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 south Alabama, I've frequently come into contact with an important species, the viability of which has become greatly strained - the gopher tortoise (*Gopherus polyphemus*). I've often had to wait for the slow, lumbering gopher tortoise to cross the forest paths of south Alabama which I've traveled. The tortoise is listed as both a threatened and endangered species throughout a portion of its range, and due to development pressures and forest management practices is quickly declining throughout the rest. The timber cropped to provide jobs and subsistence to thousands of foresters in Alabama is a necessary part of the tortoise's survival. Take away the longleaf pine, destroy the 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, 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

[1] Catherine Puckett & Richard Franz, *Gopher Tortoise: A Species in Decline*, Gopher Tortoise Council, University of Florida Extension, Institute of Food and Agricultural Sciences 1 (1991).

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. 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 passage of sunlight necessary for the development of low, herbaceous plant growth for food. Sunny patches of open space in longleaf forests also provide prime area for nesting.[3] Natural fires play a crucial role in maintaining tortoise nesting areas by opening up the canopy and promoting the growth of herbaceous plants.[4]

Though considered prime tortoise habitat, as well as prime habitat for numerous other endangered species, the longleaf pine ecosystem has become highly fragmented. It is estimated that longleaf pine habitat has been reduced by over ninety-five percent.[5] Declines in gopher tortoise population directly correlate with this loss of habitat, as population densities have decreased by 80%.[6] 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. The incubation period for tortoise eggs ranges from 70-100 days, and usually one group of eggs is produced each year. Gopher tortoise nests are subject to extreme predation from numerous other animals, causing a loss of more than 80%

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[2] Puckett, *supra* note 1, at 1.
[3] *Id*.
[4] Thomas Ankersen, *The Gopher Tortoise and Upland Habitat Protection in Florida, Legal and Policy Considerations*, University of Florida Conservation Clinic Center for Governmental Responsibility Leven College of Law, February 2003, *available at* http://www.law.ufl.edu/conservation/pdf/gopher.pdf.
[5] Bill Finch, *Group buys chunk of forest land*, Mobile Press Register, March 29, 2006.
[6] Jeannine Eubanks, William Michener, & Craig Guyer, *Patterns of Movement and Burrow Use in a Population of Gopher Tortoises (Gopherus Polyphemus)*, Herpetologica, Vol. 59, No. 3, at 311.

of those nests. The cumulative effect of these circumstances is that tortoise eggs may only survive one out of every ten years.[7] Stated differently, only 1-3 of 100 hatchlings will ever reach sexual maturity. Such a low reproductive success rate makes the gopher tortoise especially sensitive to fragmentation, or other kinds of environmental degradation which results 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. Tortoise burrows, which can be up to forty feet long and ten feet deep, provide refuge for over 360 other species of animals. These species use the burrows to escape predators, fire and bad weather.[8] 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. Other species are listed as "species of special concern" under Florida state law. These include the pine snake, gopher frog and burrowing owl.[9] 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. Resulting is the destruction of mini-ecosystems that have existed for hundreds of years and on which numerous 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

[7] Puckett, *supra* note 1, at 3.
[8] *Id*. at 2.
[9] Ankersen, *supra* note 4, at 2-3.

counties is it federally protected by the ESA, passed by Congress in 1973. 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 animal with *no open season*."[10] Such federal and state laws currently provide inadequate protection for the tortoise, and have further facilitated the decline of the species.

This article addresses two main conflicts which affect the gopher tortoise's viability. The first is urban development, which has exploded across the southeastern U.S. – especially in areas of prime tortoise habitat. Incentives and other cooperative measures have been crafted to deal with rapid development. Though 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 which have almost entirely destroyed the tortoise's habitat throughout all of its historical range. Though development has gotten the most attention in the media, city council meetings, and other legislative forums, the much larger problem – private forest management – remains largely unaddressed. Five million non-industrial private land owners own 70% of the forestland in the southeastern United States. The fragmentation of the environment which results from so many landowners managing their own forests "is recognized by scientists as one of the major causes of loss of biological diversity."[11]

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.

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[10] Harold Wahlquist, *Gopher Tortoise Conservation*, From: Proc. 1st Intern. Symposium on Turtles & Tortoises: Conservation & Captive Husbandry, Pages 77-79, 1991, *available at* http://www.tortoise.org/archives/gopher.html (emphasis added).

[11] Michael G. Jacobson, *Ecosystem Management in the Southeast United States: Interest of Forest Landowners in Joint Management Across Ownerships*, Small-scale Forest Economics, Management and Policy, 2002, 1(1).

The takings clause of the 5th amendment of the Constitution grants protection for private property owners by establishing that property may not be taken by the government without just compensation. However, judicially validated "regulatory takings" cause controversy when regulation of private property limits a landowner's rights on that property to some degree. The ESA 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 it may place limits on their property rights and management practices, as well limit economic return from current forest management practices. The result of such resistance is often the phenomena 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. Such practices often hamstring the efforts of the federal government to protect biodiversity. Furthermore, most states have failed to address the issue of private forest management practices and maintain minimal protections for species like the gopher tortoise.

Given the increasing tension between the tortoise, development and private forest management efforts throughout its range, what can be done to encourage private land management that benefits both the landowner and the tortoise? 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, as well as 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). CITES regulates global trade in threatened and endangered species by restricting the flow of rare species and parts of species across national borders.[12] In the United States, 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. The restrictions on trade of species vary depending upon which "appendix" the species is listed. CITES has three appendices, each having a different threshold of permitting requirements. The 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

[12] James Rasband, James Salzman, Mark Squillace, Natural Resources Law and Policy, Chapter 14 (forthcoming) (document, Chapter_14_IV_final, on file with authors) (Foundation Press 2004).

controlled and monitored to avoid exploitation incompatible with species survival."[13] For a species listed in appendix II, a permit is required for the *export* of species, but not for the *import* of species. For such a permit to be granted for the gopher tortoise, 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.[14]

Since 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. *ESA*

On July 7, 1987, FWS listed the gopher tortoise as a threatened species under the ESA. 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."[15] The coverage of ESA 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, pg. 15).[16]

Section 7(a)(2) of the ESA insures 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 must consult

[13] *Id.*
[14] The Convention on International Trade in Endangered Species of Wild Flora and Fauna, Article IV, 27 U.S.T. 1087, T.I.A.S. No. 8249, 1973.
[15] 16 U.S.C. § 1532 (20).
[16] Ankersen, *supra* note 4, at 7-8.

with FWS on how to best achieve this goal.[17] However, section seven applies only to federal actions and provides little *direct* protection for the tortoise since most tortoise habitat is in non-federal ownership.[18]

