# PROMOTING AND ESTABLISHING THE RECOVERY OF ENDANGERED SPECIES ON PRIVATE LANDS: A CASE STUDY OF THE GOPHER TORTOISE

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*Everything affecting the gopher tortoise's habitat affects the tortoise and . . . eventually affects all the other organisms in its ecosystem. Efforts to save the gopher tortoise are really a manifestation of our desire to preserve, intact, significant pieces of the biosphere. Even if the gopher tortoise could be assured survival in zoos and gopher farms, few of us would be satisfied. Organisms that exist in the absence of the natural systems of which they are a part are functionally extinct, and when man's care lapses they become truly extinct. I cannot imagine the sandylands without the gopher tortoise or the tortoise without its scrub habitats. They are one. In the end, we are one with them . . . . We must preserve. . . the gopher tortoise and other species in similar predicaments, for if we do not, we lose a part of our humanity, a part of our habitat and ultimately part of our world.*[1]

## I. INTRODUCTION AND BACKGROUND

Having spent much of my life in the forests of southern Alabama, I have frequently come into contact with an important species, the viability of which has become greatly strained: the gopher tortoise (*Gopherus polyphemus*). I have often had to wait for the slow, lumbering gopher tortoise to cross the forest paths of southern Alabama that I have traveled. The tortoise is listed as both a threatened and endangered species throughout a portion of its territorial range, and the tortoise's population is quickly declining throughout the rest due to development pressures and forest management practices. The timber farmed to provide jobs and subsistence to thousands of foresters in Alabama is a necessary part of the tortoise's survival. Remove the longleaf pine, destroy the

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1. Catherine Puckett & Richard Franz, *Gopher Tortoise: A Species in Decline*, Gopher Tortoise Council, U. OF FLA. EXTENSION, INST. OF FOOD & AGRIC. SCI. 1 (1991).

tortoise burrows, and you destroy the species. How then do we find a balance between preserving our environment and developing the lands that provide housing, industry, and income for thousands of workers, and timber and paper products for the entire world?

The answer to this question is especially important given the importance of species like the gopher tortoise. The ancestors of gopher tortoises migrated into the southeastern United States millions of years ago. Of the twenty-three species known to have existed on our continent, only four remain. Three of those species are found in the western United States, and only the gopher tortoise is found east of the Mississippi River.[2] Tortoise habitat is most widespread in Florida, where it extends throughout most of the state. Habitat also extends throughout the southern half of Georgia, the southernmost parts of Mississippi and Alabama, and very small portions of Louisiana and South Carolina.[3] These locations contain the last remnants of the once expansive longleaf pine ecosystem, which provides ideal conditions for tortoise survival. Well-drained, sandy soils allow the tortoise to easily dig burrows, and the open canopy allows the passage of sunlight necessary for the development of low, herbaceous plant growth for food.[4] Sunny patches of open space in longleaf forests also provide prime area for nesting.[5] Naturally occurring fires play a crucial role in maintaining tortoise nesting areas by opening up the canopy and promoting the growth of herbaceous plants.[6]

Though considered prime tortoise habitat, as well as prime habitat for numerous other threatened or endangered species, the longleaf pine ecosystem has become highly fragmented. It is estimated that longleaf pine habitat has been reduced by as much as 96%.[7] Declines in gopher tortoise population directly correlate with

2. *Id.*

3. *See* Figure 1, *infra* Section II. B.

4. Puckett, *supra* note 1, at 2.

5. *Id.*

6. Thomas Ankersen, *The Gopher Tortoise and Upland Habitat Protection in Florida, Legal and Policy Considerations*, University of Florida Conservation Clinic Center for Governmental Responsibility Levin College of Law, February 2003, *available at* http://www.law.ufl.edu/conservation/pdf/gopher.pdf.

7. Bill Finch, *Group Buys Chunk of Forest Land*, MOBILE PRESS REG., March 29, 2006, at A1.

this loss of habitat, as population densities have decreased by 80%.[8] Furthermore, the tortoise's long reproductive cycle makes it especially sensitive to the destruction of the longleaf ecosystem. The female tortoise reaches reproductive maturity between ten and fifteen years of age.[9] The incubation period for tortoise eggs ranges from seventy to one hundred days, and usually one clutch of eggs – numbering anywhere from three to fifteen – is produced each year.[10] Gopher tortoise nests are subject to extreme predation from numerous other animals, causing a loss of more than 80% of those nests.[11] The cumulative effect of these circumstances is that a year's worth of tortoise eggs may only survive one out of every ten years.[12] Stated differently, only one to three of one hundred hatchlings will ever reach sexual maturity.[13] Such a low reproductive success rate makes the gopher tortoise especially sensitive to habitat fragmentation and other kinds of environmental degradation that result from human interference with the landscape.

The tortoise's reproductive sensitivity, in turn, can have devastating effects on the surrounding ecosystem when tortoise habitat becomes threatened. The gopher tortoise is a keystone species in its habitat, meaning that numerous other species depend upon its existence.[14] Tortoise burrows, which can be up to forty feet long and ten feet deep, provide refuge for more than 360 other species of animals.[15] These species use the burrows to escape predators, fire and bad weather.[16] Some species cannot survive without the protections these burrows provide, and many are listed as threatened or endangered under the Endangered Species Act (ESA). These include the scarab beetle, eastern indigo snake, and Florida mouse.[17] Florida state law lists other species as "species of special concern," including the pine snake, gopher frog and burrowing owl.[18]

8. Jeannine Eubanks, William Michener, & Craig Guyer, *Patterns of Movement and Burrow Use in a Population of Gopher Tortoises (Gopherus Polyphemus)*, 59 HERPETOLOGICA 311, 311 (2003).

9. Puckett, *supra* note 1, at 3.

10. *Id.*

11. *Id.*

12. *Id.*

13. Ankersen, *supra* note 6, at 2-3.

14. Eubanks, *supra* note 8, at 311.

15. Puckett, *supra* note 1, at 2.

16. *Id.*

17. Ankersen, *supra* note 6, at 2.

18. *Id.* at 3.

Heavy machinery used for clear-cutting, other intensive timber harvesting practices and development of commercial and industrial sites often causes tortoise burrows to cave in. This results in the destruction of mini-ecosystems that have existed for hundreds of years and on which numerous other species rely.

Such activities have sparked a debate in Alabama and other southeastern states regarding how to find the proper balance between species protection and progress in land use development and management. The gopher tortoise is just one example of many such controversies. The tortoise is found in twenty-two counties across south Alabama, but only in three of those counties is it federally protected by the ESA, passed by Congress in 1973.[19] The Alabama state government is responsible for protecting tortoises in the other nineteen counties. However, the state does so by simply designating the tortoise as a "game species with *no open season*."[20] Such federal and state laws currently provide inadequate protection for the tortoise and have further facilitated the unchecked decline of the species.

This article addresses two main conflicts that affect the gopher tortoise's viability. The first is urban development, which has exploded across the southeastern United States, especially in areas of prime tortoise habitat. Policy makers have crafted incentives and other cooperative measures to deal with rapid development, so although development remains a threat to the tortoise throughout some of its range, potential solutions addressing the issue have at least been set in place.

The second conflict is private forest management practices that have almost entirely destroyed the tortoise's habitat throughout all of its historical range. Though the media, city council members, and participants in other legislative forums have paid a great deal of attention to development issues, the much larger problem – private forest management – remains largely unaddressed. Five million non-industrial private landowners own 70% of the forestland in the southeastern United States.[21] The fragmentation of the environment

19. Harold Wahlquist, *Gopher Tortoise Conservation*, *in* PROCEEDINGS OF THE FIRST INTERNATIONAL SYMPOSIUM ON TURTLES & TORTOISES: CONSERVATION & CAPTIVE HUSBANDRY 77-79 (1991), *available at* http://www.tortoise.org/archives/gopher.html.

20. *Id*. (emphasis added).

21. Michael G. Jacobson, *Ecosystem Management in the Southeast United States: Interest of Forest Landowners in Joint Management Across Ownerships*, 1 SMALL-SCALE FOREST ECON., MGMT. & POL'Y 71, 72 (2002).

that results from so many landowners managing their own forests "is recognized by scientists as one of the major causes of loss of biological diversity."[22]

Private forest management has received such little attention primarily due to the complicated issue of private property rights versus government conservation regulation. A mounting tension exists between the growing recognition of the need to protect biodiversity and the strong private property rights movement that has become entrenched in American society. The Takings Clause of the Fifth Amendment of the Constitution grants protection for private property owners by establishing that property may not be taken by the government without just compensation.[23] However, judicially validated "regulatory takings" cause controversy when regulation of private property limits a landowner's rights on that property to some degree.[24] The Endangered Species Act is one such controversial regulation. Meeting constitutional muster by passage under the Commerce Clause, the ESA has been lauded by those who seek biodiversity protection and scorned by those who view it as land use regulation that should appropriately be left to state and local governments.

Many private forest landowners and managers fall into the latter category. These landowners resist federal regulations like the ESA, because they may place limits on their property rights and management practices and may limit economic return from current forest management practices. The result of such resistance is often the phenomenon of "shoot, shovel and shut up" – a landowner stumbles upon an endangered species and simply disposes of the animal in order to avoid liability under the ESA.[25] Such practices often hamstring efforts by the federal government to protect biodiversity. Furthermore, most state governments have failed to successfully address the issue of private forest management practices and maintain minimal protections for species like the gopher tortoise.

Given the increasing tension among wildlife protection interests, developers and private forest managers throughout the gopher tortoise's range, what can be done to encourage private land management that benefits both the landowner and the tortoise?

22. *Id.*

23. U.S. CONST. amend. V.

24. *See* Pennsylvania Coal v. Mahon, 260 U.S. 393 (1922).

25. JAMES RASBAND, JAMES SALZMAN, MARK SQUILLACE, NATURAL RESOURCES LAW AND POLICY 403 (Foundation Press 2004).

Current federal and state laws can only go so far in protecting rare species like the gopher tortoise. This article addresses alternative solutions under current law to both the development conflict and the much larger private forest management conflict, by first providing an analysis of the various legal protections afforded the tortoise. Second is a discussion of the development conflict, incentives provided to developers to cooperate with species protection laws, and creative new initiatives established by citizens and corporations for gopher tortoise habitat protection. Finally, I address the private forest management conflict and suggest incentives and practices which, if promoted and implemented, will result in restoration of the threatened gopher tortoise throughout its historical range. These management practices also provide a model of protection for a variety of other endangered species. Furthermore, such practices serve the dual purpose of protecting sensitive ecosystems like gopher tortoise habitat and providing private landowners the sovereignty and economic benefits they desire.

## II. REVIEW OF CURRENT LAWS PROTECTING THE TORTOISE

The gopher tortoise is protected throughout its range by various international, federal and state laws. Below are brief analyses of each type of protection afforded the tortoise from these various governing bodies.

### *A. CITES*

On an international level, the gopher tortoise receives protection by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).[26] CITES regulates global trade in threatened and endangered species by restricting the flow of rare species and parts of species across national borders.[27] In the United States, the U.S. Fish and Wildlife Service (FWS) bears responsibility under CITES for providing scientific guidance for the import or export of species, as well as issuing permits for trade in species.[28] The restrictions on trade of species vary depending upon the "appendix" in which the species is listed. CITES has three appendices, each having a different threshold of permitting requirements.[29] The

26. Wahlquist, *supra* note 19.
27. RASBAND ET AL., *supra* note 25, at 337.
28. *Id.*
29. *Id.*

gopher tortoise is listed in Appendix II of CITES, which lists "those species not yet threatened with extinction but that may become so if trade in them is not strictly controlled and monitored to avoid exploitation incompatible with species survival."[30] A permit is required for the *export* of any species listed in Appendix II, but not for the *import* of such species.[31] Before granting an export permit for the gopher tortoise, scientists at the FWS must find that the export will not endanger the survival of the species, that the animal was not obtained illegally under U.S. law and that export of the animal will minimize risk of injury, harm to health or cruel treatment.[32]

Because the gopher tortoise is only found in the United States, CITES assures that all considerations will be scrutinized before a permit is issued to transport a tortoise across national borders. However, this law does little to address the problems facing the gopher tortoise on private lands within the borders of the United States.

