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BIODIVERSITY CONSERVATION AND ECOSYSTEM MANAGEMENT IN FLORIDA: OBSTACLES AND OPPORTUNITIES

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INTRODUCTION

In 1988, while discussing the biodiversity[1] crisis, the eminent Harvard biologist, Edward O. Wilson stated that "how the human species will treat life on Earth, so as to shape this greatest of legacies, good or bad, for all time to come, will be settled during the next ten years."[2] It is now more than ten years later and, while it is difficult to determine with certainty the tenor of our legacy, it seems clear that biodiversity conservation[3] will be one of the most compelling environmental problems of the new millennium.[4]

Scientists estimate that current rates of species loss are extraordinarily high, perhaps as much as 1000 to 10,000 times greater than natural extinction rates.[5] Although hunting and

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1. Biodiversity is the genetic, species, and ecological diversity of plants, animals, and microorganisms. CONSERVING THE WORLD'S BIOLOGICAL DIVERSITY 17 (Jeffrey A. McNeely et al. eds., 1990) [*hereinafter* WORLD'S BIOLOGICAL DIVERSITY]; *see infra* notes 21–26 and accompanying text (defining biodiversity).

2. WORLD'S BIOLOGICAL DIVERSITY, *supra* note 1, at 22.

3. Biodiversity conservation involves maintaining and restoring genetic, species, and ecosystem diversity, primarily by controlling activities that degrade or destroy habitat and ecosystems. *See infra* notes 33–38 (discussing biodiversity conservation).

4. *See* EDWARD O. WILSON, THE DIVERSITY OF LIFE 278–80 (1992); A. Dan Tarlock, *Local Government Protection of Biodiversity: What Is Its Niche?*, 60 U. CHI. L. REV. 555, 555–57 (1993); Bradley C. Karkkainen, *Biodiversity and Land*, 83 CORNELL L. REV. 1, 1–4 (1997).

5. Edward O. Wilson, *The Current State of Biodiversity, in* BIODIVERSITY 12–13 (Edward O. Wilson & Frances M. Peter eds., 1988) [*hereinafter* BIODIVERSITY] (estimating extinction rates due to destruction of rainforests). This value is an estimate at best. The difficulty of determining the rate of extinction is compounded by the fact that there are probably many species that man has not yet discovered. There are presently about 1.4 million known species on earth. Scientists estimate that the actual number of species is probably between 5 and 100 million. WORLD'S BIOLOGICAL DIVERSITY, *supra* note 1, at 18. One of the tools scientists use to estimate species numbers and rates of extinction is the theory of island biogeography, which establishes a direct correlation between

poaching are also contributing factors, the principal culprit is human activity that degrades and destroys habitat.[6] Many scientists agree that conserving ecosystems and ecosystem functions is the key to maintaining overall biological diversity.[7] Increasingly, scientists, academicians, and regulators are focusing on developing policy and law to stem the loss of habitat and protect biodiversity.[8] A fundamental question concerns how to implement biodiversity conservation through the legal system.

Ecosystem management is emerging as a dominant paradigm for natural resources management and biodiversity conservation, involving a balancing of social, economic, and environmental factors.[9] Ecosystem management is generally recognized as a solution to the failures of existing regulatory programs to halt the

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habitat size and biodiversity. On the basis of this relationship, scientists predict that as the amount and size of viable habitat decrease, so does biodiversity. BIODIVERSITY, *supra*, at 10–13.

6. BIODIVERSITY, *supra* note 5, at 21; WILLIAM P. CUNNINGHAM & BARBARA W. SAIGO, ENVIRONMENTAL SCIENCE: A GLOBAL CONCERN 276–78 (4th ed. 1997). Ecological integrity is a central tenet of the multidisciplinary science of conservation biology. *See* G. TYLER MILLER, JR., LIVING IN THE ENVIRONMENT 634–36 (10th ed. 1998).

7. *See, e.g.*, BIODIVERSITY, *supra* note 5, at 410–11.

8. *See, e.g.*, BIODIVERSITY AND THE LAW (William J. Snape III ed., 1996); Tarlock, *supra* note 4; Robert B. Keiter, *Conservation Biology and the Law: Assessing the Challenges Ahead*, 69 CHI.-KENT L. REV. 911 (1994); Karkkainen, *supra* note 4; BIODIVERSITY, *supra* note 5.

9. *See generally* STAFF OF HOUSE COMM. ON NATURAL RES., 103D CONG., 2D SESS., ECOSYSTEM MANAGEMENT: SUSTAINING THE NATION'S NATURAL RESOURCES TRUST (Comm. Print 1994); U.S. GEN. ACCOUNTING OFFICE, ECOSYSTEM MANAGEMENT: ADDITIONAL ACTIONS NEEDED TO ADEQUATELY TEST A PROMISING APPROACH (1994) (GAO/RCED-94-111) [*hereinafter* GAO REPORT]; Robert B. Keiter, *Beyond the Boundary Line: Constructing a Law of Ecosystem Management*, 65 U. COLO. L. REV. 294 (1994); R. Edward Grumbine, *What is Ecosystem Management*, 8 CONSERVATION BIOLOGY 1, 27 (1994).

expanding biodiversity crisis.[10] While ecosystem management has yet to be universally accepted, there is a growing consensus among scientists and land management agencies that the approach may be a good tool to achieve sustainable use of natural resources and conserve biodiversity.[11]

Public land managers are embracing ecosystem management, in the Pacific Northwest forests.[12] Yet, ecosystem management of public lands may not provide enough habitat to support the continued existence of many species because ecosystems often extend beyond public land boundaries to neighboring private lands, or may be located entirely on private lands. For example, the endangered Florida Panther is confined to the few remaining wild areas of south Florida and is in imminent danger of extinction.[13] The

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10. Grumbine, *supra* note 9, at 28. Summarizing the then existing literature, Grumbine set forth the following definition: "ecosystem management integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term." *Id.* at 31.

11. *See generally* Grumbine, *supra* note 9; FOREST ECOSYSTEM MANAGEMENT ASSESSMENT TEAM, AN ECOLOGICAL, ECONOMIC, AND SOCIAL ASSESSMENT (1993) [*hereinafter* FEMAT] (developing an ecosystem management program for National Forests and Bureau of Land Management lands in the Pacific Northwest); GAO REPORT, *supra* note 9.

12. *See* Seattle Audubon Soc'y v. Moseley, 80 F.3d 1401 (9th Cir. 1996) (affirming a federal district court decision that the use of ecosystem management for Forest Service and Bureau of Land Management lands in the Pacific Northwest is consistent with the National Environmental Policy Act, the National Forest Management Act, and the Endangered Species Act); FEMAT, *supra* note 11; Michael C. Blumm, *The Amphibious Salmon: The Evolution of Ecosystem Management in the Columbia River Basin*, 24 ECOLOGY L.Q. 653, 668–74 (1997) (discussing the President's Northwest Forest Plan and proposed Interior Columbia Basin Ecosystem Management Project).

13. James R. Snyder et al., *South Florida Rockland, in* ECOSYSTEMS OF FLORIDA 269 (Ronald L. Myers & John J. Ewel eds., 1990); Joseph M. Schaefer, *St. Johns River Water Management District, Wildlife Resources of the Econlockhatchee River Basin, in* I

primary reason is lack of suitable habitat. The habitat needs of the Florida Panther far exceed the boundaries of public lands in South Florida. Therefore, additional habitat on private lands will be required if the panther is to be saved from extinction. This example illustrates the need to augment habitats on public lands with habitats on private lands.

In the western United States, where about half of the land area is in public ownership,[14] the new emphasis on ecosystem management may have a significant effect on conservation of natural resources and biodiversity. However, the situation in the East is more acute, where the majority of natural lands are in private ownership.[15] The conclusion that public lands do not provide sufficient habitat for certain species raises several questions regarding management of private lands. Do existing regulatory programs provide authority for ecosystem management and biodiversity conservation? Can federal, state, or local governments require ecosystem protection and biodiversity conservation on private lands?

Whether ecosystem management on private lands can be accomplished through existing statutory authority, regulatory programs, and institutional arrangements is an open question. While there are impediments to accomplishing ecosystem management on public lands, including institutional barriers and insufficient scientific information, the task is inherently more difficult from a legal standpoint on private lands because of limited agency authority and private property rights. Unlike government regulation of public lands, regulation of private lands must comply with the

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ECONLOCKHATCHEE RIVER BASIN NATURAL RESOURCES DEVELOPMENT AND PROTECTION PLAN 3–11 (1990). The endangered Florida Panther used to inhabit much of the southeastern United States. Today, the 20 to 30 remaining panthers have been driven into remnant wild areas in the southern tip of Florida. Memorandum from Richard Hamann, Acting Director, Center for Governmental Responsibility, to the Florida Defenders of the Environment, Bulletin 23 (Jan. 1998) (on file with the Center for Governmental Responsibility, University of Florida College of Law, Gainesville, Florida). Ninety-three percent of five male Florida Panthers examined had abnormal sperm. Schaefer, *supra*.

14. George Cameron Coggins & Robert L. Glickman, 1 PUBLIC NATURAL RESOURCES LAW, 1–3 (1995).

15. *See* GAO REPORT, *supra* note 9, at 15.

constitutional prohibition against uncompensated expropriations of private property.[16]

In 1993, Florida became the first state in the nation to legislatively endorse ecosystem management as its guiding principle for natural resources management on public and private lands.[17] The Florida Department of Environmental Protection ("DEP"), has declared that biodiversity conservation is an important component of its ecosystem management strategy.[18] In addition, Florida has several other regulatory programs that regulate biodiversity, including a statewide comprehensive growth management law[19] and innovative regional programs.[20]

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16. The fifth amendment of the United States Constitution requires that the government provide "just compensation" if it takes private property for public use. U.S. CONST. amend. V. A government regulation that deprives a property owner of the use and value of their property may constitute a compensable Fifth Amendment taking if the regulation "goes to far." Pa. Coal Co. v. Mahon, 260 U.S. 393, 414–18 (1922); *see infra* notes 118–22 and accompanying text (discussing regulatory takings as a potential barrier to regulations to implement ecosystem management and conserve biodiversity).

17. The Florida Environmental Reorganization Act of 1993, 1993 Fla. Laws ch. 213 § 2(2)(c) (codified at FLA. STAT. ch. 20.255 (1997)). The Florida Legislature directed the state's environmental agency (Department of Environmental Protection) to "protect the functions of entire ecological systems through enhanced coordination of public acquisition, regulatory, and planning programs." *Id.*; *see infra* notes 179–98 (discussing Florida's ecosystem management policy in greater detail); *see also* John J. Fumero, *Environmental Law: 1994 Survey of Florida Law—At a Crossroads in Natural Resource Protection and Management in Florida*, 19 NOVA L. REV. 77, 116 (1994).

18. FLA. DEP'T OF ENVTL. PROT., *Beginning Ecosystem Management*, *in* 4 ENVTL. EXCH. POINT 2, 5–6 1994.

19. *See infra* notes 131–178 (described Florida's mandatory local government discussing Florida's growth management program). *See generally* FLA. STAT. ch. 163, pt. II (1997). One commentator has comprehensive planning program as "our nation's most ambitious experiment in growth management." Thomas G. Pelham, *Adequate Public Facilities Requirements: Reflections on Florida's*

This article examines Florida's regulatory programs to evaluate the effectiveness and limits of regulatory programs to implement ecosystem management and conserve biodiversity. Part II defines and provides background on biodiversity conservation and ecosystem management. Part III identifies common obstacles to achieving biodiversity conservation through ecosystem management and other mechanisms. Part IV analyzes Florida's effectiveness in implementing ecosystem management and conserving biodiversity. Part V concludes that most existing programs are unlikely to conserve biodiversity on private lands, and suggests reforms to provide for effective ecosystem management and biodiversity conservation.

II. BACKGROUND

A. *Biodiversity*

Biodiversity is the variety of animals, plants, and microorganisms, and the ecosystems and ecological processes of which they are a part that occur in nature.[21] Biodiversity occurs on three levels. Genetic diversity refers to variations of the same genes within an individual species.[22] Species diversity describes the number of different kinds of species.[23] Ecosystem diversity describes the richness and complexity of a biological community, including the number of trophic levels and niches.[24] Many humans recognize that biodiversity is valuable because it provides important ecosystem

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Concurrency System for Managing Growth, 19 FLA. ST. U. L. REV. 973, 974 (1992).

20. *See infra* Part IV.D (discussing Florida's regulatory programs for the Green Swamp ecosystem and the Wekiva, Econlockhatchee, and Tomoka Rivers).

21. WORLD'S BIOLOGICAL DIVERSITY, *supra* note 1, at 17.

22. *Id.*

23. *Id.*

24. *Id.*

services to the environment,[25] as well as food, and medicine to humans.[26]

There is general agreement in the scientific community that the world is experiencing a biodiversity crisis,[27] due in large part to the unprecedented destruction of nature caused by the exploding human population.[28] Human development activities destroy habitat directly or diminish its value through pollution, fragmentation, and edge effects.[29] Habitat is also diminished by exotic species introduced by humans,[30] which degrade habitat by competing with native species, or directly killing native species. Hunting and poaching have also contributed to loss of biodiversity. In addition, predator and pest control diminishes biodiversity.[31] Finally, some species are threatened by genetic assimilation.[32]

Biodiversity conservation involves conserving genetic, species, and ecosystem diversity. Many scientists believe that the key to maintaining overall diversity is to focus on maintaining ecological

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25. *See generally* BIODIVERSITY AND ECOSYSTEM FUNCTION (Ernst-Detlef Schulze & Harold A. Mooney eds., 1993).

26. CUNNINGHAM & SAIGO, *supra* note 6, at 272–75. "Biodiversity is also a source of economic activity and wealth." *Id.* "The United States Fish and Wildlife Service estimates that Americans spend $18 billion every year watching wildlife." *Id.* at 274. In addition, many people value wildlife simply because it exists. *Id.* at 274–75.

27. *See, e.g.*, BIODIVERSITY, *supra* note 5; LANDSCAPE LINKAGES AND BIODIVERSITY (Wendy E. Hudson ed., 1991); WILSON, *supra* note 4, at 278–80; BIODIVERSITY AND ECOSYSTEM FUNCTION, *supra* note 25.

28. BIODIVERSITY, *supra* note 5, at 21.

29. CUNNINGHAM & SAIGO, *supra* note 6, at 86, 276, 282.

30. *Id.* at 281–82.

31. *Id.* at 270–81. Pest control may be intentional, as in the poisoning of coyotes in the American West, or unintentional, as in the spraying of endangered schaus swallowtail butterflies in the Florida Keys with pesticides intended to control mosquitos. Thomas C. Emmel, *Overview: Mosquito Control, Pesticides, and the Ecosystem, in* MOSQUITO CONTROL PESTICIDES: ECOLOGICAL IMPACTS AND MANAGEMENT ALTERNATIVES 12–13 (Thomas C. Emmel & John C. Tucker eds., 1991).

32. CUNNINGHAM & SAIGO, *supra* note 6, at 283.

diversity.[33] In practical terms, biodiversity conservation requires protecting the integrity of natural areas to prevent species and ecosystem losses. Ultimately, this involves limiting or prohibiting activities that degrade or destroy ecosystem functions, such as removal of vegetation or disruption of surface water flows.

Government actions to conserve biodiversity may take different forms, many of which restrict the use of private land. For example, the government may adopt laws that restrict development in certain types of habitat, such as wetlands protection programs and riparian buffer zones. Government may also limit the density and intensity of development through zoning regulations, restrict removal of natural vegetation, and designate and restrict activities in wildlife corridors.[34] Government may also develop incentives, such as lower tax rates, to encourage private property owners to conserve natural systems and thus conserve biodiversity. Land acquisition and management of natural areas provides government with the greatest control of land use, but is expensive.[35]

Precisely how much, and to what degree, land and water must be protected to conserve biodiversity are scientific questions that vary by ecosystem and depend upon the nature and intensity of the

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33. *See, e.g.*, BIODIVERSITY, *supra* note 5, at 410–11.

34. Corridors provide wildlife "highways" by which animals can roam from one habitat area to another. Brian L. Kuehl, *Conservation Obligations Under the Endangered Species Act: A Case Study of the Yellowstone Grizzly Bear*, 64 U. COLO. L. REV. 607, 618 (1993). Corridors are important to animals with large home ranges, because corridors can greatly increase the availability of suitable habitat for these species. *See* Joseph M. Schaefer & Mark T. Brown, *Designing and Protecting River Corridors for Wildlife, in* 3 RIVERS 1, 18 (1992) (discussing the concept of wildlife home ranges). Corridors themselves may also provide useful habitat to various species. Corridors may satisfy all the habitat needs of some species with small home ranges and also provide habitat functions to large species as they move from one intact area to another. *Id.*

35. Conservation easements are a less costly alternative to acquiring full title that have protected millions of acres of privately owned land in the United States. Anita P. Miller, *Report of the Subcommittee on Innovative Growth Management Measures: Preservation of Agricultural Land and Open Space*, 23 URB. LAW. 821, 824 (1991).

development.[36] The difficulty of conserving biodiversity is compounded by scientist's limited data and understanding of ecological interrelationships and ecosystems.[37] For example, there is substantial scientific uncertainty concerning the number of species in the world, the rate of biodiversity loss, the methodology to define species, the minimum habitat to maintain or restore viable populations of species, the minimum number of individuals to maintain or restore viable populations of species, and the effect of human activities on species and ecosystem viability.[38] It is also unclear in many instances how degradation of habitat and ecosystems affects wildlife. These uncertainties present regulators with the difficult task of deciding whether to adopt land use restrictions based on imperfect understandings of ecosystem functions and relationships.

Florida is experiencing a biodiversity crisis like the rest of the world. Florida's ecosystems support a rich diversity of plants and animals, many of which are unique to the state. Remarkably, the state supports some 235 species of vascular plants that are found nowhere else in the world.[39] Further, about 17 percent of America's vertebrate species are now found only in Florida.[40] Yet, despite its unique and abundant biodiversity, the state's ecosystems are on the brink of collapse, due to decades of unsustainable agricultural, residential, and commercial development.[41]

Florida's burgeoning population and development have severely stressed the state's natural resources, including water, wildlife, and habitat.[42] For example, during the past 50 years human activities have destroyed about 90 percent of Florida's old-growth longleaf

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36. WORLD'S BIOLOGICAL DIVERSITY, *supra* note 1, at 21.

37. *See* BIODIVERSITY, *supra* note 5, at 14.

38. *See generally* CUNNINGHAM & SAIGO, *supra* note 6, at 270–90.

39. FLA. DEP'T OF ENVTL. PROT., 2 ECOSYSTEM MANAGEMENT COMMITTEE REPORTS 16 (1994) [*hereinafter* COMMITTEE REPORTS].

40. *Id.*

41. JAMES COX ET AL., FLORIDA GAME AND FRESH WATER FISH COMMISSION, CLOSING THE GAPS IN FLORIDA'S WILDLIFE HABITAT CONSERVATION SYSTEM 4–5 (1994).

42. The population of Florida is currently approaching 14 million, and is projected to exceed 22 million by the year 2020. *Id.* at 16, 79.

pine forests, which historically covered more than half of the state.[43] The state has also lost over 50 percent of its wetlands.[44] As a result, Florida has more federally listed species than any other state in the nation except California.[45]

In Florida, much of the remaining habitat is on privately owned lands. Accordingly, if ecological collapse is to be avoided, it is essential that Florida achieve greater control over activities on private lands. While Florida has several aggressive land acquisition programs,[46] it is unlikely that the state can buy and manage enough natural areas to maintain and restore biodiversity because of the high cost of land and close proximity of natural areas to populated areas

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43. COMMITTEE REPORTS, *supra* note 39, at 17; Ronald L. Myers & John J. Ewel, *Problems, Prospects, and Strategies for Conservation*, *in* ECOSYSTEMS OF FLORIDA 622 (Ronald L. Myers & Jack J. Ewel eds., 1990).

44. COMMITTEE REPORTS, *supra* note 39, at 17.

45. Joe M. Schaefer, *An Overview of Florida's Endangered and Threatened Species and Their Habitats, Lecture Before the Florida Bar Continuing Legal Education Committee* (Feb. 8, 1991), *in* WILDLIFE, HABITAT AND LAND USE LAW: FLORIDA'S DEVELOPING ZOO, Feb. 8–9, 1991, at 1.3.

46. Florida has several state land acquisition programs, including the Conservation and Recreational Lands program ("CARL"), the Florida Communities Trust program, the Florida Recreational Trails program, the Ecosystem Management and Restoration Trust Fund, and inholdings and additions programs of the Division of Recreation and Parks, the Florida Game and Fresh Water Game Commission, and the Division of Forestry. *See* FLA. STAT. chs. 259.032 (1997), 380.510, 260.016, 373.459 (2001). Funding for the various land acquisition programs is supplied by several funds, including Preservation 2000, a state bonding program intended to raise $300 million annually over the next ten years to supply partial funding for all of the land acquisition programs, and the Water Management Lands Trust Fund (Save Our Rivers), which supports acquisitions relating to water resources. *See also id.* at chs. 375.045, 373.59 (2001); THE GREEN SWAMP TASK FORCE, THE GREEN SWAMP SYSTEM: A SCIENTIFIC ANALYSIS 3–27 (1992) (report prepared by the Green Swamp Task Force and the Green Swamp Technical Advisory Committee for the Polk County Board of County Commissioners, Polk County, Florida).

which are subject to intense development pressure. In response to the state's impending biodiversity crisis, the Florida Legislature recently directed the Florida Department of Environmental Protection to "protect the functions of entire ecological systems through enhanced coordination of public acquisition, regulatory, and planning programs."[47] DEP has endorsed ecosystem management as the best approach to satisfy this new legislative directive.[48] Part IV.B of this article discusses Florida's ecosystem management program in detail.

B. *Ecosystem Management*

Ecosystem management has emerged as the consensus paradigm to manage and conserve natural systems, and thus to conserve biodiversity. In 1994, in an article summarizing the existing literature, Edward Grumbine defined ecosystem management as "integrat[ing] scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term."[49] Grumbine identified ten dominate themes: 1) manage entire ecologic systems, not individual levels of systems (genes, species, populations, ecosystems, landscapes); 2) manage based on ecological boundaries, not political boundaries; 3) protect total native diversity (species, populations, ecosystems) and ecological patterns and processes that maintain that diversity; 4) conduct research and collect data and use that information to improve management; 5) monitor management results; 6) adapt management to reflect new information and address uncertainty; 7) promote interagency cooperation between federal, state, and local agencies as well as private parties; 8) change the structure and operation of land management agencies; 9) recognize that humans influence and are affected by ecological patterns and processes; and 10) recognize that

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47. The Florida Environmental Reorganization Act of 1993, 1993 Fla. Laws ch. 213 § 2(2)(c) (codified at FLA. STAT. ch. 20.255 (1997)).

48. *See infra* notes 179–98 and accompanying text (discussing Florida's ecosystem management program in greater detail); *see also* FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 5, 6.

49. Grumbine, *supra* note 9, at 31.

human values play a dominate role in ecosystem management goals.[50]

Despite the efforts of Grumbine and others, "ecosystem management" continues to mean many things to many people. Most definitions of ecosystem management are vague and devoid of operational meaning. Generally, ecosystem management attempts to integrate scientific, social, and economic considerations, and as such is laden with value choices. Ecosystem management programs that do not recognize and address these conflicting value choices will probably be ineffective.[51]

Regardless of any definitional uncertainties it is clear that biodiversity conservation is a fundamental goal of ecosystem management. Biodiversity conservation is clearly identified by Grumbine and other commentators as an essential component of ecosystem management.[52] The federal government has begun implementing ecosystem management, primarily targeting public lands.[53] Government agencies implementing ecosystem management have re-articulated that biodiversity conservation is a fundamental goal. For example, the Forest Service and Bureau of Land Management ecosystem management programs for the Pacific Northwest purport to conserve biodiversity,[54] as does Florida.[55]

What most ecosystem management definitions fail to address is how the approach will accomplish biodiversity conservation on private lands. Specifically, what government actions are necessary to conserve biodiversity. As this article discussed in the preceding Part, biodiversity conservation will require restriction of private land use.[56] Forest Service and Bureau of Land Management[57] ecosystem

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50. *Id.* at 29–31.

51. *See generally* GAO REPORT, *supra* note 9, at 38–39.

52. *See* Grumbine, *supra* note 9, at 30–31; Blumm, *supra* note 12, at 659.

