DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2009–0029; MO 92210–0–0008–B2]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Gopher Tortoise as Threatened in the Eastern Portion of Its Range

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the gopher tortoise (*Gopherus polyphemus*) in the eastern portion of its range (east of the Mobile and Tombigbee Rivers) as threatened and to designate critical habitat under the Endangered Species Act of 1973, as amended. In this finding, we also evaluate whether the status of the gopher tortoise in the western portion of its range (west of the Mobile and Tombigbee Rivers) is accurate. After review of all available scientific and commercial information, we find that the current listing of the gopher tortoise as a threatened species in the western portion of its range is accurate and that listing the gopher tortoise in the eastern portion of its range is warranted. Currently, however, listing the gopher tortoise in the eastern portion of its range is precluded by higher priority actions to amend the Lists of Endangered and Threatened Wildlife and Plants. We will add the gopher tortoise in the eastern portion of its range to our candidate species list, and we will develop a proposed rule to list the gopher tortoise in the eastern portion of its range as our priorities allow. We will make any determination on critical habitat during development of the proposed listing rule. In any interim period we will address the status of the candidate taxon through our annual Candidate Notice of Review and will work through partnerships to conserve the species by improving the habitat and removing the threats with the objective to make listing unnecessary. The Service's candidate conservation efforts place great emphasis on coordination with the states and other partners, voluntary conservation efforts, and may include tools such as Candidate Conservation Agreements with Assurances. Even though we are currently unable to take action to list the gopher tortoise in the eastern portion of its range, this does not affect the status of the gopher tortoise in the western portion of its range, where it remains listed as threatened.

DATES: The finding announced in this document was made on July 27, 2011.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number [FWS–R4–ES–2009–0029]. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, North Florida Field Office, 7915 Baymeadows Way, Suite 200, Jacksonville, FL 32256. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: David L. Hankla, Field Supervisor, North Florida Field Office (see **ADDRESSES**); by telephone at 904–731–3308; or by facsimile at 904–731–3048 *mailto:*. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*) requires that, for any petition to revise the Federal Lists of Threatened and Endangered Wildlife and Plants that contains substantial scientific or commercial information that listing a species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we determine that the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are threatened or endangered and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Action

On July 7, 1987, we listed the population of the gopher tortoise as a threatened species in the western portion of its range (west of the Mobile and Tombigbee Rivers in Alabama, Louisiana, and Mississippi) (52 FR 25376). On January 18, 2006, we received a petition dated January 13, 2006, from Save Our Big Scrub, Inc. and Wild South requesting that the population of the gopher tortoise in the eastern portion of its range (east of the Mobile and Tombigbee Rivers in Alabama, Florida, Georgia, and South Carolina) be listed as a threatened species under the Act and critical habitat be designated. The petition included supporting information regarding the species' taxonomy, biology, historical and current distribution, present status, and a summary of actual and potential threats. We acknowledged receipt of the petition in a letter to Wild-Law, legal counsel for Save Our Big Scrub, Inc. and Wild South, dated February 24, 2006. In that letter we also stated that, due to a substantial number of listing-related actions in fiscal year 2006, there were insufficient funds to begin processing the petition at that time. We indicated that we would reevaluate our ability to respond to outstanding petitions as additional funding became available.

Funding became available to begin processing the petition in early February, 2007. On September 9, 2009, we published a 90-day finding (74 FR 46401) that the petition presented substantial scientific and commercial information indicating that listing may be warranted and that we would initiate a status review. We indicated we would accept information to assist us in the review until November 9, 2009. Several commenters requested additional time to provide their comments, and on January 12, 2010, we published clarification that we would accept information through *http://www.regulations.gov* until March 15, 2010 (75 FR 1567). Thereafter, we indicated that information could be submitted to the Service's North Florida Field Office (see **ADDRESSES**) throughout the time period of our review. This notice constitutes the 12-month finding on the January 13, 2006, petition to list the population of the gopher tortoise in the eastern portion of its range as a threatened species.

Species Information

Our 90-day finding summarized much of the current literature regarding the gopher tortoise's distribution, habitat requirements, and life history and

should be reviewed for detailed information (74 FR 46401; September 9, 2009). Below, we summarize previously presented information and provide new information that we believe is relevant to understanding our analysis of the factors that may threaten the gopher tortoise.

Taxonomy and Genetics

The gopher tortoise is one of four living North American tortoise species and the only one indigenous to the southeastern United States (Ernst and Lovich 2009, p. 581). The other three species are found in the western United States. First described by F.M. Daudin in 1802, *G. polyphemus* is classified as belonging to class Reptilia, Order Testudines, and Family Testudinidae. Bramble (1982, p. 864) proposed that *G. polyphemus* along with its cladistic relative *G. flavomarginatus* should be the only members of genus *Gopherus,* placing the other members of this genus *G. berlandieri* and *G. agassizii* into a new genus *Scaptochelys.* However, more recent morphological and genetic studies have reinforced the traditional assignment of all four species into genus *Gopherus* (Crumly 1994, pp. 12–16). Allozyme differentiation has indicated that *G. polyphemus* is most closely related to *G. flavomarginatus* and is thus placed in a clade (genetically related group) distinct from the clade containing *G. berlandieri* and *G. agassizii* (Morafka *et al.* 1994, p. 1669). Mitochondrial DNA (mtDNA) sequences for the cytochrome b gene show a seven percent sequence divergence between the two clades (Lamb and Lydeard 1994, p. 283).