### *B. Endangered Species Act*

On July 7, 1987, the U.S. Fish and Wildlife Service listed the gopher tortoise as a threatened species under the Endangered Species Act.[33] A threatened species is defined as "[a]ny species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."[34] The coverage of federal protection ranges from the small portion of tortoise habitat in Louisiana, throughout the entire tortoise range in Mississippi, and into the area of Alabama west of the Tombigbee and Mobile rivers (see Figure 1, below).[35]

Section 7(a)(2) of the ESA ensures that any action authorized, funded, or carried out by federal agencies will not "jeopardize the continued existence" of a species or "result in the destruction or adverse modification" of critical habitat of that species. Agencies

30. *Id.*

31. Convention on International Trade in Endangered Species of Wild Flora and Fauna, art. IV, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243 (emphasis added).

32. *Id.*

33. Wendell Neal, *Gopher Tortoise Recovery Plan*, U.S. FISH & WILDLIFE SERVICE, SOUTHEAST REGION 1 (1990), *available at* http://ecos.fws.gov/docs/recovery_plans/1990/901226.pdf.

34. 16 U.S.C. § 1532 (20) (2005).

35. Ankersen, *supra* note 6, at 7-8.

must consult with the FWS on how to best achieve this goal.[36] However, Section 7 applies only to federal actions and provides little *direct* protection for the tortoise since most tortoise habitat is in non-federal ownership.[37]

Section 9(a)(1) of the ESA declares illegal the taking of a listed species, whether the "take" be by federal, state or local governments, corporations, *or private individuals*. "Take" under the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[38] In the few areas where the gopher tortoise is covered by the ESA, the full protection awarded to *endangered* species under Section 9 was not initially extended to *threatened* species.[39] However, under authority granted to the Secretary of Interior under section 4(d) of the ESA, the Secretary decided that the "take" prohibition of Section 9 applies to threatened species unless the Secretary *approves* the possession, sale, or taking of individuals of those species.[40]

Perhaps the most important requirement of the ESA for the gopher tortoise is the Section 4(f) mandate that the FWS develop recovery plans to promote the conservation of threatened species. The agency must give priority to species it determines will most benefit from such a plan, and "particularly those species that are, or may be, in conflict with construction or other development projects or other forms of economic activity."[41] The recovery plan for the gopher tortoise was issued on December 26, 1990.[42] The plan makes clear that "[o]bjectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints."[43] This statement highlights a major limitation on the success of recovery plans under the ESA, that the impacts of such plans have often been hampered due to a lack of resources. For instance, between 1989 and 1993 the National Wilderness Institute estimated that implementing all recovery plans would cost

36. RASBAND ET AL., *supra* note 25, at 359.
37. Neal, *supra* note 33, at 13.
38. 16 U.S.C. § 1532 (19) (2005).
39. RASBAND ET AL., *supra* note 25, at 369-70.
40. *Id.*
41. *Id.* at 358.
42. Neal, *supra* note 33.
43. *Id.*

approximately $1 billion.[44] Congress has yet to allocate funds totaling anywhere near this amount.[45]

The gopher tortoise recovery plan further details the current status and habitat requirements of the tortoise, and also defines a "recovery objective" for the tortoise. The two-pronged objective is first "prevention of the listed population from becoming endangered," and second, "delisting."[46] To achieve prevention of endangered status for the gopher tortoise, the FWS would need to establish the presence of five tortoise burrows per 2.47 acres (or one hectare) "for a period of thirty years on the Desoto National Forest."[47] Scientists at the FWS claim this would result in an estimated population of 22,400 gopher tortoises on 18,144 acres of government land.[48] Before delisting occurs, the agency would also need to be provided with evidence of an average of three gopher tortoise burrows per 2.47 acres on *private lands*. This would result in an estimated 34,000 gopher tortoises on 45,947 acres of privately-owned lands.[49]

The recovery plan made several recommendations for achieving the stated objectives, including:

- Survey, monitor and assess status of populations on all public lands as baseline for recovery actions, and perform surveys on public and private lands every five years;
- Protect and manage current and future habitat on federal lands, and determine the adequacy of any established and proposed plans;
- Encourage management of populations on private lands by providing landowners with management information and guidelines via professional and industrial associations, seeking management agreements with landowners, protecting habitat through easements, acquisitions, and

44. RASBAND ET AL., *supra* note 25, at 358.

45. *Id.*

46. Neal, *supra* note 33, executive summary.

47. *Id.*

48. *Id.*

49. *Id.* It is unclear why the FWS bases delisting on only 45,947 acres, since later in the plan the FWS describes the amount of gopher tortoise habitat for the listed population by state as being 100,745 acres in southwestern Alabama, 252,255 acres in Mississippi and 11,898 acres in Louisiana. *Id*. at 2. It would seem far greater total numbers of gopher tortoises would need to be established in these areas for delisting to properly occur under the FWS formula.

donations, and rewarding protection and management efforts;

- Develop law enforcement strategy to curb illegal taking;
- Conduct population viability studies, telemetry studies to determine extent of reproductive isolation as a threat, and genetic studies;
- Relocate threatened and isolated individuals/colonies to protected and managed lands.[50]

The recovery plan further detailed the steps necessary to achieve each of these goals, and estimated it would cost over $430,000 to do so.[51] However, the FWS was not able to specify a time frame in which the objectives might be achieved.[52]

FWS officials calculated that, as of 1990, the prime longleaf pine habitat upon which the tortoise depends had been reduced from 60 million acres to 4 million acres (a reduction of 93%).[53] Destruction of longleaf habitat is cited as the primary reason for the decline in tortoise populations. The recovery plan indicates that a major cause of habitat reduction has been private landowners whose forestry practices focus on regenerating former longleaf pine sites with *other* types of pine species, fundamentally altering the habitat.[54] Though tortoises can survive on lands that mimic the characteristics of the longleaf ecosystem, tortoise population densities are 32% greater on natural longleaf pine habitat.[55] Clear-cutting, soil disturbances common with even-aged timber management and prolonged intervals between burns are further reasons for longleaf habitat decline.[56]

In addition to habitat destruction, predation has been a further cause of tortoise population decline. As far back as the Great Depression, "gopher pulling" became common, as people hunted for tortoises by sticking a hook-fitted rod down into the burrows. The delicacy became known as a "Hoover chicken."[57] Unfortunately such predation is not a relic of the 1920s, but rather is a continuing cultural activity that can have exacerbating adverse effects on a species with such a fragile life cycle. A March 22, 2006 article in the *MetroWest*

50. *Id.* at 15-18.
51. *Id.*, executive summary.
52. *Id.*
53. *Id.* at 8.
54. *Id.*
55. *Id.* at 9.
56. *Id.*
57. *Id.* at 10.

*Daily News* highlighted that after a string of empty tortoise shells were sighted along a Florida highway, wildlife police successfully apprehended the man responsible for the deaths. The police discovered five pounds of tortoise meat in the man's refrigerator.[58] Although hunting still occurs, the tortoise is more commonly subject to predation by other animals.[59]

In summary, the recovery plan stated that "the current threats to the western population of the gopher tortoise in terms of habitat loss or degradation consist of certain forest management practices, conversion of dry sites to agriculture, road placement and other developments on these higher ridges, and urbanization."[60] Furthermore, "in view of past, current, and predicted forest management practices, continued illegal taking, development on dry uplands, and private ownership of much of the gopher tortoise's habitat, this species is truly threatened in the western portion of its range."[61]

Despite the recovery plan, the fact remains that due to a limited geographic listing area the gopher tortoise receives no direct protection under the Endangered Species Act throughout most of its range (Figure 1, below). Tortoises arguably receive indirect benefit from ESA protections provided for other species that have similar habitat preferences, such as the Florida shrub jay.[62] However, until the tortoise is listed throughout a greater portion of its range, the ESA alone is insufficient to stop the precipitous drop in the species. Given that the ESA has limited direct effect on the tortoise, it is necessary to analyze state laws that provide legal protection for the tortoise.

58. Rob Haneisen, *The tale of the tortoise and the vernal pool*, METROWEST DAILY NEWS, March 22, 2006 at B6.

59. Neal, *supra* note 33, at 10.

60. *Id.*

61. *Id.* at 13.

62. Ankersen, *supra* note 6, at 8.

**Figure 1**

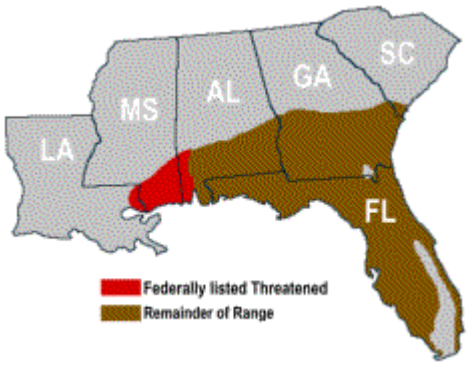


Image from http://www.gophertortoisecouncil.org/index

C. State Laws

States vary greatly in the degree of protection each affords the gopher tortoise. The only protection afforded the tortoise by the state of Georgia is designation as a "nongame species."[63] In the nineteen Alabama counties east of the Tombigbee and Mobile Rivers, where the Endangered Species Act does not cover the tortoise, the species is listed as a "game species with no open season."[64] In addition to federal endangered species designation in Mississippi, the state designates the gopher tortoise as "endangered."[65] South Carolina also designates the species as "endangered" in the small amount of gopher habitat in that state.[66] The state of Louisiana provides the species no protection beyond that afforded by the ESA.[67] Florida contains the most gopher habitat and also affords the tortoise the most comprehensive regulatory protection. However, without greater federal involvement, instances in Florida such as continued state permit issuance for the destruction of burrows make it unclear how much protection the regulations actually provide.[68]

63. Wahlquist, *supra* note 19.
64. *Id.*
65. *Id.*
66. *Id.*
67. *Id.*
68. *See infra* note 85.

In Florida, the gopher tortoise's protection status has recently been upgraded from a "species of special concern" to a "threatened species." A "species of special concern" is a species that will "face a moderate risk of extinction in the future," whereas a "threatened" species is one that is "declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become endangered in the foreseeable future."[69] The upgraded protection status, though opposed by developers, is validated by the fact that tortoise populations in the state have plummeted by as much as 80%.[70] Aside from tortoises on protected lands, some researchers predict gopher tortoises could be eliminated from the state by the year 2025.[71]

The source of protection for endangered or threatened species in the state of Florida is twofold. First, the Florida state constitution provides for the creation of the Florida Fish and Wildlife Conservation Commission (Conservation Commission) and declares that the commission "[s]hall exercise the regulatory and executive powers of the state with respect to wild animal life."[72] Second, in recognition of the multitude of endangered and threatened species in the state, the Florida state legislature enacted a statute declaring it unlawful to intentionally kill or wound any fish or wildlife that the Conservation Commission designates as endangered, threatened, or of special concern.[73] Being a threatened species, it is illegal to take, possess, transport, molest, harass or sell tortoises or their nests or eggs without an incidental take permit.[74] The main difference between a threatened listing for the tortoise and its prior listing as a species of special concern appears to be that the new listing establishes an increased level of difficulty for obtaining an incidental take permit.[75]

69. Ankersen, *supra* note 6, at 8-9. *Gopher Tortoise Now Classified Threatened Species,* NE. FLA. BUILDERS ASS'N BULLETIN, July 2006, at 15, *available at* http://www.nefba.com/pdfdir/BildorNewsJuly.pdf.

70. Mary Kelley Hoppe, *At Home on the Range: Gopher Tortoises Find Refuge at Bullfrog Creek*, BAY SOUNDINGS, 2003, *available at* http://www.baysoundings.com/fall03/tortoise.html; *Gopher Tortoise— David Rostal*, NOVA ONLINE, Nov. 2000, http://www.pbs.org/wgbh/nova/kalahari/tortoise.html.

71. *Id.*

72. Ankersen, *supra* note 6, at 8 (citing FLA. CONST. art IV, § 9).

73. *Id.* (citing FLA. STAT. § 372.0725 (2006)).

74. *Id.* at 8-9.

75. *Id.* at 10.