Section 9(a)(1) of the ESA declares illegal the taking of a listed species, whether it be 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."[19] 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. 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.[20]

Perhaps the most important requirement of the ESA for the gopher tortoise is the Section 4(f) mandate requiring FWS to develop recovery plans to promote the conservation of threatened species. FWS is to 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."[21] The recovery plan for the gopher tortoise was issued on December 26, 1990. The introduction to the plan states that "[o]bjectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints."[22] This statement highlights a major limitation on the success of recovery plans

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[17] James Rasband, James Salzman, Mark Squillace, Natural Resources Law and Policy 359 (Robert C. Clark ed., Foundation Press 2004).
[18] Wendell Neal, *Gopher Tortoise Recovery Plan*, U.S. Fish and Wildlife Service, Southeast Region, December 26, 1990, at 13, *available at* http://ecos.fws.gov/docs/recovery_plans/1990/901226.pdf.
[19] 16 U.S.C. § 1532 (19).
[20] Rasband, *supra* note 17, at 370.
[21] *Id.* at 358.
[22] Neal, *supra* note 18.

under the ESA. The impacts of such plans have often been limited due to a lack of resources. For instance, between 1989 and 1993 the National Wilderness Institute estimated that implementing all recovery plans would cost approximately $1 billion. Congress has yet to allocate an amount of funds anywhere near this total.[23]

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 "prevention of the listed population from becoming endangered," and "delisting."[24] To achieve prevention of endangered status for the gopher tortoise, FWS would need to establish the presence of five tortoise burrows per 2.47 acres (or 1 hectare) "for a period of thirty years on the Desoto National Forest." FWS claims this would result in an estimated population of 22,400 gopher tortoises on 18,144 acres of government land. Before delisting occurs, FWS would need 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.[25]

FWS made several recommendations in the recovery plan necessary to achieve the stated objectives. FWS stated that it must:

- 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,

[23] Rasband, *supra* note 17, at 358.
[24] Neal, *supra* note 18, executive summary.
[25] *Id.* at 5. It is unclear why FWS bases delisting on only 45,947 acres, since later in the plan 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. 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.

seeking management agreements with landowners, protecting habitat through easements, acquisitions, and 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.[26]

FWS further detailed the steps necessary to achieve each of these goals, and estimated it would cost $500,000 to do so. However, FWS was unable to specify a time frame in which the objectives might be achieved.[27]

FWS 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%). This is cited as the primary reason for the decline in tortoise populations. FWS regarded the major cause for habitat reduction to be private landowners whose forestry practices focus on regenerating *former* longleaf pine sites with other types of pine species, fundamentally altering the habitat. Though tortoises can survive on lands that mimic the characteristics of the longleaf ecosystem, tortoise densities are 32% greater on natural longleaf pine habitat.[28] FWS noted that clear cutting, soil disturbances common with even aged timber management and prolonged intervals between burns are further reasons for longleaf habitat decline.[29]

Regarding the tortoise itself, FWS noted that predation has been a further cause of 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." Unfortunately such predation is not a relic of the 1920's, but is a continuing cultural activity, and can have exacerbating adverse effects on a species with such a

[26] *Id.* at 5, 15-18.
[27] *Id.* at 6.
[28] *Id.* at 9.
[29] *Id.*

fragile life cycle. A March 22, 2006 article in the *MetroWest 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.[30] In addition to human predation, FWS noted that more commonly the tortoise is subject to predation by other animals.[31]

In summary, FWS stated, "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." 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."[32]

Despite the recovery plan, the fact remains that due to a limited geographic listing area the gopher tortoise receives no direct protection under the ESA throughout most of its range (Figure 1, pg. 15). Tortoises arguably receive indirect benefit from ESA protections provided for other species which have similar habitat preferences, such as the Florida Shrub Jay.[33] 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.

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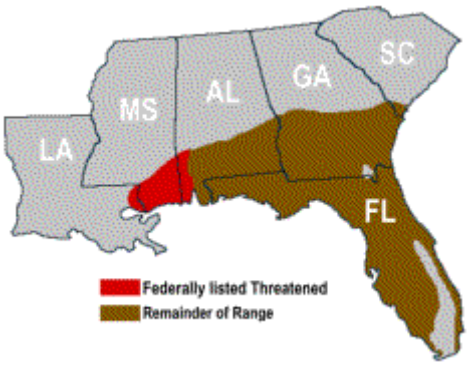
[30] Rob Haneisen, *The tale of the tortoise and the vernal pool*, MetroWest Daily News, March 22, 2006.
[31] Neal, *supra* note 18, at 10.
[32] *Id.* at 10, 13.
[33] Ankersen, *supra* note 4, at 8.

Figure 1



Picture from http://www.gophertortoisecouncil.org/index.htm

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." In the nineteen Alabama counties east of the Tombigbee and Mobile Rivers, where the ESA does not cover the tortoise, it is listed as a "game species with no open season." In addition to ESA designation in Mississippi, the state designates the gopher tortoise as "endangered." South Carolina also designates the species as "endangered" in the small amount of gopher habitat in that state. The state of Louisiana provides the species no protection beyond that afforded by the ESA.[34] 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 the continual state permitting for the destruction of burrows makes it unclear how much protection the regulations actually provide.

In Florida, the gopher tortoise 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 which is "declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate

[34] Wahlquist, *supra* note 10.

and as a consequence is destined or very likely to become endangered in the foreseeable future."[35] The upgraded status, though opposed by developers, is validated by the fact that tortoise populations in the state have plummeted by as much as 80% over the past 100 years. Aside from tortoises on protected lands, some researchers predict gopher tortoises could be eliminated from the state by the year 2025.[36]

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 (FFWC), and declares that the commission "[s]hall exercise the regulatory and executive powers of the state with respect to wild animal life." 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 which the FFWC designates as endangered, threatened, or of special concern. 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.[37] 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 former establishes an increased level of difficulty for obtaining an incidental take permit.[38]

The state listing of the gopher tortoise further 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;

[35] Ankersen, *supra* note 4, at 8-9. Northeast Florida Builders Association Bulletin, Vol. 35, No. 7, at 15, *available at* http://www.nefba.com/pdfdir/BildorNewsJuly.pdf.
[36] 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; Nova Online, Gopher Tortoise, http://www.pbs.org/wgbh/nova/kalahari/tortoise.html.
[37] Ankersen, *supra* note 4, at 8-9.
[38] *Id.* at 10.

