorization Application (PADEP Form 8000-PM-IT0001) (2002), *available at* http://164.156.71.80/WXOD.aspx?fs=7780d840f80b00008000009d0000009d&ft=1.

30. Breggin & George, *supra* note 3, at 97-101; *see also* Robert B. McKinstry Jr. et al., *Legal Tools That Provide Direct Protection for Elements of Biodiversity*, *in* Biodiversity Conservation Handbook: State, Local, and Private Protection of Biological Diversity 227 (Robert B. McKinstry Jr. et al. eds., Envtl. L. Inst. 2006).

31. See Thomas E. Lovejoy, *What Is Biodiversity, Why Do We Care, and What Is the Importance of Regional, State, Local, and Private Policies and Programs?, in* Biodiversity Conservation Handbook, *supra* note 30, at 19, for a discussion of the values served by biodiversity.

32. V.H. Dale et al., *ESA Report: Ecological Principles and Guidelines for Managing the Use of Land*, 10 Ecological Applications 639 (2000) [hereinafter *ESA Report*]. The *ESA Report* is a report of the Ecological Society of America. These principles are also discussed in Robert B. McKinstry Jr. et al., *Coordination and Planning Tools That Can Be Applied to Biodiversity Conservation*, *in* Biodiversity Conservation Handbook, *supra* note 30, at 203.

33. *ESA Report, supra* note 32, at 648-54.

34. *Id.* at 648-54.

(2) Plan for long-term change and unexpected events.
(3) Preserve rare landscape elements, critical habitats, and associated species.
(4) Avoid land uses that deplete natural resources over a broad area.
(5) Retain large contiguous or connected areas that contain critical habitats.
(6) Minimize the introduction and spread of nonnative species.
(7) Avoid or compensate for effects of development on ecological processes.
(8) Implement land-use and land-management practices that are compatible with the natural potential of the area.[35]

These guidelines put a premium on considering issues regionally, even when making individual land use decisions.

IV. Conservation Opportunities in Land Use Law

A. Comprehensive Plan

A comprehensive plan, which is also known as a "master plan" in some jurisdictions, "defines goals, objectives, and implementation strategies for the future growth and development of the jurisdiction adopting the plan."[36] The plan will define a community's land use goals and explain how the community intends to achieve those goals. Plans typically will not be directly enforceable, but will be implemented through the adoption of consistent zoning and subdivision ordinances, as well as through requirements for the consideration or consistency of state and federal projects, approvals, and funding decisions.[37]

The law governing comprehensive plans creates the opportunity to take biodiversity into account in charting the land use goals of a municipality or county. Planning can be particularly important to biodiversity conservation because it enables the entity developing the plan to: (1) chart out requirements for consideration of natural features and connections in a regional context rather than in individual approvals; (2) develop an informational base; (3) establish biodiversity as a goal that must be considered in individual decisions; and (4) map out strategies for achieving that goal over time and over space. This can be achieved by including in the plan the following information:

- a county inventory of living resources and habitat types and locations;
- identification of opportunities for retaining agricultural lands and a goal of conserving biodiversity on multiple use and resource lands;
- designation of denser development areas that avoid vulnerable habitat, areas of biodiversity richness or uniqueness, and habitat cores and corridors;
- development guidelines that minimize and mitigate for impacts of authorized development activities;
- a capital improvement plan that addresses habitat and conservation impacts, including provision for investments in "green infrastructure" like open space, and designated goals for mitigation of capital infrastructure impacts; and
- elements supporting a habitat conservation plan if needed to address federal Endangered Species Act concerns [or similar concerns under state law].[38]

These strategies are authorized under the laws of most states.[39] For example, under the PAMPC, comprehensive plans *must* include an element that addresses "land use"—an element that "may include" provisions for "public grounds, parks and recreation, preservation of prime agricultural lands, flood plains and other areas of special hazards and other similar uses."[40] More importantly, comprehensive plans must also contain "a plan for the protection of *natural* and historic *resources* to the extent not preempted by federal or state law . . . [including, but] not limited to, *wetlands and aquifer recharge zones, woodlands, steep slopes, prime agricultural land, flood plains, unique natural areas* and historic sites."[41] This natural resources element provides mandatory authority to address issues that are significant for biodiversity. A separate provision applicable only to county comprehensive plans requires that they "identify land uses as they relate to important natural resources."[42] Good examples of the use of these strategies can be found in the regulations implementing regional land use plans for the coastal area,[43] the Pinelands region,[44] and the Highlands region[45] in New Jersey and the Adirondacks region in New York.[46]

B. Information Requirements

Another technique that is authorized in most states and frequently used to protect biodiversity is to require the development and submission of information regarding features important to biodiversity conservation as a part of a subdivision, land development, or other zoning application. This can take the form of either a natural resources inventory or an environmental impact statement. Requiring the development and submission of this information is critically important if the use of other techniques is to be effective on a site-specific basis. One cannot protect important features if one is not aware of them, and jurisdictionwide inventories of such information are rarely available and, if so, unlikely to be complete or up-to-date.

Most authorities recommend the development of a natural resources inventory to identify the features that need protection from the effects of the subdivision and development of land.[47] This inventory must identify the location of natural features on a site to be developed, such as the location of

35. *Id*. at 656.
36. McElfish, *supra* note 3, at 31.
37. *Id.* at 31-32.
38. *Id.* at 33 (providing examples of their application).
39. Breggin & George, *supra* note 3, at 96-101.
40. 53 Pa. Stat. Ann. §10301(a)(2).
41. *Id.* §10301(a)(6) (emphasis added).
42. *Id.* §10301(a)(7).
43. N.J. Admin. Code tit. 7, ch. 7E (2005), adopted pursuant to the New Jersey Coastal Area Facilities Review Act, N.J. Stat. Ann. §§13:19-1 to -21 (West 2005).
44. N.J. Admin Code tit. 7, ch. 50, adopted pursuant to the New Jersey Pinelands Protection Act, N.J. Stat. Ann. §§13:18A-1 to -58.
45. N.J. Admin. Code tit. 7, ch. 38, adopted pursuant to the Highlands Water Protection and Planning Act, N.J. Stat. Ann. §§13:20-1 to -37.
46. *See* N.Y. Exec. Law §§800-820 (McKinney 2005).
47. Ripp, *supra* note 1, at 45-46 (citing Randall Arendt, Growing Greener: Putting Conservation Into Local Plans and Ordinances (Island Press 1999)); *see also* McElfish, *supra* note 3, at 69-70.

wetlands and their buffers, floodways and floodplains, moderate and steep slopes, groundwater resources and their recharge areas, woodlands, productive farmland, endangered and threatened species habitat, other significant wildlife and vegetative habitat, geologic features, and specimen trees. Other natural resource-specific plans that may be required are the completion of a water resources map or plan. These include the location of all water resources in the municipality including wetlands, springs, lowland areas, swales, stormwater facilities, sensitive areas, exceptional value waterways, and other significant water-related features. Often, municipalities categorize landscape features in a site analysis or inventory as either primary conservation areas or secondary conservation areas.[48] By doing so, the areas most valuable to biodiversity can be identified and set aside.