The taxonomic status of the gopher tortoise throughout its range is considered valid (Interagency Taxonomic Information System 2010, p. 1). There is no taxonomic distinction between the gopher tortoise in the western and eastern portions of its range or at any level of geographic subdivision. We are aware of no efforts to describe subspecies. There have been several phylogeographic studies of the gopher tortoise including mtDNA (Osentoski and Lamb, 1995 entire; Clostio 2010) and microsatellites (Schwartz and Karl 2005, entire; Ennen 2009, pp. 66–85; Clostio 2010). Several showed genetically distinct population assemblages across the geographic range (Osentoski and Lamb 1995, p. 713; Ennen 2009, p. 78; Clostio 2010) although the three studies were not entirely congruent in their delineations of western and eastern genetic assemblages. Osentoski and Lamb (1995, pp. 713–714) described three major genetic groups; an eastern group, containing 21 haplotypes (combination of DNA sequences) and ranging from South Carolina to southern Florida; a mid-Florida group, made up of seven haplotypes and located in a small region in central peninsular Florida; and a western group, containing seven haplotypes in a range from the Florida panhandle north to west-central Georgia and west to Louisiana.

Ennen (2009, p. 73) reported a phylogenetic (difference in genetics) break between the western and eastern portions of the tortoise's range based on a 712 base pair portion of a mitochondrial gene. However, the phylogenetic break did not entirely correspond to one particular geographic barrier because shared haplotypes from the eastern and western portions of the tortoise's range were found in the panhandle of Florida and in Georgia populations (Ennen 2009, p. 73). Recent research using another mitochondrial gene similarly found no shared haplotypes across the Mobile and Tombigbee Rivers (Clostio 2010). However, analysis of microsatellite markers indicates phylogenetic division of *G. polyphemus* into eastern and western lineages apparently corresponding to the ranges east and west of the Apalachicola River (Clostio 2010).

There are a number of other smaller-scale genetic analyses that have been conducted to better understand local and regional genetic variation. From comparisons of nine microsatellite loci sampled throughout Florida and southern Georgia (Schwartz *et al.* 2003, p. 285), it was subsequently determined that the populations could be further subdivided into at least eight genetic assemblages, five of which were showing effects of population bottlenecks and four of which showed signs of genetic admixture from separate populations (Schwartz and Karl 2005, pp. 921–925). In the Florida panhandle, mitochondrial DNA analysis found minimal genetic diversity among six populations and suggested that gene flow has occurred among these populations (Berish 2010), which would be in conflict with the findings of Clostio (2010) and consistent with Ennen (2009, p. 78). Subsequent analysis compared the above-referenced Florida panhandle genetics with those collected by Schwartz and Karl (2005, entire) and found a genetic break between peninsular Florida and the Florida panhandle as did Osentoski and Lamb 1995 (as cited in Winters 2010, pp. 3–4), but these data indicated genetic exchange across the panhandle of Florida from Wakulla County to Escambia County, with no significant break at the Apalachicola River as suggested by Clostio (2010).

Microsatellite DNA markers and mitochondrial DNA were used to determine whether gopher tortoise populations on Camp Shelby, Mississippi, were spatially structured, if spatial structure was affected by military activity and habitat quality, and whether there was a correlation between geographic distance and genetic relatedness (Theodorakis 2008, p. 6). Results indicated that there was genetic structure within these populations, and that genetic diversity and gene flow were affected by habitat and land use. Genetic distance did not seem to correlate with geographic distance (Theodorakis 2008, p. 21).

Based on the diversity of six microsatellite loci from 96 individual tortoises from Kennedy Space Center in east-central Florida, it was determined that the population was one nearly continuous population; there were no genetically distinct assemblages (Sinclair *et al.* 2010, p. 192). These findings resulted in a recommendation to manage the Space Center's tortoises as one single population.