- May occupy *an unusually vital ecological niche* that should it decline significantly in numbers, other species would be adversely affected.[39]

As highlighted in the introduction of this article, 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 highlighted that the uplisting of the tortoise was eminent. The article first noted that "[*u*]*nfortunately*, tortoises prefer the high and dry sandy areas that also are heavily sought for development." The article also highlighted that the FFWC listing process was recently revised.[40] It was after this revision, and after application of the new listing criteria, that the commission recommended that the gopher tortoise be uplisted from a species of special concern to a threatened species.[41]

Though the new regulations for the "threatened" tortoise have yet to be promulgated, the commission provided a glimpse of the direction it is headed when it proposed the uplisting. 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. Also, as noted, the uplisting of the tortoise makes it more difficult for developers to obtain incidental take and relocation permits. This would likely slow down the practice of "burying" tortoise burrows described earlier.[42]

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[39] *Id.* at 9 (emphasis added).
[40] Steve Godley, *Gopher Tortoise Regulations to Change*, Cornerstone, The News of the Home Builders Association of West Florida, March 2006, at 16, *available at* http://www.westfloridabuilders.com/_pdf/march06.pdf (emphasis added).
[41] *Id.* The key criteria for the recommendation was the commission's finding "an inferred or suspected population size reduction of more than 50% in either the last three [gopher tortoise] generations, or projected into the current or future three generations." Stated differently, FFWC'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% over a period of 60-93 years (or three generations) due to habitat loss or degradation.
[42] *Id.*

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 the gopher tortoise protection, the patchwork system of international, national and state laws provide 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, rather than resist, regulation of their property for the gopher tortoise.

III. GOPHER TORTOISE CONSERVATION VS. DEVELOPMENT

A. *Introduction*

The conflict between the gopher tortoise 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.[43] Mobile County, one of three Alabama counties where the tortoise is protected by the ESA, underwent a 94% increase in residential development in the 1990's.[44] In the year 2000, city of Mobile landowners were pitted against an unexpected opponent: the gopher tortoise. The Mobile County Health Department began denying landowners permits to install septic systems on lots containing the tortoise, and housing

[43] Alex Levy, *Solutions from the sunbelt: the southeastern States share strategies to protect wildlife and fragile habitats*, Public Roads, July-August 2003, Vol. 67, Iss. 1, at 44.
[44] Mike Grout, *Banking on Gopher tortoises*, Endangered Species Bulletin, August 2005, Vol. 30, Iss. 1, at 10.

development stopped dead in its tracks. This was the major impetus for the establishment of a conservation bank for gopher tortoises in Mobile in 2001.[45]

Florida, which maintains the greatest acreage of tortoise habitat, is one of the most rapidly growing states in the country. Over two-thirds of Florida's scrub habitat, which is home to over twenty species listed as endangered, threatened or "species of special concern" by federal or state agencies, has been destroyed.[46] One only needs to visit http://conservation.mongabay.com/news/Gopher_Tortoise.htm to find over 230 articles from Florida newspapers since January 2005 which highlight controversies surrounding the gopher tortoise and land management. In March 2006 a Leon County animal rights activist, Steve Rosen, filed a suit against the Florida Fish & Wildlife Conservation Commission claiming the commission wrongfully issued state permits that allowed developers to bury live tortoises in their burrows. The commission defended its decision by citing state statutory authority which has allowed it to issue permits to fill 74,000 burrows since 1991. 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 over $11,000 to protect an acre and a half of land "not used by tortoises for burrowing."[47] Furthermore, tortoises in Hillsborough County have been pushed 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* to roam.[48]

Recently, as noted, the state of Florida upgraded the gopher tortoise's status from "species of special concern" to "threatened." Many hope the upgraded designation will force

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[45] Robert Bonnie, *Guest Feature: Banking on Endangered Species Conservation*, The Katoomba Group's Ecosystem Marketplace, November 16, 2004, *available at* http://ecosystemmarketplace.com/pages/article.news.php?component_id=639&component_version_id=712&language_id=12.
[46] Hoppe, *supra* note 36.
[47] Charles Rabin, *Activist: Don't bury turtles alive*, Miami Herald, March 9, 2006.
[48] Yvette Hammett, *Tortoises Lag Developers in Fight for Florida Land*, Tampa Tribune, February 26, 2006.

developers to stop burying tortoises, or at least purchase tortoise habitat elsewhere.[49] Opponents of the up-listing claim the increased cost of dealing with "threatened" tortoises will eventually fall upon the homebuyer. Opponents argue that these species increase construction costs, cause months of delay and often derail major projects. Executive director of Brevard Home Builders and Contractors Association Franck Kaiser asserted that "[m]illions of dollars have been spent to relocate gopher tortoises." He and other opponents question biologists' contentions that current populations of tortoise are inadequate to maintain the viability of the species.[50]

In order to avoid such stand-offs 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." Bonnie further asserted that "property owners who have gopher tortoises can be completely relieved of Endangered Species Act responsibilities by participating in this bank."[51]

Although a step forward, complications have arisen from similar re-locations 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."[52] 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. United States Fish and Wildlife Service (FWS) biologists investigating the matter discovered that the cause of the die-off was an

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[49] Jim Waymer, *Tortoises may slow state's rapid growth*, Florida Today, September 26, 2005.
[50] *Id.*
[51] 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.
[52] Wahlquist, *supra* note 10.

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." Such die-offs of the tortoise on protected or partially protected lands are not without precedent: 350 tortoises were found dead in Florida's Green Swamp five years ago.[53]

In the end, if development is inevitable throughout portions of the tortoise's range, developers and conservationists must achieve cooperation if the purposes of each will be served. Ironically, those who contend 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 initial 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 the government has 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.[54]

B. *Habitat Conservation Plans*

In 1983 Congress initiated the first incentive based approach for seeking greater cooperation from developers and private landowners under the ESA. 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."[55] Section 10 allows landowners or developers an "incidental take" of an endangered species in exchange for establishment of a habitat conservation plan (HCP). This plan must be designed to minimize the

[53] Dan Dewitt, *Tortoise deaths alarm state naturalists*, St. Petersburg Times, November 18, 2005.
[54] The government incentives and private initiatives discussed in this section also have relevance and application to forest management practices, discussed below in section V.
[55] Christopher Mills, *Incentives and the ESA: Can Conservation Banking Live up to Potential?*, 14 Duke Environmental Law and Policy Forum 523, 527 (2004).

impact of the take.[56] Early on, HCPs 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 mitigate *unanticipated* impacts in the future. Between 1983 and 1994 no more than twenty HCPs were approved.[57]

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. The following year, eighty-six HCPs were approved, and a total of 274 plans had been approved by 1999.[58]

Once HCPs became more popular, they appeared to be a promising start to incentive based programs under the ESA. Not only do HCPs 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.[59]

Critics of the HCP approach argue that most HCPs lack any 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. Critics also argue that HCPs are insufficiently proactive in helping endangered or threatened species recover, since they only focus on minimizing impacts of development. Critics state, "a preventative approach that focuses more on species recovery, rather than mitigation of new harms alone, would improve the

[56] *Id.* at 523.
[57] *Id.* at 526.
[58] *Id.* at 526-527.
[59] *Id.* at 531.

efficacy of the ESA relative to section 10."[60] Furthermore, because HCPs are still relatively expensive to establish, landowners will often seek to develop plans in the cheapest way possible, often leading to shoddy and arguably ineffective plans.