The initial state listing of the gopher tortoise (as a species of special concern) found that the tortoise:

- Is significantly vulnerable to habitat modifications, environmental alterations, human disturbances, or human exploitation, and may soon become threatened;
- May already qualify as threatened but for limited or lacking data;
- May occupy an unusually vital ecological niche that should it decline significantly in numbers, other species would be adversely affected.[76]

As noted, despite having a seemingly comprehensive scheme for protecting the tortoise, numerous problems still exist in the state of Florida. An article in a March 2006 Homebuilders Association of West Florida newsletter (prior to the recent tortoise uplisting) highlighted that the uplisting of the tortoise to "threatened" protection status was imminent. The article first noted the common conflict between development and the tortoise when it stated that "[u]nfortunately, tortoises prefer the high and dry sandy areas that also are heavily sought for development."[77] The article also highlighted the then-pending Conservation Commission listing process revision, after which, and after application of new listing criteria, the commission recommended that the gopher tortoise be uplisted from a species of special concern to a threatened species.[78]

Though the new regulations for the "threatened" tortoise have yet to be promulgated, in its uplisting proposal the Conservation Commission provided a glimpse of the direction in which it is headed. The commission proposed a "burrow rule" which would make it a third degree felony for any landowner without a permit to destroy any hole in the ground meeting the definition of a burrow, regardless of whether the action would result in an actual take of a tortoise.[79]

76. *Id.* at 9 (emphasis added).

77. Steve Godley, *Gopher Tortoise Regulations to Change*, CORNERSTONE: THE NEWS OF THE HOME BUILDERS ASS'N OF W. FLA., Mar. 2006, at 16, *available at* http://www.westfloridabuilders.com/_pdf/march06.pdf (emphasis added).

78. *Id.* The key criteria for the recommendation was the commission's finding "an inferred or suspected population size reduction of more than 50 percent in either the last three [gopher tortoise] generations, or projected into the current or future three generations." Stated differently, the Conservation Commission's criteria for threatened species designation required its scientists to conclude that total gopher tortoise population either has declined or will decline by over 50 percent over a period of sixty to ninety-three years (or three generations) due to habitat loss or degradation. *Id.*

79. *Id.*

Also, as noted, the uplisting of the tortoise makes it more difficult for developers to obtain incidental take and relocation permits.[80]

It is only appropriate that the state containing the most extensive tortoise habitat would take this important step forward in providing greater protection for the tortoise. However, depending on what regulations the state promulgates for the threatened tortoise, it remains to be seen if the state's efforts will result in recovery of gopher tortoises in Florida.

Despite increasing concern over how to balance development with gopher tortoise protection, the patchwork system of international, national and state laws provides no coherent message for exactly how this species' habitat should be managed. However, given the laws as they stand, it is necessary to analyze ways in which landowners can be encouraged to cooperate with, rather than resist, efforts to regulate their property for the gopher tortoise.

## III. GOPHER TORTOISE CONSERVATION VS. DEVELOPMENT

### *A. Introduction*

The conflict between gopher tortoise habitat protection and development is an ever-growing issue in areas undergoing rapid growth and sprawl. The southeastern United States is one of the fastest growing regions in the country. The Southern Rural Development Center at Mississippi State University conducted a study which found that population growth in the southeastern U.S. averaged 20% from 1990 to 2000.[81] Mobile County, one of three Alabama counties in which the tortoise is protected by the Endangered Species Act, underwent a 94% increase in residential development in the 1990s.[82] In the year 2000, landowners in the city of Mobile were pitted against an unexpected opponent: the gopher tortoise. The Mobile County Health Department began denying landowners permits to install septic systems on lots where the tortoise lived, and housing development stopped dead in its tracks. This was

80. *Id.* As such, the uplisted protection status would likely slow down the practice of "burying" tortoises in their burrows as described below in Section III. A.

81. Alex Levy, *Solutions from the Sunbelt: The Southeastern States Share Strategies to Protect Wildlife and Fragile Habitats*, PUB. ROADS, July-Aug. 2003, at 44.

82. Mike Groutt, *Banking on Gopher Tortoises*, ENDANGERED SPECIES BULL., Aug. 2005, at 10.

the major impetus for the establishment of a conservation bank for gopher tortoises in Mobile in 2001.[83]

Florida, which maintains the greatest acreage of tortoise habitat, is one of the most rapidly growing states in the country. Greater than two-thirds of Florida's scrub habitat, which is home to more than twenty species listed as endangered, threatened or species of special concern by federal or state agencies, has been destroyed.[84] One only needs to visit http://conservation.mongabay.com/news/Gopher_Tortoise.htm to find more than 230 articles from Florida newspapers since January 2005 that highlight controversies surrounding the gopher tortoise and land management. For example, in March 2006, Steve Rosen, a Leon County animal rights activist, filed suit against the Florida Fish and Wildlife Conservation Commission claiming the commission wrongfully issued state permits that allowed developers to bury live tortoises in their burrows.[85] The commission defended its decision by citing state statutory authority which has allowed it to issue permits to fill 74,000 burrows since 1991.[86] The controversy came to the forefront as news spread that a Palm Beach County Wal-Mart had received a permit to entomb five gopher tortoises. As "compensation," Wal-Mart paid more than $11,000 to protect an acre and a half of land "not used by tortoises for burrowing."[87] Furthermore, tortoises in Hillsborough County have been forced nine or ten at a time onto parcels of land as small as one acre, even though tortoises typically need 1.5 to 4.5 acres each on which to roam.[88]

Recently, as noted, the state of Florida upgraded the gopher tortoise's protection status from "species of special concern" to "threatened." Many hope the upgraded protection designation will force developers to stop burying tortoises, or to at least conserve tortoise habitat elsewhere.[89] Opponents of the uplisting claim the increased cost of dealing with "threatened" tortoises will eventually fall upon the homebuyer, as working around the tortoise will increase

83. Robert Bonnie, *Guest Feature: Banking on Endangered Species Conservation*, THE KATOOMBA GROUP'S ECOSYSTEM MARKETPLACE, Nov. 16, 2004, *available at* http://ecosystemmarketplace.com/pages/article.news.php?component_id=639&component_version_id=712&language_id=12.

84. Hoppe, *supra* note 70.

85. Charles Rabin, *Activist: Don't Bury Turtles Alive,* MIAMI HERALD, Mar. 9, 2006.

86. *Id.*

87. *Id.*

88. Yvette C. Hammett, *Tortoises Lag Developers in Fight for Florida Land*, TAMPA TRIB., Feb. 26, 2006.

89. Jim Waymer, *Tortoises May Slow State's Rapid Growth*, FLA. TODAY, Sept. 26, 2005.

construction costs, cause months of delay and often derail major projects.[90] Executive director of Brevard Home Builders and Contractors Association Franck Kaiser asserted that "[m]illions of dollars have been spent to relocate gopher tortoises."[91] He and other opponents question biologists' contentions that current populations of tortoise are inadequate to maintain the viability of the species.[92]

In order to avoid such standoffs between development projects and the tortoise, the first-ever federal conservation bank for tortoises was created on approximately 220 acres in Mobile, Alabama in 2001. Robert Bonnie, an economist for Environmental Defense and a partner in the project, stated that "this collaborative effort is indicative of how the Endangered Species Act should work."[93] Bonnie further asserted that "property owners who have gopher tortoises can be completely relieved of Endangered Species Act responsibilities by participating in this bank."[94]

Although a step forward, complications have arisen from similar relocations of the tortoise. In his symposium, "Turtles & Tortoises: Conservation and Captive Husbandry," Harold Wahlquist stated that "relocation is being advocated by developers and their environmental consultants, and by regional planning councils with little thought to such biological impacts as carrying capacity of relocation habitats, population disruptions, gene pool mixing, and disease transmission."[95] Indeed, research has determined that diseases transmitted during the relocation of tortoises have been increasingly responsible for their decline. In October 2005, more than sixty dead tortoises were found in Withlacochee State Forest.[96] U.S. Fish and Wildlife Service biologists investigating the matter discovered that the cause of the die-off was an upper respiratory infection. The spread of infection was exacerbated by "well-meaning residents [who were] moving tortoises out of the way of development and onto public land."[97] Such die-offs of the tortoise on protected or partially protected lands are

90. *Id.*

91. *Id.*

92. *Id.*

93. U.S. Fish and Wildlife Service, Southeast Region 4, *First Federal Conservation Bank Announced for Threatened Gopher Tortoise in Mobile*, June 25, 2001, http://www.fws.gov/southeast/news/2001/r01-039.html.

94. *Id.*

95. Wahlquist, *supra* note 19.

96. Dan Dewitt, *Tortoise Deaths Alarm State Naturalists*, ST. PETERSBURG TIMES, Nov. 18, 2005, at 1B.

97. *Id.*

not without precedent: 350 tortoises were found dead in Florida's Green Swamp five years ago.[98]

In the end, if development is inevitable throughout portions of the tortoise's range, developers and conservationists must cooperate to serve the purposes of each. Ironically, those who seek to avoid application of federal statutes like the ESA by contending that environmental regulation is the sole realm of state control often turn around and oppose regulatory actions by state governments. As such, various strategies have been proposed to transition from the command-and-control approach by which the ESA and similar state laws were initially implemented. Previous command-and-control techniques provided limited flexibility for landowners and increased resistance by landowners to the statutes. However, recently federal and state governments have attempted to reduce these tensions by promoting voluntary or market-based incentives. In addition, some developers have chosen to initiate solutions to the problem above and beyond what is required by law.[99]

### *B. Habitat Conservation Plans*

In 1983 Congress initiated the first incentive-based approach for seeking greater cooperation from developers and private landowners under the Endangered Species Act. Congress added Section 10 to the ESA to "encourage creative partnerships between the public and private sectors, and among governmental agencies in the interest of species and habitat conservation."[100] Section 10 allows landowners or developers an "incidental take" of an endangered species in exchange for establishment of a Habitat Conservation Plan (HCP).[101] This plan must be designed to minimize the impact of the take.[102] Early on, these plans provided little incentive to most developers. The plans proved costly and created a great amount of regulatory uncertainty as landowners received no assurance that they would not be required to

98. *Id.*

99. The government incentives and private initiatives discussed in this section also have relevance and application to forest management practices, discussed below in section IV.

100. Christopher Mills, Note, *Incentives and the ESA: Can Conservation Banking Live up to Potential?*, 14 DUKE ENVTL. L. & POL'Y F. 523, 527 (2004).

101. *Id.* at 526.

102. *Id.*

mitigate unanticipated impacts in the future.[103] Between 1983 and 1994 no more than twenty plans were approved.[104]

To address the concerns of wary landowners, in 1994 Secretary of Interior Bruce Babbitt issued the "No Surprises" policy. The policy provided that if changes to the HCP were necessary due to unforeseen circumstances, the landowner would not be responsible for increased costs associated with those changes.[105] The following year, eighty-six plans were approved, and a total of 274 plans had been approved by 1999.[106]

Once HCPs became more popular, they appeared to be a promising start to incentive-based programs under the ESA. Not only do these plans allow landowners to be involved in the conservation effort, but landowners are required to expend a portion of their own funds in doing so. This can be an effective method of increasing the amount of resources available for management. Perhaps most importantly, HCPs provide a means for the government to have some measure of influence on both private land management and development.[107]

Critics of the HCP approach argue that most plans lack a firm foundation in science. They point out that biological information such as average life span or rates of change in population size is unknown for 80% or more of HCP species studied.[108] Critics also argue that the plans are insufficiently proactive in helping endangered or threatened species recover, since they only focus on minimizing impacts of development.[109] Critics have stated that "a preventative approach that focuses more on species recovery, rather than mitigation of new harms alone, would improve the efficacy of the ESA relative to section 10."[110] Furthermore, because the plans are still relatively expensive to establish, landowners may seek to develop them in the cheapest way possible, which can lead to shoddy and arguably ineffective plans.