Drawing conclusions about genetic subdivisions and unique genetic assemblages based on available genetic data are difficult because methodologies varied between studies, sample sizes were small in some areas, distances between samples were large in some cases, and areas covered by each study varied. Conclusions from rangewide phylogeographic studies of the gopher tortoise are somewhat contradictory. However, other important information about gopher tortoises can be synthesized from these studies. For example, analyses of mitochondrial DNA and nuclear DNA microsatellite markers indicate a long-term population decline since the Pleistocene era of *G. polyphemus* in the western portion of its range (*i.e.,* the listed portion of its range) and past population bottlenecks (Clostio 2010). These findings are supported by a recent evaluation of genetic diversity indices which indicated that four gopher tortoise populations in Mississippi have lower genetic diversity than some populations in the eastern portion of the tortoise's range (Ennen *et al.* 2010, p. 31, 36). This lower genetic variation and heterozygocity (different genes) suggests either a prior population bottleneck, or that historically the western populations persisted naturally with low genetic diversity (Ennen *et al.* 2010, p. 35).

Distribution

The gopher tortoise occurs in the southeastern Coastal Plain from

southeastern South Carolina to extreme southeastern Louisiana (Auffenberg and Franz 1982, p. 95). Throughout much of the western range of the gopher tortoise, only small populations remain in isolated habitat patches (Landry and Gregory 2008, pp. 2–3). The largest populations and greatest density of populations in the western portion of its range occur in the De Soto National Forest, Mississippi (Hammond 2009, p. 12). The eastern portion of the gopher tortoise's range includes Alabama (east of the Tombigbee and Mobile Rivers), Florida, Georgia, and South Carolina. The core of the current distribution of the gopher tortoise in the eastern portion of its range includes central and north Florida and southern Georgia.

There has been no rangewide survey of gopher tortoises, and there are only a limited number of comprehensive surveys over relatively small geographic areas. As a result, the distribution of gopher tortoises would be incomplete if we used only existing survey data, so we relied on the location of potential habitat to identify where tortoises may be present. It is important to note, however, this Geographic Information System (GIS) effort does not reflect the current distribution of gopher tortoise populations nor the size or connectivity of gopher tortoise populations. In all likelihood, the actual distribution of gopher tortoises is less, perhaps much less, than modeled because much of the modeled potential habitat may be unsuitable. However, the information generated from the Hoctor and Beyeler (2010, entire) GIS model and subsequent model revisions for Florida (FWC 2011a) is the best information currently available and roughly estimates the amount and distribution of potential gopher tortoise habitat throughout the eastern portion of the tortoise's range.

In their assessment, Hoctor and Beyeler (2010, pp. 6–7) defined potential primary habitat as having appropriate vegetative communities (*e.g.,* longleaf pine forests, scrub, coastal dunes), soils, and canopy cover of less than 65 percent within the known historic range of the tortoise. Potential secondary habitat was defined as having appropriate forest cover types and soils, but not suitable canopy cover. Potential foraging habitat was defined as areas with appropriate habitat types within 300 meters (m) (984 feet) of either potential primary or potential secondary habitat. Hoctor and Beyeler (2010, p. 16) conducted a goodness-of-fit analysis comparing known gopher tortoise data points from Florida with habitat categories established in the GIS analysis. The analysis indicated that the location of gopher tortoise point data in Florida was not randomly distributed in relation to any grouping. This suggests the GIS analysis distinguished between potential habitat and non-habitat fairly well: primary habitat ($\chi^2 = 3091.58$, df = 1, $P < 0.001$); primary and secondary habitat combined ($\chi^2 = 2157.66$, df = 1, $P < 0.001$); primary, secondary, and foraging habitat combined ($\chi^2 = 1319.44$, df = 1, $P < 0.001$); appropriate soils ($\chi^2 = 826.07$, df = 1, $P < 0.001$). These statistics indicate that the model accurately identified gopher tortoise potential habitat in Florida.

The FWC slightly modified the Hoctor and Beyeler model to account for variations in potential gopher tortoise habitat that were thought to be unique to Florida (FWC 2011a). The inclusion of beach and dune habitat, inclusion of depth to water table of 0.5 to 2.3 meters (1.5 to 6.5 feet), and the exclusion of the 300 meter buffer surrounding primary habitat. These model modifications resulted in a decrease in the acreage of potential gopher tortoise habitat identified in Florida (3.0 million to 2.2 million) but likely more closely estimates the distribution of habitat in Florida. For consistency and comparative purposes, we use acreages reported by Hoctor and Beyeler (2010). Refined analyses such as those conducted by FWC are not available for the remainder of the range and reductions in acreages such as those indicated in Florida's model revisions bolsters our prior assumption that the Hoctor and Beyeler model overestimates the actual distribution of potential habitat. Future conservation actions for the species would no doubt benefit from more site-specific data included in modeling efforts such as that carried out by FWC.