53. *See generally* GAO REPORT, *supra* note 9; FEMAT, *supra* note 11; STEVEN L. YAFFEE ET AL., ECOSYSTEM MANAGEMENT IN THE UNITED STATES: AN ASSESSMENT OF CURRENT EXPERIENCE (1996) (providing a comprehensive inventory of ecosystem management projects in the United States).

54. FEMAT, *supra* note 11.

55. FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 4.

56. *See supra* notes 33–38 and accompanying text.

management programs for public lands reveal the types of actions that are necessary to conserve biodiversity. These programs dramatically restrict harvest of timber from riparian areas and late successional forests to benefit fish and wildlife.[58]

Ecosystem management has begun to attract attention at the state level.[59] In 1993, Florida became the first state to adopt ecosystem management as an official state policy.[60] However, it is unclear whether Florida agencies and local governments have the authority and will to successfully conserve biodiversity through ecosystem management of private lands. Part IV.B of this article examines Florida's ecosystem management approach in detail.

III. COMMON INSTITUTIONAL AND LEGAL BARRIERS TO BIODIVERSITY CONSERVATION AND ECOSYSTEM MANAGEMENT

There are substantial institutional and legal barriers to achieving biodiversity conservation and ecosystem management. Key barriers involve inadequate geographic and substantive jurisdiction, limited time frame, intergovernmental coordination, scientific uncertainty, inadequate control of land use, and private property rights.[61] These

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57. *See generally* U.S. Bureau of Land Management, *at* http://www.blm.gov/nhp/index.htm (last visited Mar. 12, 2002).

58. *Id.*

59. *See* YAFFEE ET AL., *supra* note 53.

60. The Florida Legislature directed the state's environmental protection and land management agency to "protect the functions of entire ecological systems through enhanced coordination of public acquisition, regulatory, and planning programs." *See* The Florida Environmental Reorganization Act of 1993, 1993 Fla. Laws ch. 213 § 2(2)(c) (codified at FLA. STAT. ch. 20.255 (1997)). The agency has adopted ecosystem management as the guiding principle for achieving this objective. FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 1.

61. Commentators have documented many of these barriers to ecosystem management. *See generally* GAO REPORT, *supra* note 9 (identifying insufficient scientific and socioeconomic data, coordination among federal agencies, collaboration and consensus-building between federal and nonfederal parties as barriers to ecosystem management); Alyson C. Flournoy, *Beyond the Balance*

barriers must be overcome if ecosystem management or some other management strategy is going to conserve biodiversity. Part IV of this article analyzes Florida's experience in dealing with these barriers.

A. *Political Versus Ecological Boundaries*

The geographic jurisdiction of government entities is often based upon political factors rather than upon the physical extent of natural systems.[62] Thus, natural systems often extend outside of political jurisdictions.[63] For example, rivers may extend through several counties or states. A county has jurisdiction over the portion of the river running through its boundaries, but has no jurisdiction over portions of the river that fall outside its boundaries.

Inconsistent and uncoordinated regulation of natural systems may have far reaching adverse effects because of the systems' interconnected nature. For example, rivers with intact riparian habitat often serve as important wildlife corridors for wildlife. If one local government allows substantial fragmentation of riparian habitat, the integrity of the river system as a wildlife corridor could be degraded in adjacent counties. Similarly, a local government that allows substantial clearing of riparian vegetation may increase pollution from stormwater runoff, thereby polluting not only the river adjacent to that local government's jurisdiction, but also

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of Nature: Environmental Law Faces the New Ecology: Preserving Dynamic Systems; Wetlands, Ecology and Law, 7 DUKE ENVTL. L. & POL'Y F. 105 (1996) (identifying delineation methodologies, jurisdiction, case-by-case permitting without planning, and reliance on compensatory mitigation as working at cross-purposes with nature); Thomas T. Ankersen & Richard Hamann, *Ecosystem Management and the Everglades: A Legal and Institutional Analysis*, 11 J. LAND USE & ENVTL. L. 473 (1996) (identifying geographic boundaries, institutional boundaries, procedural boundaries, and scientific uncertainty as barriers to ecosystem management).

62. A notable exception involves Florida's Water Management Districts, whose jurisdiction is based on the hydrologic boundaries of the state's five major watersheds, rather than on political factors. *See* FLA. STAT. ch. 373.069 (1997).

63. Kuehl, *supra* note 34, at 615.

downstream portions of the river located within other local governments.

B. *Intergovernmental Coordination*

Rare is the government agency that has sufficient statutory authority to regulate and protect all important environmental parameters of a natural system. It is a fundamental axiom of federal and state administrative law that agencies are creatures of statute and have no legitimate authority beyond that authorized by law.[64] State or federal government could create new regulatory agencies with broad powers, but are unlikely to do so because of current trends to downsize and streamline environmental regulatory programs.[65] In contrast, local governments possess broad powers to make law for the "health, safety, and general welfare" of the citizenry.[66] Despite this broad authority, most local governments have neither the resources nor the political will to provide comprehensive protection for natural systems. Even if they had the resources and were willing to protect important natural resource values of river watersheds, their physical jurisdiction is often limited to less than the full extent of a natural system. Thus, many systems are subject to the regulatory authority of multiple government entities. In order to achieve ecosystem management and conserve biodiversity, regulatory entities must cooperate in all stages of planning and regulation.

Intergovernmental coordination can be promoted through several mechanisms. Intergovernmental agreements between the appropriate agencies and governments can facilitate coordination. Agreements may be interagency, interlocal, or some combination of both. Intergovernmental agreements are useful, but may not be

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64. *See, e.g.*, California v. Bergland, 483 F. Supp. 465, 501 (E.D. 1980) (stating that "[a]dministrative agencies are products of the law—they have no legitimate powers save that given to them by law. When they fail to comply with the law, they simply act *ultra vires*—beyond their power. When an agency acts beyond the power given it by Congress, then the courts must perform their duty which is to require the agency to comply with the law").

65. *See, e.g.*, Florida Environmental Reorganization Act ch. 213, 2(2)(c); *see also* Fumero, *supra* note 17 (discussing The Florida Environmental Reorganization Act of 1993).

66. Tarlock, *supra* note 4, at 575–76.

legally binding.[67] Another approach is to mandate that local governments cooperate. Florida's planning law requires local governments to practice intergovernmental coordination,[68] with limited success to date.[69]

C. *Inadequate Law Protecting Biodiversity*

Environmental laws provide little or no protection for many species located on privately owned lands. The shortcomings of the nation's primary wildlife law, the Endangered Species Act ("ESA"),[70] are well documented.[71] Although the ESA can promote conservation of habitat of species listed by the Fish and Wildlife Service ("FWS") as threatened or endangered, the Act in no way creates a comprehensive regulatory program for natural systems because it does not apply to the vast majority of flora and fauna or

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67. *See, e.g.*, Apalachicola-Chattahoochee-Flint River Basin Compact, Pub. L. No. 105-104, 111 Stat. 2219 (1997) (providing for termination of the Apalachicola-Chattahoochee-Flint River Basin Compact between Alabama, Florida, and Georgia if those states fail to agree on an equitable apportionment of surface waters by December 31, 1998).

68. FLA. STAT. ch. 163.3177(6)(h) (1997).

69. *See infra* note 165 and accompanying text (discussing shortcomings of intergovernmental coordination in Florida).

70. The ESA establishes a national program to identify and conserve endangered and threatened species. 16 U.S.C. §§ 1531–1544 (1988). The general purpose of the ESA includes conservation of endangered and threatened species and the ecosystems upon which they depend. *Id.* § 1531(b).

71. *See generally* Daniel J. Rohlf, *There's Something Fishy Going On Here: A Critique of the National Marine Fisheries Service's Definition of Species Under the Endangered Species Act*, 24 ENVTL. L. 617, 619 (1994) (discussing the absence of substantive protection in the ESA for non-listed species); Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277 (1993); Christopher A. Cole, Note, *Species Conservation in the United States: The Ultimate Failure of the Endangered Species Act and Other Land Use Laws*, 72 B.U. L. REV. 343 (1992).

their habitat.[72] The Act applies only to species formally listed by the FWS as threatened or endangered.

If a species is listed, the Act may protect that species through agency consultation[73] or the takings prohibition,[74] but only

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72. The ESA directs the Secretary of the Interior to list species threatened or endangered with extinction. 16 U.S.C. § 1533(a)–(c) (1988). The Act's protection applies only to species listed by these agencies. *See* Keiter, *supra* note 9, at 307–09; *see also* Cole, *supra* note 71, at 346.

73. Section 7 of the Act, requires that federal agencies abide by the Act's prohibitions and carry out programs for the conservation of listed species. 16 U.S.C. § 1536(a)(1). Under Section 7, federal agencies must also consult with the Secretary of the Interior to ensure their actions do not jeopardize the continued existence of threatened or endangered species, nor result in destruction or modification of the habitats of such species. *Id.* § 1536(a)(2). After initiating consultation, an agency or permit applicant may not make any "irreversible or irretrievable commitment of resources . . . which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures." *Id.* § 1536(d).

74. Section 9 of the ESA prohibits any person from taking listed species. *Id.* § 1538(a)(1)(B). The Section 9 prohibition against taking listed species has potential broad application to activities that actually kill endangered species. Congress defined the term "take" to include "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." *Id.* § 1532(19). Under the current FWS definition of "harm," habitat modification that actually kills or injures wildlife, i.e., construction activities that remove trees, which provide critical habitat for a listed species, such as red cockaded woodpeckers, could amount to a "taking" of a listed species. The FWS defines "harm" to "include habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3 (1997). In *Palila v. Hawaii Department of Land & Natural Resources*, 852 F.2d 1106 (9th Cir. 1988), the Ninth Circuit held that state failure to control feral goats which were destroying habitat of the listed Palila bird constituted a taking under the FWS definition. The FWS regulation was reviewed and held valid by the Supreme Court in

occasionally provides incidental protection to non-listed species. The Act's effectiveness in conserving biodiversity is diminished further by backlogs in listing species,[75] designating critical habitat,[76] and developing and implementing recovery plans.[77]

State endangered species laws mirror the ESA and suffer many of its shortcomings. For example, The Florida Endangered Species Act ("FESA")[78] complements many of the provisions of the federal Endangered Species Act.[79] Notably, the FESA prohibits takings of listed species, including plants as well as animals.[80] However, like

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Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687 (1995).

75. Houck, *supra* note 71, at 281.

76. *Id.* at 297. The ESA requires the FWS to designate critical habitat for listed species. 16 U.S.C. §§ 1532(5), 1533(a)(3), (b)(2) (1988). Yet as of early 1992, the FWS had designated habitat for only sixteen percent of listed species (critical habitat had been designated for only 105 out of 651 species). Houck, *supra* note 71, at 302.

77. Houck, *supra* note 71, at 345. The ESA directs the FWS to develop recovery plans for listed species, "unless he finds that such a plan will not promote the conservation of the species." 16 U.S.C. § 1533(f)(1). The Secretary, when developing and implementing recovery plans, must give priority to endangered or threatened species which are most likely to benefit from a recovery plan, and which are threatened by construction, other development projects, or other forms of economic activity. *Id.* § 1533(f)(1)(A). Recovery plans must include: 1) site-specific management actions which are necessary to ensure the conservation and survival of the species; 2) objective, measurable criteria to measure the success of the plan; and 3) estimates of the time and cost to achieve the plan's goal. *Id.* § 1533(f)(B).

78. FLA. STAT. ch. 372.072 (1997).

79. 33 U.S.C. §§ 1531–1544 (1988). Section 1538 of the federal act and section 372.0725 make it unlawful for any person to kill or wound an endangered species. *Id.* § 1538; FLA. STAT. ch. 372.0725.

80. FLA. STAT. ch. 372.0725; *see also* FLA. STAT. ch. 581.185(3) (making it unlawful for any person to willfully destroy or harvest an endangered plant without permission from the landowner and the state).

the federal ESA, the Florida statute applies only to listed species.[81] FESA provides little benefit to non-listed species, other than when habitat preserved for a listed species happens to coincide with the habitat needs of non-listed species. Further, the state's prohibition on destroying or removing listed plants is undercut by substantial exemptions, including clearing or disturbing land for agriculture or silviculture, building sites, and roads.[82] Like the ESA, the Florida statute is largely reactive in nature, coming into play only after a species has declined to such an extent that it has been listed through an administrative process as threatened or endangered. The statute does not provide for protection of habitat of species that are in decline but have not yet been listed, such as the central Florida crowned snake and short-tailed hawk.[83]

Other laws, such as wetlands protection laws, may consider impacts to wildlife and wildlife habitat, but jurisdiction under these laws is limited to wetlands, and thus provides little protection for other types of natural systems. For example, when reviewing dredge and fill permit applications under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers ("Corps") applies guidelines which prohibit discharges that cause significant degradation of waters of the United States.[84] Activities contributing to significant degradation include activities that cause significant adverse effects to water quality, fish, plankton, aquatic life, aquatic ecosystem diversity and stability, and other wildlife dependent on aquatic ecosystems.[85] The Corps permit review criteria consider a variety of aquatic ecosystem functions,[86] yet jurisdiction is limited to aquatic

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81. *See generally* Rohlf, *supra* note 71, at 619 (discussing the absence of substantive protection in the ESA for non-listed species).

82. FLA. STAT. ch. 581.185(8).

83. *See* Schaefer, *supra* note 13, at 3-32.

84. The Corps applies guidelines commonly referred to as the "404(b)(1) guidelines," which are adopted by EPA in consultation with the Corps. 40 C.F.R. § 230 (1997).

85. *Id.* § 230.10(c).

86. The Corps must also consider secondary and cumulative impacts of dredge and fill activities on the aquatic ecosystem and evaluate whether there are practicable alternatives that would be less damaging than the proposed discharge. *Id.* § 230.10(a)–(h). The Corps must deny the permit if practicable alternatives are available.

and wetland systems, and does not extend to non-aquatic areas or functions.

State water pollution and wetland programs share similar limitations. For example, the Florida Air and Water Pollution Control Act directs DEP to regulate point source discharges into waters of the state.[87] The Act contains broad language directing DEP to conserve wildlife, fish, and other aquatic or plant life, including listed species and certain aquatic and wetland dependent species.[88] However, the Act does not provide DEP with authority to consider impacts of discharges on upland species of plants and animals unless those species are listed as threatened or endangered. Further, the Act does not apply to a host of other activities that may harm biodiversity, such as destruction and removal of upland vegetation. Thus, the Act does not adequately protect biodiversity because it fails to consider the impact on the vast array of other plants and animals that are integral to Florida's biodiversity. Another example involves Florida's water management districts,[89] whose statutory authority to regulate "water resources"[90] includes consideration of affects of land development activities and other non-point sources on aquatic and wetland dependent species, but does not extend to uplands.[91]

Id. § 230.12(a)(3)(i). Practicable alternatives are presumed to be available if the activity is not water dependent. *Id.* § 230.10(a)(3).

87. FLA. STAT. ch. 403.088. The legislature defined "waters" broadly as "rivers, lakes, streams, springs, impoundments, and all other waters or bodies of water, including fresh, brackish, saline, tidal, surface, or underground waters." *Id.* at ch. 403.031(13). The Act also directs DEP to regulate sources of air pollution. *Id.* at ch. 403.061.

88. *Id.* at ch. 403.021 (1997). The program is similar to the National Pollutant Discharge Elimination System ("NPDES") permitting program authorized by the federal Clean Water Act. *See* 33 U.S.C. § 1342 (1988).

89. *See* FLA. STAT. ch. 373.069.

90. *Id.* at chs. 373.413(1), 373.414(1). The Florida Legislature did not define "water resources."

91. St. Johns River Water Mgmt. Dist. v. Consol.-Tomoka Land Co., 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999); Friends of Fort George, Inc. v. Fairfield Cmtys.,

D. *Scientific Uncertainty*

Scientific uncertainty is a familiar issue in environmental law.[92] Biodiversity conservation is fraught with scientific uncertainty, including defining species, determining minimum individuals required to maintain viable populations, determining minimum habitat requirements, and selecting an appropriate timeframe to judge the success of conservation efforts.[93] When policymakers and regulators seeking to conserve biodiversity face incomplete or equivocal information, how should they respond? Should they go forward and implement polices to conserve biodiversity based on imperfect understanding of ecosystem dynamics and functions, or should they forgo action and wait for more complete information?

In 1990, regulators developing protection zones for Florida's Econlockhatchee River were faced with this dilemma, having to evaluate the legitimacy of a riparian habitat protection zone, the width of which was based on an average value of home ranges of wildlife that inhabited the area.[94] Scientists recommended that regulators adopt a 550-foot wide buffer zone, which scientists estimated would maintain viable populations of about 50 percent of the species living in the Econlockhatchee River Basin.[95] Opponents questioned the scientific rational for the zones, arguing that a buffer zone of a constant width was irrational because it ignored variations in habitat value at different points along the river.[96] Opponents also argued the scientific rational was flawed because it was largely based on existing data from scientific literature and not on Econlockhatchee-specific research. Rather than forgo action and wait for more definite information, the regulators chose to go

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Inc., Nos. 85-3537, 85-3596, 1986 Fla. Div. Adm. Hearings LEXIS 4106 (Oct. 6, 1986).

92. *See, e.g.*, WILSON, *supra* note 4 (discussing the difficulty in determining the number of species in the world and extinction rates).

93. *See generally* CUNNINGHAM & SAIGO, *supra* note 6, at 270–90.

94. Schaefer, *supra* note 13, at 3-42.

95. *Id.*

96. Opponents attacked the basis of the protection zones during rule adoption hearings, but the basis was upheld by an administrative hearing officer as based on logic and reason. *Consol.-Tomoka*, 717 So. 2d at 75, 76.

forward and implement the habitat protection zones based on a less-than-perfect understanding of ecosystem dynamics and functions.[97]

Policymakers and regulators who choose to wait for conclusive resource specific research before developing programs to conserve resources run the risk of allowing continued degradation or destruction, perhaps irreversible, of the resource. Conversely, policies based on inadequate or incorrect information may not protect the resource and may even contribute to its degradation. Further, policies based on incomplete information may be susceptible to legal challenges claiming the policies are unreasonable or unsupported by scientific evidence.[98]

The precautionary principle, well established in international environmental law,[99] provides some guidance in dealing with scientific uncertainty. The principle, as articulated in the 1983 World Charter for Nature, warns against allowing projects to proceed when potential adverse effects are not fully understood.[100] Included in the 1992 Rio Declaration, the principle states "lack of full scientific certainty shall not be used as a reason for postponing

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97. *See infra* pp. 80–88 (discussing the Econlockhatchee River habitat protection zones).

98. *See, e.g., Consol.-Tomoka*, 717 So. 2d at 75–76 (landowners asserted the St. Johns River Water Management District proposed riparian habitat protection zone for the Tomoka River was arbitrary and capricious and unsupported by competent substantial evidence).

99. *See* G.A. Res. 37/7, U.N. GAOR, 37th Sess., Agenda Item 21, at II (11)(b), U.N. Doc. A/RES/37/7 (1983); *Report of the U.N. Conference on Environment and Development: Rio Declaration on Environment and Development*, Principle 15, U.N. Doc. A/CONF.151/6 (1992) [*hereinafter Rio Declaration*]; United Nations Conference on Environment and Development: Convention on World's Biological Diversity, June 5, 1992, 31 I.L.M. 818 [*hereinafter* Convention on Biodiversity] (entered into force on December 29, 1993).

100. The full text of the Principle states: "Activities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed." G.A. Res. 37/7, *supra* note 99.

cost-effective measures to prevent environmental degradation."[101] The principle was also restated in the Convention on Biological Diversity.[102]

Ecosystem management may be well suited to dealing with the problem of scientific uncertainty because it includes mechanisms to respond to the dynamic nature of natural systems and the possibility that management approaches may need to be changed regularly. Adaptive management, a central component of ecosystem management, provides for regular testing and experimentation to determine the best ways to manage natural systems.[103] New information should be used to refine and improve management of the resource. This approach reduces the likelihood that ineffective policies will remain in effect for long periods of time.

E. *Limitations on Agency Regulation*

1. Jurisdiction and Authority

Ideally, natural systems should be regulated by government entities with geographic jurisdiction over entire systems, and with sufficient substantive authority to protect essential natural functions and overall ecological integrity. This is a rare situation indeed. Government entities may have broad substantive authority, as is the case with local governments, but limited geographic jurisdiction. Or, conversely, state and federal agencies may possess broad geographic jurisdiction but limited authority. For example, the U.S. Fish and Wildlife Service has geographic jurisdiction over the entire United States, but its substantive authority, granted by the

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101. The full text states: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. · Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." *Rio Declaration*, *supra* note 99.

102. Convention on Biodiversity, *supra* note 99 (stating in the preamble that "where there is a threat of significant reduction or loss of World's Biological Diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat").

103. Grumbine, *supra* note 9, at 31.

Endangered Species Act, is limited primarily to protecting species formally listed as threatened or endangered.[104] Similarly, a state agency may have jurisdiction over the entire system, but substantive authority is limited to protecting only a small complement of relevant environmental parameters.[105]

The logical unit of government to regulate many natural systems is a regional entity with jurisdiction over the entire ecosystem. However, existing regional governments may have inadequate statutory authority to adequately protect system resources, and may have to work in tandem with local governments, whose authority may be substantially broader. For example, Florida's water management districts have regional geographic jurisdiction, but their authority is limited to regulating "water resources."[106] Thus, district efforts to protect uplands through regulation[107] require close cooperation with local governments.[108] Florida's regional planning councils are also regional agencies, but their authority is limited primarily to developing strategic regional plans to govern land use and acting in an advisory capacity to local governments.[109] One comprehensive approach for regulating natural systems involves the New Jersey Pinelands, where federal and state legislation required a regional commission to develop a comprehensive management plan that local governments must implement.[110] The legislation gave the commission authority to review and overrule local decisions that are inconsistent with the comprehensive management plan.[111] This approach avoids the problems discussed above because it vests

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104. *See supra* notes 70–77 and accompanying text.

105. *See infra* notes 342–58 and accompanying text (discussing statutory authority of Florida's water management districts).

106. *Id.*

107. The water management districts have authority to acquire uplands but not regulate uplands. *See* FLA. STAT. ch. 373.139 (1997); *see also infra* notes 342–58 and accompanying text.

108. *See infra* Part IV.G.2.a (discussing water management district and local government protection programs for the Wekiva and Econlockhatchee Rivers).

109. FLA. STAT. chs. 186.504, 186.505, 186.507.

110. Act of Nov. 10, 1978, Pub. L. 95-625 § 502, 92 Stat. 3467; N.J. STAT. ANN. §§ 13:18A-1–13:18A-29 (West 1979).

111. N.J. STAT. ANN. § 13:18A-10(c).

comprehensive authority within a single government entity possessing jurisdiction over the entire natural resource.

State administrative procedure statutes that unduly restrict agency discretion create another potential barrier for agencies seeking to adopt new regulatory programs to implement ecosystem management and protect biodiversity.[112] For example, recent amendments to Florida's Administrative Procedure Act require both a general grant of rulemaking authority and a specific law that grants "particular powers and duties."[113] The statute eschews familiar "reasonably related" and "arbitrary and capricious" standards, stating that

> [n]o agency shall have authority to adopt a rule only because it is reasonably related to the purpose of the enabling legislation and is not arbitrary and capricious. . . .[114]

The Legislature added these provisions in response to concerns of the regulated community, including developers and property owners,

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112. *See, e.g.*, FLA. STAT. chs. 120.52(8), 120.536(1).

113. *Id.*

114. *Id.* The following language is repeated twice in the statute:

> A grant of rulemaking authority is necessary but not sufficient to allow an agency to adopt a rule; a specific law to be implemented is also required. An agency may adopt only rules that implement, interpret, or make specific the particular powers and duties granted by the enabling statute. No agency shall have authority to adopt a rule only because it is reasonably related to the purpose of the enabling legislation and is not arbitrary and capricious, nor shall an agency have the authority to implement statutory provisions setting forth general legislative intent or policy. Statutory language granting rulemaking authority or generally describing the powers and functions of an agency shall be construed to extend no further than the particular powers and duties conferred by the same statute.