Despite these criticisms, some states have implemented similar plans. Modeled after the federal HCP program, the state of Florida

103. *Id.*
104. *Id.*
105. *Id.* at 526-27.
106. *Id.* at 527.
107. *Id.* at 531.
108. *Id.* at 530.
109. *Id.* at 530-31.
110. *Id.* at 531.

has its own "habitat protection option" (HPO) to mitigate the impacts of incidental take of endangered, threatened, or species of special concern.[111] Under the current HPO, a landowner is allowed to entomb or kill tortoises on development lands if the developer agrees to preserve alternative tortoise habitat in perpetuity.[112] A direct correlation exists between the amount of land required for preservation and the density of gopher tortoises on the development property. A developer must set aside an area 25% of the size of habitat being destroyed if tortoise density is 0.8 tortoises per acre or greater, and must set aside 15% if tortoise density is between 0.4 and 0.79 (15% is considered the standard mitigation percentage and 0.4 per acre the standard tortoise density).[113] If tortoise density is less than 0.4 per acre, the percentage of land that must be set aside is calculated by multiplying that density by 37.5 (the standard mitigation percentage divided by the standard tortoise density).[114]

If a developer chooses to develop an HPO plan, rather than choosing to relocate the tortoise or to not develop at all, the developer may preserve habitat in three different ways. First, the individual can protect a large, continuous block of tortoise-occupied area on-site. These blocks must pass in perpetuity, and a permanent conservation easement is usually required.[115] Second, the individual may purchase property adjacent to public lands that are managed in a way that benefits gopher tortoises, and then transfer that property to the public entity.[116] Finally, the individual may purchase the required acreage from a mitigation bank. However, the latter option requires that mitigation banks be readily available.[117] As discussed below, because mitigation banking is still in its infancy as an incentive-based program, this may not be a viable option in many areas.

Habitat Conservation Plans or state programs such as Habitat Protection Options are reasonable starting points for establishing recovery efforts for gopher tortoises in areas that are undergoing rapid development. Though many criticize HCPs as being too expensive to result in high-quality plans, and not proactive enough for

111. Ankersen, *supra* note 6, at 21.
112. *Id.*
113. *Id.*
114. *Id.* at 22.
115. *Id.*
116. *Id.*
117. *Id.*

robust conservation efforts, developers have increasingly used HCPs to meet the requirements of federal and state conservation laws.

### C. *Conservation Banking*

#### 1. General Background

Conservation banking is a relatively new incentive-based program, the creation of which is hailed by many as a turning point in biodiversity conservation. Supporters praise conservation banking because it provides economic rewards for landowners who make proactive efforts to conserve species rather than merely mitigating environmental harm.[118] Encouraging private landowner interest in proactive environmental stewardship is especially important because most threatened or endangered species' habitat exists on private property.[119]

Conservation banking allows developers to buy credits from a conservation bank that has already achieved mitigation goals for a species.[120] Technically, a conservation bank is a piece of land upon which a conservation easement attaches in perpetuity. The entity in charge of enforcing the terms of the easement requires that the land be managed for the benefit of the species subject to impacts occurring elsewhere.[121] Credits are sold to the entity that causes the impact on non-bank land (i.e. developers), and credit prices include funding for the long-term management and protection of the species.[122] By establishing a bank in perpetuity, future projects affecting the species, as well as listing and delisting decisions, can be evaluated in a more stable ecological and economic context.[123] FWS officials are responsible for evaluating the sufficiency of a proposed bank when development affects an endangered or threatened species. Agency approval of a bank must be based on scientific evidence supporting

118. Jessica Fox, *Conservation Banking: Moving Beyond California*, THE KATOOMBA GROUP'S ECOSYSTEM MARKETPLACE, 2004, *available at* http://ecosystemmarketplace.com/pages/article.news.php?component_id=470&component_version_id=454&language_id=12.

119. Position Statement of the Society of American Foresters, *Protecting Endangered Species Habitat on Private Land*, *available at* http://www.safnet.org/policyandpress/psst/ProtEndgSpcOnPrvtLand_amended_12-3-05.pdf.

120. *See* Guidance for the Establishment, Use, and Operation of Conservation Banks, 68 Fed. Reg. 24,753 (Dep't of the Interior April 25, 2003) (notice of availability), *available at* http://www.epa.gov/EPA-SPECIES/2003/May/Day-08/e11458.htm.

121. *Id.*

122. *Id.*

123. *Id.*

the best available site for the bank, as well as an evaluation of how the bank's management program is to operate.[124] Especially with regard to legislation like the Endangered Species Act, conservation banking allows for a simplified regulatory compliance scheme with reduced paperwork.[125]

The most important aspect of conservation banking is that when developers enter into a contractual agreement to establish a bank, that agreement has already been approved by federal (or state) authorities.[126] Such final approval by authorities is in stark contrast to HCPs, which necessitate continual planning efforts and may require a developer to pay $50,000 to $100,000 a year for maintenance.[127] With conservation banks, however, the developer gains saved time and money because pre-approved conservation areas and "willing sellers" are already identified, which increases flexibility during the course of procuring conservation. Thus, a conservation bank has been described as "one-stop shopping" for developers who seek relief from responsibility early in the conservation process.[128] Though it was previously considered a liability to have endangered or threatened species on one's property, the revenues generated from credits purchased by eager developers can provide significant income for conservation bank owners.[129]

Conservation banks also remedy other problems presented by the HCP program. As noted, HCPs are efforts taken by developers to mitigate or compensate for certain impacts upon displaced, killed or otherwise incidentally taken species. However, such efforts take place only after developers have already decided to develop a certain property, as developers usually choose development sites by either purchasing new property or modifying existing property.[130] As discussed, developers involved in the creation of HCPs have criticized the process as requiring complex, tedious and costly management responsibilities, while conservationists have consistently complained that HCPs are often unsuccessful.

124. *Id.* at 5.

125. *Id.* at 1.

126. Fox, *supra* note 118.

127. Mills, *supra* note 100, at 539.

128. Guidance for the Establishment, Use, and Operation of Conservation Banks, *supra* note 120.

129. *Id.* at 1.

130. Fox, *supra* note 118.

Another significant issue with the HCP program is that the plans become part of the developer's development. Developers ordinarily seek to minimize the cost of development, so such a scenario may result in the most inexpensive plan the developer can create while still gaining the approval of the FWS.[131] The owner of a conservation bank, on the other hand, has very different incentives. The owner of a bank will seek to make money by actually creating the best habitat possible for the species and guaranteeing that it thrives on the property. Such an incentive ensures greater protection for species in conservation banks than for those in HCPs.[132] Furthermore, conservation bank credits can be purchased by anyone, whether it is the developer of a property or a non-profit organization that wishes to preserve a particular species. HCPs do not allow for such an option, and parties who wish to protect species, such as non-profits, are left only with the choice of putting pressure on developers to not develop the property. Of course, this is usually unsuccessful, or even if successful is the result of expensive and protracted litigation. Thus, conservation banking allows non-developers to engage in protection of species in a more robust manner, and provides them with equal weight as developers within the market.[133]

Conservation banking has already been successful for various species in numerous states. For example, one California landowner received $125,000 for protecting habitat for a federally endangered bird called the Least Bell's Vireo. In Texas, a rancher has sold credits for $5,000 per acre of federally endangered Golden-cheeked warbler habitat.[134]

Important elements of a successful conservation bank are:

- Protection of habitat for at least one rare species (listed as endangered, threatened, or candidate under the Endangered Species Act);
- Permanent habitat protection;
- Large enough to be ecologically stable;
- Backed by a banking agreement signed by the U.S. Fish and Wildlife Service;
- Receives long-term funding via an endowment fund;
- Habitat is protected prior to impacts;

131. Mills, *supra* note 100, at 536.
132. *Id.* at 537.
133. *Id.* at 540.
134. Fox, *supra* note 118.

- Credit prices governed by the open market.[135]

In addition, for conservation banking to be successful, there must be strong enforcement of biodiversity protection laws, strong support from state and federal agencies, and development activities that result in demand for credits.[136] Alabama and Florida, each containing prime tortoise habitat, are both states where "ample opportunities [exist] to establish markets in species credits and conservation banks."[137]

2. Mobile, Alabama Tortoise Conservation Bank Analysis

As noted, a major flaw with gopher tortoise protection under the ESA and state laws is that prohibiting further tortoise habitat destruction alone is insufficient to ensure tortoise survival. Only through non-federal landowners' proactive efforts to "plant longleaf pine, re-introduce periodic fires into pine forests, control hardwoods and invasive plants, and thin dense forests" can gopher tortoise habitat be restored to a level that will ensure viability.[138]

Studies performed during the 1990s show that failure to adequately protect and restore tortoise habitat caused populations to drop significantly despite ESA protection in the western portion of the gopher tortoise's range.[139] Matters became more complicated when development efforts conflicted with tortoise viability. When landowners were unable to build homes due to the presence of gopher tortoise burrows in southern Alabama, residents of Mobile County began searching for a solution. During this time, Art Dyas, forester for the Mobile Area Water and Sewer System (the Water System), implemented a program to restore gopher tortoise habitat. The Water System owns land adjacent to a key Mobile water

135. *Id.*

136. *Id.*

137. *Id.* On May 2, 2003 the U.S. Department of Interior released a memorandum titled *Guidance for the Establishment, Use, and Operation of Conservation Banks*. This memorandum is expected to increase landowner knowledge and participation in conservation banking. The department stated that such guidance was necessary because, "as demand for conservation banking increases, it is important that the essential components and operational criteria of conservation banks are standardized to ensure national consistency." Guidance for the Establishment, Use, and Operation of Conservation Banks, *supra* note 120. The guidance document provides instruction on the goals and objectives of conservation banking, conservation strategies, eligible lands, site selection, bank evaluation, credit system establishment, management requirements, monitoring requirements and coordination with other levels of government. *See generally id.*

138. Bonnie, *supra* note 83.

139. *Id.*

resource, the Converse Reservoir.[140] The area around this reservoir is undergoing rapid development, and the Water System has expanded its property via land purchases to create a buffer.[141] The Water System manages the land to protect the quality of the water in the reservoir and for timber resources. Dyas shifted management of the timber resources to restore longleaf pine and used the land to sell credits to landowners whose projects were being frustrated by gopher tortoise habitat preservation.[142] The shift in management proved relatively cheap; in areas that could be successfully restored to longleaf pine by using prescribed burning, the cost was as little as fifteen dollars per acre. In areas where the removal of invasive species and planting of longleaf pine seedlings was required, the cost varied from $50 to $200 per acre.[143]

Art Dyas worked with the Water System, the U.S. Fish and Wildlife Service, Environmental Defense and gopher tortoise experts to establish the first-ever conservation bank for gopher tortoises on a 222-acre parcel in Mobile, Alabama in 2001.[144] Under the banking system, landowners can purchase credits for $3,500 apiece for each gopher tortoise they plan to take in the course of development. The tortoises are then tested for disease and, if cleared, are transferred to the bank. For each credit sold, officials at the Water System agree to protect and manage the proper proportion of habitat acreage for each gopher tortoise.[145]

Initially the bank contained fourteen tortoises, but by the middle of 2005, there were almost eighty-five tortoises on the premises.[146] The bank is monitored intensively by FWS officials, who use annual surveys to determine breeding success of the gopher tortoise and radio tracking to carry out monitoring. Monitoring reports show that the tortoises are doing well and are reproducing at a successful rate.[147] Furthermore, the management and economic benefits provided by the bank have led the Water System to consider expanding the bank beyond 222 acres.[148]

140. Groutt, *supra* note 82.
141. *Id.*
142. Bonnie, *supra* note 83.
143. Groutt, *supra* note 82, at 11.
144. *Id.* at 10-11.
145. Bonnie, *supra* note 83.
146. Groutt, *supra* note 82, at 11.
147. Bonnie, *supra* note 83.
148. *Id.*

Robert Bonnie, Managing Director of the Environmental Defense Center for Conservation Incentives, believes the Mobile conservation bank is a success and is an excellent model for conservation banking in general. Bonnie stated:

> Whereas tortoises were once something of a nuisance [to the Water System], today their welfare and the protection of the longleaf pine ecosystem on which they depend is a source of revenue and, perhaps just as importantly, a source of pride. And, as if that weren't enough, the whole process has enhanced the water agency's reputation: [the Water System] is now viewed by the wider community as having helped to solve what at one time appeared to be [a] vexing and intractable problem. So successful has the gopher tortoise experience been, that [the Water System] is now considering enlarging the bank.
>
> Conservation banking and other incentive-based approaches work because landowners, many of whom would like nothing more than to participate in recovery efforts, are given the opportunity and the financial and other resources needed to underwrite the costs of stewardship. In other words, the power of private conservation is unleashed.[149]

The Water System bank's success has also encouraged other governmental entities in southern Alabama to undertake similar efforts. In 2004, the FWS, the Federal Highway Administration and the Alabama Department of Transportation created a second conservation bank for the gopher tortoise. This bank is located in northwestern Mobile County and provides a relocation site for tortoises displaced by local highway projects.[150] Yet another bank is planned as FWS officials work with South Alabama Utilities and the City of Citronelle to dedicate more space for gopher tortoises.[151] As of late 2006, approximately 1500 acres of Mobile County were set aside for gopher tortoise conservation banks.[152]

Despite the promising benefits of conservation banks, they do not yet provide the most robust solution for protection of species like the gopher tortoise. Because conservation banks rely on market forces, they may provide little protection for species located on habitat that is subject to routine forest practices, rather than subject to rapid development. Rapid urban development is only one factor in the loss of tortoise habitat and, as mentioned, much tortoise

149. *Id.*
150. Groutt, *supra* note 82, at 11.
151. *Id.*
152. *Id.*

population loss is due to forest management practices. So, because most tortoise habitat is located on private property that does not play a role in the development market, conservation banking may not be a silver bullet solution across large portions of the gopher tortoise's range.