Despite these criticisms, some states have also implemented similar plans. Modeled after the federal HCP, the state of Florida has its own "habitat protection option" (HPO) to mitigate the impacts of incidental take of endangered, threatened, or species of special concern. 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.[61] 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 an 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). If tortoise density is less that 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).[62]

If a developer chooses to develop an HPO, rather than choosing to re-locate 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. 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. Finally, the individual may purchase the required acreage from a mitigation bank. However, the latter option

[60] *Id.* at 530-531.
[61] Ankersen, *supra* note 4, at 21.
[62] *Id.* at 22.

requires that mitigation banks be readily available.[63] Since mitigation banking is still in its infancy as an incentive based program, this may not be a viable option in many areas.

HCPs, or state programs such as HPOs, are a reasonable starting point for establishing recovery plans for gopher tortoises in areas which are undergoing rapid development. Though many criticize HCPs as being too expensive to result in plans of high quality, and not proactive enough for 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 hailed by many as a turning point in biodiversity conservation. Supporters praise conservation banking because it provides economic rewards for landowners who take proactive efforts to conserve species rather than merely mitigating environmental harm.[64] Encouraging private landowner interest in proactive environmental stewardship is especially important since most threatened or endangered species habitat exists on private property.

Conservation banking allows developers to buy credits from a conservation bank that has already achieved mitigation goals for a species. 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 which is subject to impacts occurring elsewhere.[65] Credits are sold to the entity causing

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[63] *Id.*

[64] 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.

[65] Memorandum from Matt Hogan, Director Fish & Wildlife Service, United States Department of the Interior, to Regional Directors, *Guidance for the Establishment, Use, and Operation of Conservation Banks*, May 2, 2003, at 2, *available at* http://www.fws.gov/endangered/policies/conservation-banking.pdf.

the impact on non-bank land, i.e. developers, and credit prices include funding for the long-term management and protection of the species. 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.[66] FWS is responsible for evaluating the sufficiency of a proposed bank when development affects an endangered or threatened species. FWS' approval of a bank must be based on scientific evidence supporting the best available site for the bank, as well as an evaluation of how the bank's management program is to operate.[67] Especially with regard to legislation like the ESA, conservation banking allows for a simplified regulatory compliance scheme with reduced paperwork.

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.[68] 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.[69] With conservation banks, however, the developer gains saved time and money because pre-approved conservation areas and "willing sellers" are already identified, thus increasing 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.[70] Though it was previously considered a liability to have endangered or threatened species on one's property, with the revenues generated from credits purchased by eager developers the owner of a conservation bank now receives an opportunity to generate significant income.[71]

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[66] *Id.* at 2.
[67] *Id.* at 5.
[68] Fox, *supra* note 64.
[69] Mills, *supra* note 55, at 539.
[70] Hogan, *supra* note 65, at 2.
[71] *Id.* at 1.

Conservation banks also remedy other problems presented by HCPs. As discussed above, HCPs are efforts taken by developers to mitigate or compensate for certain impacts upon a displaced, killed or otherwise incidentally taken species. However, such efforts take place only *after* developers have already decided to develop a certain property. Developers usually choose development sites by either purchasing new property or modifying existing property.[72] As such, 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.

Another significant problem with HCPs is that they become *a part* of the developer's development. Since developers ordinarily seek to minimize the cost of development, such a scenario will result in the most inexpensive HCP the developer can create while still gaining the approval of FWS.[73] 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.[74] 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

[72] Fox, *supra* note 64.
[73] Mills, *supra* note 55, at 536.
[74] *Id.* at 537.

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.[75]

Conservation banking has already been successful for various species in numerous states. For example, in California one landowner has 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.[76]

Important elements of a successful conservation bank are:

- Protects habitat for at least one rare species (listed as endangered, threatened, or candidate under the United States Endangered Species Act);
- Permanently Protects habitat;
- Large enough to be ecologically stable;
- Backed by a banking agreement signed by FWS;
- Long-term funding via an endowment fund;
- Habitat is protected prior to impacts;
- Credit prices governed by the open market.[77]

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 which result in demand for credits. Alabama and Florida have both been listed as areas where there are "ample opportunities to establish markets in species credits and conservation banks."[78]

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[75] *Id.* at 540.
[76] Fox, *supra* note 64.
[77] *Id.*
[78] *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." Hogan, *supra* note 65. The guidance document provides instruction on the goals and objectives of conservation banking, conservation

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 habitat destruction alone does little to ensure tortoise survival. Only by obtaining 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.[79]

Studies during the 1990's show that failure to adequately protect and restore tortoise habitat caused populations to drop significantly despite ESA protection in the western portion of tortoise range. 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 south Alabama, residents of Mobile County began searching for a solution. Art Dyas, forester for the Mobile Area Water and Sewer System (MAWSS), decided to implement a program to restore gopher tortoise habitat. MAWSS owns land adjacent to a key Mobile water resource, Converse Lake. The area around this reservoir is undergoing rapid development, and MAWSS has expanded its property via land purchases in order to create a buffer.[80] MAWSS not only manages the land to protect the quality of the water in the lake, but also for timber resources. Dyas decided to shift management of the timber resources to restore longleaf pine, and use the land to sell credits to landowners whose projects were being frustrated by the gopher tortoise.[81] 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 $15

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strategies, eligible lands, site selection, bank evaluation, credit system establishment, management requirements, monitoring requirements and coordination with other levels of government. *Id.*, *see generally*.

[79] Bonnie, *supra* note 45.

[80] Grout, *supra* note 44.