Id. This provision was amended again in 1999 to require that the rule implement or interpret the "specific powers and duties" granted by the enabling statute. 1999 Fla. Laws chs. 99-379 §§ 2, 3 (codified at FLA. STAT. chs. 120.52(8), 120.536(1) (2001)).

that state agencies were over-regulating and needed to be constrained.[115]

Florida's Administrative Procedure Act ("APA") language has the potential to hinder agency development of new regulatory programs to implement ecosystem management and conserve biodiversity, because many existing statutes do not include these or related terms.[116] Thus, if the Florida Legislature wants agencies to implement ecosystem management and conserve biodiversity, the Legislature must now adopt new statutes or amend existing statutes to specifically authorize these activities.[117]

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115. *See* Jim Rossi, *The 1996 Revised Florida Administrative Procedure Act: A Survey of Major Provisions Affecting Florida Agencies*, 24 FLA. ST. U. L. REV. 283, 286 (1997) (describing a populist counterrevolution to agency rulemaking led by a regulatory reform coalition composed of "proponents of flexibility and rationality in the administrative process; those who support accountability to majoritarian-primarily legislative-political processes; and libertarian opponents of any attempt, legislative or otherwise, to regulate markets—even where regulation may enhance social welfare").

116. *See infra* pp. 89–95 and accompanying text (discussing the Tomoka River cases). *But c.f.*, Consol.-Tomoka Land Co. v. St. Johns River Water Mgmt. Dist., 717 So. 2d 72, 75–78 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999) (administrative law judge held that statutory language directing the District to "require such permits and impose such reasonable conditions" to assure surface water management systems are not "harmful to the water resources of the district," and to adopt rules necessary to implement the provisions of this part which are "consistent with state water policy and shall not allow harm to water resources . . ." did not provide sufficient authority for the riparian protection zones to protect aquatic and wetland dependent wildlife because the statute did not refer to a riparian habitat protection zone or any specific program or duty which would authorize the zones).

117. *See infra* pp. 89–95 and accompanying text (discussing the Tomoka River cases).

2. Private Property Rights

Few legal issues are as difficult as determining the boundary between the rights of private property owners and regulation for the protection of the public health, safety, and welfare. While it is beyond the scope of this article to conduct an in-depth analysis of takings law,[118] it is likely that private property owners will challenge new regulatory programs to conserve biodiversity as takings of private property because these programs may substantially restrict the use of private land.[119] For example, regulatory programs to

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118. *See supra* note 167 (discussing the legal basis for regulatory takings claims); *see also Symposium: Guidance For Growth*, 16 U. PUGET SOUND L. REV. 863 (1993); Lawerence Watters, *Colloquium on Dolan: The Taking Clause Doctrine of the Supreme Court and the Federal Circuit: Dolan v. City of Tigard: Introduction and Decision*, 25 ENVTL. L. 111 (1995); Mark Sagoff, *Muddle or Muddle Through? Takings Jurisprudence Meets the Endangered Species Act*, 38 WM. & MARY L. REV. 825 (1997) (detailing analyses of recent developments in takings law).

119. *See, e.g.*, Saboff v. St. Johns River Water Mgmt. Dist., 200 F.3d 1356 (11th Cir. 2000), *cert. denied*, 121 S.Ct. 67 (2000) (reversing district court's denial of summary judgment regarding the issue of whether requiring a conservation easement as a condition of a permit approval constitutes a fifth amendment taking); Glisson v. Alachua County, 558 So. 2d 1030 (Fla. Dist. Ct. App. 1990) (first district opinion holding that county land use regulations requiring protection of wetlands did not amount to a 5th amendment taking); Fla. Game & Fresh Water Fish Comm'n v. Flotilla Inc., 636 So. 2d 761 (Fla. Dist. Ct. App. 1994) (second district opinion holding that Florida Game and Fresh Water Fish Commission restriction on development of 48 acres of 173-acre parcel to protect bald eagle nesting sites did not deprive developer of most or all of its interests in the property); *see also* Ira M. Heyman, *Property Rights and Endangered Species Act: A Renascent Assault on Land Use Regulation*, 25 PAC. L.J. 157, 166 (1994) (predicting that U.S. Fish and Wildlife Service enforcement of ESA protections may lead to an increase in challenges to the ESA by private land owners asserting that regulations are resulting in a taking of private property, and suggesting several mechanisms to avoid or ameliorate takings claims

protect biodiversity in riparian areas adjacent to some rivers in Florida involve buffers up to 1100 feet wide, within which most development is prohibited.[120] In portions of Florida's Green Swamp, scientists and a task force representing interest groups recommended that local governments limit housing densities from between one dwelling unit per 40 acres to one dwelling unit per 100 acres in order to conserve biodiversity.[121] Both of these examples involve considerable restrictions on private land use, and would likely engender takings challenges by property owners.[122] Regardless of who wins, actual or potential Fifth Amendment taking suits may discourage new regulatory initiatives to protect biodiversity because of the high monetary costs involved in defending these suits and compensating landowners who prevail in court.

In addition to takings suits based on the Fifth Amendment, there is a significant movement by citizens, interest groups, and states across the country to reduce government regulation and strengthen private property rights.[123] For example, in 1995 the Florida Legislature

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under the ESA, and suggesting that in some cases acquisition of small parcels may be necessary).

120. The 1100-foot wide buffers would conserve about fifty percent of the wildlife species that use riparian areas. Studies recommended that no development be allowed within these zones. However, the buffers would not satisfy the habitat needs of a number of other species, such as the Florida Redbelly Turtle and the Eastern Indigo Snake. Schaefer, *supra* note 13 at C-51–C-52. In fact, the study found that these species would require buffers of 1,350 and 4,654 feet, respectively. *Id.*

121. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 14.

122. *But cf.*, *Saboff*, 200 F.3d at 1356 (reversing district court's denial of summary judgment regarding the issue of whether requiring a conservation easement as a condition of a permit approval constitutes a fifth amendment taking).

123. *See generally* Thomas G. Douglas, Jr., Note, *Have They Gone "Too Far"? An Evaluation and Comparison of 1995 State Takings Legislation*, 30 GA. L. REV. 1061, 1070–75 (1996) (describing the history of the private property rights movement); David Helvarg, *Grassroots for Sale, The Inside Scoop on (Un)Wise Use*, THE AMICUS JOURNAL 24 (Fall 1994); Ronald L. Weaver & Mark D. Solov, *Emerging Property Rights Protection*, FLA. BAR J. (June

adopted legislation to protect private property rights.[124] The law creates a new cause of action to compensate landowners when governmental actions impose an "inordinate burden" upon the landowner's property that does not rise to the level of a taking under state or federal constitutions.[125] The apparent motivation behind this was to quell what the development industry, business interests, and some property owners viewed as excessive regulation by state agencies in Florida.[126] The property rights movement can have significant impacts on attempts by legislatures and local governments to provide ecosystem and biodiversity protection. Each of the aforementioned factors—takings claims, private property rights protection statutes, statutory authority, and heightened procedural scrutiny—has the potential to hinder development of new regulatory programs to implement ecosystem management and conserve biodiversity. Working together, these factors present formidable barriers to agency rulemaking to implement ecosystem management and conserve biodiversity. Agencies in Florida presently face all four of these factors, a truly chilling prospect.

IV. ANALYSIS OF FLORIDA PROGRAMS

Florida has substantial statutory authority to regulate the environment, and has used this authority to adopt a complex yet innovative array of environmental and land use programs. Conservation of natural resources and ecosystem management are central themes of many of these programs. Although Florida's programs are far from perfect—many natural resources remain seriously threatened—analysis of these programs may provide insights for other jurisdictions grappling with similar problems. This

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1994); Patrick R. Scott, *State and Local Regulations: Are We Being Taken?*, FLA. BAR J. (Nov. 1993).

124. 1995 Fla. Laws ch. 95-181 (codified at FLA. STAT. ch. 70.001 (1997)); *see* David L. Powell et al., *Florida's New Law to Protect Private Property Rights*, FLA. B. J. 12 (1995).

125. FLA. STAT. ch. 70.001(1) (1997).

126. Douglas, *supra* note 123, at 1075–76 (citing a Florida Chamber of Commerce study indicating about 80% of business people in Florida viewed excessive regulation as Florida's number one impediment to business).

Part evaluates the effectiveness and potential of Florida's Growth Management Act,[127] ecosystem management policy,[128] Area of Critical State Concern program,[129] and several ecosystem specific protection programs.[130]

A. *Comprehensive Land Use Planning and Regulation*

1. Overview of Regulatory Framework

Florida's Local Government Comprehensive Planning and Land Development Regulation Act, known as the Growth Management Act ("GMA"), requires local governments to adopt comprehensive plans and land development regulations to guide future growth and development.[131] The Florida Department of Community Affairs ("DCA") reviews local government plans for consistency with minimum state criteria,[132] and may require local governments to amend their plans if state criteria are not satisfied.[133] The Act also establishes eleven regional planning agencies that provide technical support to local governments and play a role in enforcement of the Act.[134] If a local government has not prepared all of the required

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127. FLA. STAT. ch. 163, pt. II.

128. The Fla. Envtl. Reorganization Act, 1993 Fla. Laws ch. 93-213 § 2(2)(c), (codified at FLA. STAT. ch. 20.255 (1997)).

129. FLA. STAT. ch. 380.05; *see infra* pp. 56–65 and accompanying text (Florida's Area of Critical State Concern Program provides greater-than-normal state control over local development activities in certain geographic regions).

130. *See infra* pp. 66–95 (discussion of protection programs for the Wekiva, Econlockhatchee, and Tomoka Rivers).

131. FLA. STAT. ch. 163.3167; *see* Richard Grosso, *Florida's Growth Management Act: How Far We Have Come, and How Far We Have Yet to Go*, 20 NOVA L. REV. 589 (1996) (for detailed information about Florida's Growth Management Act); Thomas G. Pelham, *Adequate Public Facilities Requirements: Reflections on Florida's Concurrency System for Managing Growth*, 19 FLA. ST. U. L. REV. 973 (1992).

132. FLA. STAT. ch. 163.3177(9).

133. *Id.* at chs. 163.3177(9), 163.3184.

134. Each of Florida's regional planning agencies must adopt a regional comprehensive plan. *See id.* at ch. 186.504 (providing for

elements, the regional planning agency must prepare the missing elements and adopt them by rule.[135] After a plan has been approved by DCA and adopted by a local government, subsequent local government plan amendments, land development regulations, land development decisions, and development orders must be consistent with local, regional, and state plans.[136]

The Legislature provided the state with substantial enforcement authority. Local governments that fail to comply with deadlines for submitting comprehensive plans are subject to sanctions levied by Florida's Administration Commission.[137] The Administrative Commission may direct state agencies to withhold funds to increase the capacity of roads, bridges, or water and sewer systems, within local governments that are not in compliance with GMA requirements.[138] The Administrative Commission may prevent local governments from obtaining state grants for community development, recreation development, and revenue sharing.[139] The Act also provides DCA with authority to bring an action in a Florida circuit court to require local governments to adopt land use regulations.[140] The GMA also allows "affected persons" to administratively challenge proposed comprehensive plans[141] and

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creation of regional planning councils); FLA. ADMIN. CODE ANN. r. 27E-4, 5 (1994) (rules of practice and procedure pertaining to regional policy plans).

135. FLA. STAT. chs. 163.3167(3), (4) (1997).

136. *See id.* at chs. 163.3177(9), (10), 163.3194, 163.3202.

137. *Id.* at ch. 163.3164. Florida, unique within the 50 states, has an Administration Commission composed of the Florida Governor and Cabinet. FLA. CONST. art. IV, § 4(a). The cabinet is composed of an attorney general, a chief financial officer, and a commissioner of agriculture. The Governor and Cabinet review appeals from several administrative programs. *Id.*

138. FLA. STAT. ch. 163.3184(11).

139. *Id.*

140. *Id.* at ch. 163.3202(4).

141. *Id.* at ch. 163.3181(3). "Affected persons" include the affected local government; persons owning property, residing, or owning or operating a business within the boundaries of the local government whose plan is the subject of the review; and adjoining local governments that can demonstrate that the plan or plan amendment will produce substantial impacts on the increased need

"substantially affected persons" to bring administrative actions to assure that land development regulations implement and are consistent with the local comprehensive plan.[142]

2. Statutory Authority to Conserve Biodiversity

The GMA has potential to conserve biodiversity because it provides a clear mandate requiring local governments to protect natural resources, including forests, native vegetation, wildlife, wetlands, fisheries, and rivers.[143] Local governments must first collect data and analyze natural resources,[144] and then identify these resources on future land use maps and assign land use categories, which are consistent with conservation of the resources.[145] The future land use plans, maps, and land use categories are part of the local comprehensive plan, and local regulations and development approvals must be consistent with natural resource protection provisions of the plan and map.[146] Although Florida's approach has great potential to conserve natural resources, including biodiversity, several factors impede effective local government protection of natural systems in Florida.

First, the GMA provides broad authority but very little specific guidance for local governments to protect natural systems. The lack of specificity increases the likelihood of inconsistent or inadequate local government programs. For example, the conservation element

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for publicly funded infrastructure or substantial impacts on areas designated for protection or special treatment within their jurisdiction. *Id.* at ch. 163.3184(1)(a).

142. *Id.* at ch 163.3213(1). The legislature did not define "substantially affected persons" in the GMA or Chapter 120 of Florida's Administrative Procedure Act.

143. Local government conservation elements must provide for conservation, use, and protection of rivers and related natural resources, including water, water recharge areas, wetlands, estuarine marshes, soils, shores, flood plains, forests, and fisheries and wildlife. *Id.* at ch. 163.3177(6)(d).

144. FLA. STAT. ch. 163.3177(8).

145. *Id.* at ch. 163.3177(6)(a).

146. *Id.* at chs. 163.3177(6)(a), 163.3231, 163.3177(10a) (defining consistency).

requires local governments to conserve "wildlife."[147] Many local governments have interpreted this to require conservation of species listed as threatened or endangered by federal or state law, but not of other wildlife.[148] Second, many local governments do not have sufficient resources to protect biodiversity. It can be very expensive to inventory, map, plan, and manage or regulate natural resources. The ability of local governments to inventory, plan, and regulate varies widely with the economic and technical capabilities of individual local governments, and is often linked directly to the size of the local government's *ad valorem* tax base.[149] Thus, rural counties with low populations generally have less money and technical capability to devote to environmental protection.[150] This fact could hinder efforts to conserve biodiversity because many of the remaining large natural areas are in rural counties.

Local governments are not implementing the Legislature's broad mandate to conserve natural resources in an even-handed manner. Like state and federal environmental regulatory programs, local governments are focusing almost entirely on conserving wetlands and listed species. While the Act requires local governments to inventory and designate "environmentally sensitive lands,"[151] local governments have almost uniformly limited this designation to wetlands.[152] There are many other habitat types in Florida that are regionally or locally important, such as hydric hammock, scrub, and other uplands. Typically, local governments protect these other habitats only if species listed as threatened or endangered under state or federal laws are present. This approach may be inadequate because 1) the amount of habitat protected is limited to the

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147. *Id.* at ch. 163.3177(6)(d).

148. *See, e.g.*, John Tucker & Richard Hamann, *St. Johns River Water Management District, Regulatory Framework for the Econlockhatchee River Basin, in* II ECONLOCKHATCHEE RIVER BASIN NATURAL RESOURCES DEVELOPMENT AND PROTECTION PLAN 3–5 (1990) (discussing lands protected by comprehensive plans and land development regulations in Seminole and Orange County, Florida).

149. ENVTL. LAND MGMT. STUDY COMM., BUILDING SUCCESSFUL COMMUNITIES, 79–80 (1992) [*hereinafter* ELMS REPORT].

150. *Id.*

151. *See* FLA. STAT. ch. 163.3202(2)(e) (1997).

152. *See, e.g.*, Tucker & Hamann, *supra* note 148, at 18–63.

immediate area around the listed species and not the larger natural system, and 2) it is well established that by the time many species become listed by state and federal endangered species laws the numbers of individuals may be so low or the habitat so reduced that continued existence or recovery of the species is extremely unlikely.[153] Further, there are many species that merit listing but that have not made it through the administrative listing process,[154] as well as backlogs in designating critical habitat[155] and adopting recovery plans for listed species.[156] Local governments, which fail to recognize and conserve habitats other than wetlands, will not conserve biodiversity.

Perhaps more importantly, the state has not required local governments to adequately protect biodiversity. The Department of Community Affairs, charged with reviewing and approving or denying local government comprehensive plans and land development regulations,[157] approves plans that do not adequately protect natural systems and biodiversity. For example, local governments with jurisdiction over the Green Swamp adopted densities of one dwelling unit per twenty acres, which was subsequently approved by DCA, despite recommendations by scientists and a task force composed of interest groups that housing densities ranging from one dwelling unit per forty acres to one dwelling unit per one hundred acres were necessary to conserve habitat and wildlife.[158]

3. Statutory Authority to Implement Ecosystem Management

The GMA has potential to implement ecosystem management on private lands because it already includes several provisions

153. *See supra* notes 70–77 and accompanying text.

154. DANIEL J. ROHLF, THE ENDANGERED SPECIES ACT 43–48 (1989).

155. *Id.* at 50–52.

156. Houck, *supra* note 71, at 345.

157. *See supra* notes 131–36 and accompanying text.

158. Dep't of Cmty. Affairs v. Lake County, No. 91-5960GM 48, 1994 Fla. ENV LEXIS 130 (Fla. Dep't of Comty. Affairs Sept. 8, 1994); THE GREEN SWAMP TASK FORCE, *supra* note 46, at 14.

consistent with principles of ecosystem management[159] and could be amended to provide for more complete ecosystem management. The GMA is appropriate to implement ecosystem management on private lands because it creates a comprehensive program regulating local governments, which are the level of government most involved in controlling land use on private lands.

Land management based on ecological boundaries, not political boundaries, and interagency cooperation between government agencies are dominate themes of ecosystem management.[160] In theory, the GMA has potential to address the extra-jurisdictional nature of many natural systems because it requires local governments to coordinate their regulatory programs.[161] Therefore, local governments in Florida should develop programs to protect natural systems and biodiversity within their jurisdictions, and coordinate with adjacent local governments and state agencies to ensure consistent and effective protection. Recently, however, a committee reviewing environmental and land use regulations in Florida reported "many shortcomings of local comprehensive plans as they relate to coordinating governmental decision making and reviewing development projects."[162]

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159. For example, the GMA requires local governments to coordinate planning and regulatory activities with other units of government and protect natural resources. *Compare* FLA. STAT. ch. 163.3177(6)(d) (1997), *with* ch. 163.3177(6)(h)(1) (highlighting the conservation element and the intergovernmental coordination element).

160. *See* Grumbine, *supra* note 9 and accompanying text (Principle 3: protect total native diversity; and Principle 7: promote interagency cooperation).

161. Local government intergovernmental coordination elements must identify relationships between a local government's comprehensive plan and the comprehensive plans of adjacent local governments, regional plans, and the state comprehensive plan. FLA. STAT. ch. 163.3177(6)(h)(1). The element must provide for consideration of the effects of the local plan upon development in other local governments or state or regional resources. *Id.* The element may provide for a voluntary dispute resolution process to resolve intergovernmental disputes. *Id.* at ch. 163.3177(6)(h)(1)(c).

162. ELMS REPORT, *supra* note 149, at 44.

Intergovernmental coordination by local governments in Florida is insufficient for several reasons. First, local governments often continue to take a parochial view, considering local factors only and failing to coordinate their land use planning and regulatory programs with adjacent jurisdictions.[163] Yet, protection of complex interconnected ecosystems requires coordination of planning and regulation between all levels and jurisdictions of government. For example, consider a piece of rare scrub habitat, which straddles the jurisdictional line between two counties. County A allows intense development of the habitat, while County B prohibits development of the habitat. Because of the interconnected nature of natural systems, activities allowed by County A are likely to degrade the habitat in County B, and may threaten the overall ecology and biodiversity of the entire habitat.

Perhaps more importantly, the intergovernmental coordination provisions of the GMA are fundamentally flawed because they fail to require local governments to adequately coordinate when developing comprehensive plans and land development regulations. Instead, intergovernmental coordination most often becomes an issue after an applicant proposes a project, which may impact an adjacent local government. Thus, by focusing primarily on minimizing or resolving specific disputes, intergovernmental coordination becomes merely a reactive mechanism to resolve conflicts caused by inconsistent regulatory provisions. One disadvantage of requiring intergovernmental only at the project stage is that projects gain momentum from having interested proponents. That sort of pressure might not exist at the plan stage.

Intergovernmental coordination would be much more effective if local governments were required to address potential regulatory conflicts in a proactive manner. For example, if the state required counties A and B, discussed above, to coordinate in developing their comprehensive plans and regulations, potential differences in the degree of protection to be afforded to the scrub habitat could be resolved before persons began planning and proposing development

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163. *See, e.g., id.* at 38, 78, 79 (discussing shortcomings of the intergovernmental coordination requirement, yet failing to address the underlying need to transform intergovernmental coordination from a reactive procedure to one facilitating cooperation and consistency in all phases of regulation, including development of local plans and regulations).

projects. Such an approach would avoid a host of problems, which plague the present approach. First, as part of the cooperative planning process, local governments would be forced to inventory and assess the regional significance of natural resources and to consider the regional implications of potential land uses. Second, and most importantly, a proactive approach would reduce the likelihood that one local government would permit projects that would harm natural resources in another local government. This is because local governments would have to evaluate the regional significance of natural systems within their jurisdictions, and adopt regulatory programs to protect the systems, in advance of specific permit proposals. Third, property owners would have more certainty regarding allowable land uses. For example, under the present approach, persons may invest substantial time and money in projects, which they believe will satisfy applicable local government regulations, only to have the project halted because of an adjacent local government's objections. The Legislature should therefore transform intergovernmental coordination from a reactive procedure to one that facilitates cooperation and consistency in all phases of planning and regulation, including development of local plans and regulations.[164]

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164. Recent legislative amendments to the intergovernmental coordination requirements of the GMA have had little positive impact. These amendments were in large part a response to recommendations of the ELMs committee that existing intergovernmental coordination requirements were weak. *See* ELMS REPORT, *supra* note 149, at 38–39. In 1995, the Legislature directed DCA to appoint a committee to study its intergovernmental coordination rule and then to develop a draft intergovernmental rule, subject to approval by the Florida Legislature. Act of June 15, 1995, 1995 Fla. Laws ch. 322.5. In 1996, the legislature amended the intergovernmental coordination provisions of the GMA, deleting explicit provisions requiring local governments to develop processes to 1) determine if development proposals would have impacts on adjacent jurisdictions, 2) mitigate extra-jurisdictional impacts, and 3) resolve disputes, and adding provisions establishing a deadline for local governments to establish inter-local agreements. Act of June 6, 1996, 1996 Fla. Laws ch. 416. The legislative amendments appear to diminish rather than improve intergovernmental coordination.

Data collection and use of that data to protect native diversity and ecological patterns and processes that maintain that diversity are also dominate themes of ecosystem management.[165] The GMA is consistent with this theme because it requires that local governments collect and analyze data and protect natural systems.[166] Human values and interactions with the environment are also dominate themes of ecosystem management.[167] The Florida program implements this theme because it requires that local governments consider economic and sociologic factors as part of the planning process.[168] Comprehensive and integrated consideration of environmental, economic, and social factors is crucial for development of an effective ecosystem management program.[169]

Management of entire ecologic systems, not individual levels of systems, is another dominant ecosystem management theme.[170] The Florida approach places responsibility for development of comprehensive plans at the local level, subject to approval by the state.[171] Local plans must be consistent with regional and state minimum standards,[172] and must be coordinated with the plans of

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165. *See* Grumbine, *supra* note 9 and accompanying text (Principle 4: conduct research and collect data and use that information to improve management).

166. FLA. STAT. ch. 163.3177(8).

167. *See* Grumbine, *supra* note 9 and accompanying text (Principle 10: recognize that human values play a dominate role in ecosystem management goals).

168. FLA. STAT. chs. 163.3161(7), 163.3177(c).

169. Most commentators agree that the term ecosystem management includes consideration of economic and social factors. *See* Grumbine, *supra* note 9, at 27; GAO REPORT, *supra* note 9, at 23–25.

170. *See* Grumbine, *supra* note 9 and accompanying text (Principle 1: manage entire ecosystems; Principle 2: manage based on ecological boundaries).

171. FLA. STAT. ch. 163.3177(9).

172. State planning criteria are contained in the GMA, the state comprehensive plan, and DCA rules. *Id.* at chs. 163, pt. II, 187; FLA. ADMIN. CODE ANN. r. 9J-5, 9J-24 (9J-5 provides minimum criteria for review of local government comprehensive plans and determination of compliance with the GMA).

adjacent local governments.[173] These requirements may facilitate the large-scale landscape approach needed for ecosystem management. The Legislature should amend the GMA and the State Comprehensive Plan to identify important natural systems and to require local governments to protect those systems in a consistent manner.