Another complication is that most conservation banks are habitat banks rather than species banks, meaning that the currency used in the market is land value rather than the value of species protection. This is due largely to the fact that in a market system, acreage value used to describe habitats is easier to use as currency than is species protection value, which is much harder to quantify.[153] There are some advantages to the habitat bank approach, as habitats not directly protected under the ESA will receive protection through bank creation, which may allow a species to re-establish and extend its range. The habitat bank approach also protects endangered or threatened plants, which receive no direct ESA protection.[154] However, using habitat as a currency can be problematic because there is no strong regulatory enforcement for habitat protection. Without adequate enforcement, developers may be less likely to deal in these markets in which they are not required to participate.[155]

Although conservation banking currently entails some difficulties, it nonetheless provides an ever-growing avenue for gopher tortoise protection, and it also remedies some of the inadequacies presented by the HCP program. With the regulatory and market tools of HCPs and conservation banks for habitat conservation, government authorities and conservation groups have a decent starting point for encouraging developers to take into account species like the gopher tortoise when undertaking new development.

### *D. Proactive Developer Initiatives*

In addition to incentive plans created to encourage landowner cooperation with regulatory laws and agencies, developers have undertaken creative new initiatives for gopher tortoise habitat protection. One such initiative has been coined a "conservation

153. *See* Mills, *supra* note 100, at 541-55.
154. *Id.* at 550.
155. *Id.* at 541-55.

community," a community of unusual urban design as exemplified in Harmony, Florida.[156]

Harmony lies on 11,000 acres in a quickly growing, tourism-dependent community in Osceola County, Florida. Jim Lentz, an investment banker who started the project, intended to create a new type of conservation community.[157] The site includes "two pristine, sandy-bottomed, 500-acre lakes (Buck and Cat), cypress-forested wetlands, palmetto prairies, and extensive forests filled with live oaks and pine flatwoods," and "a variety of rare plants, including bromeliads and a threatened pine lily."[158] However, it also has foot and bike paths, a thirty-acre town center, a "golf preserve," apartments, schools and 1.8 million square feet of commercial and light industrial uses.[159] Despite this seemingly odd juxtaposition, Harmony has been praised for its dedication to preserving ecologically functional open space. Almost 70% of community land is set aside for open space. The eastern half of the community is subject to a conservation easement and is managed strictly for habitat protection.[160] The wetlands located on the property are home to Florida softshell turtles, eastern indigo snakes and Florida pine snakes. In addition to bobcats, white-tailed deer and river otters, there are also numerous legally-protected species present on the property, including the American alligator, Florida sandhill crane, bald eagle, osprey, Florida black bear and of course, the gopher tortoise.[161]

Developers of Harmony point to the gopher tortoise as proof of their intention to design a legitimate development that accounts for environmental concerns. Rather than using a state permit that allows them to pay into a mitigation fund for gopher habitat elsewhere, Harmony has gone beyond state and federal regulations by setting aside thirty-one acres of developable land as a gopher tortoise preserve.[162]

156. Jennifer Wolch, *Two by Two: Looking Out Over Cat Lake, a Hiker Gets a Treat: Two Beady Eyes Peering Out from the Water's Surface. It's an Alligator Monitoring Its Realm: A Conservation Community with a Twist*, PLANNING, Aug./Sept. 2003, at 32.

157. *Id.*

158. *Id.*

159. *Id.* at 33.

160. *Id.*

161. *Id.*

162. *Id.*

The town has also addressed a number of other environmental issues. Harmony employs a full-time conservation manager who has designed strict road building regulations intended to protect the wetland corridors on the property, and the town's lighting is designed to prevent light pollution.[163] The community is even taking steps to educate its citizens. Harmony has coordinated a program with the University of Florida to educate residents by establishing kiosks, a website and a wildlife monitoring program. Furthermore, local schools include an environmental curriculum to teach human-wildlife coexistence values.[164]

Although they may not be the ultimate solution to gopher tortoise preservation, communities like Harmony can provide a winning solution in areas that open to new development. By encouraging greater integration of species habitat within the confines of residential developments, those species receive a certain amount of protection and developers and residents reap the economic benefits of mixed-use development.

HCPs, conservation banks and conservation communities are important steps in the right direction for saving gopher tortoise habitat that is subject to development throughout the southeastern United States. However, because most tortoise habitat is affected by private forest management practices, solving the development conflict will have relatively minimal impacts on the recovery of the gopher tortoise throughout most of its range. Thus, it is crucial that forest managers determine and implement appropriate forest management practices that will aid in the recovery of gopher tortoises across their historic range.

## IV. GOPHER TORTOISE CONSERVATION VS. PRIVATE FOREST MANAGEMENT

> The restoration, conservation and management of . . . forests, about two-thirds of which occur on private lands, are critical to the survival of these rare species . . . . Private lands contain the vast majority of forest containing gopher tortoises. Accordingly, maintenance of the [gopher tortoise] population is not possible without some significant successes on privately-owned timberlands.[165]

163. *Id.* at 34-35.

164. *Id.*

165. Robert Bonnie, *Forestry Expert is the Gopher Tortoise's Best Friend*, ENVIRONMENTAL DEFENSE, Nov. 17, 2004, http://www.environmentaldefense.org/article.cfm?contentid=4497.

### *A. Introduction*

As noted, tortoise population has decreased by an estimated 80% during the last century, partly due to the development of housing projects, industrial centers and corporate agriculture.[166] Though the impacts of development are of great concern, and the solutions to the problems presented by development are important, the single greatest cause of gopher tortoise decline has been the destruction of the longleaf pine ecosystem on which the tortoise depends. Private forest management practices, in turn, have been the primary cause of the destruction of longleaf habitat because they have focused on monoculture plantation management of timber. This type of management is characterized by completely replacing the entire forest every twenty-five to thirty years – timber is planted, thinned after about ten or twelve years, completely cleared after twenty-five to thirty years, and then the process starts all over again. Furthermore, the exclusion of fire from these plantations has had especially detrimental results, as the gopher tortoise depends on fire to clear undergrowth and provide an open canopy for food production and nesting.[167] In short, the fire-maintained savannas of widely-spaced longleaf pine are as crucial to the tortoises' survival as the uniform, monoculture plantations are destructive to the species. In fact, forester Fred White, referring to the longleaf habitat, stated, "this natural mechanism is so closely fitted to the gopher tortoise that it may be how [the tortoise] began."[168]

However, due to the aforementioned struggle between property rights advocates and habitat conservation efforts, the rapid decline of the longleaf ecosystem has been a difficult problem to solve. Private forest managers feel threatened by what they feel is an unnecessary encroachment on not just their property, but their liberty. Keville Larson is Chairman of the Board for Larson & McGowin Forest Managers and Consultants, Inc. of Mobile, Alabama. In his article titled "Perspective of a Private Forestry Entrepreneur," he stated that forest owners have "felt and seen real threats to their property and management rights [from laws like the ESA]."[169] He further stated:

166. Hoppe, *supra* note 70.

167. *Id.*

168. Interview with Fred White, S. Forestry Found. Bd. Member and Forester for the Forest Land Group, LLC, in Chapel Hill, N.C. (May 2004).

169. Keville Larson, Public Policy and Private Response: Perspective of a Private Forestry Entrepreneur, Southern Forest Economics Workers Annual Meeting (March 27, 2001) (unpublished paper, on file with author).

> For our 235 acres of Longleaf Pine in Mobile County, Alabama, my wife and I have mild concerns about hurricanes, tornados, insects or wildfire, but major concerns about . . . local regulations that could affect logging . . . and restrictions on activities because of the threatened gopher tortoise, whose habitat we are maintaining, or because of some new threatened or endangered species.[170]

Larson's concerns highlight the need to consider the steps that have been taken, such as government incentives and private initiatives, to address the problems associated with private forest management.[171] However, because these steps have proven inadequate thus far, it is imperative that landowners understand the need to augment private forest management practices in a way that can protect species like the gopher tortoise while maintaining the economic return that landowners have come to expect from the use of their property.

### *B. Government Incentives and Private Initiatives*

In an effort to address concerns of private landowners such as Larson, the federal government has created incentives for landowners concerned about legal obligations for protecting endangered or threatened species. Previously discussed incentive programs such as the HCP program and conservation banks are options available to private timber managers, just as they are to developers. In addition, the federal government has created the Safe Harbor program to further address the specific concerns of private forest managers. In this way, large-scale private timber managers are now involved in developing solutions to the problem via private initiatives targeted at biodiversity protection.

#### 1. Safe Harbor

The Safe Harbor program, established by the FWS, allows private landowners to manage their land in ways that promote the survival of an endangered or threatened species without incurring any additional future ESA responsibilities.[172] The owner of the land first

170. *Id.*

171. Forester Fred White stated that he is familiar with Larson's management style, and that Larson actually *does* engage in the types of forestry practices suggested in this article. As such, White suggested that Larson's statements were likely political in nature and merely motivated by the "conditioned reflex to be against regulation." White, *supra* note 168. Nonetheless, Mr. Larson's stated concerns are salient to many forest landowners who do *not* properly manage their timber. As such, Larson's statement informs about the tension in this area as well as the types of landowners at whom information and incentives should be directed.

172. *What is Safe Harbor?*, ENVTL. DEFENSE, Sept. 1, 2002, http://www.environmentaldefense.org/article.cfm?contentid=156.

enters into an agreement to restore, enhance or create habitat for a species. In return, the landowner's ESA responsibilities are frozen at the level occurring at the time of the signing of the agreement.[173] The Federal Register states that property owners "will not be subjected to increased property-use restrictions if their efforts attract listed species to their property or increase the numbers or distribution of listed species already on their property."[174] If a future increase occurs from the baseline population of the threatened or endangered species, the landowner must simply notify the FWS, which will send officials to remove those individuals from the property. Any failure to comply with the agreement could result in a "take" of the threatened or endangered species, and subject the landowner to civil or criminal liability.[175] Supporters of Safe Harbor claim that its benefits go far beyond merely protecting the species for which the agreement is signed. These benefits include:

- The use of prescribed burning and other techniques to control hardwood growth in ecosystems that historically were naturally dependent on wildfire disturbance and are now declining because of fire suppression;
- Longer rotation cycles in forest systems where endangered species are associated with older forest communities;
- Active control of invasive, non-native grasses and other organisms that threaten ecological integrity;
- Reestablishment of hedgerows, vegetated field borders, and native vegetation generally in areas now denuded by "clean farming" practices;
- Reintroduction of imperiled species into formerly occupied areas;
- Connecting habitat patches in fragmented landscapes.[176]

The first Safe Harbor agreement was signed in 1995 to protect endangered red-cockaded woodpecker habitat in North Carolina.[177] Since that time, more than sixty-two landowners in the area have enrolled more than 36,000 acres of land, and woodpeckers have

173. *Id.*

174. *See* Proposed Martin Branch Woodland Safe Harbor Agreement, Covington County, MS, 68 Fed. Reg. 43,157-43,158 (Dep't of the Interior July 21, 2003) (notice).

175. Sayeed Mehmood & Daowei Zhang, *Determinates of Forest Landowner Participation in the Endangered Species Act Safe Harbor Program*, HUMAN DIMENSIONS OF WILDLIFE, Winter 2005, at 250-51.