A total of about 9.5 million hectares (ha) [23.5 million acres (ac)] of potential primary, secondary, and foraging habitat is estimated to currently occur within the eastern portion of the tortoise's range (Hoctor and Beyeler 2010, p. 12). Nearly 88 percent of the habitat is estimated to be in private ownership, and the remainder is controlled by local, State, Federal, or private conservation entities (Table 1). The largest patches of contiguous potential habitat (those greater than 100 ha or 250 ac) accounted for about 5.6 million ha (13.9 million ac), and 85 percent of this area was privately owned (Hoctor and Beyeler 2010, pp. 13–14). Using a similar GIS analysis based on the Hoctor and Beyeler (2010, entire) model for the eastern range, the distribution of potential gopher tortoise habitat was estimated throughout the western range (Ginger 2010). A total of 1.8 million ha (4.5 million ac.) of potential primary, secondary, and foraging habitat was estimated using the model, with the largest habitat patches (those greater than 100 ha or 250 ac) accounting for about 0.5 million ha (1.4 million ac). For two counties, Greene (Mississippi) and Washington (Alabama), base soils information was not available, so those counties were not included in the analysis. The base layers represent coarse and sometimes outdated data, and the model was not field tested and no goodness-of-fit analysis was conducted for data originating from the western portion of the tortoise's range. However, the results are likely inflated values that may represent the amount of habitat closer to the historic range rather than the current potential distribution.

Table 1. Distribution of all (primary, secondary and foraging) potential gopher tortoise habitat on private and public lands currently in the eastern portion of its range (summarized from Hoctor and Beyeler 2010, p. 14).

Alabama	Private	1,798,369 ha (4,444,371 ac)
Alabama	Public	57,493 ha (142,065 ac)
Florida	Private	2,378,338 ha (5,876,794 ac)
Florida	Public	753,272 ha (1,861,312 ac)
Georgia	Private	3,569,093 ha (8,819,109 ac)
Georgia	Public	135,599 ha (335,599 ac)
South Carolina	Private	640,987 ha (1,583,858 ac)
South Carolina	Public	73,941 ha (182,707 ac)

Habitat

Gopher tortoises require well-drained, sandy soils for burrowing and nest construction, an abundance of herbaceous ground cover for food, and a generally open canopy that allows sunlight to reach the forest floor (Landers 1980, p. 6; Auffenberg and Franz 1982, p. 98). Longleaf pine and oak uplands, xeric hammock, sand pine and oak ridges (beach scrub), and ruderal (disturbed) habitat most often provide the conditions necessary to support gopher tortoises (Auffenberg and Franz 1982, p. 99). In the western range, soils contain more silt, and xeric (dry) conditions are less common west of the Florida panhandle (Crual *et al.* 2005, p. 73). Ground cover in this Coastal Plains area can be separated into two general regions with the division in the central part of southern Alabama and northwest Florida. To the west, bluestem (*Andropogon* spp.) and panicum (*Panicum* spp.) grasses predominate; to the east, wiregrass (*Aristida stricta*) is most common (Boyer 1990, p. 3). However, gopher tortoises do not necessarily respond to specific plants but rather the physical characteristics of habitat (Diemer 1986, p. 126). Longleaf pine and oak uplands (*e.g.,* sandhills) are the preferred habitat for gopher tortoises (Landers and Speake 1980, p. 515; McRae *et al.* 1981, p. 177; Auffenberg and Franz 1982, p. 100; Diemer 1986, p. 126). Ruderal (*i.e.,* disturbed or atypical) habitats include roadsides and utility rights-of-way, grove/forest edges, fencerows, and clearing edges. Historic gopher tortoise habitats were open pine forests, savannahs, and xeric grasslands that covered the coastal plain from Mexico and Texas to Florida. Historic habitats might have had wetter soils at times and been somewhat cooler but were generally xeric, open, and diverse (Ashton and Ashton 2008, p. 73).

Sandy soils are most appropriate for burrow construction (Jones and Dorr 2004, p. 461), and most burrows are found on loam and sandy loam type soils (Tuma 1996, p. 43). Much of the remaining undisturbed gopher tortoise habitat in the eastern portion of the range consists primarily of coastal dunes or xeric uplands dominated by wiregrass and longleaf pine-turkey oak or scrub communities (Landers *et al.* 1980, pp. 353–354; Diemer 1986, p. 126). Conversely, most tortoise habitat in the western portion of the range (western Alabama, Louisiana, and Mississippi) consists of soils with a low sand content and a more substantial clay component. Jones and Dorr (2004, p. 461) suggest that higher clay content in soils may contribute to lower abundance and density of tortoises in Mississippi versus the remainder of the range.

Sand texture is most important in the formation of the burrow apron, which impedes rain from entering the burrow (Landers 1980, p. 6). Sand depth is also important because soil layers underlying it, such as clay, can impede digging and influence burrow depth (Baskaran *et al.* 2006, p. 347). Burrows are shorter in clay soils, and clay soils may adversely affect nest success because these soils reduce exchange of oxygen and carbon dioxide (Wright 1982, p. 21; Ultsch and Anderson 1986, p. 790; Smith *et al.* 1997, p. 599). Larger diameter burrow openings tend to result in longer burrows (Hansen 1963, p. 355). Burrows are usually distributed on higher ridge tops rather than wetlands, and their depths are sometimes limited by the water table (Baskaran *et al.* 2006, p. 346).