In some cases, municipalities require developers to conduct environmental impact assessments or to compile environmental reports before any disturbance is allowed on the site. These assessments, statements, and reports typically identify the natural resource features that are found on the site and provide additional information about them, such as size. Often these assessments or reports must also contain a discussion of the potential impact the proposed subdivision or land development activities have on these features, alternatives to the proposed activity, and measures to reduce or minimize these impacts.[49]

There are several key issues to consider in drafting these information requirements for biodiversity conservation. First, the provision must specify the types of information that must be considered and developed. At a minimum, natural heritage information should be included, as well as information about habitat types, connectivity, and rare, threatened, and endangered species. The information should be keyed to the other requirements of the ordinance, and additional information may be required in certain districts or areas deemed important for biodiversity conservation.[50] Finally, the information should be keyed to substantive requirements, and a municipality should require that adverse impacts be minimized, where feasible.

C. Subdivision Requirements

Subdivision and land development ordinances regulate both the division of land into multiple lots through the creation of lot lines or a change in property lines (subdivision) and the improvements on land such as the construction of homes or buildings (land development). Subdivision and land development ordinances describe the design of new development, addressing issues such as density, lot sizes, setbacks for buildings and grading, and the location of roads and utilities.[51] Subdivision and land development ordinances can protect biodiversity by including restrictions on the subdivision and development of land or the placement of utilities in areas with sensitive environmental features or features otherwise important to biodiversity. The restrictions include prohibitions or limitations on land disturbance within those features and may include requirements for buffers or setbacks of varying sizes. Features that are frequently protected in this manner by ordinances containing provisions for the protection of natural resources include floodplains, wetlands, surface water, riparian buffers, aquifers, groundwater recharge areas, special geologic features, steep slopes, forests and trees, wildlife, and important wildlife habitat, including corridors and habitat connections.[52]

Subdivision ordinances may also impose density requirements that require reduced density in areas valuable to biodiversity. This can be accomplished by modifying lot sizes or reducing overall density. For example, the size or area of the lot can be affected by the presence of specific sensitive natural resource features. The ordinance may not allow certain features to be included as part of the lot, or it may require the increase or decrease of the lot area or size to compensate for the presence of the feature and to ensure the preservation of the natural resources. Provisions may also impose maximum lot size standards to provide protection and encourage compact development or may set higher minimum lot sizes for the protection of sensitive natural features.[53] The presence of natural resource features important to biodiversity on a site can change the allowable overall density on a site. This reduction in density is often achieved through subtracting the area containing natural resource features from the developable area of the site and then multiplying this area by the appropriate density factor.[54]

There are several critical issues that should be addressed in subdivision ordinances aimed at protecting biodiversity. They should provide sufficient opportunity for development while conserving features most important for biodiversity. They should require identification of features important to biodiversity to allow adequate review. They should protect important features, including those noted above. The ordinance should address the broader impacts of infrastructure, including effects such as induced growth and habitat fragmentation from linear development. The ordinances should also consider timing of development, so that activities occur at times that may avoid critical nesting and dispersion times. Finally, although smaller developments are frequently excluded from review, it should assure that all development impacting features critical to biodiversity be subject to the same standard of review.[55] Many of these requirements can be incorporated into the more specific tools described below, such as cluster zoning, planned residential and planned unit developments, and conservation subdivisions.

D. Zoning and Zoning Districts

As noted above, zoning ordinances are frequently developed in conjunction with subdivision ordinances and will include many of the same types of provisions for conservation of biodiversity as discussed in connection with subdivision ordinances. Zoning differs from subdivision ordinances in that it governs what uses can occur on the land and frequently prescribes different uses for different districts.

48. Ripp, *supra* note 1, at 45-46.

49. *Id.* at 46.

50. McElfish, *supra* note 3, at 69-70.

51. Ripp, *supra* note 1, at 11-12; McElfish, *supra* note 3, at 78.

52. Ripp, *supra* note 1, at 75-121.

53. *Id.* at 42.

54. *Id.*

55. McElfish, *supra* note 3, at 69-70.

Like subdivision ordinances, zoning frequently addresses issues such as density, setbacks, and lot sizes. Accordingly, zoning ordinances often use many of the same tools as discussed in connection with subdivision ordinances. Thus, zoning ordinances may include impervious surface limitations, minimum required setbacks from natural features, maintenance of existing natural features important to biodiversity conservation, and requirements for incorporation of natural features into open space or common areas.[56] Zoning ordinances can be a somewhat more effective tool than subdivision ordinances in that by restricting use, as well as density and design, they can be used to steer development or more intensive development away from areas important to biodiversity, such as unusual habitats, high quality habitat, movement corridors, and wildlife reproduction areas.[57]

Protecting features important to biodiversity can be accomplished only partially through the establishment of traditional zoning districts. For example, if an area within a municipality includes multiple features important for biodiversity, it could become a separate district with more restrictions on use and lower density. Frequently, however, natural features are dispersed, and other tools, such as cluster zoning and overlay zones discussed below, must be created to protect sensitive features. In drafting zoning ordinances to protect biodiversity, it is important to tie the restrictions to purposes set forth in the comprehensive plan and to create justification for the increased restrictions. This can be done through surveys and by reference to the principles of conservation biology discussed above. Rather than reverting to standard, "cookie-cutter" lot sizes allowed in many zoning ordinances "by right," zoning laws should require the linkage of important biodiversity areas and mandate the use of flexible options, such as clustering, to protect biodiversity features where they are present.

Since zoning is a tool that is used to implement comprehensive plans, the authority to protect biodiversity contained in most states' planning or growth management laws will also authorize the use of zoning ordinances for these purposes.[58] In addition, state statutes will frequently include specific authorization for the use of zoning to protect biodiversity independent of a comprehensive plan. For example, under the PAMPC, zoning ordinances may regulate land use for the "protection and preservation of natural and historic resources" and may contain provisions to protect and preserve "environmentally sensitive areas."[59] Zoning purposes described in the PAMPC include preserving "the natural, scenic and historic values in the environment and preservation of forest, wetland, aquifers and floodplains."[60]

E. Cluster Zoning

Cluster zoning provides for varying lot sizes yet maintains the average overall density of a development. This can allow certain sensitive areas to be retained as open space or in large lots while allowing development of the same number of lots. For example, in a 50-acre parcel with 1-acre zoning, a cluster ordinance might allow 50 houses to be placed on a portion of the parcel on one-half-acre lots while retaining the remaining 25 acres as open space. Clustering allows more effective use of the mechanisms for biodiversity conservation discussed above, such as exclusion of development or setbacks from sensitive features, important habitat, and dispersal corridors. These areas can be excluded from development while compensating the landowner by allowing more intensive development of areas that are less sensitive. Sometimes use of a cluster option is encouraged by offering a density bonus, but, even without a density bonus, clustering can benefit a developer by reducing site development costs. Cluster zoning, alone, however, will not necessarily be effective for biodiversity conservation. It should be coupled with other zoning or subdivision provisions that exclude or limit development on or near sensitive areas, as discussed earlier in this chapter. If the biodiversity protection provisions are included in the cluster ordinance, it is important to explain why the features are important and to justify the limitations on development. Because offering a density bonus may, in some cases, undercut the environmental benefits of the cluster option, a municipality may want to consider mandating cluster zoning for protection of biodiversity, since this will result in a pattern of development that will leave more land that can potentially become habitat. It is also important to consider the context of the clustering in the overall landscape.[61] For example, including the open space in the middle of a grassed traffic circle surrounded by development will do little to provide functional habitat, while requiring that it provide corridors through or around the development and be placed adjacent to existing corridors will promote biodiversity protection.