[81] Bonnie, *supra* note 45.

an acre. For areas where the removal of invasive species and planting of longleaf pine seedlings was required, the cost varied from $50 to $200 an acre.[82]

Dyas worked with the MAWSS, FWS, Environmental Defense and gopher tortoise experts to establish the first ever conservation bank for gopher tortoises on a 220 acre parcel in Mobile, Alabama in 2001. Under the banking system, landowners can purchase credits for $3500 a piece for each 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, MAWSS agrees to protect and manage the proper proportion of habitat acreage for each tortoise.[83]

At first the bank contained twelve tortoises, but by the middle of 2005 there were almost eighty-five tortoises on the premises.[84] The bank is monitored intensively by FWS, who uses annual surveys to determine breeding success of the tortoise and radio tracking to carry out monitoring. Monitoring reports have found that the tortoises are doing well, and are reproducing at a successful rate.[85] Furthermore, the management and economic benefits provided by the bank have led MAWSS to consider expanding the bank beyond 220 acres.

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

> Whereas tortoises were once something of a nuisance [to MAWSS], 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: MAWSS is now viewed by the wider community as having helped to solve what at one time appeared to be vexing and intractable problem. So successful has the gopher tortoise experience been, that MAWSS is now considering enlarging the bank…[c]onservation 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

[82] Grout, *supra* note 44.
[83] Bonnie, *supra* note 45.
[84] Grout, *supra* note 44.
[85] Bonnie, *supra* note 45.

> financial and other resources needed to underwrite the costs of stewardship. In other words, the power of private conservation is unleashed.[86]

The MAWSS bank's success has also encouraged other governmental entities in South Alabama to undertake similar efforts. In 2004, 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. Yet another bank is planned as FWS works with South Alabama Utilities and the City of Citronelle to dedicate more space for gopher tortoises. As of late 2006, approximately 1,500 acres of Mobile County was set aside for gopher tortoise conservation banks.[87]

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 are subject to market forces, they may provide little protection for species located on habitat that is not subject to rapid development, but instead subject to routine forest management practices. Rapid urban development is only one factor in the loss of tortoise habitat and, as mentioned, much tortoise population loss is due to forest management practices. So, since most tortoise habitat is located on private property which does not play a role in the development market, conservation banking may not be a silver bullet solution across large portions of gopher tortoise range.

Also, most conservation banks are habitat banks, rather than species banks. This is due largely to the fact that in a market system, "acreage value" used to describe habitats is an easier to use "currency" than is "species value," which is much harder to quantify. There are some advantages to the habitat bank approach, since habitats not protected under the ESA will receive

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[86] *Id.*
[87] Grout, *supra* note 44.

explicit protection. Such habitat may allow the species to re-establish and extend its range. The habitat bank approach also protects endangered or threatened plants, which receive no direct ESA protection. However, using habitat as a currency is problematic since 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.[88]

Though conservation banking does entail some of these problems, it nonetheless provides an ever growing avenue for gopher tortoise protection, and also remedies some of the inadequacies presented by HCP's. Between HCPs and conservation banks, conservation groups and government authorities have a decent starting point for encouraging developers to take into account species like the gopher tortoise when undertaking ever increasing 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 community" – a community of unusual urban design present in Harmony, Florida.

Harmony lies on 11,000 acres in a quickly growing, tourism dependent community in Osceola County, Florida. An investment banker who started the project, Jim Lentz, hails it as a "conservation community." 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."[89] 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

[88] Mills, *supra* note 55, at 550.
[89] 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, August-September 2003, Vol. 69, Iss. 8, at 32.

industrial uses. Despite this seemingly odd juxtaposition, Harmony has been praised for its dedication to preserving ecologically functional open space. Almost seventy percent of community land is set aside for open space. The eastern half of the community is subject to a conservation easement, and managed strictly for habitat protection. 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.[90]

Developers of Harmony point to the gopher tortoise as proof of their intention to design a legitimate development which 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 otherwise developable land as a gopher tortoise preserve.

There are also numerous other environmental issues addressed by the town. Harmony employs a full time conservation manager who has designed strict road building regulations which are meant to protect the wetland corridors on the property. The town's lighting is designed to prevent light pollution. The community is even taking steps to educate its citizens. Harmony has coordinated a program with the University of Florida designed to educate residents by establishing kiosks, a web-site and a wildlife monitoring program. Furthermore, local schools include an environmental curriculum to teach human-animal coexistence values.[91]

While not the ultimate solution to gopher tortoise preservation, communities like Harmony can be a winning solution in areas that are certain to fall subject to development. By encouraging greater integration of species habitat within the confines of our residential

[90] *Id.*
[91] *Id.*

developments, a certain level of protection exists for those species, while also providing developers and residents the economic benefits they desire.

HCP's, conservation banks and "conservation communities" are important steps in the right direction for saving gopher tortoise habitat subject to development throughout the southeast. 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. It then becomes crucial to determine appropriate private forest management practices which will aid in the recovery of gopher tortoises across their historic range.

IV. GOPHER TORTOISE CONSERVATION VS. PRIVATE FOREST MANAGEMENT

A. *Introduction*

As noted, tortoise population has decreased an estimated 80% during the last century partly due to the development of housing projects, industrial centers and corporate agriculture.[92] Though development is a great concern, and the solutions to the problems presented by development are important, the single greatest cause of tortoise decline by far has been the destruction of the longleaf pine ecosystem on which it depends. Private forest management practices, in turn, have been the primary cause of the destruction of longleaf habitat. These practices have focused on monoculture plantation management of timber. This type of management is characterized by completely replacing the entire forest every 25-30 years – timber is planted, thinned at about 10-12 years, completely cleared at 25-30 years, then the process starts all over again. Furthermore, the exclusion of fire from these plantations has had

[92] Hoppe, *supra* note 36.

especially detrimental results, as the tortoise depends on fire to clear undergrowth and provide an open canopy for food production and nesting.[93]

However, due to the property rights versus conservation dynamic highlighted earlier, 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 acts like the ESA. He further stated:

> 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.*[94]

Larson's statement highlights the need to first consider what steps have been taken, such as government incentives and private initiatives, to address the problems associated with private forest management. However, since 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 tortoise, while maintaining the economic return 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 regarding endangered or threatened species. HCPs and conservation banks are options also available to

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[93] *Id.*

[94] Keville Larson, *Public Policy and Private Response: Perspective of a Private Forestry Entrepreneur*, Larson & McGowin, Inc. Forest Managers and Consultants, *available at* http://www.larsonmcgowin.com/articles/publicpolicy.php (emphasis added).

private timber managers, just as they are to developers. The federal government has also created the "Safe Harbor" program to further address the specific concerns of private forest managers. In addition, large scale private timber managers have been involved in developing solutions to the problem via private initiatives targeted at biodiversity protection.