Gopher tortoises use their burrows as a respite from extreme surface temperatures, desiccation, and predators (Hansen 1963, p. 359; Landers 1980, p. 7; Wright 1982, p. 50; Diemer 1986, p. 127; Boglioli 2000, p. 699). Digging burrows benefits the surrounding habitat by returning leached nutrients to the surface (Auffenberg and Weaver 1969, p. 191; Landers 1980, p. 7), as well as increasing the heterogeneity (diversity) of the habitat in the vicinity of the burrow (Kaczor and Hartnett 1990, p. 107). Burrows can also serve to shelter seeds from fires (Kaczor and Harnett 1990, p. 108). Many organisms adapted to hot summers and cool winters use gopher tortoise burrows for refuge (Landers and Speake 1980, p. 515). Jackson and Milstrey (1989, p. 87) compiled a list of 60 vertebrates and 302 invertebrates that share tortoise burrows. Gopher tortoise burrows not only provide other species shelter from extreme environmental conditions and predation, but may also be used as feeding or reproduction sites, as well as permanent microhabitats for one or all life stages (Jackson and Milstrey 1989, p. 86).

Gopher tortoises have a well-defined activity range where all feeding and reproduction take place and that is limited by the amount of herbaceous ground cover (Auffenberg and Iverson 1979, p. 549). Tortoises are obligate herbivores eating mainly grasses, plants, fallen flowers, fruits, and leaves. Gopher tortoises prefer grassy, open-canopy microhabitats (Boglioli *et al.* 2000, p. 703), and their population density directly relates to the density of herbaceous biomass (Auffenberg and Iverson 1979, p. 558; Landers and Speake 1980, p. 522; Wright 1982, p. 22; Stewart *et al.* 1993, p. 79) and a lack of canopy (Breininger 1994, p. 63; Boglioli *et al.* 2000, p. 703). Grasses and grass-like plants are important in gopher tortoise diets (Auffenberg and Iverson 1979, p. 558; Landers 1980, p. 9; Garner and Landers 1981, p. 123; Wright 1982, p. 25; McDonald and Mushinsky 1988, p. 351; Mushinsky *et al.* 2003, p. 480; Birkhead *et al.* 2005, p. 146). A lack of vegetative diversity may negatively impact the long-term sustainability of gopher tortoise populations (Ashton and Ashton 2008, p. 78).

Gopher tortoises may enhance nitrogen cycling by augmenting legume germination and abundance around burrows. Boglioli *et al.* (2000, p. 704) found that legumes were three times more abundant around burrows than at control points. Since legumes have thick seed coats, they may benefit from scarification after passing through the digestive tract (Boglioli *et al.* 2000, p. 704). Low food availability negatively affects tortoise population densities and can be caused by plant growth suppression due to accumulated leaves, litter, and low light associated with canopy closure (Landers and Speake 1980, p. 522).

Gopher tortoises require a sparse canopy and litter-free ground not only for feeding, but also for nesting (Landers and Speake 1980, p. 522). In Florida, McCoy and Mushinsky (1988, p. 35) found that the number of active burrows per tortoise was lower where canopy cover was high. Females require almost full sunlight for nesting (Landers and Buckner 1981, p. 5) because eggs are often laid in the burrow apron or other sunny spot and require the warmth of the sun for appropriate incubation (Landers and Speake 1980, p. 522).

At one site in southwest Georgia, Boglioli (*et al.* 2000, p. 703) found most tortoises in areas with 30 percent or less canopy cover. Diemer (1992, p. 162) found that ecotones created by clearing were also favored by tortoises in north Florida. When canopies become too dense, usually due to fire suppression, tortoises tend to move into ruderal habitats such as roadsides with more herbaceous ground cover, lower tree cover, and significant sun exposure (Garner and Landers 1981, p. 122; McCoy *et al.* 1993, p. 38; Baskaran *et al.* 2006, p. 346). In Georgia, Hermann *et al.* (2002, p. 294) found that open pine areas (*e.g.,* pine forests with canopies that allow light to penetrate to the forest floor) were more likely to have burrows, support higher burrow densities, and have more burrows used by large, adult tortoises than closed-canopy forests. Historically, open-canopied pine forests

were maintained by frequent, lightning-generated fires. Subsequently, grazing and mowing have contributed to the maintenance of some gopher tortoise habitat (Ashton and Ashton 2008, p. 78).