Despite the criticisms discussed above, the GMA could facilitate biodiversity conservation and ecosystem management throughout the state because the GMA already provides sufficient statutory authority for DCA to implement many ecosystem management objectives through agency rulemaking. The governor or legislature should direct DCA to require local governments to incorporate ecosystem management principles into their comprehensive plans and regulations.[174] DCA should establish interagency agreements with DEP and other Florida agencies to coordinate implementation of the state's ecosystem management policy. The Legislature should amend the GMA and expand DCA's regulatory authority to clearly require local governments to implement ecosystem management and biodiversity conservation, and to provide DCA with explicit authority to review local plans and regulations for compliance with state criteria for ecosystem management biodiversity conservation.

The comprehensive planning process in Florida is still in its infancy. Although the Act was adopted in 1985, many local governments were not required to adopt comprehensive plans until the early 1990s.[175] The Legislature envisioned comprehensive planning as a "continuous and ongoing process,"[176] and required local governments to conduct evaluation and appraisal reports ("EARs") within seven years of adoption of the initial comprehensive plan, and then every five years thereafter.[177] The

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173. FLA. STAT. ch. 163.3177(6)(h)(1).

174. DCA should amend Rule 9J-5 to require that local governments implement ecosystem management principles and conserve biodiversity.

175. FLA. STAT. ch. 163.3167(2)(b) (requiring local governments to submit comprehensive plans to DCA from July 1, 1989 to July 1, 1991).

176. *Id.* at ch. 163.3191(1).

177. *Id.* at ch. 163.3191(5).

EARs are subject to a sufficiency review by DCA.[178] The EARs process provides an opportunity for the state and local governments to update and refine local comprehensive plans to include greater emphasis on biodiversity conservation and ecosystem management.

B. *Ecosystem Management*

In 1993, the Florida Legislature directed DEP to develop a statewide ecosystem management policy to "protect the functions of entire ecological systems through enhanced coordination of public acquisition, regulatory, and planning programs."[179] Borrowing heavily from Grumbine's ten principles of ecosystem management,[180] DEP has produced a substantial body of information[181] that reveals

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178. *Id.* at ch. 163.3191(9). The state may sanction local governments that fail to comply with the EAR requirements. *Id.* at ch. 163.3191(11).

179. 1993 Fla. Laws ch. 93-213 § 2(2)(c) (codified at FLA. STAT. ch. 20.255 (1997)). The provision is part of the Florida Environmental Reorganization Act, most of which is devoted to consolidating several agencies and streamlining environmental permitting programs. *Id.* DEP defined ecosystem management as "an integrated, flexible approach to management of Florida's biological and physical environments—conducted through the use of tools such as planning, land acquisition, environmental education, regulation, and pollution prevention—designed to maintain, protect and improve the state's natural, managed, and human communities." FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 3. The concept of regulating entire natural systems represents a substantial change from policies underlying existing regulatory programs in Florida, most of which focus on regulating only one or two environmental parameters, without considering ecosystem dynamics or other important parameters of natural systems.

180. Grumbine's ten principles include: connectedness, ecological management, ecological integrity, data collection, evaluation/ auditing, adaptive management, interagency cooperation, organizational change, humans are critical, and human values. FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 1–2; Grumbine, *supra* note 9.

181. DEP has established three primary goals for its ecosystem management policy: 1) better protection and management of

the agency considers biodiversity protection to be a fundamental component of the state's overall ecosystem management policy.[182] However, it is unlikely that DEP will adequately protect biodiversity because the Legislature failed to provide any meaningful substantive statutory authority for ecosystem management. This weakness is critical because existing authority is inadequate to require biodiversity conservation on private lands. Further, although the new policy sets lofty goals of providing for the needs of natural systems and humans,[183] the Legislature provided no guidance on how

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Florida's ecosystems, 2) agency structure and culture based on ecosystem management, and 3) public ethic of shared responsibility for the environment. FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 3. DEP has developed a four step planning process in order to achieve these goals. The first step involves background research into ecosystem management. The second step involves implementing six model ecosystem management projects in Florida. The six ecosystem management areas are the: Apalachicola River and Bay, Lower St. Johns River, Florida Bay, Wekiva River, Hillsborough River, and Suwannee River. Letter from Virginia B. Wetherell, Secretary, Fla. Dep't of Envtl. Prot., to the general public (Feb. 25, 1994) (document containing a description and initial assessment of these six areas and on file with the *Fordham Environmental Law Journal*). The third step is to develop an ecosystem management strategy ("EMIS") to guide DEP. DEP made a commendable effort to obtain input from diverse interests in developing the EMIS. For example, in addition to establishing twelve committees to address ecosystem management issues, DEP conducted a series of public hearings throughout the state to solicit information and created an ecosystem database for the public to obtain information or comment on the new policy. The final step is for DEP and the water management districts to develop area implementation strategies for regions throughout Florida. *Id.*

182. In discussing the principle of ecological integrity, DEP states that it is necessary to "protect, maintain, and restore native diversity, ecological patterns, and the processes that maintain diversity." FLA. DEP'T OF ENVTL. PROT., *supra* note 18, at 4. Clearly, DEP acknowledges the importance of conserving biodiversity to the overall ecological integrity of natural systems.

183. The new policy has a decidedly anthropocentric orientation. For example, human needs are expressly recognized in DEP's

to weigh and balance environmental, social, economic, and cultural values.[184]

As the principal environmental regulatory agency in Florida, DEP is a logical choice to oversee the state's ecosystem management program.[185] However, it is far from clear whether DEP has sufficient regulatory authority to exert mandatory planning or regulatory criteria over other state agencies. Other than a general supervisory role over the state's five water management districts,[186] DEP has no clear statutory authority to require other agencies, governments, and individuals to comply with ecosystem management.[187]

The Legislature's directive to protect ecosystems through "enhanced coordination of public acquisition, regulatory, and planning programs" illustrates its intent to rely on existing mechanisms and authority. The Legislature provided DEP with almost no guidance as to how to achieve this goal, nor did it provide DEP with any substantive regulatory authority beyond existing programs. Essentially, the legislation directs DEP to protect ecological systems through "enhanced coordination" of existing programs. Consequently, DEP is focusing primarily on developing

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definitions of ecosystem and ecosystem management, as well as throughout initial planning documents. *Id.* at 3.

184. Lack of substantive statutory standards often leads to ineffective regulatory programs. For example, commentators have criticized the multiple-use sustained yield policy of the National Forest Management Act because it directs the National Forest Service to consider multiple values (including outdoor recreation, range, timber, watershed, wildlife, fish, and wilderness), but provides the agency with overly broad discretion to balance the values when they come into conflict. *See* 16 U.S.C. §§ 1601(d)(1), 1604(e)(1), 1604(g)(3)(A) (1988).

185. DEP's organic statute, the Florida Air and Water Pollution Control Act, provides the agency with a general grant of authority to conserve the natural resources of the state. FLA. STAT. chs. 403.021, 403.061 (1997).

186. *Id.* at ch. 373.026(7).

187. *Id.* at ch. 403.081 (stating "[a]ll state agencies . . . shall be available to the department to perform, at its direction, the duties required of the department under this act," may provide authority for DEP to require other agencies to implement ecosystem management).

non-regulatory mechanisms and enhancing coordination of regulatory programs. For example, out of twelve committees formed by DEP to help develop its ecosystem management implementation strategy, none is devoted to regulatory initiatives, other than to improve intergovernmental coordination.[188]

DEP considers its ecosystem management program for the Wekiva River Basin a successful model of the state's new ecosystem management program.[189] Ironically, the Wekiva River is one of the few natural systems in Florida for which the legislature provided clear substantive authority requiring regulators to protect wildlife and wildlife habitat.[190] Portraying the Wekiva ecosystem as a successful example of Florida's new ecosystem management program is somewhat misleading because a regulatory program to protect biodiversity on privately owned lands was already in place at the time the state adopted its ecosystem management policy.[191] The important lesson from the Wekiva River ecosystem management program is that when "enhanced coordination" of existing programs includes a regulatory program, which protects wildlife habitat, the program is likely to conserve biodiversity. The Florida Legislature should provide DEP and the state's water management districts[192] with clear authority to regulate upland habitat to benefit all species.

The Florida Legislature amended the ecosystem management portions of DEP's organic statute in 1996 and 1997, but failed to strengthen DEP's regulatory authority.[193] The 1997 amendments

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188. DEP formed the following committees to explore issues relating to ecosystem management in Florida: Land Acquisitions and Greenways, Public Lands Management, The Role of Private Landowners, Education, Science and Technology, Pollution Prevention, Intergovernmental Coordination, Training, Audit and Evaluation, Incentive-based Regulatory Alternatives, and External Steering Committee. FLA. DEP'T OF ENVTL. PROT., *supra* note 48, at 4.

189. Letter from Wetherell to the general public, *supra* note 181, at 2.

190. *See* FLA. STAT. ch. 373.415(1).

191. *See* FLA. ADMIN. CODE ANN. r. 40C-41.063(3)(e) (1995).

192. Florida has five water management districts that regulate water resources. *See infra* Part IV.C.1.

193. In 1996, the Legislature created the Ecosystem Management and Trust Fund to support management and restoration of

may actually weaken existing regulations by authorizing voluntary ecosystem management agreements between DEP and regulated entities to "better coordinate the legal requirements and timelines applicable to a regulated activity."[194] DEP may enter into an agreement if the agency determines that there is "net ecosystem benefit to the subject ecosystem more favorable than operation under applicable rules."[195] While it is doubtful that DEP can legally waive existing regulatory requirements, the policy has engendered substantial criticism.[196] In an apparent further retreat from ecosystem management, the Legislature recently amended the statute to delete the position of executive coordinator for ecosystem management and

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ecosystems. 1996 Fla. Laws ch. 96-176 § 1 (codified at FLA. STAT. ch. 403.1651 (1997)). In 1997, the legislature again amended DEP's organic statute, adding legislative findings in support of ecosystem management, recognizing intergovernmental coordination as important element, and re-affirming DEP as the appropriate lead agency. FLA. STAT. ch. 403.075.

194. *Id.* at ch. 403.0752. Ecosystem management agreements may include incentives for participation and implementation by a regulated entity, including: 1) coordinated regulatory contact per facility, 2) permitting process flexibility, 3) expedited permit processing, 4) alternative monitoring and reporting requirements, 5) coordinated permitting and inspections, 6) cooperative inspections that provide opportunity for informal resolution of compliance issues before enforcement action is initiated, and 7) alternative means of environmental protection. *Id.* at ch. 403.0752(4).

195. *Id.* at ch. 403.0752(2). DEP must also determine 1) the agreement will not conflict with federal programs, 2) the agreement will result in a reduction in overall risks to human health and the environment, and 3) the regulated entity has sufficient ability to implement the agreement. *Id.*

196. Recent experience indicates DEP may be providing marginal protection for the environment. Citizens and DEP employees have widely criticized DEP's new ecosystem management policy as bending over backwards to please regulated interests, at the expense of satisfying environmental laws. *See, e.g.*, Jan Hollingsworth, *State Lax in Enforcing Environmental Rules, Group Says*, THE TAMPA TRIBUNE, Feb. 24, 1998, Metro, at 6.

the office of ecosystem planning and coordination from DEP's organizational structure.[197]

Recent amendments seem designed to codify DEP's new streamlined and flexible permitting approach, rather than provide meaningful direction. DEP is unlikely to adequately protect upland habitat and wildlife because existing statutes provide insufficient authority and the amendments provide no new substantive authority. The legislature should remedy this by providing DEP and the state's water management districts[198] with clear authority to regulate upland habitat to benefit all species.

C. *Water Management Districts and Water Resources*

1. Institutional Overview

The federal Clean Water Act relies almost entirely upon state nonpoint source programs to regulate complex interactions between land uses and water resources. In Florida, water management districts ("WMDs")[199] regulate water resources, including nonpoint source pollution, through surface water management[200] and ground water[201] permitting programs. Each district administers similar, but distinct permitting programs.[202] These programs regulate activities that affect wetlands and surface waters.

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197. 2000 Fla. Laws ch. 00-197 § 1 (codified at FLA. STAT. Ch. 20.255(2)(a) (2000).

198. *See infra* Part IV.C.1 (describing Florida's water management districts).

199. Structurally, a nine-member governing board, appointed by the Governor and subject to confirmation by the senate, governs each district. FLA. STAT. ch. 373.073(1)(a) (1997). Unlike the other four districts, the Southwest Florida Water Management District has eleven members. Governing board members serve for four-year terms, and must reside within the respective district. *Id.* at ch. 373.073(1)(a). Each governing board selects an executive director, subject to approval by the Governor and the Senate, who oversees daily operations of the districts. *Id.* at ch 373.079(4)(a).

200. *Id.* at ch. 373, pt. IV.

201. *Id.* at ch 373, pt. II.

202. Generally the largest three WMDs (South Florida, Southwest Florida, and St. Johns River Water Management Districts) have the

Florida's water management districts are well suited to regulating many natural systems because their geographic jurisdiction is based on the boundaries of the state's five major watersheds. Thus, many natural systems are contained entirely within one water management district.[203] The districts have broad statutory authority to regulate activities that affect the water resources of the state.[204] Figure A depicts Florida's water management district boundaries.

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most extensive permitting programs and the two smaller districts (Northwest Florida and Suwanee River Water Management Districts) have less comprehensive regulatory programs. *See id.* at ch. 373.073(2)(a).

203. Some natural systems in Florida extend beyond the boundaries of one water management district, such as the Green Swamp system, which includes area within the Southwest Florida Water Management District and the St. Johns River Water Management District. *See id.* at ch. 373.069.

204. The districts have authority to regulate activities that impact "water resources," including ground water and surface water and wetlands (including isolated wetlands). Administrative judges have interpreted this statutory authority to extend to aquatic and wetland-dependent species, but not to uplands. *See id.* at ch. 373, pts. II, IV; *see also infra* note 344 and accompanying text.

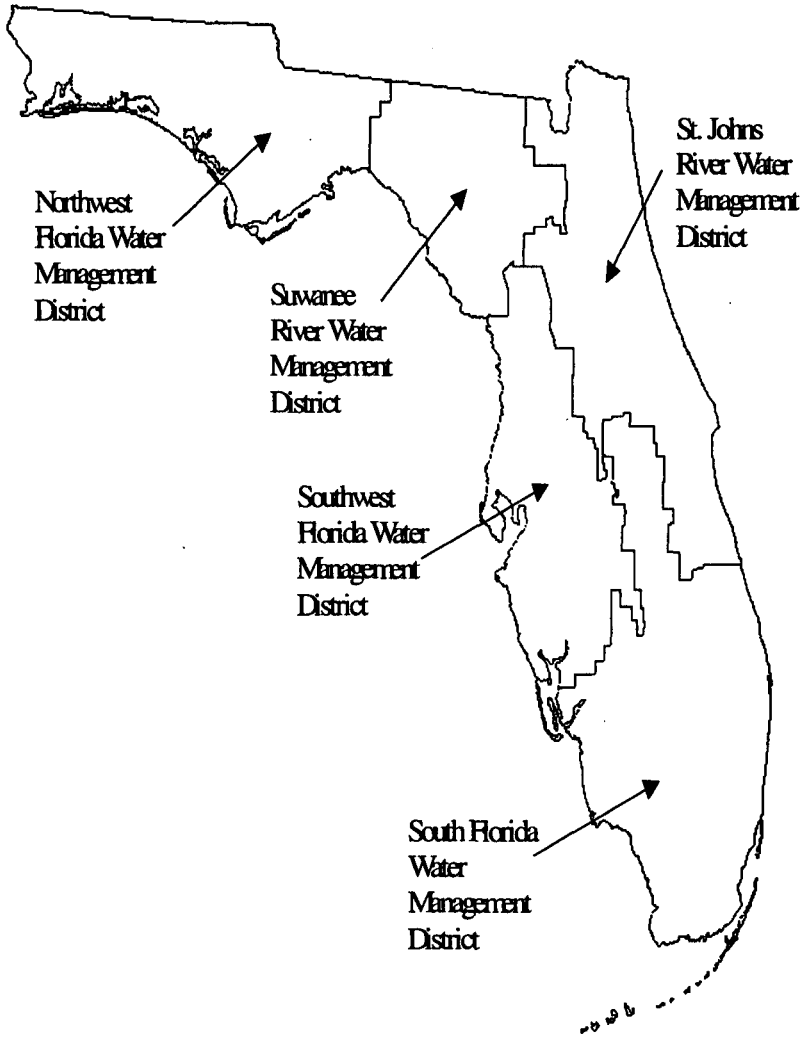

Figure A: Florida Water Management Districts

Historically, the districts have functioned fairly efficiently, due in large part to their relatively steady source of funding, which comes primarily from *ad valorem* taxes levied by each district, as well as

through general appropriations and permit fees.[205] Districts with large populations have substantial budgets, infrastructure, and staff, while districts in rural areas have fewer resources.[206]

The Florida Water Resources Act ("WRA") directs DEP and the state's five WMDs to regulate activities, which manage and store surface waters, including impacts to wetlands.[207] Development activities, which disrupt natural surface drainage patterns, may adversely affect water quality and quantity, as well as fish, wildlife, and their habitat. Almost all development activities in Florida require manipulation of surface water, and thus most require a WMD permit.[208]

2. Limitations on Water Management District Authority

At first glance, the WMD would seem to be an appropriate agency to regulate natural systems because most land development activities result in some degree of manipulation of surface drainage patterns. However, the scope of inquiry under the WRA is limited to activities affecting the "water resources" of the state, and does not extend to species that are not aquatic or wetland dependent.[209] Accordingly, upland habitat and species, which may be affected by development, do not fall within the jurisdiction of the WRA. For example, the habitat needs of non-listed species which are nonetheless experiencing substantial declines, such as the striped newt, central Florida crowned snake, and short-tailed hawk, are not considered

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205. FLA. STAT. ch. 373.503(1) (1997). The Florida Constitution establishes maximum allowable millages for the water management districts. FLA. CONST. art. 7, § 9(b).

206. The South Florida Water Management District, Southwest Florida Water Management District, and St. Johns River Water Management District have substantial budgets and infrastructure.

207. FLA. STAT. ch. 373, pt. IV.

208. The Legislature exempted agricultural and "silvicultural" activities that are not for the "sole or predominate purpose of impounding or obstructing surface waters." *Id.* at ch. 373.406.

209. Friends of Fort George, Inc. v. Fairfield Cmtys., Inc., Nos. 85-3537, 85-3596, 1986 Fla. Div. Adm. Hearings LEXIS 4106 (Oct. 6, 1986); St. Johns River Water Mgmt. Dist. v. Consol.-Tomoka Land Co., 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

under the WRA permitting program.[210] Part IV.D.2 discusses the District's statutory authority in greater detail.

Wetlands regulations may fail to protect certain types of wetland habitat. For example, the Legislature authorized the districts to disregard the impacts of development activities on fish and wildlife and their habitat in wetlands that fall below certain size thresholds established by the districts.[211] The districts must base these thresholds on biological and hydrological evidence, which shows the fish and wildlife values of such areas are minimal.[212] The districts must protect threatened and endangered species regardless of wetland size.[213] However, certain non-listed species of amphibians, including the southern chorus frog and the eastern spadefoot toad, are dependent upon small ephemeral wetlands for their existence.[214]

3. Mitigation

The use of mitigation to offset adverse impacts to the environment also undercuts the effectiveness of the WRA in protecting watershed integrity.[215] In theory, regulators can use mitigation to allow

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210. Schaefer, *supra* note 13, at 3-31–3-32. The Florida Game and Fish Commission classified these species as imperiled (vulnerable to extinction), a classification which provides no legal protection. None of the species are listed under federal or state endangered species protection statutes. *Id.*

211. FLA. STAT. ch. 373.414(2).

212. *Id.* at ch. 373.414(2)(a); *see* Sierra Club v. St. Johns River Water Mgmt. Dist., No. 90-5835R, 1990 Fla. ENV LEXIS 192 (Fla. Div. of Admin. Hearings Dec. 18, 1990) (invalidating St. Johns River Water Management District permitting thresholds that failed to consider impacts to certain isolated wetlands that exceeded the District's 0.5 acre permitting threshold).

213. FLA. STAT. ch. 373.414(2)(b).

214. Schaefer, *supra* note 13, at 3-25; *see also* ROBIN HART & JAMES R. NEWMAN, FLORIDA GAME AND FRESH WATER FISH COMM. NONGAME WILDLIFE PROGRAM, THE IMPORTANCE OF ISOLATED WETLANDS TO FISH AND WILDLIFE IN FLORIDA 22 (1990).

215. Mitigation is the practice of creating, restoring, enhancing, or preserving habitat to offset adverse environmental impacts caused by a development activity. WHITE HOUSE OFFICE ON ENVTL. POLICY, PROTECTING AMERICA'S WETLANDS: A FAIR, FLEXIBLE, AND

development to continue in wetlands, while offsetting adverse impacts to natural resources, including biodiversity. Theoretically, habitat values or functions which are harmed by a project can be protected or re-created elsewhere.[216] In fact, this is what the Florida Legislature attempted to do by requiring the WMDs to consider proposals for mitigation for projects, which fail to satisfy permitting criteria.[217] However, the use of mitigation in Florida has resulted in substantial destruction of wildlife and habitat.[218]

Mitigation has failed for several reasons. First, early mitigation programs favored type-for-type and on-site mitigation.[219] These programs were plagued with problems, including inappropriate use

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EFFECTIVE APPROACH (1993). Mitigation is often required by government environmental agencies as a condition of obtaining a development permit for a specific project. *See, e.g.*, FLA. STAT. ch. 373.414(1)(b). Mitigation may occur at the site of the adverse impacts (on-site mitigation), or may occur at some other location (off-site mitigation). Mitigation may involve conserving, restoring, or creating habitat of the same type as that adversely impacted (type-for-type mitigation), or of a different type of habitat (non-type-for-type mitigation). John H. Hankinson, Jr., *Mitigation of Wetland Impacts in Florida: Policy Development and Practical Application*, *in* WETLAND PROTECTION: STRENGTHENING THE ROLE OF THE STATES 334–36.

216. Ann Redmond, *How Successful is Mitigation*, 14 NAT'L WETLANDS NEWSLETTER 5 (1992).

217. FLA. STAT. ch. 373.414(1)(b).

218. Mitigation for degraded or destroyed wetlands does not guarantee "no net loss" of wetlands. A 1991 study by the Florida Department of Environmental Regulation found that during the late 1980s the Department issued permits authorizing the loss of 3505 acres of wetlands, and mitigated that loss through creation, enhancement, and preservation of about 18,231 acres of wetlands. However, the same study found an extremely high rate of noncompliance. Only four of 63 permits reviewed were found to be in full compliance with mitigation requirements of the permit. The success rate for freshwater mitigation was a dismal 12 percent, while 45 percent of tidal mitigation was successful. FLA. DEP'T. OF ENVTL. REGULATION, REPORT ON THE EFFECTIVENESS OF PERMITTED MITIGATION 3–4 (1991) [*hereinafter* DEP MITIGATION REPORT].

219. *See supra* note 215 (discussing types of mitigation).

of mitigation, such as attempts to create wetlands in well drained sandy soils; high failure rates, due to use of poor techniques to construct mitigation areas; and low levels of compliance, due to lax monitoring and enforcement of mitigation projects.[220] In fact, several commentators reported that only about one-quarter of mitigation projects in Florida successfully produced functional wetlands.[221]

More recently, agencies have begun to focus on using mitigation to protect other types of habitat, including uplands, through the use of off-site and non-type mitigation.[222] The new trend in mitigation allows the conservation of large tracts of one or more habitat types in Florida.[223] A recent example involves the use of mitigation to offset destruction of numerous small wetlands by an expressway project in central Florida.[224] The old approach to mitigation would have

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220. DEP MITIGATION REPORT, *supra* note 218, at 5–7, 14–18; Tucker & Hamann, *supra* note 148, at 78.

221. *See* Redmond, *supra* note 216, at 5–6; Roy R. Lewis, *Why Florida Needs Mitigation Banking*, 14 NAT'L WETLANDS NEWSLETTER 7 (1992). Mitigation under Section 404 of the Clean Water Act is also flawed. *See generally* Michael C. Blumm, *The Clinton Wetlands Plan: No Net Gain in Wetlands Protection*, 9 J. LAND USE & ENVTL. L. 227 (1994).

222. *See, e.g.*, FLA. STAT. ch. 373.4135 (1997) (finding that "mitigation banks and offsite regional mitigation can enhance the certainty of mitigation and provide ecological value due to the improved likelihood of environmental success," and directing the DEP and water management districts to participate in and encourage mitigation banks and offsite regional mitigation); *see also id.* at ch. 373.4137 (directing the Florida Department of Transportation to use regional long-range mitigation planning to offset adverse effects of transportation projects, rather than on a project-by-project basis).