176. ENVIRONMENTAL DEFENSE, *supra* note 172.

177. *Id.*

successfully re-inhabited and even reproduced on some portions of that land.[178] The number of Safe Harbor programs has since grown, and some states have enacted legislation establishing their own programs. In 2003, the FWS distributed just under $35 million to forty-two states for incentive-based programs, including Safe Harbor, for rare species habitat protection on private lands.[179]

The first Safe Harbor agreement for the gopher tortoise was signed by Dr. Jack Lambert, who owns 750 acres near Sumrall, Mississippi. Dr. Lambert is managing his land for both timber production and longleaf habitat restoration.[180] Under the agreement, Lambert is required to manage habitat by taking the following actions:

1. Reduce tree density and canopy cover, increase sunlight on the forest floor, and maintain an open pine forest by thinning timber and prescribing frequent fire;
2. Plant and/or naturally regenerate longleaf pine;
3. Grow and maintain trees of sufficient size and quantity for suitable nesting and foraging habitat for one or more groups of red-cockaded woodpeckers.[181]

Lambert has successfully thinned hardwood trees and used prescribed burning to reintroduce to the forest floor the herbaceous vegetation that tortoises thrive upon. Lambert's management activities have also benefited the endangered red-cockaded woodpecker and many of the other 360 species that gopher tortoise burrows support.[182] He has successfully protected these species while also protecting soil and water resources and generating income. Lambert stated, "Safe Harbor allows me to manage my land for profit and at the same time help wildlife . . . . I get an assurance that some bright morning I won't be faced with a regulatory problem."[183]

Safe Harbor appears to be a successful means of protecting the tortoise, but what is the best method of encouraging private

178. *Id.*

179. Timothy Male & Marybeth Bauer, *The Landowner Incentive Program: Model State Approaches and Recommendations to the U.S. Fish & Wildlife Service*, ENVIRONMENTAL DEFENSE CENTER FOR CONSERVATION INCENTIVES 3 (July 2003), *available at* http://www.environmentaldefense.org/documents/2937_LIPreport.pdf.

180. Bonnie, *supra* note 165.

181. *See* Proposed Martin Branch Woodland Safe Harbor Agreement, *supra* note 174.

182. *In Mississippi, a Retired Veterinarian Now Tends to Trees,* BACK FROM THE BRINK, May 3, 2004, *available at* http://www.environmentaldefense.org/article.cfm?contentID=3712 (last visited Nov. 20, 2007).

183. *Id.*

landowners to participate in the program? A study performed by the Arkansas Forest Resource Center at the University of Arkansas-Monticello and the School of Forestry and Wildlife Sciences at Auburn University found that there are many determinants of landowner participation in Safe Harbor.[184] The study was based on a survey of private landowners in North and South Carolina in the year 2000, in which 162 landowners were surveyed, forty-six of whom were enrolled in a Safe Harbor program for red-cockaded woodpeckers.[185] The survey data, compiled and examined for various components of participation, provide a useful tool for deciding how best to educate landowners and promote the Safe Harbor program.

Landowners of large tracks of property were more willing to sign a Safe Harbor agreement than landowners of smaller parcels. These landowners were more likely to manage their property for forest products, and "had more to lose from regulatory uncertainty."[186] Those landowners who had knowledge of woodpecker proximity to their property were also more likely to sign. Presumably, these landowners were aware that the risk of woodpeckers locating on their property was elevated. Such land characteristics, seen as risky by some landowners, can serve as a strong incentive to sign a Safe Harbor agreement, and indeed, endangered species proximity to the property had the highest impact on landowner participation in the Safe Harbor program.[187] Similarly, landowners who used prescribed burning or other methods of controlling understory hardwood, and who were also aware that this created prime woodpecker (or gopher tortoise) habitat, were more likely to sign an agreement.[188] The study suggested that agencies "should focus their limited resources on owners of large parcels with substantial mature pines, who have [endangered or threatened species] in close proximity to their land, and those who practice silvicultural management that favors [those species]."[189]

Interestingly, the component with the second highest impact on Safe Harbor program participation was simply the receipt by landowners of information about the program from consulting foresters, rather than directly from governmental agencies. The

184. Mehmood, *supra* note 175, at 251-52.
185. *Id.* at 251.
186. *Id.* at 252.
187. *Id.* at 255.
188. *Id.* at 256.
189. *Id.*

authors cited private landowners' general skepticism about government agencies as a probable reason for the high impact.[190] They further noted that knowledge of this component's impact is especially useful as it informs on how best to approach and educate landowners about the Safe Harbor program.[191]

Perhaps not surprisingly, the study found that "landowners who concurred with the notion that the society had a moral obligation to protect the [red-cockaded woodpeckers]" and other endangered species had "a higher probability of participation in the . . . program. On the other hand, landowners concerned about private property rights . . . were less likely to sign a[n] . . . agreement."[192] However, another component of the study indicates that much of the hesitancy by property rights proponents may simply be due to a lack of knowledge regarding the law or how incentive programs work. The study found that 43% of non-participants in the program were not familiar with the provisions of the ESA, 47% were unfamiliar with the ESA's impact on forest management and 51% were unaware of the legal consequences of not complying with the ESA.[193] These results indicate that greater efforts should be taken to increase landowner knowledge and overall awareness of both the ESA and the Safe Harbor program. Use of the most effective channels – i.e., local forestry consultants rather than government entities – can go a long way toward ensuring that more private landowners take advantage of the program for the benefit of endangered or threatened species like the gopher tortoise.

2. Private Forest Landowner Initiatives – International Paper Case Study

A handful of large-scale private forest landowners have undertaken voluntary initiatives to protect endangered or threatened species. One example is International Paper (IP), which entered into a Habitat Conservation Plan in 1999 in southern Georgia for the endangered red-cockaded woodpecker, which shares much of the same habitat as the gopher tortoise.[194] The company worked with state and federal wildlife agencies and the Environmental Defense

190. *Id.* at 253.

191. *Id.* at 255.

192. *Id.* at 256.

193. *Id.*

194. Greg Fales, *IP Donates 2,650 acres in Mississippi to the Conservation Fund*, PIMA'S PAPERMAKER, April 1999, at 10.

Fund to draft a plan that would mitigate any development harms, and "enhance the long-term survival" of the species by increasing woodpecker habitat from 1300 acres to 5300 acres.[195] IP also agreed to increase its responsibility from eighteen clusters of woodpeckers to thirty active clusters, install artificial nesting cavities and create new habitat for nesting and foraging.[196] This was the first-ever HCP in which a private landowner voluntarily increased its responsibility for endangered or threatened species habitat on its own property, rather than relocating the species to public lands.[197]

IP's effort became a unique model, which in fact resembles an HCP and a conservation bank wrapped into one. The company attempted to go beyond the endangered species baseline population required for the HCP, and additional improvements to the population were sold as credits under a conservation bank model. Credits for red-cockaded woodpeckers on the property have been valued at as much as $250,000 per credit. This could be a valuable source of revenue for the paper company's operations in Georgia.[198] It also provides greater encouragement to companies like IP to preserve habitat rather than aggressively harvest the timber on all portions of their land.

In addition to the habitat conservation efforts in Georgia, in 1999 IP donated two tracts of Mississippi land worth around $1.8 million to The Conservation Fund. The donation included a 1700-acre parcel and a conservation easement on 950 acres that created a 300-foot buffer along the Wolf River.[199] Gopher tortoises live on the donated land, which will eventually be added to the U.S. Fish and Wildlife Service's Grand Bay National Wildlife Refuge.[200] Some consider the area to be "one of the most important undisturbed sites in the Gulf Coastal Plain region."[201] The refuge is open to the public for wildlife observation, environmental education and scientific research. George A. O'Brien, vice president of IP's forest resources division, stated, "[s]ince our company derives a significant amount of its shareholder value from our sustainably managed forestlands, it is appropriate for us to look for unique environmental and ecological

195. *Id.*
196. *Id.*
197. *Id.*
198. Bonnie, *supra* note 83.
199. Fales, *supra* note 194.
200. *Id.*
201. *Id.*

holdings and set them aside permanently for the benefit of all Americans, now and in the future."[202] This was the fifth donation and third cooperative conservation project between IP and The Conservation Fund.[203]

In March, 2006 IP also completed a deal with The Nature Conservancy deemed the "largest single U.S. land conservation purchase ever." IP sold the Nature Conservancy 14,000 acres of forest land along the Perdido River in Baldwin County, Alabama.[204] The Perdido River winds through what was formerly the heart of the nation's longleaf pine ecosystem and is a prime location for restored gopher tortoise habitat. Much of the area has been converted to tree farms, which has had a deleterious effect on tortoise populations. As noted, only about 4% of the original longleaf pine ecosystem remains throughout the Southeast.[205] However, there are some remaining high-quality stands of longleaf pine on the property, and The Nature Conservancy hopes to reintroduce natural processes like fire to restore more longleaf habitat. The organization further hopes this purchase will be a significant step towards establishing a 100,000-acre conservation corridor along the Perdido River and all the way into the panhandle of Florida.[206]

The Perdido land supplements a 4000-acre purchase also made from IP pursuant to Alabama's Forever Wild Program, which was established by constitutional amendment in 1992 to facilitate the purchase of public lands for conservation.[207] Such proactive efforts by the paper company to aid conservation are especially significant because it is the largest private landholder in Alabama, with roughly 1.2 million acres of property in the state.[208] Overall, The Nature Conservancy and other conservation groups have made deals for about 218,000 acres of land owned by IP across ten Southern states. About 67,000 acres of that land is in Florida and South Carolina, which also contain quickly shrinking gopher tortoise habitat.[209] Echoing IP's George A. O'Brien, John Faraci, IP's Chairman and

202. *Id.*

203. *Id.*

204. Finch, *supra* note 7, at A1.

205. *Id.*

206. *Id.*

207. Outdoor Alabama, *Alabama's Forever Wild Program*, http://www.outdoor alabama.com/public-lands/stateLands/foreverWild (last visited Oct. 25, 2007).

208. Finch, *supra* note 7, at A1.

209. *Id.*

Chief Executive Officer, stated that "[t]his historic transaction demonstrates the compatibility of environmental, recreational and economic interests, and is a testimony to IP's legacy of sustainably managing healthy, working forest lands and protecting special forest lands for 108 years."[210]

Thus far, however, few large-scale private forest corporations appear to be following IP's lead in handling their lands in such an environmentally responsible manner. Furthermore, as highlighted, government incentives like the Safe Harbor program have reached only those who are both informed about environmental legislation and likely to manage their land for the benefit of endangered or threatened species in the first place. To properly address gopher tortoise recovery, as well as the recovery of other species which depend on the longleaf ecosystem, it is necessary to reach landowners, both corporations and individuals, who are neither properly informed nor properly managing forests for species conservation.

### *C. Private Forest Landowner Framework for Conserving Gopher Tortoise Habitat*

As discussed, the Endangered Species Act and state laws provide some measure of protection for the gopher tortoise, yet that protection only covers a small portion of the tortoise's range. Also, incentive programs designed to encourage cooperation with state and federal laws can result in protection of gopher tortoise habitat. However, species protection under these laws via incentives is usually only triggered at the initiation of a development project or as a result of developer or private forest manager conflicts with the law. We have already established that the single greatest cause of tortoise habitat destruction is forest management practices that have transformed 96% of former longleaf pine habitat into monoculture tree farms, or into some other management scheme in which the tortoise cannot survive. Also, private forest landowner acreage of habitat suitable for the tortoise far outweighs acreage significantly affected by development. Weighing the likelihood that the tortoise will be located on private, forested lands, as opposed to lands necessarily affected by development, it seems that private forest management should be the obvious focal point for gopher tortoise habitat restoration.