Status

Effectively assessing the status (*i.e.,* whether it is increasing, decreasing, or stable) of the gopher tortoise throughout its range requires evaluation of the distribution of tortoises, number of tortoises and populations, number of individuals in populations, and trends in population growth. As we indicated above, we do not have specific distribution data for most of the tortoise's range, but we estimated where potential habitat existed and where tortoises may still be present. Below, we provide summaries of survey data about the sizes and, in some cases, trends of gopher tortoise populations. There is a noticeable disparity between the apparently large area (expressed in hectares or acres, or ha/ac) of potential gopher tortoise habitat reported above and actual numbers of individual tortoises known from populations that have been surveyed, as summarized below. Upon cursory examination, there seem to be few tortoises where there are millions of hectares of potential habitat. Many Federal and State agencies, non-governmental organizations (NGO), and timber owners have only recently begun to assess where and how many gopher tortoises are present on lands they own or manage. Nonetheless, we have evaluated the status of the gopher tortoise based on the best available scientific information, which is summarized in the next section.

Our review of the literature indicates that the status of an individual gopher tortoise population is dependent on the size of the population and its demographic performance. For comparative purposes, and as described in greater detail below, we considered tortoise populations to be large enough to persist in the future (*i.e.,* viable) if they contained 250 or more reproductively active individuals. Ideally, recruitment should exceed mortality, but few long-term studies provide this demographic information. In the absence of these data, burrow surveys that report hatchling- and juvenile-sized burrows indicate that recent recruitment occurred, but we still often lack information about whether the observed level of recruitment is sufficient to offset mortality. The amount of habitat necessary to support a population of at least 250 breeding individuals likely varies depending on habitat quality. Populations in poor-quality habitat, such as those in atypical vegetative communities and in areas not aggressively managed, will likely require more area than populations in high-quality soils where there would be sparse canopy cover, multi-aged pine forests with abundant ground cover, and where prescribed fire is used periodically to maintain habitat conditions. Because of these variations, the density of gopher tortoises in a population that is large and demographically viable will vary.

Using available information we can estimate that 250 individual tortoises are needed to represent a viable population. We also estimated how much habitat an ancestral (conditions prior to human disturbance) gopher tortoise population of 250 individuals may have required. The recovery criteria for the populations in western portion of the range on priority soils calls for gopher tortoise densities of five active burrows per ha (two active burrows per ac). With a reported 0.61 burrow occupancy correction factor (*i.e.,* proportion of burrows occupied by tortoises) this equates to about 3.0 tortoises per ha (1.2 per ac) (Service 1990, p. 14). Based on historic survey data, tortoise densities as high as 4.9 per ha (2.0 per ac) are targeted for some high-quality recipient sites under Florida's gopher tortoise management plan (Plan) (Fish and Wildlife Conservation Commission (FWC) 2007, p. 76). Burrow densities on two conservation parcels containing mature longleaf pine forests in Georgia that have been managed with short-return (*i.e.,* 1–3 years) fire intervals for 20 to 70 years had burrow densities 2.7–5.1 per ha (1.1–2.1 per ac) (Guyer 2010, Hermann *et al.* 2002, p. 296). Based on the above data, we estimate that a viable ancestral (prior to human disturbance) tortoise population contained a minimum of 250 breeding individuals, with active burrow densities ranging between 1.5–5.1 per ha (0.6–2.1 per ac). Using an occupancy correction factor 0.37 from the best representative ancestral extant population (Hermann *et al.* 2002, p. 296), these burrow densities would equate to 0.6–1.9 tortoises per ha (0.2–0.8 per ac). At these densities, ancestral tortoise populations of 250 tortoises in southern Georgia would likely have occurred in habitat patches ranging from 132–416 ha (326–1,028 ac). Using the 0.61 correction factor specified in the gopher tortoise recovery plan results in 0.9–3.1 tortoises per ha (0.4–1.3 per ac) and would have occupied 81–278 ha (192–687 ac). Few extant gopher tortoise populations currently meet these criteria.

Status in Western Portion of the Range

Alabama: On commercial forests in Alabama and Mississippi, tortoise surveys were conducted from July 1999 through May 2001 on about 11,838 ha (29,252 ac). Survey sites were selected opportunistically and not based on known tortoise populations or habitat suitability for tortoises. About 0.05 active burrows per ha (0.02 per ac) were found in these mostly closed-canopy slash and loblolly pine forests (National Council for Air and Stream Improvement, Inc. 2010, pp. 15–16). Burrow surveys conducted on corporate pine forests in southern Mississippi and southwestern Alabama on soils that were variably suitable for gopher tortoises did not detect active burrows on about 88 percent of surveyed sites (Jones and Dorr 2004, p. 461). Where burrows were detected, densities of active burrows ranged from 0.10–0.60 burrows per ha (0.04–0.24 burrows per ac) (Jones and Dorr 2004, p. 460).

Louisiana: Tortoises are not widespread or abundant in Louisiana, and all known populations are small and occur in fragmented habitat. Determining the status of tortoises in Louisiana is difficult because of limited survey data (Diaz-Figueroa 2005, p. 5). The most recent surveys during 2007 and 2008 in Washington, Tangipahoa, and St. Tammany parishes, where the largest known gopher tortoise populations remain, found 54 active and 45 inactive burrows on Ben's Creek Wildlife Management Area. Sandy Hollow Wildlife Management Area contained 25 active, 12 inactive, and 4 abandoned burrows. A natural gas pipeline corridor supported 26 active, 31 inactive, and 4 abandoned gopher tortoise burrows (Landry and Gregory 2008, pp. 2–3). Burrow density estimates were not included in the survey results for locations in Louisiana.