223. Management of these areas is typically for natural functions, and may be conducted by government agencies or private entities. The long-term conservation of mitigation areas is assured because the government or a private trust usually obtains title or a conservation easement over the property.

224. *Id.* at ch. 338.250 (providing that adverse effects of the Central Florida Beltway be mitigated through acquisition of lands, restoration, or creation of lands providing regional environmental benefit); *see* ST. JOHNS RIVER WATER MGMT. DIST. & S. FLA. WATER MGMT. DIST., CONCEPTUAL PLAN FOR WETLAND

required developers to create, restore, or preserve a small wetland for each wetland destroyed or degraded by the project. Under the new approach, the policymakers determined that the net environmental benefit would be greatest if a large off-site tract composed of wetlands and uplands was preserved.[225]

While the use of off-site and non-type mitigation avoids some of the pitfalls of early mitigation efforts, the approach also suffers from serious deficiencies. For example, non-type and off-site mitigation require regulators to make quantitative and qualitative decisions regarding the relative value of different types of habitat. Regulators must not only decide what type of habitat must be conserved in exchange for allowing destruction of another type of habitat, but they must also decide how much habitat must be conserved.[226] Valuation of habitats can be exceedingly complex and subjective.[227] Agencies are accepting mitigation, as mandated by the Legislature, but mitigation ratios may not be based on scientific studies of the

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MITIGATION, SOUTHERN CONNECTOR, CENTRAL FLORIDA BELTWAY (1990) [*hereinafter* CONCEPTUAL PLAN FOR WETLAND MITIGATION] (a report jointly authored by two divisions of the Florida Management. District); *see also* Flournoy, *supra* note 61, at 120–21 (discussing the Disney Wilderness Preserve which mitigates impacts to wetlands from Disney's twenty-year build-out plan).

225. CONCEPTUAL PLAN FOR WETLAND MITIGATION, *supra* note 224, at i–iii.

226. For example, the following DEP definition of "mitigation credits" requires agencies to assess and compare ecological value of uplands and wetlands. A mitigation credit is a unit of measure which represents the increase in ecological value resulting from restoration, enhancement, preservation, or creation activities. FLA. ADMIN. CODE ANN. r. 62-342.200(5) (1994). Mitigation credits assigned for enhancement, restoration or preservation of wetlands or uplands will be based on the extent of improvement in ecological value resulting from these activities relative to that obtained by successfully creating one acre of wetland. *Id.* at r. 62-342.470(2).

227. *See* David Smith, *Comparing Apples to Oranges*, 19 NAT'L WETLANDS NEWSLETTER 11 (1997) (discussing the tremendous variation in how wetland loss and restoration data are defined, measured, tracked, and reported).

relative value of different habitats.[228] Nor has there been any comprehensive statewide assessment of cumulative impacts to habitats. Without this information, it is difficult for regulators to determine the direct and indirect effects of projects. Permitting decisions are being made on the basis of inadequate information. There is no certainty that the types of habitats being preserved are important for conservation, nor is there any certainty that mitigation is preventing net loss of certain habitats, or is tied to conserving overall natural system integrity.

Despite the limitations discussed above, non-type mitigation and mitigation banking hold great potential for protecting certain natural systems.[229] Mitigation can be used to support purchase and ecosystem management of large tracts of preserved natural land. Mitigation could also allow development activities, which might otherwise violate regulatory programs to go forward in exchange for money or direct preservation of forests or other habitat types in other locations. Another mitigation alternative would be to require that certain lands be managed in conformance with ecosystem management or biodiversity conservation criteria.

D. *Designation and Protection of Special Areas*

1. Green Swamp Area of Critical State Concern

a. *Overview*

Florida has a program to identify and regulate areas of ecological importance to the entire state.[230] The Legislature has designated the Florida Keys, city of Key West, Big Cypress Swamp, Green Swamp, and the Apalachicola Bay area as Areas of Critical State Concern because they have statewide significance.[231] Figure B depicts, on the following page, Florida's ACSCs. The state adopted principles for

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228. *See* Redmond, *supra* note 216, at 6 (discussing the need to develop guidance for determining enhancement-to-loss-ratios); Lewis, *supra* note 221, at 7 (discussing the need to establish clear, safe mitigation ratios for each wetland type).

229. *See generally* Flournoy, *supra* note 61, at 120–22.

230. FLA. STAT. ch. 380.012 (1997) (referred to as the Florida Environmental Land and Water Management Act of 1972).

231. ELMS REPORT, *supra* note 149, at 84.

guiding development to control land use in each of the five areas[232] and local governments must implement the principles through their comprehensive plans and land development regulations.[233] Local governments must provide the state with notice of applications for development permits within ACSCs.[234] The Department of Community Affairs has authority to initiate an administrative proceeding to enjoin local development approvals that violate the principles or local plans or regulations, and to compel local governments to properly administer critical area regulations.[235] The state also evaluates local compliance with the ACSC requirements as part of its review of local comprehensive plans and plan amendments pursuant to the GMA.[236] While the ACSC statute provides broad authority regarding the specific purposes for which the Legislature can designate ACSCs,[237] most have focused on conservation of water resources and listed species. The Legislature intended for ACSC designations to be temporary, providing for de-designation when the state was satisfied local governments were adequately protecting the resource, yet the state has not yet de-designated any ACSCs.[238]

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232. *See, e.g.*, FLA. ADMIN. CODE ANN. r. 28-26 (1995) (discussing boundary and principles for guiding development for the Green Swamp Area of Critical State Concern).

233. FLA. STAT. ch. 380.05(6).

234. *Id.* at ch. 380.05(19).

235. *Id.* at ch. 380.11(2)(c).

236. *See id.* at chs. 163.3177(4)(b), 163.3184(14).

237. *See id.* at ch. 380.05(2)(a). This chapter provides for ACSC designation of areas

> containing, or having a significant impact upon, environmental or natural resources of regional or statewide importance, including . . . state or federal parks, forests, wildlife refuges, wilderness areas, aquatic preserves, major rivers . . . , state environmentally endangered lands, Outstanding Florida Waters, and aquifer recharge areas, the uncontrolled private or public development of which would cause substantial deterioration of such resources.

Id.

238. *See id.* at ch. 380.05(12). The state may not de-designate unless the local governments have been successfully implementing the ACSC requirements for at least one year. *Id.*

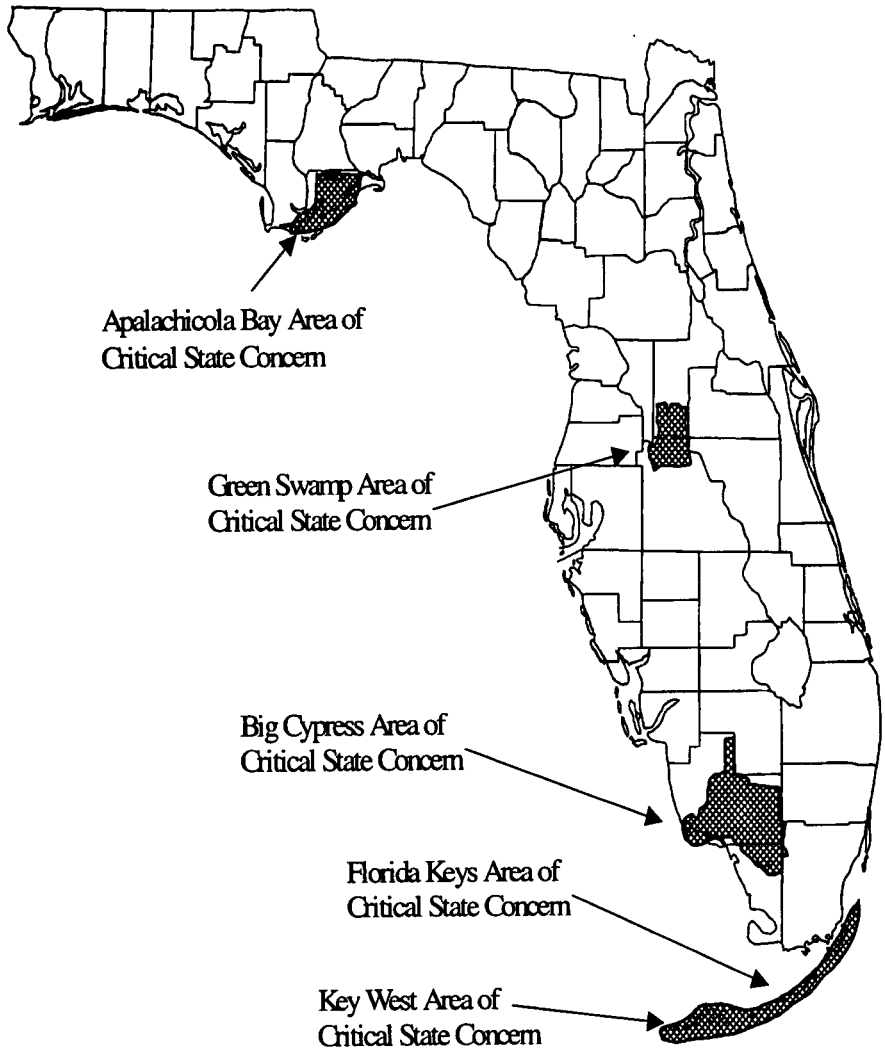

Figure B: Florida Areas of Critical State Concern

The Green Swamp system provides an interesting case study in natural resource management. The system covers about 556,000 acres of wetlands, rivers and uplands, serves as the headwaters of five rivers, contains the potentiometric high of Florida's principal

aquifer,[239] and contains important wildlife habitat for a variety of species.[240] The system is one of the larger areas of intact habitat still left in Florida. Much of the important wildlife habitat is located on private lands, which compose a substantial portion of the Green Swamp ecosystem.

In the late 1970's, the Governor and Cabinet[241] designated 322,690 acres of the Green Swamp in Lake and Polk Counties as Florida's second ACSC.[242] The system was designated an ACSC because of its unique hydrologic values.[243] In 1974, the Governor and Cabinet adopted the Green Swamp Principles for Guiding Development[244] and land development regulations[245] to protect the hydrologic resources of the Green Swamp. For example, the Principles prohibited site alteration that would alter surface water flows and reduce natural recharge.[246] The ACSC designation required local governments to administer these land development regulations, subject to oversight by the state.

b. *Critique of Green Swamp ACSC Program*

During the early 1980s the DCA and local governments largely ignored the ACSC designation for the Green Swamp.[247] Not only did local governments often fail to send notice of development approvals to DCA, as required by the ACSC statute,[248] but also DCA did not

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239. *See* THE GREEN SWAMP TASK FORCE, *supra* note 46, at 1-1–1-16.

240. *See* THE GREEN SWAMP TASK FORCE, *supra* note 46, at 2-1–2-2.

241. *See, e.g.*, FLA. CONST. Art. IV, § 4(a).

242. *See* FLA. STAT. ch. 380.0551 (1997) (designating the Green Swamp Area as Area of Critical State Concern, effective July 1, 1979).

243. *See* FLA. DIV. OF STATE PLANNING, FINAL REPORT AND RECOMMENDATIONS FOR THE PROPOSED GREEN SWAMP AREA OF CRITICAL STATE CONCERN, LAKE AND POLK COUNTIES, FLORIDA 20 (1974).

244. FLA. ADMIN. CODE ANN. r. 28-26.003 (1974).

245. *Id.* at r. 28-27, 28-28 (1975).

246. *Id.* at r. 28-26.003(2)(a)(b) (1974).

247. *See* THE GREEN SWAMP TASK FORCE, *supra* note 46, at 4–28.

248. FLA. STAT. ch. 380.05(19) (1997).

adequately pursue enforcement of the notice requirement.[249] In addition, local governments and DCA criticized the Principles for Guiding Development as being too general to provide local governments with adequate guidance.[250] This lack of specificity in the Principles for Guiding Development fostered uncertainty as to what is actually required to meet the objectives of the ACSC designation. For example, a monitoring report, conducted by DCA in 1987, found that both DCA and Polk County continued to authorize projects designed using inappropriate methodologies and based on insufficient data because the rule contained outdated methodologies and was vague on many key issues.[251]

The ACSC program holds little potential to bring about widespread biodiversity conservation. The program has been only marginally successful,[252] largely because there has been substantial local government and citizen opposition to the program, and the state has been less than diligent in implementing and enforcing its provisions. Local governments have generally opposed the program because it usurps local authority and imposes substantial obligations on local governments that fall within ACSC boundaries. Given the history of the program and today's political trend toward reducing government, it is unlikely that the Legislature will designate any new ACSCs, or that local governments will request to become ACSCs. Ironically, a state committee recently recommended the ACSC program be used to protect additional natural areas in Florida, despite the substantial difficulties the program has encountered thus far.[253]

The Green Swamp ACSC also fails to satisfy a fundamental principle of ecosystem management—that management programs must include the entire natural system.[254] The Green Swamp ACSC

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249. *See* THE GREEN SWAMP TASK FORCE, *supra* note 46, at 4–29.

250. *Id.*

251. *See* FLA. DEP'T OF CMTY. AFFAIRS, GREEN SWAMP ACSC SUMMARY OF MONITORING PERIOD FOR POLK COUNTY 42 (1987).

252. The fact that the state has not de-designated any ACSCs is an indicator of the program's marginal performance. Several ACSCs have been designated for over 20 years. Further, the DCA has acknowledged the program's shortcomings in its own reports. *See id.*

253. *See* ELMS REPORT, *supra* note 149, at 86–87.

254. *See supra* Parts III.A–B (discussing anthropocentric versus natural boundaries and intergovernmental coordination).

includes only about 58 percent of the Green Swamp system. Thus, less stringently regulated activities outside the ACSC boundaries may adversely effect natural resources within the ACSC.

It was not until the late 1980's that the state began taking a closer look at local management of the system.[255] Ultimately, DCA determined that both Lake and Polk Counties comprehensive plans were in noncompliance because numerous provisions in the plans were inconsistent with the GMA, the state comprehensive plan, and the ACSC statute.[256] For example, the Polk County comprehensive plan did not depict a conservation land use category, protect wetlands and hydrologic functions, protect native vegetative communities, protect threatened ecological communities, or define environmentally sensitive areas.[257] As part of a negotiated settlement, Polk County agreed to appoint a task force to conduct an in depth study of the Green Swamp and to amend its comprehensive plan to provide more protection for the system.[258]

One of the principal findings of the Green Swamp Study was that the Green Swamp minimum standards were inadequate because they only addressed hydrologic functions and did not protect important wildlife habitat values or ecosystem integrity.[259] While in 1974 the Green Swamp was considered valuable primarily for its hydrologic functions, the study identified other important and unique values, including, but not limited to wildlife, wildlife habitat, wildlife corridors, recreation, aesthetics, and rare or unique habitat.[260] The

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255. The state's renewed interest occurred for two reasons. First, the DCA began reviewing local government comprehensive plans as required by the new GMA. Second, development proposals increased dramatically during the late 1980s as Orlando continued to boom and spread westward.

256. *See* Notice of Intent to Find the Lake County Comprehensive Plan Not in Compliance, Docket No. 91-NOI-3501-(N) (Fla. Dept. of Cmty. Affairs Aug. 30, 1991); Notice of Intent to Find the Polk County Comprehensive Plan Not in Compliance, Docket No. 90-NOI-3501-(N) (Fla. Dept. of Cmty. Affairs June 13, 1991) [*hereinafter* Polk County Notice of Non-compliance].

257. Polk County Notice of Non-compliance, *supra* note 256, at 5, 9–15.

258. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 4-28–4-29.

259. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 4–30.

260. THE GREEN SWAMP TASK FORCE, *supra* note 46.

study also recommended an alternative institutional structure to manage the Green Swamp System.

c. *Proposed Alternative Green Swamp Program*

The Green Swamp Task Force proposed an interesting solution to protect the ecological integrity of the Green Swamp System. Modeled on the approach used for the New Jersey Pinelands,[261] the Task Force recommended creation of a regional commission with authority to develop and adopt a comprehensive management plan for the entire system, including designation of core preservation areas to protect wildlife and habitat.[262] Local governments would then implement the plan through their comprehensive plans and land development regulations. A regional plan and authority would provide local governments with broader development review authority than exists under the ACSC program. Under the existing ACSC regulatory program, local governments make initial development review decisions, which are then subject to review and reversal by DCA. Under a regional plan and authority, local governments would retain initial development review authority and would gain a degree of final development review authority by virtue of their representation on the regional authority. DCA would surrender its individual development review authority to the regional authority, but would retain general oversight authority.

Local government response to the recommendations for a Green Swamp regional commission was less than enthusiastic, despite the opportunity to possibly be de-designated as an ACSC. De-designation is desirable for local governments within ACSCs because the ACSC program requires that they comply with standards developed by the state, whereas the proposed approach would involve local governments in the development of regional criteria and would provide for local representation on a regional oversight commission. The local governments chose to risk a non-compliance action by DCA[263] rather than comply with state pressure and Green

261. *See supra* notes 110–11 and accompanying text.

262. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 9, 14, 23, 24.

263. *See supra* note 235 and accompanying text (discussing DCA enforcement of ACSC requirements); *see also supra* notes 137–42

Swamp Task Force recommendations that the counties coordinate in conserving the natural resources of the Green Swamp, including its biodiversity. Ultimately, the DCA and local governments reached a settlement, which scientists warned would not provide for adequate biodiversity conservation.[264]

Policymakers and regulators should consider the proposed Green Swamp approach for other ecosystems because it resolves several of the barriers to ecosystem management and biodiversity conservation identified in Part III of this article. A comprehensive plan would ensure that the Green Swamp is managed from an ecosystem perspective rather than along existing jurisdictional lines. This is particularly important because the Green Swamp is a multi-jurisdictional resource, with many of its natural resource functions being shared by two or more jurisdictions.[265] A comprehensive plan would identify areas of ecological importance and designate appropriate levels of development for those areas. A regional authority could also ensure consistent application of the comprehensive plan. Existing governmental entities provide inconsistent regulation, often resulting in contradictory and haphazard protection of natural functions. A regional authority for the entire resource would eliminate these problems because final development review authority would reside in one reviewing body.

A regional plan and development review authority would facilitate assessment of the cumulative adverse effects of development on the entire Green Swamp. Existing agency regulatory programs do not track the overall effects of individual development activities on the natural resources of the Green Swamp. Jurisdictional lines inherently limit local government perspectives. A regional plan with appropriate land use designations and monitoring mechanisms would

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and accompanying text (discussing DCA enforcement and sanctions for violation of GMA requirements).

264. The county comprehensive plans designate a density of one dwelling unit per 20 acres for the core preservation area, instead of the one dwelling unit per 40 acres to one dwelling unit per 100 acres recommended by scientists and the Green Swamp Task Force. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 14.

265. THE GREEN SWAMP TASK FORCE, *supra* note 46, at 14. Five counties (Lake, Polk, Pasco, Hernando, and Sumter), two water management districts, and numerous state and federal agencies share jurisdiction over the Green Swamp. *Id.*

enable both local governments and the regional authority to determine the cumulative impacts of development.

An effective regional plan and review authority could speed the way to de-designation of the Green Swamp ACSC. The ACSC program was intended to provide a temporary process, which would be dissolved after local governments demonstrated that they had achieved state goals for protection of the resource.[266] An effective regional plan and review authority would probably satisfy the concerns of the state and lead to de-designation.

A comprehensive regional plan would not require a completely new planning effort because much of the background information already exists in individual local government comprehensive plans and regional and state regulatory agencies. The combined resources of local governments and pertinent agencies working in a concerted fashion would enable the resource to be better protected. Individual regulatory entities in the Green Swamp often lack the economic resources and technical expertise to adequately consider and protect the natural resources of the Green Swamp. A regional authority with funding from local, regional, state, and federal entities would have much greater economic and technical capability than existing entities acting unilaterally.

A regional plan and authority have potential disadvantages for local governments. First, there would be some loss of local government planning autonomy. While local governments would retain initial development review authority and gain final development review authority, they would lose some planning authority because they would be bound by the regional comprehensive plan. However, there would be local government representation in the development of the regional plan.

The regional plan and authority approach is unlikely to work unless it is mandatory. In addition, a regional plan and authority approach is only as good as the content of the comprehensive plan and the manner in which it is implemented. Therefore, significant state direction and oversight are critical in the early stages of the process. Once the mechanism is in place, only periodic state review should be necessary.

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266. FLA. STAT. ch. 380.05(12) (1997).

2. Riparian Buffers to Protect Wildlife Habitat

Florida has developed several river protection programs to protect biodiversity and employ ecosystem management principles. This Part discusses protection of the ecosystems surrounding the Wekiva, Econlockhatchee, and Tomoka Rivers, which are depicted in Figure C below. These regulatory programs use wildlife home range needs as the basis for establishing riparian habitat protection zones, within which most development is prohibited. Analysis of these regulatory efforts identifies some of the problems and potential solutions for protecting biodiversity.

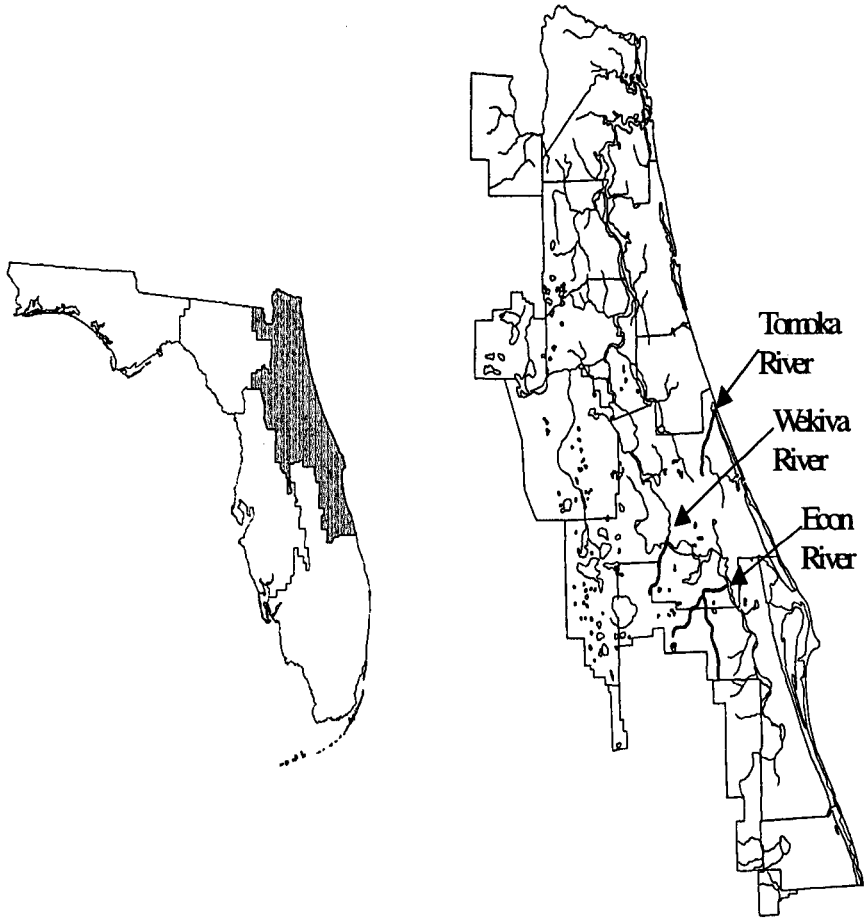

Figure C: Florida Rivers With Riparian Habitat Protection Zones

a. *Wekiva River*

The Wekiva River is a small pristine inland river located precariously close to the Orlando metropolitan area. In 1988, due to public concern that the Wekiva River was threatened by rapid development, then Governor Bob Martinez commissioned the Wekiva River Task Force, composed largely of agency heads, to study the Wekiva watershed and to make recommendations for its

protection.[267] The Task Force's report proposed sweeping recommendations, including legislative directives that the St. Johns River Water Management District ("SJRWMD") adopt protection zones along the river for water quality, water quantity, and riparian habitat, and that local governments amend their comprehensive plans to provide for protection of the Wekiva Watershed.[268] The Legislature responded quickly and passed the legislation recommended by the Task Force.[269] The Wekiva legislation is unique because it requires the water management district and local governments to take specific and concrete action to protect riparian wildlife and other ecosystem attributes within the Wekiva Basin.[270]

1. Water Management District Buffer Zones

In 1988, the legislature amended the water management district's organic statute, requiring the SJRWMD to adopt rules establishing protection zones along watercourses in the Wekiva River System.[271]

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267. Fla. Exec. Order No. 88-26 (Feb. 4, 1988) (issued by the office of the governor of the state of Florida).