210. *Id.*

1. Forest Service "New Perspectives" Program

Sharitz et al., researchers at the University of Georgia and Clemson University, published an article about shifts in forest management titled "Integrating Ecological Concepts with Natural Resource Management of Southern Forests."[211] The study suggested management practices from the Forest Service's "New Perspectives" program, which was established in response to "increased public environmental awareness and legislative mandates in placing a greater emphasis on ecosystem sustainability and non-traditional utilization of national forestlands."[212] The authors began by noting that many non-industrial forest owners no longer consider timber to be a primary management objective, and therefore recognize the growing necessity of ecosystem sustainability in private forests.[213] The article provides the history of forests in the southern United States, noting the large private ownership (90%), forest management techniques (fire suppression and monocultures), and development pressures that have dramatically altered forest structure and created a highly fragmented landscape.[214]

The modern, transformed forest landscape lacks the multilayered canopy, diverse tree sizes, abundant snags (upright partially or completely dead trees) and fallen trees of a natural forest, all of which would together support the greatest amount of biodiversity.[215] In order to recreate such an optimal forest, Sharitz et al. recommended longer rotations, less intensive harvesting and site preparation practices, retention of mature trees in harvested stands and retention of snags and woody debris on the forest floor.[216] The authors specifically noted that these practices can be used to reestablish longleaf pine habitat, or for our purposes, gopher tortoise habitat.[217] Also, the establishment of wildlife corridors is cited as a major objective for longleaf restoration. Corridors benefit interior species, which are not as well adapted to living in a fragmented landscape as edge species.[218] Furthermore, Sharitz et al. highlighted the necessity

211. Rebecca Sharitz, Lindsay Boring, David Van Lear, & John Pinder III, *Integrating Ecological Concepts with Natural Resource Management of Southern Forests*, 2 ECOLOGICAL APPLICATIONS 226, 226 (1992).

212. *Id.* at 226.

213. *Id.* at 227.

214. *See generally id.*

215. *Id.* at 231.

216. *Id.*

217. *See id.* at 232.

218. *Id.*

of simulating fires similar to those which naturally occur in the longleaf ecosystem in order to establish a more sustainable longleaf pine habitat.[219]

Ultimately, the New Perspectives program highlights an important shift in forest management that emphasizes methods of increasing longleaf habitat, overall biodiversity and a more ecologically sustainable environment. These management practices can help in the recovery of many endangered or threatened species like the gopher tortoise. Even so, some critics may question why private landowners, many of whom reap economic benefits from current forest management practices, would wish to adopt new methods. Sharitz et al. even noted that "[a]lthough many private landowners may be willing to accept some reduced profit to sustain ecological values, it is unrealistic to expect large-scale implementation of new management procedures without sustained income or tax benefits or other personal rewards."[220] It is important to note that persuading landowners to participate in better management practices requires that such sustained income not be a negligible amount of revenue. Instead, financial returns must not deviate far from current returns received by landowners. It then becomes necessary to encourage management practices which both protect tortoise habitat and provide significant financial return for landowners.

2. "Increased Efficiency" and "Longleaf Pine" Management Frameworks

There are a couple of ways that private lands can be managed to achieve both tortoise protection and financial return. For this analysis, I will use seven hundred acres of Southern plantation-style pine timber as a model example. Let us suppose that for the past thirty years, this forest has been managed strictly as a monoculture plantation: a cycle of planting, growing, and large scale thinning of trees after about ten to twelve years, followed by clear-cutting after twenty-five to thirty years. Two alternative management practices can increase the land available for tortoise habitat and create a financial return at least equal to that of commonly used management schemes. In this subsection, these management practices, both being forms of "soft silviculture" as deemed by forester Fred White,[221] are detailed merely by way of description and example. The academic

219. *Id.*
220. *Id.* at 235.
221. White, *supra* note 168.

and industry support behind such practices is presented in subsection 3 below.

i. "Increased Efficiency" Framework: More Efficient and Aggressive Management of One Parcel in Order to Release other Parcels for Conservation

On our seven hundred-acre example of monoculture pine, the first alternative management practice that will maintain (or increase) the current yield of financial return involves a move toward more efficient and aggressive management on a reduced portion of the total acreage. More efficient management practices will reduce the overall acreage being managed for timber while providing sufficient economic return. For instance, by receiving the same financial return off five hundred acres as that previously gained off seven hundred, the remaining two hundred acres may be managed strictly for endangered or threatened species protection. Throughout the tortoise's range, the habitat released from intensive pine monoculture management (here, the two hundred-acre parcel) could be managed to benefit the gopher tortoise, the red-cockaded woodpecker, as well as many other species that thrive in the longleaf pine ecosystem. Furthermore, this released acreage could bring additional financial return, as a landowner may choose to establish a conservation bank, for example, and sell credits for species protection.

Dr. Norm Christensen, founding Dean of the Nicholas School of the Environment and Earth Sciences at Duke University, expressed that a key element to increasing forest management efficiency of a fixed parcel of land is longer rotations of the timber; by simply retaining one's trees for a longer period of time, one can increase the economic efficiency of the land.[222] As noted, the dominant modern practice is to harvest most trees young, after only ten to twelve years, to be processed for pulp and paper products. Wide-scale harvesting of ten- to twelve-year-old trees floods the market and causes prices of timber to go down. This practice is one means by which some large-scale corporate timber owners, such as Weyerhaeuser, Georgia Pacific, etc., leverage the market in their favor to achieve the most economic return from paper production.[223] However, as the niche industries of sawmills and pole timber facilities grow, there is an

222. Interview with Norman Christensen, Professor of Ecology and Founding Dean of the Nicholas School, Environmental Sciences and Policy Division, Duke University, in Durham, N.C. (Sept. 2004).

223. *Id.*

opportunity to maintain (or even increase) revenue streams without harvesting trees as often. If a landowner can wait until trees are age twenty or older, rather than after ten or twelve years, and selectively harvest those older trees, the result will be long-term positive economic effects.[224]

Trees twenty-years-old or older serve two roles in providing stable economic return off of less acreage, i.e. increased economic efficiency. First, when older trees are cut, each tree yields a much greater economic return based upon a greater volume of wood per tree. Such trees are more suitable for sale to sawmills or pole timber facilities. These facilities pay significantly more for single trees than paper mills pay for an entire bundle of pulp timber trees. Second, having pulp trees in the market in fewer numbers and less often will reduce the glut in the market and cause timber prices to increase. Importantly, the market is currently poised to fulfill the increased economic efficiency arguments I have suggested – sawmills and pole timber facilities are occupying an increasing segment of the timber market, as pulp facilities are rapidly moving overseas.[225]

Application of this management style to our example property would be as follows: small scale selective cutting after ten to twelve years allows some short-term economic gain and provides that the remaining trees grow at an optimal rate. Next, it is necessary to maintain the remaining trees for twenty years or more, rather than clear-cutting after twenty-five to thirty years and beginning a new monoculture. Then, trees that are much larger and older should be selectively cut and sold to sawmills or pole timber facilities for maximized economic return per tree. The trees sell for a greater price per tree because each tree is worth more as pole timber than as pulp, and some of the trees which would have flooded the pulp market after ten or twelve years would be part of the current sale. This scenario potentially allows the same long term economic return off only five hundred acres as previously obtained off seven hundred acres. Furthermore, the additional two hundred acres now freed from

224. Of course, some small scale selective cutting will be necessary between ten and twenty years in order to provide sufficient space for the remaining trees to grow at an optimal rate.

225. Regarding use of sawmills and pole timber facilities as a means of achieving greater economic efficiency, forester Fred White stated, "I think in the ensuing years, this approach is going to become much more widespread." White stated that the "short rotation, push, pile and plant" type of monoculture timbering, which focuses mostly on pulp production, is "in its last throws" because the fiber industry is heading overseas. "If there is any future to forestry in the South it is going to be long rotations producing dense grain, structural timber." White, *supra* note 168.

monoculture timber management can be managed for natural, prime longleaf pine restoration for species such as the gopher tortoise.

There are two potential issues with this approach that warrant consideration. One issue is that for the market forces prong of the argument to work, many landowners in a regional market would need to engage in the recommended management practice to actually affect the market. However, this is the very reason I strongly recommend that landowners actually engage in this practice. Another potential issue is that this approach requires ownership of a large enough tract of land to ensure the steady flow of selectively harvested, mature pines necessary to maintain the economic viability of the scheme, rather than the alternative of clearing entire stands every twenty-five or thirty years. Large holdings are also more likely to affect the market. This should not be a major issue in the state of Alabama, as well as many other states that have gopher tortoise habitat, as most forestry practicing landholders who rely substantially on forest income do indeed own tracts large enough to manage in this manner. Furthermore, as seen earlier, large-parcel landowners are more likely to manage their property for timber products than small-parcel landowners.[226]

For instance, in Alabama there are publicly owned lands (state parks, preserves, etc.), corporately owned lands (paper companies) and smaller, third-party forest management operators. As mentioned earlier, International Paper is the largest private landowner in the state, with approximately 1.2 million acres. Owning a large bulk of the remaining acreage of managed pine plantation are third-party forestry operators who take advantage of low property taxes and readily available land in the state. Managers at IP have stated the company's intention to sell most of its property in North America, and Weyerhaeuser is dumping large amounts of holdings in Southern states as well.[227] These companies are so eager to release their holdings that they often sell property at cheaper-than-normal rates. Also, property taxes in Alabama are extremely low. The availability of cheap property, along with low tax liability, allows these third-party forestry operators to purchase thousands of acres of pine lands. Some operate responsibly, using best management practices, and others operate poorly, causing much environmental degradation due to the lack of enforcement of forestry standards. These third-party

226. Mehmood, *supra* note 175, at 252.

227. Finch, *supra* note 7, at A1.

forestry operators own tracts large enough to implement the aforementioned management scheme.

Most other remaining pine plantation owners are individuals, owning perhaps between 200- and 1000-acre plots. If managed properly, even these smaller plots can yield significant economic returns in the long run – i.e., after the harvesting of twenty-year-old pine trees begins. The landowners least likely to capitalize on this scheme are those owning even smaller plots of forested lands. It may be difficult for them to ensure enough mature pines available for harvesting each rotation to gain significant economic return. Nonetheless, by owning smaller parcels of land, these landowners are less likely to rely on timber production as a major means of subsistence in the first place. Therefore, after longer rotations are established, timber may provide less economic gain for small landholders than for large landholders, but should ensure at least the levels of return gained when rotating younger stands of timber via monoculture and plantation management. In short, all can benefit in some way by using the more aggressive, longer-rotation management scheme described above.

This type of management can lead to what many, including Dr. Christensen, believe to be the best method of conservation: managing part of one's holdings aggressively for timber and managing another part aggressively for conservation. Otherwise, the alternative of providing a part timber, part conservation approach on the entire plot of land can cause many forest owners to fail to capture the best economic return for themselves, as well as the best habitat for species living on the property, such as the gopher tortoise.

ii. "Longleaf Pine" Framework: Managing the Entire Holding for Longleaf Pine

Some people disagree that the aggressive management/aggressive conservation approach is the most appropriate method of forest management for conservation. For instance, Sharitz, though recommending longer rotations and retention of mature trees in harvested stands, suggests less-intensive harvesting and site preparation practices on an entire parcel of property. The second alternative management practice I wish to discuss incorporates this view, and is somewhat distinct from the aggressive timber management/aggressive conservation approach discussed above. On our seven hundred-acre example, this approach would maintain or increase current yields of financial return by simply managing the entire acreage as a longleaf pine ecosystem.

The longleaf pine ecosystem is the ideal system for longer-rotation timber management coupled with selective harvesting. An inherent character of this ecosystem is low-density, adequately spaced longleaf pines with open spaces of wiregrass and other herbaceous ground cover between trees. The open space allows trees to grow faster and larger due to reduced competition for nutrients. Thus, as mentioned above, the twenty-year-old tree selectively cut out of a longleaf ecosystem will yield a significant economic return, due to the size of the tree and the market into which it is sold. When enough landowners convert relatively large acreages into longleaf pine habitat, it will serve the further purpose of increasing economic return by decreasing the amount of pulp timber in the market and causing timber prices to rise. So, despite having overall fewer trees on one's property, managers will get a greater price per tree, because pole and saw timber is worth more than pulp timber, and the prices for those trees will also increase in the market for the reasons mentioned in section IV. C. 2. i. above. Again, the number of landowners participating in this practice and the amount of acreage those landowners control play key roles in determining the success of this scheme. Furthermore, landowners must be willing to potentially forgo a portion of their short-term economic gains in order to establish the practice successfully.[228]

Whether a landowner decides to set aside specific property for gopher tortoise habitat through aggressive and efficient management of other properties, or whether a landowner manages an entire acreage for the longleaf pine ecosystem, landowners can feel confident about receiving reasonable financial return for their efforts. Such management is key if the gopher tortoise or other species are to reestablish, or at least survive, throughout their historical ranges.