1. Safe Harbor

The "Safe Harbor" program was established by FWS, and allows private landowners to manage their land in a way that promotes the survival of an endangered or threatened species without incurring any additional future ESA responsibilities. The owner of the land first 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.[95] The federal register states that property owners are assured that "they 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."[96] If a future increase occurs from the baseline population of the threatened or endangered species, the landowner must simply notify FWS, who will 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.[97] 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 wild fire disturbance and are now declining because of fire suppression;

[95] Environmental Defense, What is Safe Harbor?, http://www.environmentaldefense.org/article.cfm?contentid=156.
[96] Department of the Interior, Fish and Wildlife Service, Proposed Martin Branch Woodland Safe Harbor Agreement, Covington County, MS, 68 Fed. Reg. 43157, 43158 (July 21, 2003).
[97] Sayeed Mehmood & Daowei Zhang, *Determinates of Forest Landowner Participation in the Endangered Species Act Safe Harbor Program*, Human Dimensions of Wildlife, 2005, Vol. 10, at 250-251.

- 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.[98]

The first Safe Harbor agreement was signed in 1995 to protect endangered red cockaded woodpecker habitat in North Carolina. Since that time, over sixty-two landowners in the area have enrolled more than 36,000 acres of land, and woodpeckers have successfully re-inhabited and even reproduced on some portions of that land.[99] Safe Harbor programs have since taken off, with some states enacting legislation establishing their own programs. In 2003, FWS distributed to forty-two states just under $35 million for incentive based programs, including Safe Harbor, for rare species habitat protection on private lands.[100]

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.[101] 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;

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[98] Environmental Defense, *supra* note 95.
[99] *Id.*
[100] 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, July 2003, at 3, *available at* http://www.environmentaldefense.org/documents/2937_LIPreport.pdf.
[101] Robert Bonnie, *Forestry Expert is the Gopher Tortoise's Best Friend*, Environmental Defense, November 17, 2004, *available at* http://www.environmentaldefense.org/article.cfm?contentid=4497.

(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.[102]

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, as well as many of the other 360 species that tortoise burrows support. 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."[103]

Safe Harbor appears to be a successful means of protecting the tortoise, but how is it best to encourage private 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 determinates of landowner participation in Safe Harbor. These determinants can be analyzed to gain a better understanding of how to educate landowners and promote the Safe Harbor program. The study was based on a 2000 survey of private landowners in North and South Carolina. One hundred sixty-two landowners were surveyed, forty-six of whom were enrolled in a Safe Harbor program for red cockaded woodpeckers. The survey data were compiled and analyzed for various components of participation.

Landowners who owned 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."[104] Those

[102] 68 Fed. Reg. at 43158.
[103] Back From the Brink, In Mississippi, a Retired Veterinarian Now Tends to Trees, Tree farmer's land management helps gopher tortoise, http://www.backfromthebrink.org/inthespotlight.cfm?subnav=landowner&ContentID=3712.
[104] Mehmood, *supra* note 97, at 252.

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 "risky" land characteristics can serve as a strong incentive to sign a Safe Harbor agreement, and indeed endangered species proximity had the highest impact on landowner participation in Safe Harbor.[105] Similarly, landowners who used prescribed burning or other methods of controlling understory hardwood, and who were also aware that this created prime woodpecker (or tortoise) habitat, were more likely to sign an agreement.[106] 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.[107]

Surprisingly, the second highest impact on landowner participation was receiving information about Safe Harbor from consulting foresters, rather than directly from governmental agencies. The authors cited private landowners' general skepticism about government agencies as a probable reason. They further note that this is a useful result as it informs on how best to approach and educate landowners about the Safe Harbor program.[108]

Not surprisingly, the study found that "landowners who believed that the society had a moral obligation to protect RCW and other endangered species had a higher probability of enrolling into the program. On the other hand, landowners that were concerned about privacy and property rights issues were less likely to sign an agreement."[109] However, 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

[105] *Id.* at 255.
[106] *Id.* at 255.
[107] *Id.* at 256.
[108] *Id.* at 255.
[109] *Id.*

impact on forest management and 51% were unaware of the legal consequences of not complying with the ESA.[110]

These results indicate that greater effort should be undertaken to increase landowner awareness of both the ESA and the Safe Harbor program. Use of the most effective channels, such as local forestry consultants, 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, in 1999, entered into an HCP in southern Georgia for the endangered red-cockaded woodpecker, which shares much of the same habitat as the gopher tortoise. IP not only agreed to mitigate any development harms, but agreed to "enhance the long-term survival" of the species by increasing woodpecker habitat from 1,300 acres to 5,300 acres. 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.[111] This was the first ever HCP in which a private landowner voluntarily increased its responsibility for an endangered or threatened species habitat on its own property, rather than relocating the species to public lands. IP worked with state and federal wildlife agencies and the Environmental Defense Fund to develop the plan.[112]

IP's effort became a unique model, which in fact resembles an HCP and a conservation bank wrapped into one - IP 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

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[110] *Id.* at 256.
[111] Greg Fales, *IP donates 2,650 acres in Mississippi to the Conservation Fund*, Pima's…Papermaker, April 1999, Vol. 81, Iss. 4, at 10.
[112] *Id.*

conservation bank model. Credits for red cockaded woodpeckers on the property have been estimated to be worth as much as $250,000 per credit. This could be a valuable source of revenue for IP's operations in Georgia.[113] 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 1999, IP donated two tracts of land in Mississippi, 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. The donated land contains gopher tortoises, and will eventually be added to FWS's Grand Bay National Wildlife Refuge. Some consider the area to be "one of the most important undisturbed sites in the Gulf Coastal Plain region."[114] 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 holdings and set them aside permanently for the benefit of all Americans, now and in the future."[115] This was the fifth donation and third cooperative conservation project between IP and The Conservation Fund.[116]

In March 2006, IP also completed a deal with The Nature Conservancy deemed the "largest single U.S. land conservation purchase ever."[117] The deal is for 14,000 acres of forest land along the Perdido River in Baldwin County, Alabama. The Perdido River winds through what was formerly the heart of the nation's longleaf pine ecosystem and is a prime location for 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

[113] Bonnie, *supra* note 45.
[114] Fales, *supra* note 111.
[115] *Id.*
[116] *Id.*
[117] Finch, *supra* note 5.

ecosystem remains.[118] 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 Nature Conservancy 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.[119]

The Perdido land supplements a 4,000 acre purchase made pursuant to the state's Forever Wild Program, which was established by constitutional amendment in 1992 to facilitate the purchase of public lands for conservation.[120] Such actions by IP are especially important because IP is the largest private landholder in Alabama, and owns roughly 1.2 million acres in the state.[121] Overall, The Nature Conservancy and other conservation groups have made deals for about 218,000 acres of IP land across ten Southern states. About 67,000 acres of that land is in Florida and South Carolina, which also contain shrinking tortoise habitat. Echoing O'Brien, John Faraci, chairman and chief executive officer of IP, 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."[122]

However, few large scale private forest corporations are following IP's lead in managing lands in 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 most likely to manage for the benefit of species in the first place. To properly address gopher tortoise recovery, as well as the recovery of other species which

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[118] *Id.*
[119] *Id.*
[120] Outdoor Alabama, Alabama's Forever Wild Program, http://www.outdooralabama.com/public-lands/stateLands/foreverWild.
[121] Finch, *supra* note 5.
[122] *Id.*

depend on the longleaf ecosystem, it is necessary to reach landowners who are *not* informed and who do *not* properly manage forests for species conservation.