Mississippi: Data gathered in the De Soto National Forest evaluated gopher tortoise population trends over a 12-year period based on three burrow surveys conducted in 1995, 2002, and 2007. The surveys were limited to only the deep, sandy soil types, which comprise only 2.5 percent of the De Soto National Forest. Nonetheless, gopher tortoise burrow densities declined by 35.7 percent from 1995 to 2007, and 18 locations that contained tortoises in 1995 had no tortoises in 2007 (Conservation Southeast, Inc. 2009, pp. 1, 12, 27). Eighty percent of locations containing adults contained no juvenile burrows. The mean adult active burrow density on priority soils ranged from 0.12–0.67 per ha (0.05–0.27 per ac) on three sections of the National Forest

(Conservation Southeast, Inc. 2009, p. 21). Qualls (2010) observed that the majority of tortoise populations on the De Soto National Forest appeared to be small and adult-dominated and recruitment was low or absent. Analysis of gopher tortoise population sizes from Wester (2005, pp. 18–19) on the Camp Shelby Training Site (within the De Soto National Forest) found that 159 of 162 colonies (98 percent) contained fewer than 50 individual tortoises and up to 25 percent of all tortoises found were not associated with a population (Ginger 2010). These findings support earlier observations of small, fragmented populations on many of the study sites in Mississippi evaluated by Mann (1995, pp. 1, 2, 24). Implementation of recent management efforts within the De Soto National Forest may be slowing the observed population decline (Conservation Southeast, Inc. 2009, p. 13).

A subsample of gopher tortoise survey locations from 1995 on Camp Shelby were resurveyed in 1999 and 2000. The distribution of tortoise colonies did not change between surveys and most were still located in ruderal habitats, and the largest number of burrows was located in fire-suppressed pine forests (Epperson and Heise 2001, p. 26). Populations appear to be declining, and age classes are shifting towards more adults (Epperson and Heise 2001, p. 38). Burrow densities were not estimated from data gathered during this study, but evaluation of three prior surveys on the De Soto National Forest showed that burrow densities (including all active, inactive, and abandoned burrows) ranged from 0.11–1.38 burrows per ha (0.04–0.56 burrows per ac) (Epperson and Heise 2001, p. 25). A subsequent comparison of gopher tortoise survey data from 1995 with information obtained during 2003 and 2004 surveys found the number of active burrows declined from 1,133 to 856 (33 percent reduction) while the number of inactive or abandoned burrows increased by 923 (Wester 2005, p. 17). The 33 percent decline in active burrows was consistent with documented tortoise declines throughout the remainder of the De Soto National Forest (Conservation Southeast, Inc. 2009, pp. 1, 12).

Surveys in known gopher tortoise habitat were conducted from 1993–1995 (during the months between May and August) on 1,554 ha (3,840 ac) of planted pines in southern Mississippi. The planted pines had been recently thinned and frequently burned. About 0.20 active burrows per ha (0.08 per ac) and 0.7 active burrow per kilometer (1.1 per mile) in linear (*e.g.,* roads, gas line right of ways, electrical transmission lines) habitats were found (National Council for Air and Stream Improvement, Inc. 2010, p. 15).

Estes and Mann (1996, p. 1) conducted surveys on sites with suitable soils on Section 16 lands (*i.e.,* in each township, Section 16 is set aside for maintenance of public schools) in southern Mississippi. Surveys covered about 1,090 ha (2,693 ac) and found an average of 1.0 burrow (active and inactive) per ha (0.4 per ac). Burrows were most dense on suitable soils in longleaf pine habitats that were regularly burned. Based on burrow sizes encountered, the authors concluded that recruitment was low. Gopher tortoise populations were small and isolated, and few had evidence of recruitment. The researchers questioned the long-term viability of most Section 16 tortoise populations (Estes and Mann 1996, pp. 23–24).

We also reviewed data collected during a mail survey seeking information on the status of gopher tortoises on private lands within the historic range of the tortoise in Mississippi. Although data were not useful in evaluating numbers, densities, or status of tortoises in southern Mississippi, we found that few reporting landowners had tortoises (19 percent); of the remaining tortoises, most were persisting in longleaf pine habitats, and most tortoise populations had recently disappeared from other habitat types (Underwood *et al.* 2010, pp. 8, 11, 15).