268. WEKIVA RIVER TASK FORCE, REPORT TO GOVERNOR BOB MARTINEZ v–ix (1988).

269. FLA. STAT. ch. 373.415 (requiring the SJRWMD to adopt protection zones); *Id.* at ch. 369.301 (requiring local governments to protect the river).

270. *See generally* Naomi Smith Whitney & Jeffery C. Elledge, *Effective Environmental Action: The Case of the Wekiva River, in* WATER: LAWS AND MANAGEMENT 9B–13 (1989) (proceedings of a Conference Sponsored by the American Water Resources Association (Sept. 17–22, 1989)); Glenn Lowe & Carl Salafrio, *The Evolution of Wetland Regulation Under Chapter 40C-4, F.A.C., in* WETLANDS: CONCERNS AND SUCCESSES 557 (1989); MARK T. BROWN & JOSEPH M. SCHAEFER, ST. JOHNS RIVER WATER MGMT. DIST., BUFFER ZONES FOR WATER, WETLANDS AND WILDLIFE (1987) (proceedings of a Conference Sponsored by the American Water Resources Association (Sept. 17–22, 1989) and describing rationale and methodology to determine riparian habitat protection zones); Schaefer & Brown, *supra*, note 34 (describing process to determine and adopt riparian habitat protection zones).

271. Act of June 6, 1988, 1988 Fla. Laws chs. 88-121.2, 88-393.27 (codified at FLA. STAT. ch. 373.415 (1997)). In addition, the District

The protection zones must be wide enough to "prevent harm to the Wekiva River System, including water quality, water quantity, hydrology, wetlands, and aquatic and wetland-dependent wildlife species."[272] The Water Management District must consider the following factors when determining the widths of the protection zones:

> (a) The biological significance of the wetlands and uplands adjacent to the designated watercourses . . . including the nesting, feeding, breeding, and resting needs of aquatic species and wetland-dependent wildlife species.
> (b) The sensitivity of these species to disturbance, including the short-term and long-term adaptability to disturbance of the more sensitive species, both migratory and resident.
> (c) The susceptibility of these lands to erosion, including the slope, soils, runoff characteristics, and vegetative cover.[273]

Residential development, land clearing, and other activities within the Wekiva River Hydrologic Basin are required to satisfy standards addressing water quantity (including recharge,[274] storage,[275] and

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must obtain the appropriate local government's certification that a proposed activity is consistent with the local comprehensive plan and is in compliance with land development regulations prior to issuing a District permit. *Id.* at ch. 373.415(2). The District must also develop a groundwater basin resource availability inventory for the Wekiva River Protection Area, and must establish minimum flows and minimum water levels for surface waters in the Wekiva River System and minimum groundwater levels within the Wekiva Basin. *Id.* at ch. 373.415(3).

272. *Id.* at ch. 373.415(1).

273. *Id.* at chs. 373.415(1)(a)–(c).

274. Recharge Standard: Projects located in Most Effective Recharge Areas must retain within the project three inches of runoff from all directly connected impervious areas, or show that post development recharge capacity is equivalent or greater than pre-development recharge capacity. FLA. ADMIN. CODE ANN. r. 40C-41.063(3)(a) (1995).

275. Storage Standard: Surface water management systems are prohibited from causing a net reduction in flood storage within certain 100 year flood plains within the Basin. *Id.* at r. 40C-41.063(3)(b).

drawdowns[276]), water quality,[277] and riparian wildlife habitat.[278] The SJRWMD implemented these standards by establishing three protection zones: the Water Quality Protection Zone,[279] the Water Quantity Protection Zone,[280] and the Riparian Habitat Protection Zone.[281] Each of these zones contributes to conserving biodiversity in the Wekiva ecosystem because collectively they restrict development activities that degrade ecosystem functions, including land clearing, construction of dwellings and other buildings, and alteration of surface water flows.

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276. *Id.* at r. 40C-41.063(3)(d).

277. *Id.* at r. 40C-41.063(3)(c).

278. *Id.* at r. 40C-41.063(3)(e).

279. The Water Quality Protection Zone extends one half mile from the Wekiva River and many of its tributaries, and also extends one quarter mile from any wetland abutting an Outstanding Florida Water. *Id.* at r. 40C-41.063(3)(c). Applicants for surface water management permits must submit an erosion and sediment control plan as part of their permit application. *Id.* at r. 40C-41.063(3)(c)2. The erosion and sediment control plan must provide "reasonable assurance . . . that during construction or alteration of the system (including revegetation and stabilization), erosion will be minimized and sediment will be retained on-site." *Id.* at r. 40C-41.063(2); *see In re* Floyd R. Womack, 1992 Fla. ENV LEXIS 195 (Fla. St. Johns River Water Mgmt. Dist. Nov. 10, 1992) (denying landowner's application to construct three single-family residences within the Water Quality Protection Zone in part because landowner failed to provide an erosion and sediment control plan).

280. The Water Quantity Protection Zone extends 300 feet landward from wetlands which abut the Wekiva River and many of its tributaries. FLA. ADMIN. CODE ANN. r. 40C-41.063(3)(d) (1995). When any part of a surface water management system is located within the zone, the applicant must provide "reasonable assurance that . . . the system will not cause ground water table drawdowns which would adversely affect the functions provided to aquatic and wetlands dependent species . . . by the referenced wetlands." *Id.* The District presumes the drawdown standard is satisfied if a surface water management system will not cause a ground water table drawdown within the Water Quantity Protection Zone. *Id.*

281. *Id.* at r. 40C-41.063(3)(e).

The key regulatory provision protecting biodiversity is the Riparian Habitat Protection Zone, which includes 1) wetlands abutting the river and its tributaries, 2) uplands within fifty feet of abutting wetlands, and 3) uplands which are within 550 feet of the river's edge.[282]

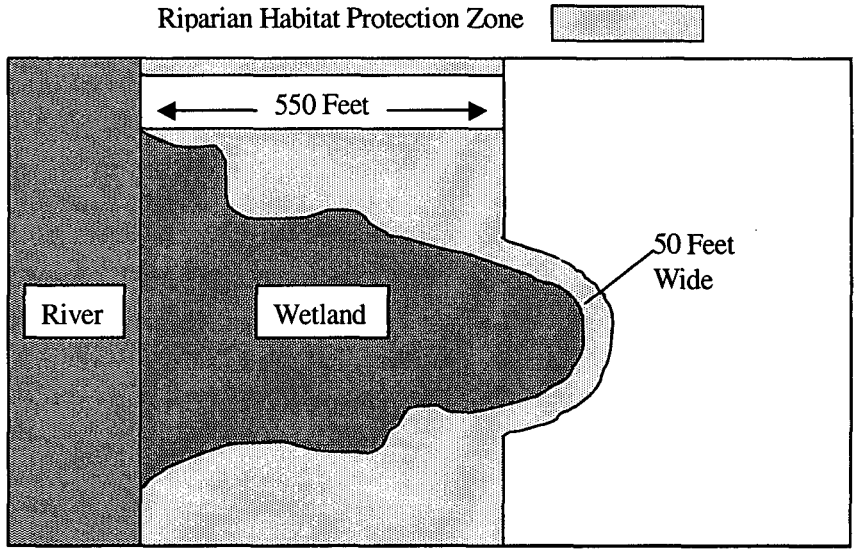

Figure D: Wekiva River Riparian Habitat Protection Zone

Within the Riparian Habitat Protection Zone, the District presumes that construction of buildings, golf courses, impoundments, roads, canals, ditches, swales, and any land clearing resulting in the creation of any surface water management system violate the Riparian Wildlife Habitat standard.[283] An applicant seeking a surface water management permit must provide "reasonable assurance that

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282. *Id.* r. 40C-41.063(3)(e)1. The buffer width is based on studies conducted by the University of Florida's Center for Wetlands. *See* BROWN & SCHAEFER, *supra* note 270; Schaefer & Brown, *supra* note 34.

283. FLA. ADMIN. CODE ANN. r. 40C-41.063(3)(e)2. The rule does not presume that activities not listed have no adverse effect. *Id.* The presumption does not apply to activities that promote a more endemic state on land that has already been changed by man. *Id.* at r. 40C-41.063(3)(e)3.

the construction or alteration of a system will not adversely affect the abundance, food sources, or habitat (including its use to satisfy nesting, breeding and resting needs) of aquatic or wetland dependent species provided by the [zone]."[284]

The rebuttable presumption established in the SJRWMD rule has the effect of severely restricting most, but not all, forms of development within the Riparian Habitat Protection Zone. Predictably, several landowners have contested the District's application of the rules and the validity of the rules and statute. *In re Floyd R. Womack Womack Subdivision MSSW Application* involved a District denial of a landowner's request to construct three single-family residences within the zone in part because the applicant failed to provide reasonable assurance the construction would not cause adverse effects to fish and wildlife, including aquatic and wetland species.[285] The property consisted of three acres of forested uplands and four acres of forested wetlands located within the zone, and six-tenths of an acre located outside the zone.[286] The applicant proposed clearing at least nine-tenths of an acre within the zone. The District determined construction of the three residences would destroy valuable habitat and diminish effectiveness of the zone as a wildlife corridor. The District proposed several alternatives to mitigate the adverse effects, including relocating the project outside the zone or reducing the developed acreage and relocating the project within the zone.[287] The applicant rejected both of these proposals and declined to offer any mitigation.[288] The District then issued a final order denying the application. The applicant has filed suit in circuit court, alleging inverse condemnation, among other claims, but the case was not resolved at the time of this writing.[289]

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284. *Id.* at r. 40C-41.063(3)(e)1.

285. *In re* Floyd R. Womack, 1992 Fla. ENV LEXIS 195 (Fla. St. Johns River Water Mgmt. Dist. Nov. 10, 1992).

286 *Womack*, 1992 Fla. ENV LEXIS, at *2–*3.

287. *Id.* at *4–*5.

288. *Id.*

289. The landowner alleged denial of substantive due process, inverse condemnation, temporary taking, inverse condemnation, permanent taking, violation of equal protection rights, unconstitutional interference with constitutional privacy rights, and requested a declaration that the Wekiva rules and statute are unconstitutional. Plaintiff's First Amended Complaint, Womack v.

In another case interpreting the riparian habitat protection zone, a private property owner applied for a permit to construct a single family residence on a 0.72 acre lot located within the zone.[290] The District issued a permit allowing destruction of 0.3 acres of forested uplands, subject to a condition that the owners dedicate a conservation easement to the District prohibiting all construction including clearing, dredging, or filling not authorized in the permit.[291] Citizen groups subsequently filed a petition for a formal hearing, objecting to a provision in the permit allowing for "limited vegetation removal of trees less than 4 inches in diameter and of under brush, to be agreed upon by District staff and permittee."[292] A hearing officer determined the permit would violate the riparian habitat protection standard unless the District removed the provision allowing limited removal of vegetation.[293]

The landowner then filed suit in circuit court alleging inverse condemnation.[294] The court found for the District, holding the plaintiff had failed to establish they had been deprived of substantially all reasonable economic use of the property, or suffered a physical intrusion due to continuing occupation by animals and plants native to the area.[295] The decision was affirmed by a Florida District Court of Appeal.[296]

St. Johns River Water Mgmt. Dist. (Seminole County Ct. filed Sept. 28, 1994) (No. 92-3044-CA-14K). The case remained unresolved and a trial date had not been set at the time this article was published. Telephone Interview with William H. Congdon, Attorney, Office of General Counsel, St. Johns River Water Management District (Dec. 14, 2001).

290. Friends of the Wekiva & Fla. Audubon Soc'y v. Jim Saboff, No. 91-6823, 1992 Fla. ENV LEXIS 132 (St. Johns River Water Mgmt. Dist. Aug. 4, 1992).

291. *Wekiva*, 1992 Fla. ENV LEXIS, at *2, *14–*15.

292. *Id.* at *17.

293. *Id.* at *31–*34.

294. Plaintiff's Third Amended Complaint, Saboff v. St. Johns River Water Mgmt. Dist. (Seminole County Ct. filed Apr. 4, 1994) (No. 91-2970-CA-16L).

295. Order Dismissing Counts II, III, IV & V of Second Amended Complaint, Striking paragraph 54 and 56 of Count III and Granting Plaintiffs Leave to Amend Count I of the Second Amended Complaint, Saboff v. St. Johns River Water Mgmt. Dist. (Seminole

The landowner subsequently filed suit in federal district court, alleging the District had taken his property and violated his equal protection and substantive due process rights.[297] In *Saboff v. Saint Johns River Water Management District*, Judge Sharp held for the plaintiff, finding that the conservation easement frustrated a portion of the plaintiff's reasonable investment-backed expectations because it burdened the property in a way not bargained for by the plaintiff.[298] The court ordered the District to pay the Saboff's $188,333.07 to compensate for property value, violation of substantive due process rights, and interest.[299] Judge Sharp based this finding on a flawed interpretation of *Nollan v. California Coastal Commission*.[300] Judge Sharp correctly cited *Nollan* as authority that a permit condition that effectuates acquisition of title or interferes with possessory rights may be a taking of private property, but failed to examine whether there was a nexus between the purpose of the riparian protection regulations and the conservation easement. The *Saboff* case is easily distinguished from *Nollan* because the purpose of conservation easement was to conserve native vegetation in the riparian habitat protection zone, which is the identical purpose for which the District established the protection zones.[301] Clearly, there is an extremely close nexus between the purposes of the *Saboff* permit condition and the riparian

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County Ct. filed Dec. 14, 1993) (No. 91-2970-CA-16-K); Order on Plaintiffs' Motion for Rehearing, Saboff v. St. Johns River Water Mgmt. Dist. (Seminole County Ct. filed Feb. 28, 1994) (No. 91-2970-CA-16-K).

296. Saboff v. St. Johns River Water Mgmt. Dist., 681 So. 2d 757 (Fla. Dist. Ct. App. 1996).

297. Saboff v. St. Johns River Water Mgmt. Dist., No. 96-1223-CIV-ORL-18, 1 (M.D. Fla. July 28, 1996), *rev'd*, 200 F.3d 1356 (2000).

298. *Saboff*, at 4 (M.D. Fla. July 28, 1996).

299. *Id.* at 6–7.

300. 483 U.S. 825 (1987) (in which the Supreme Court found that a building permit condition requiring landowners to dedicate an easement for public beach access was a taking because there was an insufficient nexus between the permit condition and the purpose of the government regulation).

301. *See* FLA. STAT. ch. 373.415(1) (1997); FLA. ADMIN. CODE ANN. r. 40C-41.063(3)(e) (1995).

zones, whereas in *Nollan* there was no apparent nexus at all. On appeal, the Eleventh Circuit Court declined to review Judge Sharp's reasoning regarding takings, finding instead that landowner's federal takings claims were barred by Florida principles of *res judicata*.[302] The practical effect of this decision is to reinstate the Florida District Court of Appeal decision that there was no taking of private property. Nonetheless, the *Saboff* case illustrates the potential for clashes between landowners and government regulatory programs to protect biodiversity.

2. Local Government Buffer Zones

In 1988, the Florida legislature also enacted the Wekiva River Protection Act[303] ("Act"), which directed counties with jurisdiction in the Wekiva River Protection Area ("Wekiva Area")[304] to revise their comprehensive plans and land development regulations to protect the Wekiva Area.[305] Specifically, the counties must adopt goals, policies, and objectives for the Wekiva Area which will protect water quantity, water quality, hydrology, wetlands, aquatic and wetland-dependent wildlife species, habitat of listed species, and native vegetation.[306] County plans and regulations for the Wekiva River Protection Area are subject to review and approval by the Department of Community Affairs and the Governor and Cabinet.[307]

County plans must provide for land uses, and densities and intensities of development which will protect the resources and rural character of the Wekiva Area.[308] The county comprehensive plans

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302. Saboff v. St. Johns River Water Mgmt. Dist., 200 F.3d 1356 (11th Cir. 2000), *cert. denied*, 121 S.Ct. 67 (2000).

303. 1988 Fla. Laws chs. 88-121.1, 88-393.26, (codified at FLA. STAT. chs. 369.301–369.313 (1997)).

304. The Wekiva River Protection Area is larger than the area regulated by the Water Management District protection zones. FLA. STAT. ch. 369.303(9).

305. *Id.* at ch. 369.305(1).

306. *Id.* at ch. 369.305(1)(a).

307. *Id.* at chs. 369.305(2)–(6); *see also supra* notes 131–42.

308. County comprehensive plans must include:

> 1. Provisions to ensure the preservation of sufficient habitat for feeding, nesting, roosting, and resting so as to

must require that development which is permitted on property adjacent to the Wekiva River System be concentrated on portions of the property furthest away from surface waters and wetlands of the river system.[309] Counties must also develop land development regulations to implement the Wekiva River protection provisions of their comprehensive plans.[310]

The three affected counties, Orange, Seminole, and Lake, responded quickly and adopted provisions required by the Wekiva legislation.[311] Their plans and regulations were reviewed by DCA

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maintain viable populations of species designated . . . [as endangered, threatened, or of special concern].

2. Restrictions on the clearing of native vegetation within the 100-year flood plain.

3. Prohibition of development that is not low-density residential in nature, unless that development has less impacts on natural resources than low-density residential development.

4. Provisions for setbacks along the Wekiva River for areas that do not fall within the protection zones established pursuant to [Water Management District protection zones for the Wekiva River Protection Area].

5. Restrictions on intensity of development adjacent to publicly owned lands to prevent adverse impacts to such lands.

6. Restrictions on filling and alteration of wetlands in the Wekiva River Protection Area.

7. Provisions encouraging clustering of residential development when it promotes protection of environmentally sensitive areas, and ensuring that residential development in the aggregate shall be of a rural density and character.

Id. at ch. 369.305(1)(b).

309. FLA. STAT. ch. 369.305(1)(c).

310. *Id.* at ch. 369.305(1)(e).

311. Orange County, Fla., Ordinance 88-6 (Apr. 18, 1988); SEMINOLE COUNTY, FLA., AMENDMENTS TO THE ELEMENTS OF THE SEMINOLE COUNTY COMPREHENSIVE PLAN (Feb. 28, 1989) [*hereinafter* SEMINOLE COUNTY AMENDMENTS]; Lake County, Fla., Ordinance 1990-91 (Mar. 6, 1990).

and approved by the Governor and Cabinet.[312] The Orange and Seminole County approaches are similar, with Orange County prohibiting development within 550 feet of the River,[313] and Seminole County enforcing all water management district clearing and building setbacks and establishing a minimum 200-foot clearing and building setback measured from the ordinary high water elevation or the landward limit of wetlands.[314] Both counties encourage clustering of development outside the protected zone,[315] include policy statements pledging to maintain the "rural character" of the area,[316] and designate zoning densities for the Area.[317]

Lake County also adopted provisions to conform with the SJRWMD protection zones.[318] However, Lake County went further than the other counties, adopting several innovative mechanisms including a Transferrable Development Rights ("TDRs") program[319]

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312. Telephone Interview with Jim Farr, Department of Community Affairs (Jan. 1990); *see supra* note 137.

313. Orange County Ordinance, *supra* note 311. Orange County prohibits development within a buffer zone 550 feet landward from the edge of waters or the landward edge of connected wetlands, whichever is greater, unless the activity can be shown to "pose no significant threat to water quality, water quantity, or wildlife habitat for wetland dependent species." *Id.*

314. SEMINOLE COUNTY AMENDMENTS, *supra* note 311, at 38–49.

315. Orange County Ordinance, *supra* note 311; SEMINOLE COUNTY AMENDMENTS, *supra* note 311, at 46–47.

316. Orange County Ordinance, *supra* note 311; SEMINOLE COUNTY AMENDMENTS, *supra* note 311, at 42, 47.

317. Orange County Ordinance, *supra* note 311 (limiting density in the rural service area to one dwelling per five acres); SEMINOLE COUNTY AMENDMENTS, *supra* note 311, at 42–45 (limiting density in areas designated rural to one dwelling per acre, but adopting policy that no development will be approved, regardless of zoning classification, unless the development conforms with the Wekiva Act).

318. Lake County Ordinance, supra note at 311, 312, 331.

319. The amendments create a TDR system where Districts 1 and 2 are designated as "sending areas." *Id.* at 11–13. Owners of land within the sending areas may sell their development rights to owners of land within designated receiving areas. The amendments create two receiving areas where Lake County wants to direct development

and a Development Points Rating System,[320] to encourage protection of sensitive lands while providing property owners with options for use of their land. The Lake County amendments establish two overlay protection zones which limit density and intensity of land use within the Wekiva River Protection Area.[321]

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activities. *Id.* at 13–17. Land owners within the receiving areas who purchase development rights may then increase the density of development on their lands. Lake County staff indicate the TDR program has been used infrequently. Telephone Interview with Jeff Richardson, Principal Planner, Lake County Planning Department, Lake County, Fla. (July 9, 1997). The TDR program was last used in 1991. Lake County Ordinance, *supra* note 311, at 3–17.

320. The Development Point Rating System assigns numerical values to various rating criteria. The objectives of these criteria are to "ensure environmental protection; control urban sprawl; maximize land use efficiency; promote the efficient use of public facilities; ensure that services required by development are in place or are programmed concurrent with development impacts; and to direct appropriate growth patterns within the Wekiva River Protection Area." Lake County Ordinance *supra* note 311, at 17. The amendments establish ranges of scores which correspond to the amount of density increase which will be allowed. *Id.* Although the point system establishes guidelines for determining whether increases in density should be granted, the amendments state explicitly that the achievement of points will not prohibit the county from allowing an increase in density. *Id.* This provision weakens the point system by allowing the county to deviate from the underlying density of one unit per 40 acres.

321. District 1 corresponds with the farthest boundary established by the Water Management District's Wekiva River Hydrologic Basin Protection Zones and limits maximum density to one dwelling unit per forty net acres. Lake County Ordinance, *supra* note 311. Net acres is defined as the total acreage of the parcel minus 1) wetlands defined by the Water Management District or Lake County, 2) lands within the Water Management District's Wekiva River Riparian Habitat Protection Zone, 3) lands within the 100 year flood plain, and 4) road right of ways and easements for ingress and egress. *Id.* at 5. Alternatively, density may be increased to one dwelling unit per 10 net acres through successful application of the Development Point Rating System. *Id.* at 12. District 2 includes

3. Analysis of the Wekiva Program

The Wekiva approach has several strengths. Authorizing the St. Johns River Water Management District, a regional agency, to adopt special regulations for the Wekiva Basin increases the likelihood that enumerated values will receive consistent consideration throughout the entire Basin. The use of protection zones of constant width by the Water Management District ensures that District permitting criteria will be applied consistently throughout the Wekiva Basin, simplifies administration because it eliminates the need to map the entire basin, and provides applicants with easily determined zones with consistent boundaries. Further, the width of the protection zone is based on scientific findings.

The legislation unambiguously directs the Water Management District to establish protection zones and regulations to protect wetland and wetland dependent wildlife and other important habitat values, such as hydrology and water quantity.[322] The Act removes any uncertainty as to the District's authority to regulate riparian habitat for the benefit of wetland and wetland dependent wildlife. Although this authority can be implied from general language in Chapter 373,[323] the governing board of the District had previously declined to regulate riparian habitat without additional legislative direction. The Act made it clear that the Water Management District was authorized, and in fact directed, to regulate riparian habitat, including riparian uplands, for the benefit of wetland and wetland-dependent wildlife in the Wekiva Basin.[324]

The legislation requires local governments within the Wekiva River Protection Area to plan and regulate to protect the Wekiva System.[325] Legislative enumeration of specific values and concerns which local governments must address ensures comprehensive and

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most of the remaining lands within the Wekiva River Protection Area and limits maximum density to one dwelling unit per 20 net acres. Density may be increased to one dwelling unit per five net acres through successful application of the Development Point Rating System. *Id.* at 13.

322. *See* FLA. STAT. ch. 373.415 (1997).

323. Chapter 373 authorizes the water management districts to regulate "water resources." *Id.* at ch. 373.413.

324. *Id.* at chs. 415(1)(a)–(c).

325. *Id.* at chs. 369.301–.313.

consistent regulation of the Wekiva River Protection Area. Local governments are well-suited to participate in regulation of river systems because they routinely review all forms of development proposals and can use existing development review mechanisms to implement new regulations.

The Wekiva River Protection Act approach also has some weaknesses. The legislation puts significant responsibility on local governments that may not have the money, resources, or inclination to effectively protect the river system. Local governments, charged with addressing the multiple and often conflicting needs of the electorate, may not be the best entities to make decisions regarding protection of limited and unique environmental systems such as rivers.