F. Planned Unit Developments and Planned Residential Developments

Planned Unit Developments (PUDs) and Planned Residential Developments (PRDs) (collectively PUDs) allow the development of large tracts of land in a flexible manner, permitting variances in use and density restrictions that would otherwise apply. The terms of a PUD ordinance will vary according to the provisions of state law authorizing the PUD as well as from municipality to municipality. PUDs offer the same benefits as do clustering, but, because PUDs are used for larger tracts of land, they can be more beneficial to biodiversity by assuring better consideration of factors critical to biodiversity conservation. PUD ordinances or approvals can include provisions assuring protection of the lands most valuable to biodiversity and assure that connections can be created between those lands. Because flexibility is built into PUD ordinances, mitigation in the form of habitat enhancement can be required.[62] For example, the Historic Town of Smithville PUD in the New Jersey coastal zone required a developer to aset aside the most sensitive areas as open space and to assure both internal connections and connections with important habitat areas outside of the development, such as a neighboring wildlife refuge. After doing this, the developer was required to evaluate the quality of the remaining habitat in comparison to the original

56. Ripp, *supra* note 1, at 71-101.

57. McElfish, *supra* note 3, at 38-42.

58. Breggin & George, *supra* note 3, *passim*.

59. 53 Pa. Stat. Ann. §10603(b)(5), (c)(7).

60. *Id.* §10604(1).

61. McElfish, *supra* note 3, at 51-55.

62. *Id.* at 71-73.

habitat and to take measures to enhance the remaining habitat to make up for any losses.[63]

There are several critical factors to consider in drafting a PUD ordinance directed at biodiversity conservation. It should express clear biodiversity objectives and include clear biodiversity related standards that must be satisfied; in some cases these standards may be objective but in others they may require subjective "best-biological-opinion-based" standards. Conservation of important habitat types and requirements for connections should be a part of these standards. The mitigation of adverse impacts should be clearly mandated. Finally, conservation standards in a PUD ordinance alone will not be sufficient. The PUD ordinance must not create undue barriers to its use and must be accompanied by equally clear and equally restrictive standards applicable to by-right zoning, so that developers can take advantage of the PUD and not avoid the conservation standards by reverting to by-right zoning.[64]

G. Overlay Zones

Overlay zones are a special type of zoning district that is "overlain" across other, traditional zoning districts to impose special requirements in addition to those in the underlying district. These can be more restrictive or more permissive to suit the feature being addressed. One of the limitations of traditional zoning districts is that zoning must be uniform in each zoning district, yet important natural features cross property lines and districts. Overlay zones impose special requirements that may be adopted across zoning districts. Overlays can take into account specific needs that cut across land uses but that do not require specific prohibitions of uses. Accordingly, overlays are one of the most common mechanisms used to protect biodiversity or natural features that support biodiversity conservation.[65] Overlays have been used to protect wetlands or floodplains, to impose special restrictions in wild or scenic river corridors, and to limit development on unstable slopes or undermined areas. They can also be useful in protecting habitat corridors and connections.[66] Within the overlay district, mechanisms such as prohibitions against disturbance, setbacks or buffers, impervious cover limitations, and many of the other zoning tools discussed here can be used to protect features valuable to biodiversity conservation.

Tinicum Township, Pennsylvania, developed an overlay district that designates certain areas in that municipality as a critical biodiversity area. The district is "intended for preservation and protection and enhancement to ensure the survival, habitat, and setting of species of flora and fauna identified as being rare, Threatened, Endangered or of Special Significance."[67] The township does not allow any development or disturbance in designated areas.[68] The creation of this overlay zone was authorized by a number of provisions in the PAMPC, which includes provisions similar to those found in the land use laws of other states. For example, the PAMPC authorizes special requirement overlays for natural hazard areas and waters. These may be important for certain biological communities. Another provision that might authorize a specific biodiversity overlay authorizes such districts for "flood plain areas, agricultural areas, sanitary landfills, *and other places having a special character or use affecting and affected by their surroundings*."[69] The statutory requirement for "a special character or use" would work very well for protecting the habitat covered by the Tinicum ordinance or a bog or a cave system. It may also authorize the protection of forest habitat suitable for breeding birds, although such protection might be subject to a possible challenge based on the contention that the requirement for something *special* might preclude the protection of more common, but valuable habitat.

There are a number of factors that will make the use of overlay districts more effective for biodiversity conservation. The ordinance should clearly specify the purposes and need for the overlay district and specify clear and simple requirements. It should assure that core habitat areas and connections are clearly identified, designated, and protected. The connections should include connections to biologically significant features in adjacent jurisdictions, and only features with biological significance should be identified. The restrictions in the overlay zone should include restrictions on linear features, such as highways and utility lines, that might fragment habitat areas. Where disturbance is allowed, mitigation should be required.[70]

H. Incentive Zoning

Incentive zoning is a tool that authorizes higher density or other relief on a parcel in exchange for the developer providing certain specified amenities and features.[71] Incentive zoning could be used to encourage biodiversity restoration or conservation that is related to particular practices or protection of particular landscapes or ecosystem features. For example, density bonuses or smaller minimum lot sizes could be awarded for placing land in open space subject to protection, for construction of wildlife crossings, or the restoration of wetlands. It might be used to encourage protection of certain features by creating incentives to reduce impervious cover, to increase the amount of waterfront buffer, to retain steep slope, or to avoid fencing. For example, Park City, Utah, awards density bonuses in return for designating

63. The New Jersey Supreme Court found that the use of the PUD mechanisms with two phases of approval did not comply with the requirements of the Coastal Area Facilities Review Act requiring certain specified findings that could not be made until the final building approvals. Crema v. New Jersey Dep't of Envtl. Protection, 94 N.J. 286, 463 A.2d 910 (Aug. 1, 1983). However, use of the mechanism resulted in significant biodiversity benefits in the design of the development, since later final approvals for construction of phases of the development in the most sensitive environmental portion (Phase 1C) incorporated all of the requirements of the conceptual approval. This experience demonstrates the importance of providing express statutory authorization for use of the PUD mechanism, as well as the biodiversity related benefits that can be achieved through its application.

64. McElfish, *supra* note 3, at 71-73.

65. Ripp, *supra* note 1, *passim*.

66. McElfish, *supra* note 3, at 42-47.

67. Ripp, *supra* note 1, at 120 (quoting Tinicum Township, Pa., Zoning Ordinance §806(h) (Apr. 13, 1982, with amendments through Mar. 14, 2000)).

68. *Id.*

69. 53 Pa. Stat. Ann. §10605(2) (emphasis added).