228. For example, in waiting for the trees to mature to twenty years old, landowners would likely perceive a lost 8-10 years of economic return which would have otherwise been gained under a monoculture approach. However, landowners can offset perceived short-term economic losses in various ways. Forester Fred White stated that "[i]f you substitute the production of utility poles at thirty years old . . . that's when the highest value products come out." White, *supra* note 168. White asserted that this alone could offset the lack of short-term gain received in a monoculture plantation. *See supra* note 225 and accompanying text. Also, White suggested a more densely planted longleaf stand could be thinned after 15-16 years, rather than 10-12 years as with loblolly pine. This could provide significant return if sold to pulp plants retrofitted for ethanol production in the future – White sees this as a growing market as alternative fuels are increasingly sought. Finally, White suggested that current subsidies which are paid to encourage people to *plant* pine should be substituted by subsidies to encourage people to plant pine in *long rotations,* rather than short. White, *supra* note 168.

3. The Forest Dialogue, "Ecological Forestry," and Stoddard/Neel Forest Management

> The beauty of the savannas of the southeast is often the connection that landowners, or those concerned with public land management, have with conservation, and the aesthetic value is often the motivation that allows them to forego the shorter term income that can be derived from liquidating the timber base. While aesthetics was well recognized by early conservationists . . . it is often ignored in both the contemporary silvicultural community and scientific community concerned with land management.[229]

The science behind the management suggestions described above has been presented in numerous publications. The topic of Yale School of Forestry & Environmental Studies' 2004 The Forests Dialogue Review was "Forest and Biodiversity Conservation."[230] An article in The Forests Dialogue Review specifically discusses an initiative implemented by landowners from the American Tree Farm System, conservation groups and government agencies titled the "Forested Flyways Gopher Tortoise Initiative."[231] The purpose of the initiative is to demonstrate and promote management that is beneficial to biodiversity in southeastern U.S. forests, and to "shift landowners away from short-rotation management that focuses on pulp production and toward longer rotations that focus on sawtimber and pole production."[232] The article states:

> Partners in the initiative are the American Forest Foundation, Mississippi Fish and Wildlife Foundation, Environmental Defense, American Bird Conservancy, and U.S. Fish and Wildlife Service. The goal is to improve habitat for declining species dependent on fire-maintained southern pine communities, particularly longleaf pine, in Alabama, Louisiana, and Mississippi. The initiative is currently focused on family forestlands in 23 counties covering 4.2 million hectares throughout those three states. The initiative is restoring and conserving privately-owned pineland habitat for the benefit of many species of concern such as the endangered red-cockaded woodpecker . . . .[233]

229. R.J. Mitchell, J.F. Franklin, B.J. Palik, L.K. Kirkman, L.L. Smith, R.T. Engstrom, & M.L. Hunter, Jr., *Natural and Disturbance-Based Silviculture for Restoration and Maintenance of Biological Diversity*, U.S.D.A. Forest Service, North Central Research Station, at 37-38, *available at* http://www.ncrs.fs.fed.us/4101/local-resources/docs/ncssf_report.pdf.

230. Colloquy, *Forest and Biodiversity Conservation*, The Forests Dialogue Rev. (2004), *available at* http://research.yale.edu/gisf/assets/pdf/tfd/tfd_review_01.pdf.

231. *Id.* at 19.

232. *Id.*

233. *Id.*

In another publication, the North Central Research Station of the United States Forest Service (Research Station) issued a report titled "Natural Disturbance-Based Silviculture for Restoration and Maintenance of Biological Diversity."[234] In the report, the author discusses "ecological forestry," defined as "forest management that incorporates and maintains a wide range of ecological values, such as native forest biodiversity and ecosystem processes, along with timber production."[235] The general focus of ecological forestry is promoting forest management practices "that most closely resemble the relevant natural disturbance regimes."[236] The report noted that such an approach is most likely to achieve ecological objectives, and is most appropriate for ecosystems like the longleaf pine ecosystem.[237]

The Research Station report analyzed commonly used clear-cut and shelterwood styles of even-aged timber management, both of which are monoculture plantation styles of management. Clear-cutting is a process that removes all timber from the land, and the shelterwood approach to management leaves only a few trees, which are then removed after successful regeneration of seedlings. These management styles leave no biological "structural legacies" intact, as are left in natural stand replacement disturbances. These "legacies" are defined as "the organisms, organic matter (including structures), and biologically-created patterns that persist from the pre-disturbance ecosystem and influence recovery processes in the post-disturbance ecosystem."[238] The legacies most needed for a balanced ecosystem are remnant live trees and abundant snags or downed boles. Clear-cut and shelterwood practices are meant to eliminate both types of legacies. The Research Station report noted that such even-aged management is focused on terminating all forest stands at some point, then re-growing a new forest by implementing mass regeneration.[239] As an alternative to that approach, the agency recommended intermediate stand-level treatments to "create and maintain structural and compositional complexity and heterogeneity."[240] Such treatments include:

- Thinning to stimulate development of larger trees;

234. Mitchell, *supra* note 229.
235. *Id.* at 6.
236. *Id.*
237. *Id.*
238. *Id.* at 4.
239. *Id.* at 20.
240. *Id.* at 23.

- Variable density thinning to stimulate development of spatial heterogeneity;
- Decadence creation in living trees and in the form of snags and downed boles;
- Introduction and conservation of compositional diversity; and
- Control of undesirable plant and animal species[241]

Each of the listed treatments can be accomplished by using the selective cutting and prescribed burning methods discussed above, which are necessary to maintain the longleaf pine ecosystem.

The Research Station report further affirmed that the longleaf pine ecosystem is one of the most threatened ecosystems in the U.S., having experienced one of the steepest declines since European settlement, due to "fire suppression, intensive site conversion to other timber species, and conversion of land to agricultural and urban land uses."[242] The report cited dangers to species like the gopher tortoise occupying this habitat and noted that the viability of nearly thirty faunal species and at least 187 plants associated with ecosystems in the southeastern coastal plain are considered to be of concern at state, national or global levels.[243] However, retention of old canopy trees and the application of frequent fire can help preserve the habitat's overall conservation value and re-establish the habitat. To accomplish this, the Research Station asserted the necessity of shifting from standard silvicutural practices that call for highly stocked, even-aged plantations that are completely replaced every twenty to thirty years.[244]

As a model for an alternative approach, the Research Station recommended a single-tree selection system established by Herbert L. Stoddard, and modified by Leon Neel, aptly named the Stoddard/Neal approach to timber management. This model has been applied to forests in southern Georgia and northern Florida quite successfully for the last sixty years and is a further basis for the management suggestions presented in section IV. C. 2. This approach departs from the predominant modern forestry perspective, which treats forests as an agricultural crop, and instead focuses on maintaining a "perpetual forest with all its components, while

241. *Id.*
242. *Id.* at 28.
243. *Id.* at 34.
244. *Id.* at 29.

extracting timber of considerable economic value."[245] Thus, the Stoddard/Neal approach successfully blends land management objectives that landowners value, such as protection of game species, aesthetically pleasing woodlands and revenue generated from timber harvest, with management for the endangered species that rely on longleaf pine habitat.[246]

The main tool used for maintaining a "perpetual forest" is fire. Fire is used to open pine canopy structure, sustain understory regeneration, encourage diversity of plant life, regulate the flow of energy and materials through the ecosystem and maintain fine fuels.[247] Fire is also a highly cost-effective method of managing vegetation and hardwoods which, when left alone, could lead to the destruction of the longleaf pine ecosystem.[248]

Regarding timber extraction under the Stoddard/Neal approach, researchers at the North Central Research Station noted that "although valuable timber is harvested in this system of management, harvest is considered only after the standing crop of timber is sufficient to maintain the forest for perpetuity and then extraction is done with care to enhance the ecosystem."[249] They also asserted that enhancement is best accomplished by increasing the age structure of pine, converting from various species of pine to longleaf pine and removing hardwoods.[250]

In essence, the Research Station report describes, and the Stoddard/Neal approach requires, the management technique explained in subsection IV. C. 2. above. The Stoddard/Neal approach does necessitate that some older trees with high market value be retained for the health of the ecosystem. However, as noted, the remaining timber, when selectively cut, can provide sufficient economic return. Also, somewhat contrary to FWS suggestions regarding longleaf restoration,[251] the Research Station asserted that not all remaining economically useful timber need be longleaf pine. The report stated that "[b]y retaining pine forests perpetually through time, even in situations where . . . species may be less desirable than longleaf pine, both competition and fuel production of canopy pines

245. *Id.* at 34.
246. *Id.* at 43.
247. *Id.* at 35.
248. *Id.*
249. *Id.* at 36.
250. *Id.*
251. *See supra* text accompanying notes 53 and 54.

allow for hardwood control to be accomplished primarily through fire, resulting in lower management costs," as well as tortoise habitat restoration.[252] This assertion also highlights the time element noted in subsection IV. C. 2., above, that retaining timber until it becomes mature can yield suitable gopher tortoise habitat while also providing sufficient economic gains. Stated differently,

> Forests develop through time . . . there are few, if any, ecological substitutes for time . . . . Thus, even when management objectives may be to create habitat for endangered species, such as [red-cockaded woodpecker], and longleaf pine is a much preferred species for such an objective, the [Stoddard/Neal approach] recognizes that time is a critical factor that needs to be incorporated into restoration.[253]

Regarding the value of such restoration, the Research Station report noted that the resulting transformed ecosystem provides critical habitat for the gopher tortoise, and stated, "[i]n traditionally managed forests, intensive site preparation (particularly on short rotation) can eliminate herbaceous food plants of the gopher tortoise . . . . High tree densities lead to a closed canopy, which ultimately causes tortoises to abandon their burrows and migrate toward forest edges and roadsides."[254] Finally, the Research Station made the key point that "[f]orest management with goals of restoration or saw timber management of longleaf pine forests, where a perpetual forest structure is maintained over time, is key to the perpetuation of the floral diversity of the ecosystem" on which the tortoise depends.[255]

## V. CONCLUSION

The gopher tortoise is an important species, providing benefits for numerous other species in the complex southeastern U.S. ecosystem in which it exists. That ecosystem has been largely destroyed, and what is left is being threatened by both rapid

252. *Id.* at 40. Forester Fred White agrees with the Research Station on this point. White stated that for gopher tortoise restoration "[y]ou can also do exactly the same sort of silviculture with loblolly pines," in order to simulate the longleaf ecosystem. "[Loblolly] is equally as well adapted to the sites of the gopher tortoise as longleaf." White, *supra* note 168. Given the assertions of the Research Station and Mr. White regarding substitution of other pine species to simulate longleaf habitat, it seems unclear whether the science supporting the FWS still controls on this issue. *See supra* text accompanying notes 53 and 54.

253. *Id.*

254. *Id.* at 43-44.

255. *Id.* at 45.

development in sprawling urban regions and forest management practices that focus on monoculture pine plantations and short-rotation harvesting. The Endangered Species Act provides a measured amount of protection for the tortoise on the federal level, but only throughout a small portion of the species' geographic range. Various state laws provide limited protections as well, though more stringent legal protections are needed. Various schemes exist to encourage private parties to comply with these laws, which have seen increased success as a means of protecting the tortoise. Also, conservation-minded community development projects and increased corporate landowner involvement in conservation are means of providing protection for the tortoise.

However, the primary battleground for gopher tortoise survival is in privately-owned forests where current forest management practices pose the greatest threat. Given the increasing tension between private property rights and species conservation, forest management alternatives that focus on increasing forestry efficiency, managing private property specifically for tortoise habitat, and shifting to restoration and management of a longleaf pine ecosystem are crucial to establishing the recovery of the gopher tortoise, as well as many other species. These management alternatives provide both the economic return that private landowners seek, and protection for endangered or threatened species like the gopher tortoise. If forest management alternatives are not pursued, and without greater regulatory or enforcement mechanisms at the national and state levels, it may be a rare occurrence indeed for future generations to wait patiently for the slow, lumbering gopher tortoise to cross their path.