Individual local government plans and regulations may not result in a comprehensive and uniform protection of the resource. For example, legislative requirements that local governments in the Wekiva River Protection Area adopt setbacks from the river has resulted in Lake and Seminole counties adopting setbacks of 200 feet from the river, while Orange county has adopted a much wider setback of 500 feet from the landward edge of the river or connected wetlands. Similarly, Seminole County limits density on much of the land within the Wekiva River Protection Area to a maximum of 1 dwelling unit per acre, Orange County to 1 dwelling unit per 5 acres, and Lake County to 1 dwelling unit per 20 or 40 net acres.

Local governments need considerable time to develop and implement individual comprehensive plans and regulations. For example, Seminole and Orange Counties were able to develop plans and regulations relatively quickly, largely because they already had some provisions in their comprehensive plans and regulations that helped satisfy the requirements of the Act. However, it took Lake County about one and one half years to adopt regulations for the Wekiva Basin, at which time the county permitted significant amounts of development.

The rapid enactment of protection mechanisms is critical to the preservation of natural systems where many new large scale developments are proposed. Significant acreages of sensitive and irreplaceable habitat may be lost during the time it takes to develop new land development regulations and agency rules. Governmental entities could greatly reduce the amount of unsuitable development by adopting interim regulations until new land development regulations and rules are developed.

The Wekiva legislation requires the Water Management District and local governments to protect aquatic and wetland dependent species, and habitat of endangered, threatened, or special concern species. However, the legislation fails to require protection of upland species of wildlife within the Wekiva Basin. While low density requirements may help preserve some upland habitat, there are no assurances that adequate upland habitat will be preserved in the future.

The Wekiva approach could be improved by providing more specificity in the enabling legislation, such as establishing a minimum buffer width which all local governments must adopt, defining what constitutes "rural character," and providing the Water Management Districts with authority to consider all species of wildlife when reviewing environmental resource permit applications. In addition, a legislative directive requiring regulatory entities to adopt interim regulations would prevent adverse development while the entities are developing permanent regulations for a system.

b. *Econlockhatchee River*

In 1989, shortly after adopting the Wekiva River protection program, the St. Johns River Water Management District began developing a similar plan for the Econlockhatchee ("Econ") River.[326] While the Econ program involved Wekiva-like riparian buffer zones, the program differed in several respects. First, the District used a deliberate and open process that facilitated acceptance and adoption of policies and regulations to protect the Econ River Basin. Second, unlike the Wekiva program, the District had no explicit statutory

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326. *See* ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, ECONLOCKHATCHEE RIVER BASIN NATURAL RESOURCES DEVELOPMENT AND PROTECTION PLAN (1990) [*hereinafter* ECON RIVER PLAN]. Like the Wekiva River, the area surrounding the Econlockhatchee (Econ) River was one of the most rapidly growing areas in the nation and was under intense development pressure. At least 40 major residential developments involving over 34,000 acres had recently been approved within the Econ Basin. Tucker & Hamann, *supra* note 148, at 89–93, 96–99. Many proposed developments straddled or were adjacent to the Big Econ River, which was relatively undeveloped. The potential environmental degradation from these projects was substantial. *Id.*

authority for riparian buffer zones, and instead relied upon its general authority to regulate "water resources."[327] Third, there was no legislative directive requiring local governments to protect the Econ River, yet local governments adopted ordinances establishing buffer zones for the river.[328] The remainder of this Part examines these aspects of the Econ River program in greater detail.

1. Process

The process the District followed when developing the Econ River program warrants discussion because it yielded a comprehensive management program spanning several jurisdictions that included clear substantive standards to protect biodiversity, despite the absence of a common legislative directive to adopt the program. When the District began considering a protection program for the Econ River, the scientific data and rationale for delineating riparian habitat protection zones in Central Florida already existed in the form of the Wekiva model[329] and scientific studies.[330] The District could have proceeded with rulemaking, but instead initiated a policy development process involving citizens, government, and development interests. The District contracted with consultants[331] charged with developing a management plan to protect water quality and quantity, ecological functions, and wildlife resources of the Econlockhatchee System through management, regulation, and land acquisition.[332] In addition to the consultants, the District appointed the Econ River Task Force, a committee with representatives from diverse interest groups.[333] The District then hosted a series of public

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327. *See* FLA. STAT. ch. 373.413.

328. *See infra* notes 358–60 and accompanying text.

329. *See supra* Part IV.D.2.a (describing the Wekiva River program).

330. *See* BROWN & SCHAEFER, *supra* note 270.

331. The consultants included a wildlife ecologist, a wetlands ecologist, and several legal analysts from the University of Florida, and experts in archaeological resources from a private consulting firm.

332. *See generally* ECON RIVER PLAN, *supra* note 326.

333. The Task Force included representatives from development corporations, environmental consultants, home-builders and real estate associations, environmental groups, and local, regional, and

meetings over the course of about a year and a half, in which it de-emphasized its customary role of regulator and instead served primarily as a facilitator for the Task Force, consultants, and citizens to develop a protection program.

During the course of the public meetings the consultants routinely presented their findings and recommendations to the members of the Task Force.[334] Composed of a variety of interest groups, many members of the Task Force were initially resistant to the consultant's recommendations. However, through the course of the regular public meetings, most members changed their attitudes to one of mutual cooperation and ultimately the Task Force endorsed most of the consultant's recommendations.[335] The District and local governments then responded by developing new regulations and ordinances to protect the Econ River.

While it is impossible to predict with certainty whether this process would work as well in other settings, there are several elements that contributed to its success. First, the Wekiva experience raised awareness regarding river protection and the importance of riparian habitat, and provided a scientific basis for delineating buffers. Thus, the Wekiva served as a useful model for many of the participants who developed the Econ River program. The Florida Legislature's directive to create riparian protection zones to protect wildlife in the Wekiva Basin[336] undoubtedly enhanced the legitimacy of using this approach to protect riparian wildlife habitat in other river systems. Second, the regular public meetings served to

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state government. *See generally* ECON RIVER PLAN, *supra* note 326; Joseph M. Schaefer et al., *A Natural Resources Management and Protection Plan for the Econlockhatchee River Basin, in* I WILDLIFE CONSERVATION IN METROPOLITAN ENVIRONMENTS 147–48 (1991); BROWN & SCHAEFER, *supra* note 270 (describing rationale and methodology to determine riparian habitat protection zones); Schaefer & Brown, *supra* note 34 (describing a process to determine and adopt riparian habitat protection zones).

334. The consultants were not controlled by the Task Force, and both entities presented separate reports to the water management District.

335. Ultimately, the consultants presented the District with a final report, and the Task Force issued its own recommendations, most of which endorsed key recommendations of the consultants.

336. *See* FLA. STAT. ch. 373.415(1).

educate persons developing policy for the Econ. This was an important factor because some Task Force members who were initially resistant to proposed regulations changed their minds after they fully understood the threats to the system and the scientific rationale for the riparian protection zones. Third, involving interest groups early in the process and providing them with substantial opportunities to ask questions, voice their concerns, and present alternative proposals created an atmosphere of cooperation rather than confrontation. Finally, pervasive development during the past 30 years in the Orlando area likely contributed to a heightened awareness among many citizens and government of the need to conserve remaining natural areas. The confluence of these factors facilitated development of the Econ program.

2. Key Recommendations of the Econ Consultants and Task Force

Like the Wekiva River, residential and commercial development threatened the ecological integrity and wildlife habitat values of the Econ River.[337] Existing local, regional, state, and federal regulatory programs did not adequately protect the natural resources values of

337. With respect to wildlife, the report found that many habitats within the Basin had already been severely fragmented by land uses and highways. Schaefer, *supra* note 13, at 3-45. Much of the remaining relatively undisturbed habitat was along the Big Econ. The Basin provided habitat for 22 species that were endangered, threatened, or of special concern. *Id.* at 3-2. Further, about 35 species in the Econlockhatchee Basin occur almost exclusively in aquatic and wetland habitats, and 119 species usually require access to both wetlands and uplands. *Id.* at 3-41. Land uses in the area had severed historic linkages between the Econ Basin and large areas of flatwoods to the east and sandhills to the west. *Id.* at 3-3. Conversion of native lands into pasture had benefited common open-canopy species, such as brown-headed cowbirds and red-tailed hawks that parasitize and compete with remaining forest dependent species. Schaefer, *supra* note 333, at 148. Development also had resulted in predation from dogs and cats, and unnatural noises which exert additional pressures on native wildlife. *Id.*

the Econ Basin because they did not provide for protection of upland habitat.[338]

The consultants and Task Force[339] recommended that the District amend its surface water management regulations to establish 550-foot buffers along each side of the river to protect water quality and aquatic and wetland-dependent species, limit groundwater drawdowns, strengthen stormwater permitting criteria, and provide for upland buffers adjacent to isolated wetlands.[340] In addition, the consultants and Task Force recommended that local governments implement additional protection measures including an additional 550-foot buffer to protect upland species.[341]

3. Statutory Authority for WMD Riparian Habitat Protection Zones

The WMD relied upon its general statutory authority to regulate "water resources" when developing the Econ riparian habitat

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338. Tucker & Hamann, *supra* note 148, at 1. The water management district also allowed destruction of small isolated wetlands. *Id.* at 77–78. The regulations did not adequately protect water quality and quantity and allowed harmful groundwater drawdowns which could reduce the base flow of the river system. *Id.* at 76–82. Stormwater regulations permitted inadequate treatment systems and depended on a nutrient standard that was difficult to enforce. *Id.* at 82–83. The nutrient standard stated "in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora and fauna." FLA. ADMIN. CODE ANN. r. 17-3.121(19) (1987). This standard failed to consider the effects other factors, such as temperature, light, and the rate of water movement, may have on populations of flora and fauna. Tucker & Hamann, *supra* note 148, at 83.

339. The District developed the Econ program based on recommendations of consultants and a Task Force. *See supra* notes 329–36 and accompanying text (explaining the role of the consultants and Task Force).

340. Tucker & Hamann, *supra* note 148, at 7–10, 17–20.

341. *Id.* at 6–7, 10, 18–20. The primary rationale for the second 550 foot buffer is to buffer the first buffer from edge effects that might degrade its wildlife habitat value, such as light penetration, noise, runoff, and predation from dogs and cats.

protection zones because there was no explicit legislative authorization for the zones.[342] The Legislature did not define "water resources" and thus a key legal question concerned whether "water resources" includes wildlife, and if so, what kinds of wildlife. At the time the WMD developed the Econ program there were no judicial decisions interpreting the relationship of "water resources" to wildlife, although the SJRWMD had clearly articulated its interpretation in a 1986 final order, *Friends of Fort George, Inc. v. Fairfield Communities, Inc.*[343]

Friends of Fort George concerned a request by a Georgia-based development company to construct about 1,343 residential units, 80,000 square feet of commercial area, and several golf courses on 900 acre Fort George Island, located northeast of Jacksonville, Florida.[344] The WMD approved the company's application for conceptual approval of a surface water management permit, and several citizen's groups subsequently challenged the permit.[345] In a recommended order upholding the District's permit approval, an administrative hearing officer included findings of fact and conclusions of law establishing that the proposed development would have no adverse affects on "wildlife," "plant life," and "terrestrial species."[346] The District rejected this language because the hearing officer's words implied that the District's authority to regulate water resources included upland wildlife. The District disagreed with this interpretation and issued a final order which deleted all references to "wildlife" and replaced them with "aquatic and wetland dependent wildlife," because "the scope of inquiry under [the WMD surface water permitting program] does not extend to wildlife species which are not aquatic or wetland dependent."[347]

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342. *See* FLA. STAT. ch. 373.413 (1997).

343. ST. JOHNS RIVER WATER MGMT. DIST., FINAL ORDER (Dec. 9, 1986) (Nos. 85-3537, 85-3596).

344. Tucker & Hamann, *supra* note 148, at 41–43. Existing land use on the island at the time of the proposal included about 16 homes, one golf course with clubhouse, a state park, and a bird and plant sanctuary. *Id.* at 41.

345. *Id.* at 37–38.

346. *Id.* at 55–61, 84–87.

347. *Id.* at 26–31. The district governing board based this conclusion on District staff testimony asserting that past agency practice included consideration of affects on aquatic and wetland

The recommended and final orders contain no references to allegations that the District had either shirked its responsibilities or exceeded its authority relative to wildlife. Thus, it is unclear whether the District was responding to allegations raised by the parties, was concerned that the issue would be raised on appeal, or was making an unsolicited proclamation to remove any future ambiguity concerning its view of WMD authority to regulate wildlife. Regardless of the District's motivation, the *Friends of Fort George* decision is often referenced as authority for WMDs to regulate aquatic and wetland dependent species, but not upland species, and the District relied upon this interpretation when developing the Econ riparian zones.[348] Paradoxically, the *Friends of Fort George* decision precludes district regulation of uplands for the benefit of upland species, yet impliedly validates district regulation of uplands for the benefit of aquatic and wetland dependent species.

In the spring of 1990 a bill was introduced in the Florida Legislature that directed the District, other agencies, and local governments to adopt measures to implement many of the Econ consultant's recommendations.[349] At the direction of its governing board, the District began preliminary rulemaking. Although the bill died in committee hearings,[350] the District continued rule development for the Econlockhatchee River. Despite strong developer opposition,[351] the District ultimately adopted a rule establishing a 550-foot protection zone and development standards and review criteria similar to those adopted for the Wekiva River.[352]

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dependent species, but not other species, and that the District's regulations reflected this intent. *Id.* at 28.

348. *See, e.g.*, FLA. ADMIN. CODE ANN. r. 40C-4.301 (1995) (referencing *Friends of Fort George* as authority that the scope of inquiry does not extend to species which are not aquatic or wetland dependent).

349. S.B. 1852, 1990 Leg., Reg. Sess. (Fla. 1990); H.B. 1673, 1990 Leg., Reg. Sess. (Fla. 1990).

350. *See* Lawrence J. Lebowitz, *Heavy Lobbying Leads House to Scrap Econ Plan*, ORLANDO SENTINEL, Mar. 14, 1992, at D5.

351. *See, e.g.*, Mary Beth Regan, *Activists Win Battle for Econ but Developers Vow to Fight Protection*, ORLANDO SENTINEL, Feb. 4, 1992, at B1.

352. FLA. ADMIN. CODE ANN. r. 40C-4.041(2)(b)3, 6 (establishing permitting thresholds for the Econlockhatchee Basin); *Id.* r. 40C-

Although there have been no direct challenges to the District's authority to establish riparian habitat protection zones for the Econ River, development interests have unsuccessfully challenged WMD authority to regulate uplands for the benefit of any species, whether the species is aquatic or wetland dependent.[353] In 1995, in *Florida Electric Power Coordinating Group, Inc. v. Suwanee River Water Management District*, petitioners challenged the validity of several proposed water management district rules, asserting that the rules were invalid exercises of legislative authority because they regulated uplands, and thereby exceeded the authority granted by the district's enabling statute.[354] One of the rules in question proposed to protect existing upland nests and dens of aquatic or wetland dependent species and adjacent uplands necessary to support the nests and dens.[355] The hearing officer rejected petitioner's challenge, finding the proposed rule was a valid exercise of authority because basic scientific principles supported the district's position that aquatic and wetland dependent species are an integral part of water resources, and the regulation of uplands to ensure the survival of these species was reasonably related to the district's statutory authority.[356]

The *Florida Electric Power Coordinating Group, Inc.* decision is significant because it is the first decision to explicitly state that the district's general grant of authority to regulate water resources includes regulation of uplands to benefit aquatic and wetland dependent species. Recall that in *Friends of Fort George*, the district governing board stated that district authority did not extend to upland species, thereby implying, but not stating affirmatively, that district authority did include aquatic and wetland dependent species. Further, *Florida Electric Power Coordinating Group, Inc.* has greater value as precedent because it was a final order of Florida Division of Administrative Hearings, an entity independent from the

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41.023(4) (defining the Econlockhatchee River Hydrologic Basin); *Id.* r. 40C-41.063(5) (establishing standards and criteria for the Econlockhatchee River Hydrologic Basin, including a 550 foot wide riparian habitat protection zone).

353. *See* Fla. Elec. Power Coordinating Group, Inc. v. Suwanee River Water Mgmt. Dist., Nos. 94-2722RU, 94-2930RP, 94-2935RP, 94-2936RP (Fla. Div. of Admin. Hearings July 24, 1995).

354. *Suwanee*, at 74 (Fla. Div. of Admin. Hearings July 24, 1995).

355. *Id.* at 75.

356. *Id.* at 76.

district, whereas *Friends of Fort George* was a final order of the St. Johns River Water Management District. In 1998, a state appeals court explicitly affirmed the authority of water management districts to regulate uplands for the benefit of aquatic and wetland dependent species in a case challenging proposed St. Johns River Water Management District riparian habitat protection zones for the Tomoka River.[357] Part IV.D.2.c of this article discusses administrative and judicial decisions concerning the Tomoka River zones.

4. Local Government Buffer Zones

Local governments responded quickly to recommendations of the Econ Task Force, consultants, and the District to protect riparian habitat, despite the absence of a legislative directive.[358] Orange County adopted an ordinance prohibiting development in the first 550 feet from the river and limiting development between 550 and 1100 feet from the river.[359] Seminole County amended its comprehensive plan and adopted a river protection ordinance establishing protection zones similar to those in Orange County.[360] Remarkably, local governments adopted ordinances which are even more protective than those for the Wekiva. Further, the ordinances are consistent, establishing nearly identical protection zones for the River. The process the district followed in developing the Econ program undoubtedly helped facilitate local action to protect the river.[361]

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357. St. Johns River Water Mgmt. Dist. v. Consol.-Tomoka Land Co., 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

358. There were no statutory directives requiring local governments to protect the Econlockhatchee, other than the conservation requirements of Florida's GMA. *See supra* notes 145–52 and accompanying text.

359. Orange County, Fla., Ordinance No. 91-29 (Dec. 10, 1991).

360. Seminole County, Fla., Ordinance No. 91-9 (June 25, 1991).

361. *See supra* notes 326–33 and accompanying text.

c. *Tomoka River*

A recent administrative decision threatened to sound the death knell for new water management district riparian habitat protection zones in Florida. In *Consolidated-Tomoka Land Company v. St. Johns River Water Management District*, landowners challenged the validity of proposed St. Johns River Water Management District rules creating riparian protection zones adjacent to the Tomoka River and Spruce Creek, located on the east coast of central Florida.[362] Landowners asserted the zones violated multiple provisions of Florida's recently amended Administrative Procedure Act,[363] including allegations the rules exceeded the District's rulemaking authority, enlarged the specific provisions of law being implemented, were arbitrary and capricious, and were unsupported by competent substantial evidence.[364] The administrative law judge ruled the riparian habitat protection zones exceeded the District's statutory authority, based on Florida's new APA.[365] However, the judge found the zones were based on competent substantial evidence and were not arbitrary and capricious.[366]

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362. Consol.-Tomoka Land Co. v. St. Johns River Water Mgmt. Dist., Nos. 97-0870RP, 97-0871RP, 1997 Fla. ENV LEXIS 97 (Fla. Div. Adm. Hearings June 27, 1997), 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

363. In 1996, the Florida Legislature substantially revised Florida's Administrative Procedure Act. 1996 Fla. Laws. ch. 96-159 (codified as amended at FLA. STAT. ch. 120 (1997)); *see supra* notes 113–17.

364. *Consol.-Tomoka*, 1997 Fla. LEXIS 97, at *8–*9. Landowners also asserted the rules were invalid because the rules failed to establish adequate guidance and standards, vested unbridled discretion in the District, and a suitable lower cost alternative existed. Landowners also requested attorney's fees and costs, claiming the District's actions were not substantially justified. *Id.*

365. *Id.* at *60–*62.

366. *Id.* at *33, *36. The judge ruled in favor of the District on the remaining claims, holding that 1) the rules established adequate guidance and standards, 2) the rules did not vest unbridled discretion in the district, 3) the rules were not invalid because a lower cost alternative existed, and 4) the District's rulemaking was justified and thus landowners were not entitled to attorney's fees and costs. *Id.* at *75.

This decision illustrates the potential negative affect of recent amendments to Florida's APA. The 1996 amendments to the APA greatly restrict agency discretion in rulemaking, requiring both a general grant of rulemaking authority and a specific law that grants "particular powers and duties."[367] In *Consolidated-Tomoka*, the judge determined the rule satisfied the general grant of authority,[368] but failed to identify specific law granting "particular powers and duties" because the District's organic statute does not refer to riparian habitat protection zones or any specific program or duty that would authorize the zones.[369] In the judge's words, "even though the proposed rules are not arbitrary or capricious, are supported by competent and substantial evidence, and substantially accomplish the statutory objectives, they are procedurally flawed because they lack the underlying statutory detail now required under the new law."[370] This standard severely limits the ability of agencies to adopt meaningful new programs to protect biodiversity or other natural functions without explicit new grants of statutory authority.

The judge also stated the amended APA "reverses years of precedent" because it shifts the burden of proof from the challenger to the agency.[371] Under the old APA, the challenger had the burden of proving its allegations were correct. The new APA, however, requires the agency to prove "that the proposed rule is not an invalid exercise of delegated legislative authority as to the objections raised."[372] The new allocation of burden may prove to be

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367. *Id.* at *58. The new APA language places extraordinary restraints on agency rulemaking in Florida. *See supra* note 113.

368. *Id.* at *58.

369. *Id.* at *18–*19, *58–*62. The judge determined statutory language directing the District to "require such permits and impose such reasonable conditions" to assure surface water management systems are "not harmful to the water resources of the district," and to adopt rules "necessary to implement the provisions of this part" which are "consistent with state water policy and shall not allow harm to water resources . . ." did not provide sufficient authority for the zones because they did not refer to a riparian habitat protection zone or any specific program or duty which would authorize the zones. *Id.*

370. *Consol.-Tomoka*, 1997 Fla. LEXIS 97, at *61.

371. *Id.* at *49.

372. *Id.* (citing FLA. STAT. ch. 120.56(2)(a) (1996)).

extraordinarily burdensome and time-consuming for agencies because it requires them to disprove all allegations, legitimate or not, cited in the original petition.[373]

A Florida appeals court recently reversed the administrative decision, finding it unlikely that the Legislature intended "to establish a rulemaking standard based on the level of detail in the enabling statute, because such as standards would be unworkable."[374] In interpreting the legislative history of the APA amendments, the court crafted a "functional test based on the nature of the power or duty at issue and not the level of detail in the language of the applicable statute."[375] A rule that falls within the "range of powers" identified in the implementing statute is valid.[376] The Florida supreme court declined to review the decision.[377]

The District's victory was short lived, however. In 1999, the Florida Legislature amended the APA to directly overturn the *Consolidated-Tomoka* functional test.[378] The APA now requires that agencies may only adopt rules "that implement or interpret the specific powers and duties granted by the enabling statute."[379]

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373. *Id.* at *50–*51. For example, in the instant case landowners filed sixty-seven objections to the proposed rules. The amended APA allows for attorneys fees and costs under certain circumstances if the challenger prevails on any issue. Thus, agency attorneys would be expedient to disprove all allegations, regardless of facial merit. *Id.* at *50.

374. *Id.* at *5.

375. *Id.* at *6. The court examined legislative intent after first determining that the phrase "particular powers and duties" was ambiguous.

376. *Consol.-Tomoka*, 1997 Fla. LEXIS 97, at *6.

377. Consol.-Tomoka Land Co., v. St. Johns River Mgmt. Dist., 727 So. 2d 904 (Fla. 1999).

378. 1999 Fla. Laws ch. 99-379 (codified at FLA. STAT. chs. 120.52(8), 120.536(1) (2001)). A committee report accompanying the legislation explicitly lists *Consolidated-Tomoka*. FLA. H.R. COMM. ON WATER RESOURCE & MGMT., BILL RESEARCH AND ECONOMIC IMPACT STATEMENT (1998).

379. FLA. STAT. chs. 120.52(8), 120.536(1) (2001). The full text of this provision states:

> A grant of rulemaking authority is necessary but not sufficient to allow an agency to adopt a rule; a specific

Predictably, these legislative changes have spawned a flurry of rule challenges[380] and commentary.[381] Although the exact meaning of the

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> law to be implemented is also required. An agency may adopt only rules that implement or interpret the *specific powers and duties granted by the enabling statute.* No agency shall have authority to adopt a rule only because it is reasonably related to the purpose of the enabling legislation and is not arbitrary and capricious or is within the agency's class of powers and duties, nor shall an agency have the authority to implement statutory provisions setting forth general legislative intent or policy. Statutory language granting rulemaking authority or generally describing the powers and functions of an agency shall be construed to extend no further than implementing or interpreting the *specific powers and duties* conferred by the same statute.