70. McElfish, *supra* note 3, at 45-46.

71. Governor's Center for Local Government Services, Land Use in Pennsylvania: Practices and Tools—An Inventory 99 (2000), *available at* http://www.newpa.com/default.aspx?id=228#Tools%202000 [hereinafter Land Use Inventory].

certain steep slope areas as open space.[72] Incentive zoning, like other forms, will work best if there is some means to link features on a particular parcel into the larger landscape, as is done in the Maryland GreenPrint and Massachusetts BioMap programs.[73] Incentive zoning, however, is a somewhat less effective tool for biodiversity conservation because it is voluntary and cannot ensure protection of the features in all cases.[74]

I. Performance Zoning

Performance zoning is a technique that establishes a series of objective standards, such as the amount of open space preservation, limitation or minimization of impervious surfaces, or conservation of vegetation. It then authorizes the development based on the developer presenting a design that meets or exceeds performance targets specified in the ordinance, thereby providing greater flexibility in the design than might be achieved through requirements such as setbacks.[75] Performance zoning can be useful in protecting rare and sensitive habitats, limiting introduction of invasives, or allowing a natural disturbance regime to continue. It is particularly useful for encouraging more consistent uses in private lands by buffering lands conserved through acquisition or purchase of development rights. The ordinance could set up a point system for various characteristics such as conservation of linkages, buffering of areas that might need to be treated with fire, or disturbance limitations. For this tool to be effective, it is critical that the values to be protected are clearly identified and that the municipality have a planning staff capable of evaluating proposals.[76]

J. Agricultural Zoning

Most of the practical experience with zoning and subdivision regulation that may be adaptable to biodiversity involves zoning and subdivision ordinances designed to protect agriculture and parcels significant for agriculture. In many cases, a zoning ordinance may specify an agricultural district and stringently limit subdivisions of land in the designated agricultural zone. Conserving land in agricultural use can protect biodiversity, particularly where woodlands (silvicultural lands) qualify for protection. Protection of agricultural lands can also be served where grass land, pasture land, and fence rows may be conserved, or where agricultural lands can provide food or connections between natural areas. Because zoning for agricultural preservation has been more widespread than for biodiversity conservation, agricultural zoning tools are useful because they can be directly applied to ordinances whose purpose is conservation of open space for biodiversity conservation.[77]

For example, in some municipalities agricultural tracts may be subdivided only if, after the subdivision, *each* resulting tract will contain at least 100 acres; but then the municipality allows some residential subdivision on one-acre lots under sliding-scale agricultural zoning.[78] Sliding-scale zoning is a technique that authorizes higher density development on small tracts than large tracts—based on the importance of preserving larger tracts for farming.[79] Another type of agricultural zoning specifies only the percentage of an agricultural tract that may be developed—often 10% (but then allocates the development to a small area of the tract). Fixed area-based agricultural zoning, used in some jurisdictions, establishes a specific number of dwellings per number of acres in the tract—such as 1 dwelling per 25 acres. However, the dwellings must be constructed on relatively small building lots, leaving the remaining areas intact for agriculture. The ordinance may also specify that the dwelling lots be located on the poorer soils in the tract or in such manner that they interfere least with the farming operations.[80] These techniques may be useful for biodiversity by maintaining larger tracts providing meaningful habitat areas and reducing fragmentation. Use of agricultural zoning for biodiversity, however, will still be hit or miss, since valuable habitats may be on small tracts within an undeveloped landscape.

K. Conservation Subdivision

Conservation subdivision clusters construction and development on portions of a property where it is economically efficient while protecting the remainder of the property for conservation purposes (through conservation easements or other management tools). The technique results in no loss of development potential or gross density, but it can be conducive to protection of biodiversity. The technique relies on principles developed in the field of conservation biology to design an open space network most likely to benefit biodiversity. For example, conservation development may conserve particular features (such as forest parcels and water ways) or may provide connections between significant features (such as riparian corridors or migration corridors) on adjacent parcels. Conservation subdivision can be provided for in a zoning ordinance.[81]

72. McElfish, *supra* note 3, at 57-58.

73. See Susan George, *The State of the States: An Overview of State Biodiversity Programs*, *in* Biodiversity Conservation Handbook, *supra* note 30, at 51; Bob Durand & Sharon McGregor, *Mainstreaming Biodiversity Conservation in Massachusetts*, *in* Biodiversity Conservation Handbook, *supra* note 30, at 61; McKinstry Jr. et al., *supra* note 32, for discussions on these programs.

74. McElfish, *supra* note 3, at 56.

75. Land Use Inventory, *supra* note 71, at 115-16.

76. McElfish, *supra* note 3, at 58-61.

77. *Id.* at 47-50.

78. Pennsylvania Environmental Council, Guiding Growth A-16 (3d ed. 1993). If the original agricultural parcel was less than 100 acres, land may be subdivided from it and transferred to an adjacent parcel so long as the receiving parcel, as augmented, is larger than the original parcel prior to transfer.

79. Such zoning was upheld under Pennsylvania law in *Boundary Drive Assocs. v. Township of Shrewsbury*, 491 A.2d 86 (Pa. 1985).

80. Center for Rural Pennsylvania, Zoning for Farming (1995).

81. There is a growing literature on conservation subdivision, promoted extensively by Randall Arendt and the Natural Lands Trust of Media, Pennsylvania. A succinct presentation aimed at Pennsylvania's local governments and developers is provided in booklet form in Natural Lands Trust, Growing Greener: Putting Conservation Into Local Codes (1997). A more complete analysis is found in Arendt, *supra* note 47, which expands upon the treatment in Randall Arendt, Conservation Design for Subdivisions—A Practical Guide to Creating Open Space Networks (Natural Lands Trust 1996). These and other sources were identified as sources of best management practices and best stewardship practices for biodiversity in Robert B. McKinstry et al., Survey and Proposed Conceptual Model for Best Management Practices and Best Stewardship Practices to Be Applied in Pennsylvania to Promote Biodiversity, Pennsylvania Biodiversity White Paper No. 3 (PBP, Feb. 2, 2002), to be posted at http://www.pabiodiversity.org/.

Although zoning ordinances provide specifically for conservation subdivision, the technique uses a variety of other tools described here. The term was coined by Randall Arendt to describe the results of the "Growing Greener Conservation by Design" process.[82] The Conservation by Design process consists of four main "keys" to conservation: (1) performing "community assessments," including the completion of an existing resources and/or site analysis map to identify those resources that are on the lot to be developed; (2) conducting conservation planning to protect open space networks; (3) provision of different, and flexible, options for development; and (4) using the four-step conservation subdivision design process.[83] Those steps entail: (1) identifying the primary and secondary conservation areas; (2) locating the house sites in the potential development area, which is that area of the site that remains after identifying the conservation areas; (3) aligning the streets and trails; and (4) drawing the lot lines.[84]

If this process is prescribed by ordinance, it is important to specify the key biodiversity elements that should be avoided. These should include important habitat areas, connections between those areas, and connections to neighboring areas. A municipality might consider mandating the process in order to maximize protection of biodiversity. Alternatively, the process can be encouraged using other tools, such as those described in connection with performance zoning.

L. Traditional Neighborhood Development

Some zoning and subdivision ordinances will include provisions encouraging traditional neighborhood development, consisting of compact, mixed used developments aligned along streets, as occurred in towns and cities before the advent of the automobile. While this technique, by itself, does not promote biodiversity, by encouraging more compact development it can help conserve areas critical to biodiversity in other areas. To be an effective part of the tool box, this development should be authorized in areas less important for biodiversity and prohibited in prime habitat and corridor areas. It will only protect biodiversity if coupled with other techniques.[85]

M. Coordination and Cross-Boundary Collaboration

Cross-boundary collaboration is essential if land use regulation is to be at all meaningful as a biodiversity conservation tool. Habitats cross municipal lines, and entire municipalities are smaller than the ranges of many species. Some states such as Florida, Hawaii, and New Jersey, among others, assure cross-boundary consistency by requiring statewide planning and consistency of municipal land use laws with the state plans.[86] Most states, however, leave land planning and land use regulation exclusively to counties, cities, and towns or townships. In these states, other mechanisms can be used to allow greater collaboration or even joint zoning.