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

As discussed, the ESA 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, protection under these laws is usually only triggered at the initiation of a development project or as a result of developer/private forest manager conflict. We have already established that the single greatest loss of tortoise habitat is due to forest management practices that have transformed 96% of former longleaf pine habitat into tree farms, or into some other management scheme in which the tortoise cannot survive. Private forest landowner acreage containing the tortoise far outweighs acreage significantly affected by development. Weighing the likelihood that the tortoise will be located on private lands, as opposed to lands necessarily affected by development, it seems private forest management would be the obvious focal point for concentrating gopher tortoise habitat restoration which results in tortoise recovery.

1. Forest Service "New Perspectives" Program

Sharitz et. al., researchers at the University of Georgia and Clemson University, wrote an article about shifts in forest management titled *Integrating Ecological Concepts with Natural Resource Management of Southern Forests*. The study extrapolated suggested management practices from the Forest Service's "New Perspectives" program. This program 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."[123] Sharitz began by noting that many non-industrial forest owners no longer consider timber to be a primary management objective, and therefore greater emphasis on ecosystem sustainability in private forests is a growing necessity. The article gives the history of southern forests, noting the large private ownership (90%), and forest management techniques (fire suppression and monocultures) and development pressures that have dramatically altered forest structure and created a highly fragmented landscape.[124]

The modern, transformed forest landscape lacks the multilayered canopy, diverse tree sizes, abundant snags and fallen trees of a natural forest. A natural forest supports the greatest amount of biodiversity. In order to recreate such an optimal forest, Sharitz 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.[125] Sharitz specifically noted that these practices can be used to reestablish longleaf pine habitat, or for our purposes, gopher tortoise habitat. Also, establishing wildlife corridors should be 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. Furthermore, it is necessary to simulate fires similar to those which naturally occur in the longleaf ecosystem in order to establish a more sustainable longleaf pine habitat.[126]

The New Perspectives program highlights an important shift in forest management which 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, such as the gopher tortoise. However, some question why private landowners, many of whom reap economic benefits from *current* forest management

[123] Rebecca Sharitz, Lindsay Boring, David Van Lear, & John Pinder III, *Integrating Ecological Concepts with Natural Resource Management of Southern Forests*, Ecological Applications, August, 1992, Vol. 2, No. 3, at 226.
[124] *Id., see generally*.
[125] *Id.* at 231.
[126] *Id.* at 232.

practices, would wish to adopt *new* methods. Sharitz 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."[127] It is important to note that to convince landowners to participate in better management practices, this sustained income cannot 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 as an example 1,000 acres of southern timber as a model. On that property, 700 acres contain plantation style pine timber, and 300 acres contain second growth hardwood forest. For the past thirty years, the 700 acres of pine has been managed strictly as a monoculture plantation: a cycle of planting, growing, and large scale thinning of trees at about 10-12 years, followed by clear cutting at 25-30 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 are described merely by way of description and example. The science behind such practices is presented in subsection C.

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

On the 700 acres of monoculture pine, the first alternative management practice which will maintain (or increase) current yield of financial return involves a move toward a more efficient and aggressive management on a reduced portion of the 700 acres. A more efficient

[127] *Id.* at 235.

management will reduce the overall acreage being managed for timber while providing sufficient economic return. For instance, by receiving the same financial return off 500 acres as that previously gained off 700, the released 200 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 200 acres) could be managed to benefit the gopher tortoise, the red cockaded woodpecker, as well as any other species that thrives in the longleaf pine ecosystem.

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. In other words, by simply retaining one's trees longer, one can increase the economic efficiency of the land. The dominant modern practice is for most trees to be harvested young for pulp processed for paper products, after only 10-12 years. Wide scale harvesting of 10-12 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.[128] However, as the niche industries of sawmills and pole timber facilities grow, there is an opportunity to maintain (or even increase) revenue streams without harvesting trees as often. If a landowner can wait until trees are age 20 or more years, rather than 10-12, and selectively harvest those older trees, the result will be long term positive economic effects. Of course some small scale selective cutting will be necessary between 10 and 20 years in order to provide sufficient space for the remaining trees to grow at an optimal rate.

[128] Interview with Norman Christensen, Professor of Ecology and Founding Dean of the Nicholas School, Environmental Sciences and Policy Division, Duke University, in Durham, NC, September 2004.

Trees 20 years old or greater serve two roles in providing stable economic return off of less acreage – or, increased economic efficiency. First, when older trees are cut, each tree yields a much greater economic return since it can be sold 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.

Application of this management style to our example property would be as follows: *Small scale* selective cutting after 10-12 years allows some short term economic gain and provides that the remaining trees to grow at an optimal rate. Next, it is necessary to maintain the remaining trees 20 years or more, rather than clear-cutting at 25-30 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 most of the trees which would have flooded the pulp market at 10-12 years would be part of the current sell. This scenario allows the same long term economic return off only 500 acres as previously obtained off 700 acres. Furthermore, the additional 200 acres now freed from 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 region would need to engage in the recommended management practice to actually affect the market. However, this is the very reason I strongly urge and recommend landowners to 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. 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 which have tortoise habitat, since most forestry practicing landholders 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.[129]

For instance, in Alabama there are publicly owned lands (state parks, preserves), corporately owned lands (IP, Weyerhauser) and smaller third party forest management operators. As mentioned earlier, IP is the largest private landowner in the state, at 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. IP has stated its intention to sell most of its property in North America, and Weyerhauser is dumping large amounts of holdings in southern states as well.[130] These companies are so eager to release their holdings that they are selling property at cheaper than normal rates. Also, property tax in Alabama is so low that it could be tripled and still be the lowest in the nation. 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 poorly, causing much environmental degradation due to the lack of enforcement of forestry standards. These third party forestry operators own tracts large enough to implement the aforementioned management scheme.