Id. (emphasis added). The previous version of these statutory section required that an agency may adopt "only rules that implement, interpret, or make specific the *particular powers and duties* granted by the enabling statute. . . ." FLA. STAT. chs. 120.52(8), 120.536(1) (1977) (emphasis added) .

380. *See, e.g.*, Southwest Florida Water Management District v. Save the Manatee Club, Inc., 773 So. 2d 594 (Fla. Dist. Ct. App. 2000) (holding that rules granting exemptions to environmental permitting requirements were an invalid exercise of legislative authority "because they do not implement or interpret a *specific* power granted by the applicable enabling statute." *Id.* at 596) (emphasis added); State of Fla. Bd. of Trs. of the Internal Improvement Trust Fund v. Day Cruise Ass'n, Inc., 794 So. 2d 696 (Fla. Dist. Ct. App. 2001) (holding invalid a proposed rule that would forbid mooring or anchoring of certain vessels to sovereignty submerged lands because the rule exceeded statutory rulemaking authority and failed to implement specific enabling legislation).

381. *See, e.g.*, Martha C. Mann, Note, *St. Johns River Water Management District v. Consolidated-Tomoka Land Co.: Defining Agency Rulemaking Authority Under The 1996 Revisions To The Florida Administrative Procedure Act*, 26 FLA. ST. U. L. REV. 517 (1999); Jim Rossi, *Symposium: Approaching The Millennium: Are Pennsylvania's Administrative Procedure Statutes Still Doing The*

amendments is yet to be resolved, it is clear that agency rules in Florida now require much more specific grants of enabling authority than in the past.

The dispute over the proposed Tomoka program and recent changes to the APA may deter new habitat-based riparian protection zones in Florida unless the Legislature provides water management districts with additional statutory authority.[382] However, the debate will probably not affect the Wekiva protection program because of the specific grant of statutory authority to the SJRWMD to establish protection zones to prevent harm to aquatic and wetland-dependent wildlife species.[383] The SJRWMD's authority for the Econlockhatchee River is more precarious because the program is based on the District's general authority to regulate "water resources." The amended APA extends its reach backward in time, requiring that all agencies provide the Administrative Procedures Committee with a listing of each rule, or portion of a rule, adopted prior to the effective date of the APA amendments, which exceeds the rulemaking authority permitted by the APA.[384] The Florida legislature will then decide whether to enact specific legislation

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Job?: "Statutory Nondelegation": Learning From Florida's Recent Experience In Administrative Procedure Reform, 8 WIDENER J. PUB. L. 301 (1999); David M. Greenbaum & Lawrence E. Sellers, Jr., *1999 Amendments To The Florida Administrative Procedure Act: Phantom Menace Or Much Ado About Nothing?*, 27 FLA. ST. U. L. REV. 499 (2000).

382. Consol.-Tomoka Land Co. v. St. Johns River Water Mgmt. Dist., Nos. 97-0870RP, 97-0871RP, 1997 Fla. ENV LEXIS 97 (Fla. Div. Adm. Hearings June 27, 1997), 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999)

383. The protection zones must be wide enough to "prevent harm to the Wekiva River System, including water quality, water quantity, hydrology, wetlands, and aquatic and wetland-dependent wildlife species." FLA. STAT. ch. 373.415(1). The District must also consider the "biological significance of the wetlands and uplands adjacent to the designated watercourses . . . including the nesting, feeding, breeding, and resting needs of aquatic species and wetland-dependent wildlife species." *Id.* at ch. 373.415(1)(a).

384. *Id.* at ch. 120.536(2). Agencies must provide the list by October 1, 1997, one year after the effective date of the amendments. *Id.*

authorizing the identified rules, or portions of the rules.[385] Each agency must repeal each rule or portion of a rule for which the legislature fails to adopt specific authorizing legislation.[386] The SJRWMD, believing its Econlockhatchee and *Tomoka* rules to be based on sufficient statutory authority, did not identify the rules as exceeding its rulemaking authority under the new APA.[387]

A positive aspect of the *Consolidated-Tomoka* decisions are their affirmation of the rationale for the riparian habitat protection zones. During the administrative hearing, both sides presented expert testimony concerning the logic and reason for the zones. The administrative judge took an in-depth look at the rationale for the zones and the standards and criteria in the District's rule, which are essentially the same as those for the Wekiva and Econlockhatchee Rivers. The administrative judge determined the District had the more credible and persuasive evidence, and that the zones were based on logic and reason.[388] Further, the judge reviewed the riparian habitat protection standard and the rebuttable presumption designating certain activities as having adverse effects on the zones,[389] and determined they provided adequate guidance to

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385. *Id.* The legislature will review the lists at the 1998 Regular Session. *Id.*

386. FLA. STAT. ch. 120.536(2). Agencies must initiate repeals by January 1, 1999. *Id.* By February 1, 1999, the Administrative Procedures Committee must notify the legislature of any rules that an agency had previously identified as exceeding the rulemaking authority permitted by the APA for which proceedings to repeal the rule have not been initiated. *Id.* If the agency fails to act within six months, the Administrative Procedures Committee or any substantially affected person may petition an agency to repeal the rule. *Id.*

387. Telephone Interview with William H. Congdon, Attorney, Office of General Counsel, St. Johns River Water Management District (July 22, 1998).

388. Consol.-Tomoka Land Co., v. St. Johns River Water Mgmt. Dist., Nos. 97-0870RP, 97-0871RP, 1997 Fla. ENV LEXIS 97, *29–*34 (Fla. Div. Adm. Hearings June 27, 1997), 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

389. *See supra* notes 283–85 and accompanying text (describing the District's nearly identical riparian habitat protection standard and rebuttable presumption for the Wekiva River).

regulators and regulated entities.[390] The administrative judge's ruling that the riparian habitat protection zone rules provide adequate guidance, are supported by competent substantial evidence, and are not arbitrary and capricious further solidifies the zones as a legitimate approach to protecting biodiversity in river systems.

V. IMPLEMENTATION OPTIONS AND SUGGESTED REFORMS

Ecosystem management is a promising approach to managing natural resources, yet it is unlikely to conserve biodiversity on private lands unless lawmakers provide regulators and local governments with clear directives to conserve biodiversity. Florida's experience raises a number of issues and suggests several models to implement ecosystem management, despite the shortcomings discussed throughout this article.

A. *Ecosystem Management as the Overarching Principle for Regulatory Programs*

The principles of ecosystem management—connectedness, ecological management, ecological integrity, data collection, evaluation/auditing, adaptive management, interagency cooperation, organizational change, humans are critical, and human values[391]—are fundamentally sound and address many of the common barriers to natural resource regulation identified in Part III. Two of the most important principles for biodiversity conservation are the recognition that ecosystems are the appropriate management unit, rather than arbitrary political boundaries, and that basic ecological functions

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390. *Consol.-Tomoka*, 1997 Fla. ENV LEXIS 97, at *37–*39. For example, one of petitioner's expert witnesses (accepted as an expert in environmental permitting) conceded that "he has utilized, without difficulty or misunderstanding, the same provisions when processing applications for permits in the Econlockhatchee and Wekiva Basins." *Id.* at *40–*42. Further, District records showed only two denials out of 560 permit applications since adoption of the Econlockhatchee and Wekiva rules. *Id.* at *39. This fact may, however, call into question the rigor with which the District is implementing its rules for those two systems.

391. Grumbine, *supra* note 9, at 29–31.

must be maintained and restored. These principles, if implemented, could go a long way in conserving biodiversity on private lands.

Despite its potential, it is not clear to what extent ecosystem management will conserve biodiversity because ecosystem management involves a balancing of economic, environmental, and social values. Biodiversity conservation is clearly a goal of ecosystem management, but it is only one of ten goals. Ecosystem management also requires active involvement and cooperation by all government entities because each operates within certain geographic and substantive constraints.

Florida's ecosystem management policy illustrates why effective ecosystem management must be comprehensive and contain clear and substantial substantive legal authority. For example, it does little good for the Legislature to direct Florida's Department of Environmental Protection, with limited authority over land use, to promote ecosystem management without also requiring the Department of Community Affairs and local governments to practice ecosystem management and conserve biodiversity. Legislators must recognize that biodiversity conservation cannot be accomplished solely on public lands, and that ecosystem management on private lands will require more than improved efficiency of existing programs and voluntary cooperation by land owners.[392] The Florida Legislature should amend Chapter 163, part II, Florida Statutes, to require local governments to adopt comprehensive plan provisions and land development regulations to implement ecosystem management and to conserve biodiversity, including non-listed aquatic, wetland-dependent, and upland species of wildlife.

The proposed regional commission and management plan for the Green Swamp would facilitate consistent ecosystem management.[393] The Florida Legislature should amend Chapter 380, Florida Statutes, to encourage local governments to adopt the proposed Green Swamp model, in exchange for de-designation as an ACSC.[394]

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392. *See supra* note 188–90 and accompanying text.

393. *See supra* notes 326–33 and accompanying text.

394. *See* FLA. STAT. ch. 380.05(12) (1997) (providing for de-designation if local governments successfully protect the area for at least one year).

B. *Substantive Standards for Biodiversity Conservation*

Ecosystem management involves a balancing of social, economic, and environmental factors. Ecosystem management programs that fail to include legislative directives to conserve biodiversity are unlikely to protect biodiversity on private lands because economics and social factors will inevitably win the day.

Ecosystem management principles are not drastically different from Multiple-Use-Sustained-Yield ("MUSY") principles, yet past experiences with MUSY illustrate how easily public land managers can promote certain management objectives, such as timber production, to the consistent exclusion of other important objectives, such as watershed and wildlife.[395] Ecosystem management presents regulators with the same fundamental dilemmas. For example, ecosystem management promotes maintaining ecosystem functions, while at the same time promoting human economic and social values. If regulators are given sufficient discretion to balance ecosystem management principles, to the possible exclusion of ecosystem function, the policy is likely to fail to conserve biodiversity.

Obviously, not all private lands can be managed to conserve biodiversity. The danger, however, is that regulators will merely give lip service to biodiversity, and will continue business as usual. Laws authorizing ecosystem management must establish clear substantive criteria to deal with the inevitable conflicts that will arise between ecosystem, economic, and social values. Otherwise, the policy will be subject to the same subjective interpretations as MUSY, and will likely fail to conserve ecosystems and biodiversity. The Wekiva, Econ, and Tomoka programs, involving riparian buffers that prohibit almost all development, illustrate the type of dramatic restraints on private land use that are necessary to conserve biodiversity.[396]

The Florida Legislature should build on the success of the Wekiva and Econ programs and amend Chapter 373, Florida Statutes, to

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395. *See generally* Michael C. Blumm, *Public Choice Theory and the Public Lands: Why "Multiple Use" Failed*, 18 HARV. ENVTL. L. REV. 405 (discussing the failure of multiple use policy).

396. *See supra* Part IV.D.2. Even these programs provide marginal biodiversity conservation, purporting to conserve only 50% of the species inhabiting the systems.

provide clear and unambiguous authority for the water management districts to consider and regulate for the benefit of biodiversity, including aquatic, wetland-dependent, and upland species of wildlife. The Legislature should also amend Chapter 373 to establish minimum state criteria directing water management districts to identify candidate river systems for special protection. In addition, the Legislature should create a process for development of river-specific protection programs, perhaps similar to that followed for the Wekiva and Econlockhatchee Rivers.

Legislatures must establish clear goals for conserving biodiversity, and then provide regulators with the authority to obtain those goals. Florida's Wekiva program is a good example of a program where the legislature provided clear and unambiguous criteria requiring conservation of biodiversity.[397] The legislation requires the water management district to adopt riparian protection zones wide enough to protect wildlife, including consideration of nesting, feeding, breeding, and resting needs of aquatic and wetland-dependent species.[398] In contrast, Florida's statewide ecosystem management policy lacks meaningful criteria to conserve biodiversity, merely directing DEP to protect ecological systems through "enhanced coordination of public acquisition, regulatory, and planning programs."[399]

Legislators and regulators should develop substantive standards for categories of natural systems, or on a system-by-system basis. Several general issues they should address include requirements for 1) resource inventories, 2) minimum state standards to protect biodiversity, ecosystem function, and ecosystem integrity, 3) buffer zones to protect water, wetlands, wildlife, and scenic values, 4) core preservation areas to protect non-linear natural systems 5) cumulative impacts assessment programs, and 6) wildlife corridors.

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397. *See* FLA. STAT. ch. 373.415(1).

398. *Id.*

399. 1993 Fla. Laws ch. 93-213 § 2(2)(c) (codified at FLA. STAT. ch. 20.255 (1997)); *see also supra* notes 179–97 and accompanying text (discussing shortcomings of Florida's ecosystem management policy).

C. *Institutional Approaches*

This Part summarizes in general terms several different institutional approaches to regulating natural systems, drawing heavily upon Florida's regulatory experience.

1. Comprehensive Statewide Ecosystem Management Model

To be effective, ecosystem management must be integrated into all environmental and land use regulatory programs, at all levels of government. Florida's approach, though noteworthy as the nation's first state ecosystem management policy, is insufficient because it does not provide adequate substantive authority nor involve all appropriate agencies.[400] A better approach would involve a new statute creating a comprehensive statewide ecosystem management program, designating a lead agency as in Florida, but also requiring other relevant agencies to implement the policy.

The statute should contain meaningful substantive criteria, as discussed in the preceding Part. A statute that merely directs agencies to implement ecosystem management is likely to fail. Instead, the statute should identify important types of ecosystems, establish minimum criteria to protect those ecosystems, and direct agencies to adopt specific ecosystem management programs for those ecosystems. For example, the Florida Legislature should establish criteria to protect specific river systems, including riparian wildlife and habitat, and direct the water managements to develop river specific ecosystem management programs.

2. Comprehensive Growth Management Model

A comprehensive growth management statute, like the Florida GMA, provides an excellent institutional mechanism to implement statewide ecosystem management. In fact, the Florida program addresses many of the components of ecosystem management, including conservation of forests and other vegetative communities, wildlife, wildlife habitat, and other environmentally sensitive lands.[401] The Florida approach places responsibility on local governments to develop comprehensive plans, subject to approval by

400. *See supra* Part IV.B.

401. FLA. STAT. ch. 163.3177(6)(d).

the state.[402] Local plans must be consistent with regional and state minimum standards, and must be coordinated with the plans of adjacent local governments.[403] These requirements may facilitate the large-scale landscape approach needed for ecosystem management.

In jurisdictions where the institutional structures for state comprehensive planning already exist, it would be fairly easy to add ecosystem management requirements to these programs. Recent amendments to Florida's Administrative Procedure Act have cast some doubt on whether Florida's Department of Community Affairs has sufficient statutory authority to implement ecosystem management objectives through agency rulemaking.[404] The Florida Legislature should remove any uncertainties and amend Chapter 163, part II, Florida Statutes, to require local governments to adopt comprehensive plan provisions and land development regulations to implement ecosystem management and to conserve biodiversity, including non-listed aquatic, wetland-dependent, and upland species of wildlife.

3. Ecosystem Specific Models

a. *ACSC Model (State Mandate/Local Implementation)*

The Area of Critical State Concern ("ACSC") model creates a mechanism to designate and protect areas of critical importance to the state.[405] Once the legislature has designated an ACSC, the state planning agency is authorized to adopt rules to guide local government review of development proposals within an ACSC and to appeal local decisions that are inconsistent with state standards.[406] Local governments are required to comply with the state rules and statutes designating the ACSC.[407] Local governments that

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402. *See supra* notes 132–79.

403. *Id.*

404. *See, e.g.*, Consol.-Tomoka Land Co., v. St. Johns River Water Mgmt. Dist., Nos. 97-0870RP, 97-0871RP, 1997 Fla. ENV LEXIS 97 (Fla. Div. Adm. Hearings June 27, 1997), 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

405. *See supra* notes 230–66 and accompanying text (discussing Florida's ACSC program).

406. FLA. STAT. ch. 380.05(1)(a).

407. *See supra* notes 233–47 and accompanying text.

successfully protect an ACSC may obtain de-designation, otherwise the designation remains in place. Either way, the resource values should be protected because the state retains authority to immediately re-designate former ACSCs if local governments are not protecting the area.[408]

Florida's experience suggests the ACSC approach of state mandates may engender resentment and resistance at the local level that ultimately impedes the program's effectiveness, however.[409] Other problems include inadequate governmental coordination and failure to update the agency rules for specific ACSCs to reflect new priorities, technology, and scientific understanding.[410] In addition, the program may be under-used because each new designation requires new legislation.

The ACSC approach has potential to avoid some barriers to ecosystem management and to promote biodiversity conservation, despite the program's marginal success in Florida. Ideally, ACSCs should be delineated on natural system boundaries, rather than political boundaries.[411] ACSCs are well suited to promoting intergovernmental coordination because the state establishes minimum criteria that all local governments must implement. The approach also provides ample opportunity for the state to establish meaningful substantive criteria, because each ACSC designation requires specific legislative action.

b. *Proposed Green Swamp Model (State Mandate/Regional Commission and Plan/Regional and Local Implementation)*

The approach proposed by the Green Swamp Task Force involved a legislative mandate establishing protection criteria and creating a regional commission with jurisdiction over an entire natural system.[412] The regional commission, comprised of representatives from local, regional, and state government, must develop a

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408. FLA. STAT. ch. 380.05(1)(d).

409. *See supra* note 254.

410. *See supra* note 253.

411. Florida's Green Swamp ACSC includes about 58 percent of the natural system. *See supra* notes 241–44 and accompanying text.

412. *See supra* notes 232–68 and accompanying text (discussing the proposed Green Swamp programs).

comprehensive management plan for the entire system.[413] Local governments must implement the comprehensive management plan through their comprehensive plans and land development regulations.[414] The regional commission has authority to review and override local decisions that are inconsistent with the comprehensive management plan.

The proposed Green Swamp approach has great potential because it addresses many of the barriers to ecosystem management. Perhaps most notably, the program creates a regional commission and a comprehensive regional plan, thus addressing problems of intergovernmental coordination. However, it involves creating a new government entity that diminishes local authority, and thus may encounter substantial resistance.

c. *Wekiva Model (State Mandate/Regional and Local Implementation)*

The Wekiva model is based upon a legislative directive requiring a regional agency and local governments to protect a river system.[415] One of the strengths of the Wekiva model is the statute itself, which contains clear substantive guidance for the water management district and local governments to establish protection zones to protect aquatic and wetland-dependent wildlife.[416]

The Wekiva approach works only if a suitable regional agency exists. Florida's water management districts are well suited to managing watersheds, although limited statutory authority precludes them from actively regulating much of the upland habitat within watersheds.[417] If an appropriate regional agency does not already exist, the proposed Green Swamp Model may be a better approach.

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413. *See supra* note 264 and accompanying text.

414. *Id.*

415. *See supra* notes 267–323 and accompanying text (discussing the Wekiva River program).

416. FLA. STAT. ch. 373.415(1) (1997).

417. *See supra* notes 325–28 and accompanying text.

d. *Econlockhatchee Model (No State Mandate/Regional and Local Implementation)*

The Econlockhatchee Model involves riparian habitat protection zones adopted through rulemaking by a regional agency, accompanied by complementary action by local governments.[418] Remarkably, the Econlockhatchee program contains similar substantive standards to the Wekiva, despite having no common statutory directive.[419]

The St. Johns River Water Management District's experience with the Tomoka River highlights a key potential problem agencies in Florida presently face. Agencies are vulnerable to challenges whenever there is no specific statutory authorization for rulemaking because of Florida's overly restrictive Administrative Procedure Act.[420] The Legislature should amend the APA to provide agencies with more discretion, or amend substantive laws to provide specific detailed standards requiring regulators to implement ecosystem management, maintain ecosystem function and integrity, and conserve biodiversity. An additional weakness of this approach is that there are no guarantees that local governments will cooperate.

CONCLUSION

Ecosystem management is a promising tool with potential to conserve biodiversity on private lands. Whether this effort will conserve biodiversity depends in large part on the willingness of legislatures to adopt innovative regulatory approaches containing clear substantive standards to conserve ecosystem functions and integrity. Many existing regulatory programs are simply inadequate because they regulate one or two natural functions, without regard to the full array of ecosystem components or the ecosystem as a whole. As a result, many important ecosystem components are not regulated. This myopic approach ignores ecosystem relationships

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418. *See supra* notes 328–63 and accompanying text (discussing the Econlockhatchee River program).

419. *See id.*

420. *See, e.g.*, Consol.-Tomoka Land Co., v. St. Johns River Water Mgmt. Dist., Nos. 97-0870RP, 97-0871RP, 1997 Fla. ENV LEXIS 97 (Fla. Div. Adm. Hearings June 27, 1997), 717 So. 2d 72 (Fla. Dist. Ct. App. 1998), *reh'g denied*, 727 So. 2d 904 (Fla. 1999).

and dynamics. Further, many programs are severely constrained by narrow statutory authority,[421] and will be unable to establish the institutional framework and substantive standards required for ecosystem management and biodiversity conservation without additional grants of authority.

Existing state and regional regulatory programs can serve as models for development of ecosystem management programs appropriate for management of private lands. Comprehensive state regulatory programs, such as Florida's Growth Management Act, provide the kind of institutional structure necessary to begin implementing ecosystem management on a large scale.[422] Many of these programs, however, require additional substantive standards relating to ecosystem management and biodiversity conservation, such as standards addressing wildlife corridors and habitat, biodiversity, genetic variability, plant communities, and riparian corridors.[423] Further scientific research is needed to form the basis for such standards.

Regional plans developed to manage entire ecosystems, such as programs for the Wekiva River and the proposed Green Swamp program, are also well suited to implementing ecosystem management and conserving biodiversity.[424] Programs which create a regional entity with oversight authority are more likely to achieve compliance than voluntary programs. Local government and citizen resistance to regional programs may be minimized if local citizens and officials are allowed to actively participate in plan development and implementation.

Effective ecosystem management to conserve biodiversity will require substantial restrictions on the use of private property, as illustrated by the Wekiva and Econ programs. Constitutional constraints and societal views regarding private property rights and government regulation could substantially impede ecosystem management and biodiversity conservation efforts on private lands.[425] Narrow statutory authority and restrictive state administrative procedure statutes, like Florida's, further constrain

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421. *See supra* note 211.

422. *See supra* notes 133–44 and accompanying text.

423. *See supra* Part V.B.

424. *See supra* Parts IV.D.1, IV.D.1.2.a.

425. *See supra* Part III.E.

agency rulemaking.[426] Florida's legislators could reduce some of these barriers by amending key laws to require agencies and local governments to implement ecosystem management, maintain ecosystem function and integrity, and conserve biodiversity.

Ecosystem management on private lands will require a creative blend of new regulatory approaches, incentives, and citizen cooperation. The Florida Legislature's directive to DEP to protect ecosystems through "enhanced coordination of public acquisition, regulatory, and planning programs,"[427] is tacit recognition of the legal and political difficulties of regulatory programs to protect biodiversity. Yet, it is highly unlikely that ecosystem management and biodiversity conservation can be achieved primarily through "enhanced coordination" of existing regulatory programs and other voluntary programs.[428] Florida's Legislature, as well as other legislatures, should also provide meaningful statutory authority to agencies charged with implementing ecosystem management and conserving biodiversity.

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426. *Id.*

427. FLA. STAT. ch. 20.255 (1997).

428. With few exceptions, voluntary programs often result in failure. For example, Florida's precursor to the current Growth Management Act, the Local Government Comprehensive Planning Act of 1975, was largely ignored by local governments because it did not have the force of law. 1975 Fla. Laws ch. 75-257. The Florida Quality Developments Program, which provides a streamlined permitting process in exchange for conformance with certain environmental protection criteria, has been infrequently used by developers. FLA. STAT. ch. 380.061 (1993). At the national level, the Water Resources Planning Act, which was intended to facilitate interstate river basin management, has been strongly criticized as being ineffective because of its non-binding nature. The Act was eventually repealed. U.S. Water Resources Planning Act, Pub. L. No. 89-80, 79 Stat., *repealed by* Exec. Order No. 12,319, 46 Fed. Reg. 45,591 (Sept. 30, 1981); *see also* JEFFRY S. WADE ET AL., ALTERNATIVE STRATEGIES FOR BASINWIDE MANAGEMENT OF THE ACF BASIN: THE FLORIDA PERSPECTIVE 46, 47 (Feb. 9, 1994). Voluntary efforts to protect the New Jersey Pinelands were also unsuccessful, in sharp contrast to the substantial protection achieved by a subsequent mandatory planning and regulatory program.