There are a variety of mechanisms whereby states can encourage collaboration or at least coordinate their land use decisions. The PAMPC presents a number of examples of such mechanisms. While joint zoning or planning will best assure cross-boundary consistency, there are mechanisms that can be used to assure, at a minimum, that cross boundary impacts will be considered. Coordination of this sort can be beneficial to biological diversity by preventing at least inadvertent decisions by one municipality that conflict with decisions by adjacent municipalities. Under the PAMPC, neighboring municipalities have the explicit right to comment on proposed subdivisions, land use changes, and land development approvals in adjacent municipalities, and to seek mediation if they believe an adjacent municipality's approval of land development or subdivision will adversely affect their citizens.[87] The law also requires each municipal comprehensive plan to include either a statement that existing and proposed development under the plan is compatible with the existing and proposed development and plans in *contiguous portions* of neighboring municipalities, or that buffers between the conflicting uses have been provided.[88] The PAMPC further requires that municipal and cooperative comprehensive plans be "generally consistent" with county comprehensive plans, which is a greater level of coordination than under prior law.[89] These new provisions do not prevent conflicting choices and uses but they provide a greater opportunity to avoid such choices and uses.

Joint zoning is another mechanism that will better assure cross-boundary consistency. The experience in Pennsylvania, again, provides an example. Until 2000, formal collaboration in adopting cross-boundary land use ordinances was difficult in Pennsylvania, as it required municipalities wishing to jointly plan and zone to give up their autonomous institutions. The 2000 amendments to the PAMPC provided new opportunities for multi-municipal cooperation in planning and zoning. That legislation authorized municipalities to enter into cooperative agreements to adopt joint comprehensive plans without giving up their separate zoning boards and planning commissions. Communities that participate in cooperative plans are authorized to designate growth areas and future growth areas and may designate "public infrastructure areas." Within these areas, the plan identifies the municipalities' intent to provide for publicly funded infrastructure; while outside them, the plan makes it clear that the public will not fund such infrastructure. The PAMPC also authorizes cooperating municipalities to designate "rural resource areas" in which uses like forestry and agriculture will be "encouraged and enhanced" and in which taxpayer-funded "public infrastructure services are not provided except in villages."[90]

Certain additional benefits result from participation in cooperative plans. The PAMPC provides that a cooperating municipality will not be subject to legal challenge for failure to provide for a particular use within the municipality so long as the use is provided for in any of the participating

82. Ripp, *supra* note 1, at 26-27 (citing ARENDT, *supra* note 47, at 5).

83. *Id.* (citing NATURAL LANDS TRUST, GROWING GREENER: CONSERVATION BY DESIGN 1-2 (2001)).

84. *Id.* (citing ARENDT, *supra* note 47, at 67-71).

85. MCELFISH, *supra* note 3, at 61-63.

86. See discussion in *supra* Section III and sources cited in *supra* note 26.

87. 53 PA. STAT. ANN. §10502.1.

88. *Id.* §10301(5).

89. *Id.* §10105.

90. *Id.* §§10107(a), 11103.

municipalities within a reasonable geographic area.[91] Participating municipalities may also adopt a specific plan for nonresidential areas, which may include "standards for the preservation, conservation, development and use of natural resources, including the protection of significant open spaces, resource lands and agricultural lands within or adjacent to the area covered by the specific plan."[92]

Municipalities that have entered into cooperative implementation agreements are authorized to share tax revenues and impact fees and to adopt transfer of development rights (TDR) ordinances that allow transfers across municipal boundaries within the area covered by the plan.[93] Pennsylvania further encourages joint planning and land use decisions by requiring that commonwealth agencies "shall consider and may rely upon" these plans and ordinances when reviewing applications for funding or permitting infrastructure or facilities, and "shall consider and may give priority consideration to" applications for financial or technical assistance for projects consistent with these plans.[94]

N. Transfers of Development Rights and Purchases of Development Rights

TDRs allow a local government to constrain development in an area of particular environmental concern but allow the development rights associated with the property to be severed and sold for use on a parcel elsewhere, where it can provide for greater density or other advantages. The two areas are known as the "sending" and "receiving" areas. The sending area is the conservation area; the receiving area is where greater development is desired or acceptable. The TDR itself is a right in property, which may be sold, held, and purchased. The restriction may be recorded.[95]

The Purchase of Development Rights (PDR) is a related tool that allows governmental entities and others (such as conservation organizations or authorities) to purchase and convey or retire development rights, both to assure there is a market for the rights and to retire rights where greater conservation is desirable.[96] The two mechanisms may be coupled if a government or a conservation organization purchases development rights, which can then be resold or "retired."

The TDR mechanism can be coupled with a bank that acquires TDRs generated when a conservation project is created and then makes them available to developers who wish to obtain authorization for projects in the receiving district. This TDR mechanism, coupled with a credit bank, was used effectively in the New Jersey Pinelands region to provide maximum protection for lands deemed valuable for biodiversity.[97] In light of that success, a similar program was established to conserve biodiversity in the New Jersey Highlands region.[98]

Although a TDR program can be created using PDRs and reading the authorization provided under traditional zoning broadly, the validity of approvals for higher density may be subject to a variety of challenges, including possible contentions that it constitutes spot zoning. In most cases, therefore, states have amended their land use law to provide specific authorization. For example, §619.1 of the PAMPC creates "a separate estate in land" to the extent specifically authorized by the municipality's zoning ordinance, in transferable development rights. These rights may be exercised within the municipality or within the area of municipalities having a joint zoning ordinance or a written agreement.[99] Section 603(c)(2.2) of the PAMPC further authorizes provisions in zoning ordinances regulating TDRs.[100] TDR ordinances have been enacted by a number of Pennsylvania municipalities, particularly in the rapidly developing areas of Chester and Lancaster counties.

TDR programs take a variety of forms. In general, however, in a TDR program, all lands may be provided with a right to develop at a certain density or subject to a certain use. In certain lands, the right could be exercised but only if the property owner acquires a TDR from a property owner in an area where the TDR cannot be exercised. In other areas valuable for biodiversity, the right cannot be exercised, but it can be sold to an owner elsewhere where it can be used. For example, in the context of residential zoning, a municipality might provide TDRs equal to one unit per acre across the entire municipality. However, it might also bar all development of wetlands, floodplains, steep slopes, important habitat areas, corridors connecting habitat areas, and other areas critical for preservation of biodiversity, and limit development of other areas important to biodiversity to 1 unit per 20 acres. It might also allow development of less sensitive areas to up to 20 units per acre or as high rise development, but only if sufficient development rights are acquired. An owner of lands zoned for high density would then need to acquire TDRs from the owners of the environmentally sensitive lands before it could develop to the maximum permitted density. The same mechanism can be used with commercial space (providing credits for a certain number of square feet per acre) and industrial space.

The TDR mechanism is not only a useful tool for steering development away from lands valuable for biodiversity, but it can also promote fairness and reduce the disparate impacts of zoning and other government actions on land value. It prevents zoning from unreasonably reducing the value of some lands while increasing the value of others. The person whose land happens to fall in a high density, commercial, or industrial district will not obtain an unfair windfall, since, under a TDR regime, that person may be required to acquire rights from other parties. Similarly, the government will not have to "take" land that it wishes to preserve as open space, thereby avoiding the costs of having to pay "just compensation."[101] More importantly, since most restrictions do not amount to a taking, the person owning land restricted to open space use will be able to continue to pursue that open space use without suffering a financial disadvantage. For example, a person owning forest land would be able to sell

91. *Id.* §10916.1, 11006-A. This represents a significant modification of prior law, because under the prior "exclusionary zoning" law, at least some courts appeared to have taken the position that every municipality was required to provide for every use within its borders.