Most other remaining pine plantation owners are individuals, owning between 200 to 1,000 acre plots. If managed properly, even these lower amounts of acreage can yield significant economic returns in the long run – i.e. after the harvesting of 20 year old pine trees begins. The landowners least likely to capitalize on this scheme are those owning less than 200 acres. It may

[129] Mehmood, *supra* note 97, at 252.
[130] Finch, *supra* note 5.

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, once longer rotations are established, timber may provide less economic gains than 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 aggressively managing another part for conservation. Otherwise, the alternative of providing a "half and half" approach on the same 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 with habitat on the property, such as the tortoise.

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

Some 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 management/aggressive conservation approach above. On our example 700 acres, 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 perfect system for longer rotation timber management coupled with selective harvesting. An inherent character of the ecosystem is low density,

adequately spaced longleaf pines with open spaces of wiregrass and other herbaceous ground cover in between trees. The open space allows trees to grow faster and larger due to reduced competition for nutrients. Thus, as mentioned above, the selectively cut 20 year old tree off the longleaf ecosystem will yield a significant economic return, due to the size of the tree and where 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, since 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 VI. B. 1. above.

Again, the numbers of landowners participating in this practice and the amounts of acreage those landowners control play key roles in determining the success of this scheme. Furthermore, landowners must be willing to forgo a portion of their short term economic gains in order to establish the practice successfully.

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 their entire acreage for the longleaf pine ecosystem, they can feel confident about receiving at least the same, if not greater, financial return for their efforts. Such management is key if the tortoise, as well as other species, is to re-establish, or at least survive, throughout its current range.

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.[131]

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* (TFD) was "Forest and Biodiversity Conservation." TFD specifically highlights an initiative between landowners from the American Tree Farm System, conservation groups and government agencies titled the "Forested Flyways Gopher Tortoise Initiative." 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*."[132] TFD 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 . . . .[133]

In a separate publication, the North Central Research Station (NCRS) of the United States Forest Service issued a report titled *Natural Disturbance-Based Silviculture for Restoration and Maintenance of Biological Diversity*. In it NCRS discussed "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*."[134] The

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

[132] *The Forests Dialogue Review, Forest and Biodiversity Conservation*, (Justin Ward, Cassie Phillips, Gary Dunning, eds., 2004), at 19, *available at* http://research.yale.edu/gisf/assets/pdf/tfd/tfd_review_01.pdf (emphasis added).

[133] *Id.*

[134] Mitchell, *supra* note 131, at 6 (emphasis added).

general focus of ecological forestry is promoting forest management practices "that most closely resemble the relevant natural disturbance regimes." NCRS stated that this approach is most likely to achieve ecological objectives, and is most appropriate for ecosystems like the longleaf pine ecosystem.[135]

The NCRS report analyzed commonly used clear-cut and shelterwood styles of even-aged timber management. Clear-cutting is a process which 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" in tact, 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."[136] 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 NCRS 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.[137] As an alternative to that approach, NCRS recommended intermediate stand-level treatments to "create and maintain structural and compositional complexity and heterogeneity." These treatments include:

- Thinning to stimulate development of larger trees;
- Variable density thinning to stimulate development of spatial heterogeneity;
- Decadence creation in living trees and in the form of snags and down boles;
- Introduction and conservation of compositional diversity; and

[135] *Id.*
[136] *Id.* at 3.
[137] *Id.* at 20.

- Control of undesirable plant and animal species[138]

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

NCRS further noted that the longleaf pine ecosystem is one of the most threatened ecosystems, 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."[139] NCRS cited dangers to species occupying this habitat, such as the gopher tortoise, 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.[140] 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, it is necessary to shift from standard silvicutural practices that call for highly stocked, even-aged plantations where one stand of trees is completely removed every 25-30 years.[141]

As a model for an alternative approach, a single tree selection system established by Herbert L. Stoddard, and modified by Leon Neel, is recommended – and is a further basis for the management suggestions presented in section VI. B. This model has been applied to forests in southern Georgia and northern Florida quite successfully for the last sixty years. The Stoddard/Neel approach (SNA) departs from the common modern forestry perspective which views forests as an agricultural crop, and instead focuses on maintaining a "perpetual forest with all its components, *while extracting timber of considerable economic value*."[142] Thus, the SNA successfully blends land management objectives that landowner's value, such as protection of

[138] *Id.* at 23.
[139] *Id.* at 28.
[140] *Id.* at 34.
[141] *Id.* at 29.
[142] *Id.* at 34 (emphasis added).

game species, aesthetically pleasing woodlands and *revenue generated from timber harvest*, with management for the endangered animals which rely on longleaf pine habitat.[143]

The main tool used for maintaining the SNA "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. 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 on which the tortoise depends.[144]

Regarding timber extraction under the SNA, NCRS 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." NCRS 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.[145]

In essence, what NCRS describes, and SNA demands, is the management technique explained in subsection VI. B. 2. above. The SNA does require that some older trees with high market value be retained for the health of the ecosystem. However, as noted, the remaining timber can provide sufficient economic return. Also, not all remaining economically useful timber need be longleaf pine. NCRS 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 allow for hardwood control to be accomplished

[143] *Id.* at 43.
[144] *Id.* at 35.
[145] *Id.* at 36.

primarily through fire, resulting in lower management costs" and tortoise habitat restoration.[146] NCRS' assertion also highlights the time element noted in subsection VI. B, above – that retaining timber until it becomes mature can yield suitable gopher tortoise habitat while also providing sufficient economic gains. Stated differently,

> [f]orests develop through time…there are few, if any, ecological substitutes for time…[t]hus, 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 SNA recognizes that time is a critical factor that needs to be incorporated into restoration.[147]

Regarding the value of such restoration, NCRS noted that the resulting transformed ecosystem provides critical habitat for the gopher tortoise. NCRS stated, "In 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."[148] Finally, NCRS 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.[149]

V. CONCLUSION

The gopher tortoise is an important species which provides benefits for numerous other species in the complex southeastern ecosystem in which it exists. That ecosystem has been largely destroyed, and what is left is being threatened by both rapid development in sprawling urban regions and forest management practices which focus on monoculture pine plantations and short rotation harvesting. The ESA provides a measured amount of protection for the tortoise on

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[146] *Id.* at 40.
[147] *Id.*
[148] *Id.* at 44.
[149] *Id.* at 45.

a national level, but only throughout a small portion of its geographic range. Various state laws provide protections as well, though more stringent legal protections are needed. Various schemes exist to encourage private parties to comply with those laws, and these have met with increasing 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 main battleground for 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 which 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. These management alternatives provide both the economic return private landowners seek, as well as protection for endangered or threatened species like the 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.