92. *Id.* §11106(a).

93. *Id.* §11105; *see also id.* §10619.1(D).

94. *Id.* §11105(a)(2), (3).

95. McElfish, *supra* note 3, at 85-91.

96. *Id*. at 91-95.

97. N.J. Stat. Ann. §§13:18A-30 to -55 (West 2005).

98. *Id*. §13:20-13.

99. 53 Pa. Stat. Ann. §10619.1.

100. *Id*. §10603(c)(2.2).

101. U.S. Const. amend. V ("nor shall private property be taken for public use, without just compensation").

the TDR and generate cash, which can earn interest to supplement forestry income, and will have real estate and inheritance taxes reduced as a result of the sale of the TDR. TDRs also provide a mechanism for preventing the unfair effects of the provision of public infrastructure. Without this mechanism, highway improvements or the construction of an exit from a limited access highway will utilize public monies to increase the value of property along the highway and at the access point, whose owner may have already received just compensation for property taken in connection with the highway construction.

O. Exactions, In Lieu or Impact Fees, and Proffers

Exactions, in lieu or impact fees, and proffers are all methods whereby local governments may assure that developers will offset the incremental public or infrastructure impacts of a proposed development. Under these mechanisms, a developer will provide roads, utilities, school facilities, open space, habitat, or recreational facilities as a condition to subdivision approval either by providing those services or by paying for them in order to offset the impacts of the development. These mechanisms can be used for biodiversity conservation by requiring that open space for corridors and key habitat areas either be set aside or purchased elsewhere, or that funds be provided to do this. In states permitting exactions, the ordinance will require that the space be provided or required as a condition to subdivision approval. Under this mechanism, the developer must contribute funds to support the government's acquisition of open space lands valuable to biodiversity. In the case of the "in-lieu" or "impact fee" requirement, a developer agrees to pay an in-lieu or impact fee to purchase open space elsewhere, rather than providing open space within a particular development. In the case of a proffer, the ordinance will not expressly require a fee or exaction, but the developer will voluntarily agree to provide open space or pay money for open space acquisition in order to satisfy the other conditions necessary to obtain subdivision approval.

These mechanisms are frequently used to fund open space preservation. They can be more effective at biodiversity conservation than simply requiring a certain percentage of open space to be set aside because they can be targeted toward preserving key biodiversity areas and connections. However, the use of TDRs with a TDR bank can achieve the same result in a more effective, consistent and fair way.

The use of these mechanisms, however, are subject to constitutional constraints. The U.S. Supreme Court has held that exactions must bear a rational nexus to the development activity and be roughly proportional to the impact of the development.[102] In light of these requirements, many states do not allow exactions or limit exactions. Although the Court decisions did not address the use of in-lieu or impact fees, many states constrain their use. Pennsylvania presents an example of the types of limitations frequently seen in state law. There, impact fees and in lieu fees cannot be imposed across the board. Under Article V-A of the PAMPC, general in-lieu or impact fees are authorized only to support municipal transportation capital improvements, which do not include bicycle paths, public transportation, or other means that might be used to protect areas valuable for biodiversity.[103] However, a municipality may require dedication of open space or payments to acquire open space, provided it is accessible to the residents of that development.[104] Even where a municipality cannot legally require in-lieu or impact fees to support a municipal-wide open space program, this does not prevent the use of this mechanism on a purely voluntary basis by use of a proffer.

P. Urban Growth Boundaries/Priority Development Areas/Urban Service Boundaries

Urban growth boundaries are a tool that can be useful in conserving farmland, open space, forests, and biological corridors and greenbelts while directing new development toward communities where infrastructure already exists. Denser development will be encouraged or limited to areas within the growth boundary, thereby conserving open space outside of the boundary and encouraging the concentration of in-fill type development within the boundary. They may be established de jure, through zoning law, or by restricting public infrastructure spending.

Urban growth boundaries may be established through zoning law. This has been done in Colorado, Oregon, and Tennessee.[105] Even where not expressly authorized, it can be done through municipalities voluntarily coordinating their zoning. For example, in Lancaster County, Pennsylvania, 23 municipalities cooperated to adopt consistent zoning and density provisions that are intended to concentrate development and preserve some of the best farmland.[106]

Urban growth boundaries may also be established by restricting public infrastructure spending to priority development boundaries or urban service boundaries. Priority development areas were established as a part of Maryland's Smart Growth Program within developed areas.[107] Maryland restricts public infrastructure spending to the priority development areas so that development is less desirable outside of those areas. The urban service boundary concept, widely used in California, is similar, in that the local government designates areas in its plan where it does not intend to provide public services, putting developers on notice that public monies will not be spent for that purpose in those areas.[108]

These techniques can help conserve biodiversity over a large regional area outside of the urban boundary. For example, they could be used to protect areas important for biodiversity and related uses such as forestry or agriculture or

102. Nollan v. California Coastal Comm'n, 483 U.S. 825, 17 ELR 20918 (1987); *see also* Dolan v. City of Tigard, 512 U.S. 374, 24 ELR 21083 (1994); Twin Lakes Dev. Corp. v. Town of Monroe, 1 N.Y.3d 98 (N.Y. 2003) (upholding a requirement for the payment of $1,500 per subdivided lot to support parkland acquisition, finding the required nexus and proportionality).

103. 53 Pa. Stat. Ann. §§10501-A to 10508-A.

104. *Id.* §10503(11).

105. McElfish, *supra* note 3, at 95-98.

106. *Id.; see also* Tom Daniels, *Farm Follows Function*, Planning (Jan. 2000). Amendments to the Pennsylvania MPC adopted after that program was established expressly allow designation of growth areas and rural resource areas under cooperative plans. 53 Pa. Stat. Ann. §11105(a)(2), (3). These designations may be enforced through restrictions on funding and infrastructure.

107. *See* Maryland Department of Planning, *Smart Growth Background*, http://www.mdp.state.md.us/smartintro.htm (last visited Oct. 26, 2005).

108. McElfish, *supra* note 3, at 98-101.

important forested habitat corridors or watersheds. However, they are not sufficiently precise to conserve biodiversity without the use of other tools, since urban growth boundaries will allow some growth and development that may impact biodiversity resources within and outside of the boundary. In establishing boundaries, it is important to identify the growth areas with sufficient specificity such that they cannot readily be expanded. It is also important to allow sufficient development outside of the boundary both to make the designation more defensible in the event of a legal challenge and to assure that the designation will not undermine political support.[109]

Q. Adequate Public Facilities Requirement

A similar technique used to concentrate and restrict development to existing areas is to prohibit or limit new development until adequate public infrastructure, such as roads, schools, and public water and sewer, is available. This technique will conserve the public fisc and can, in some cases, concentrate development, but it will not necessarily serve biodiversity. If coupled with the growth boundary concept, this method can be used to protect areas valuable for biodiversity. However, it may actually disserve biodiversity by encouraging less dense sprawl type development in exurban areas.[110]

R. Transportation Strategies

Construction of roads can have a devastating impact on biodiversity by directly destroying or fragmenting habitat. Local governments can use a variety of techniques, many discussed elsewhere, to restrict construction of new roads that will cross important habitat areas or corridors. They may also require that road construction employ mitigating measures, such as the construction of bridges rather than tunnels or requiring overpasses for wildlife crossings, where corridors or important habitat areas cannot be avoided. Mitigation may also require the creation of new habitat, such as wetlands. These techniques will be effective where roads are to be constructed by the developer or by the municipality, but they may be less effective with respect to the most destructive state and federal road projects. In some cases, however, states may require the use of mitigating measures in state projects; use of similar requirements should then be taken into consideration by federal projects in the environmental planning process required under the National Environmental Policy Act.[111]

S. Revitalization Incentives

A final technique relevant, but not directly applicable, to biodiversity conservation is to create incentives for developing within brownfields or existing urban areas. This may be done with restrictions on public spending, by public subsidized loan programs, or grant programs. In some cases, it may be accomplished through tax abatement programs or relaxation of certain building and zoning requirements, such as set backs or requirements for impact fees in such areas. By concentrating development in brownfields areas or existing urban areas, development is diverted away from greenfields areas most valuable for biodiversity. In some cases, this technique may involve public spending on green infrastructure to preserve green areas valuable to biodiversity within the urban landscape. This may conserve valuable habitat and connections, which can serve as trail systems that will make existing urbanized areas more attractive. This technique has been used as a part of the Massachusetts BioMap strategy.[112]

V. Land Development Regulation for Aquatic Areas and Water Quality

Many land uses and development practices are regulated by state and federal law to protect water quality and other values related to waterways. These regulations also can affect the biological health of the land and waters. Virtually all water quality regulation under the federal Clean Water Act (CWA)[113] and under parallel state laws such as the Pennsylvania Clean Streams Law[114] is expressly directed at biodiversity protection. The water quality standards, planning, and discharge regulations promulgated under the CWA and parallel state laws are expressly intended "to restore and maintain the chemical, physical, and *biological integrity* of the Nation's waters."[115] This regulatory system is expressly intended to provide for "the protection and propagation of fish, shellfish, and wildlife."[116] A variety of other state laws directed at operations in terrestrial areas supplement this all-encompassing program protecting water quality for biological purposes.

A. Sediment and Erosion Control

States have long controlled sediment and erosion to protect water quality and prevent loss of soil. Most states impose controls on stormwater runoff, erosion, and sedimentation via stormwater permits under the federal CWA.[117] In these states, the state, or in many cases, a county conservation district will issue a national pollutant discharge elimination system (NPDES) permit for stormwater discharges associated with construction projects over five acres in size.[118] The federal stormwater regulations have been developed to encourage the restoration and maintenance of the biological integrity of aquatic ecosystems. Moreover, because the permit issued by the county conservation district is issued as a federal NPDES permit, issuing the permit is considered a federal action for purposes of the Endangered Species Act (ESA), and the requirements of ESA §7 apply.[119]

Pennsylvania's erosion control program is typical of these state program. Built on the foundation of the Pennsylvania Clean Streams Law,[120] the "Chapter 102" sediment and erosion control program requires a permit for all earth

109. *Id.* at 99.

110. *Id.* at 101-04.

111. 42 U.S.C. §§4321-4370f, ELR STAT. NEPA §§2-209.

112. *See* Durand & McGregor, *supra* note 73.

113. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

114. 35 PA. STAT. ANN. §§691.1 et seq.

115. 33 U.S.C. §1251(a) (emphasis added).

116. *Id.* §1251(a)(2).

117. 40 C.F.R. §122.26. States are granted the authority to implement these regulations pursuant to 40 C.F.R. §122.25.

118. *Id.* §122.26(b)(14)(x).

119. 16 U.S.C. §1536.

120. 25 PA. ADMIN. CODE ch. 102.

disturbing activities of 5 acres or more (25 acres or more for timber harvesting or road maintenance), and also requires the use of erosion and sediment control measures including best management practices (BMPs) for earth disturbing activities on smaller areas and for any agricultural plowing and tilling activities. Administration and enforcement of the program may be delegated to counties and other units of local government, e.g., county soil conservation districts, that have an acceptable program approved by the PADEP.[121]

When a permit is required for soil erosion and sediment control activities, the person seeking the permit must

> provide proof of consultation with the Pennsylvania Natural Diversity Inventory (PNDI) regarding the presence of a State or Federal threatened or endangered species on the project site. If the Department [of Environmental Protection] or county conservation district determines, based upon PNDI data or other sources, that the proposed earth disturbance activity may adversely impact the species or critical habitat, the person proposing the earth disturbance activity shall consult with the Department or county conservation district to avoid or prevent the impact. If the impact cannot be avoided or prevented, the person proposing the activity shall demonstrate how the impacts will be minimized in accordance with State and Federal laws pertaining to the protection of threatened or endangered flora and fauna and its habitat.[122]

Erosion and sediment BMPs include a requirement that, upon completion of any phase of earth disturbance, the area must be immediately seeded, mulched, or otherwise protected. The area must subsequently be permanently stabilized with either a "minimum uniform 70% perennial vegetative cover" or another acceptable BMP.[123] Since these BMPs were developed pursuant to the CWA §208 program, similar requirements apply nationwide.[124] This BMP provision may indirectly encourage the use of non-native plants for erosion control. However, it could serve as the basis for developing biodiversity-friendly alternative BMPs.

B. Stormwater Management

Stormwater management is also linked to federal CWA programs, and each state will have a system for stormwater control. For example, under the Pennsylvania Stormwater Management Act,[125] counties must prepare and update a stormwater management plan for each watershed and revise it every five years. Plans are reviewed by the PADEP, and regulations specify what plans are to contain.[126] Municipalities implement the stormwater management plans via their local land use ordinances. Stormwater management plans and municipal ordinances can help support biodiversity conservation by limiting impervious surfaces, using constructed wetlands and "soft" retention facilities rather than hardened drainage basins, by requiring grassed swales, stormwater recharge of groundwater, and low impact development, and by establishing programs to acquire and maintain forested areas and other areas that can absorb and slow the rate of runoff.[127] The PADEP administers stormwater management planning grants to help counties plan for needed improvements and to help municipalities implement ordinances mandated for stormwater management. The grant program may also help promote approaches that support biodiversity conservation and restoration while controlling stormwater discharges.

Many municipalities have adopted stormwater management ordinances that regulate volume as well as rate, requiring the retention of the same volume of water post-development as pre-development. Where streams are fed primarily by groundwater, this type of ordinance can assist biodiversity conservation by assuring that the recharge maintains minimum low flows and by regulating temperature regimes within streams.

C. Floodplain Management

Virtually all states have legislation concerning construction in floodplains and floodways to satisfy the requirements of the National Flood Insurance Act (NFIA), which makes federally subsidized flood insurance available in areas that have adopted "adequate land use and control measures" consistent with federal criteria.[128] Although the NFIA was originally designed primarily to prevent flood related damage, there is an increasing recognition that maintenance of floodplains in their natural condition and maintenance of natural ecosystem functions will also promote flood control and reduce the damage from flooding.[129]

The Pennsylvania Flood Plain Management Act[130] is typical of the laws that states have adopted to satisfy these conditions. That law allows municipalities to enact floodplain regulations even if they do not have a zoning ordinance. While the Pennsylvania Flood Plain Management Act, like the NFIA and other similar state laws, is primarily concerned with hazards and avoidance of repeated losses, it, like other state floodplain laws, provides an opportunity to take into account the importance of floodplains for biodiversity. Because it authorizes local ordinances, it allows local governments to enact ordinances promoting biodiversity values. Maintaining natural vegetation and preventing impervious surfaces and development in floodplains is a mechanism to maintain corridors for connections of habitat valuable to biodiversity and to protect water quality.

121. *Id.* §102.41.

122. *Id.* §102.6(a)(2).

123. *Id.* §102.22(c)(1).

124. 33 U.S.C. §1288 (areawide waste treatment management).

125. 32 Pa. Stat. Ann. §§680.1 to 680.17.

126. 25 Pa. Admin. Code ch. 111.

127. *See* 64 Fed. Reg. 68722 (Dec. 8, 1999) (discussion of techniques in the U.S. Environmental Protection Agency's Municipal Stormwater Phase 2 rule); *see also* Natural Resources Defense Council, Stormwater Strategies: Community Responses to Runoff Pollution (2001); James McElfish & Susan Casey-Lefkowitz, Smart Growth and the Clean Water Act (Northeast-Midwest Institute 2001) (more techniques and local examples). BMPs for conserving stormwater and conserving biodiversity are inventoried in McKinstry et al., *supra* note 81.

128. 42 U.S.C. §4022. Those criteria are promulgated by the Federal Emergency Management Agency under 42 U.S.C. §4102 and appear at 44 C.F.R. pt. 60.

129. *See* Act of Sept. 23, 1994, Pub. L. No. 103-325, tit. V, §562, 108 Stat. 2160, 2276-77 (creating a task force to "(1) conduct a study to—(A) identify the natural and beneficial functions of the floodplain that reduce flood-related losses"; and "(B) develop recommendations on how to reduce flood losses by protecting the natural and beneficial functions of the floodplain").

130. 32 Pa. Stat. Ann. §§679.101- .601.

D. Wetlands

Although wetlands are protected under the CWA §404 program,[131] a number of states have independent programs protecting wetlands that often provide even greater protection to this resource and its associated biodiversity values. Two states, New Jersey and Michigan, have received federal authorization to operate and implement their own program in lieu of the federal program within their jurisdictions.[132] Wetlands are regulated under federal and state law because of their value to biodiversity. Because they represent the intersection of aquatic and terrestrial systems, they contain a variety of habitat types and support a wide variety of species. Wetlands are valuable as spawning and nesting sites and support large numbers of rare, threatened, and endangered species. Because they are often associated with streams, they can serve as dispersion corridors. The wetlands regulatory program represents an area where states can influence a wide class of development related activities under both state and federal law to require greater consideration of biodiversity impacts.

The Pennsylvania program is an example of such a state program and demonstrates opportunities states may take to influence federal permitting decisions under the §404 program to better protect biodiversity. Wetlands and waterways are protected in Pennsylvania pursuant to the Chapter 105 regulations jointly adopted under the Dam Safety and Encroachments Act[133] and the Clean Streams Law.[134] The regulatory program under the Dam Safety and Encroachments Act, as applied in the Chapter 105 regulations, requires a permit for a dam, encroachment, or obstruction of the waters of the commonwealth,[135] including the filling of wetlands.[136] The Chapter 105 regulations provide special protection for exceptional value wetlands, defined as those that serve as habitat for threatened or endangered species, are hydrologically connected to such habitat, are in or along the floodplain of exceptional value waters or wild and scenic rivers, maintain public drinking water supply quality or quantity, or are in state-designated natural or wilderness areas.[137] Permitting criteria include water dependence, consideration of alternatives, cumulative impacts analysis, and mitigation for permitted conversions.[138] Wetland mitigation with compensatory wetland replacement must have a minimum area, function, and value ratio of 1:1, and must be located adjacent to the affected wetland unless an alternative replacement site is approved (generally within the same watershed or coastal zone management area).[139]

Applications for the discharge of dredged or fill materials into the waters of the commonwealth must identify:

> (1) The location of a public water supply intake located within 1 mile upstream and 10 miles downstream.
> (2) The location of areas of shell-fish production.
> (3) The impact of the activity upon a threatened or endangered species as identified under the [federal ESA] . . . and the critical habitat of the species.
> (4) The impact of the activity upon those species of aquatic life indigenous to the water body.
> (5) The amount of percentage of the discharge that will consist of [regulated] toxic [or hazardous] material . . . in other than trace quantities.
> (6) Other information as the Department may require.[140]

The regulatory criteria for approving applications include substantial concern for biodiversity:

> The Department will not approve an application to discharge dredged or fill material into regulated waters of this Commonwealth, unless the applicant demonstrates to the Department a public benefit which outweighs the damage to the public natural resources, if one or more of the following is true:
>
> > (1) The discharge is to a spawning area during spawning season.
> > (2) The discharge would restrict or impede the movement of aquatic species indigenous to the waters or the passage of normal or expected high flows or cause the relocation of the waters unless the primary purpose of the fill is to impound waters.
> > (3) The discharge is into regulated waters of this Commonwealth, except wetlands, which are breeding, feeding or nesting areas for migratory water birds.[141]

In addition to their own regulatory programs, the state is also responsible for reviewing federal permitting activities (including U.S. Army Corps of Engineers (Corps) wetlands permitting under CWA §404) to assure that the federal permit does not result in a violation of the states's water quality standards. This state review program, under §401 of the CWA, allows states to place conditions on federal permits and to limit or condition the use of "general permits" or "nationwide permits" by the federal agency so that they protect the state's waters and biological resources.[142] Pennsylvania, like most states, has a process for applying its §401 review to permit applications to the Corps.[143] Pennsylvania has routinely refused to grant §401 certification to the Corps' nationwide permits, but it has conditioned approval to provide added protection. Accordingly, nationwide permits are not generally applicable in Pennsylvania and instead have been replaced by a programmatic statewide permit incorporating Pennsylvania's conditions, which generally follow the conditions in the general permits adopted under Chapter 105. The federal ESA applies to CWA §§401 and 404 and, therefore, requires proposed activities to be evaluated to assure that threatened or endangered species will not be jeopardized by the grant of the permit and the state water quality certification. Likewise, Pennsylvania's natural heritage program is consulted to determine the potential for interaction with threatened or endangered species.

Thus, both the state and federal wetlands permitting programs have a substantial role to play in biodiversity conservation, not only in defining impacts and avoidance criteria, but also in specifying the form and location of suitable mitigation for permitted actions.

131. 33 U.S.C. §1344.

132. 40 C.F.R. §§233.70-.71.

133. 32 Pa. Stat. Ann. §§693.1-.27.

134. 35 Pa. Stat. Ann. §§691.1 et seq. The regulations appear at 25 Pa. Admin. Code ch. 105.

135. 25 Pa. Admin. Code §105.11.

136. *Id.* §105.1 (defining "body of water" to include wetlands).

137. *Id.* §105.17(1).

138. *Id.* §105.18a.

139. *Id.* §105.20a.

140. *Id.* §105.401.

141. *Id.* §105.411.

142. 33 U.S.C. §1341.

143. PADEP, Guide to DEP Permits 98 (2001).

VI. Conclusion

Local land use law and the regulation of development activities can be powerful tools for protecting biodiversity. The use of these tools, however, is often fragmented among multiple jurisdictions bearing little relation to ecoregions. Moreover, many localities do not act to protect biodiversity because of lack of knowledge or interest, and others lack the expertise to do so. This underlines the critical importance of planning to coordinate and to guide the use of these regulatory and land use powers by local governments. Planning can be useful in informing local governments, instructing them how to use those powers for biodiversity conservation, and requiring their use where states require consistency with state plans for land use decisions, other state permits, or both.