Status in the Eastern Portion of the Range

Alabama: The official Web site of the Alabama Department of Conservation and Natural Resources, *http://www.outdooralabama.com* (accessed September 9, 2010)), reports that gopher tortoises are found in Baldwin, Barbour, Bullock, Butler, Clarke, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Monroe, Montgomery, Pike, and Wilcox Counties. Small introduced populations also occur in Autauga and Macon counties. Alabama is in the initial stages of planning surveys or censuses for the gopher tortoise in the eastern portion of the range. Therefore, no data currently exist to evaluate the status of tortoises on public lands in the eastern portion of the range in Alabama, beyond general counties of occurrence.

In 2003, surveyors found 636 active gopher tortoise burrows at Fort Rucker, Alabama, which was reported to have about 19,830 ha (49,000 ac) of potential tortoise habitat (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 11, 27).

Florida: In north central Florida, a gopher tortoise population was intensively monitored for 6 years on a 66-ha (163-ac) 33-year-old slash pine plantation beginning in 1981. After the study site was clear cut in 1988, a follow-up assessment found that tortoises had moved to ecotones (ecological transition zone) between cut and mature forests, but roughly the same number of tortoises were captured pre- (n = 60) and post-clearcut (n = 58). In 2009, an additional follow-up in the now 11-year-old plantation that had been burned and planted in longleaf pine in preparation for gopher tortoise introductions indicated about the same number of tortoises (n = 52), but a substantial decline in the number of juveniles was detected (Berish 2010). The investigator concluded that viable and robust populations can persist long term in habitat with ongoing intensive silviculture. However, in this case, we noted that efforts were under way to enhance gopher tortoise habitat on the study site in preparation for introduction of additional tortoises. The researcher's conclusion of a viable tortoise population persisting in an intensive silvicultural forest did not take into account the possible positive demographic response tortoises may have had to habitat enhancement activities in the later stages of this monitoring effort or the substantial decline in the number of juvenile tortoises.

Tortoise populations on 10 public lands were evaluated twice over a 12-year period and the number of active and inactive burrows decreased at 9 of the 10 sites. On eight of the sites, there was at least a 10 percent decline over the 12-year period (McCoy *et al.* 2006, p. 123). No strong correlation was observed between burrow declines and habitat quality between surveys, but the response of a population to decline in habitat quality may depend on the initial habitat structure, the degree of change in habitat structure, the period of time over which change is measured, the amount of habitat involved, and the level of habitat management (McCoy *et al.* 2006, p. 1).

At Cape Sable, in south Florida, burrow counts using line- or strip-transects were conducted in 1979, 1990, and 2001. The density of active burrows decreased 76 percent between 1979 and 2001. Between 1979 and 1990 the population was probably stable or slightly increasing, but declined substantially between 1990 and 2001, despite evidence of recruitment. Reduced habitat quality and tropical storms may have been responsible for

the observed declines between 1990 and 2001 (Waddle *et al.* 2006, pp. 280–283).

Burrow counts were completed at six locations on Naval Air Station Pensacola and at eight sites at Naval Air Station Whiting Field in 1996 and again in 2006 (Davis and Russo 2007a, entire; 2007b, entire; Naval Air Station Pensacola Natural Resources Division 2008, entire). On Naval Air Station Pensacola active burrows were not detected from two locations where they were observed in 1996, but increased at three others (Davis and Russo 2007a, pp. 2–3). Small burrow sizes indicated that juvenile tortoises were present in the remaining three areas demonstrating successful reproduction. On Naval Air Station Whiting Field the number of active burrows declined on three sites, was unchanged at one site, and increased at four others. Burrow numbers were small in all areas, and reproduction was evident at two locations. Most burrows were located in ruderal habitat, and native pine forests were in need of management (Davis and Russo 2007b, p. 2).

Surveys for gopher tortoise burrows on Camp Blanding Joint Training Center, Clay County, Florida, in 2008 estimated a total of 6,433 active burrows by extrapolating from a survey of 10 percent of the 7,350 ha (18,170 ac) of potential habitat on the Center (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 11, 27).

A recent survey conducted on a 230-ha (570–ac) property in Alachua County, FL, in a high-density slash pine plantation with no burning history and substantial mid-story hardwood found 58 active burrows in the area (Plum Creek 2010, p. 3). The location of the burrows was not described.

A 2009 survey on Egmont Key National Wildlife Refuge (NWR), Hillsborough County, Florida, found 148 active burrows on about 132 ha (328 ac) (Southeast Regional Partnership for Planning and Sustainability 2010, p. 31). On Ding Darling NWR, 12 active and one inactive burrow were detected, and from five populations on Sanibel-Captiva Islands near Ding Darling NWR, a total of 170 active burrows and 39 inactive burrows were found during surveys in late 2009. Archie Carr NWR recorded 11 active burrows on two acres, and Pelican Island NWR found one active burrow during 2010 surveys.

Surveys conducted on a 74 ha (183 ac) parcel of the Jennings Forest Wildlife Management Area in 1999, 2005, and 2010 indicated that the gopher tortoise population apparently responded positively to habitat restoration and management activities (FWC 2010a). The number of tortoise burrows increased from 378 active and inactive in 1999, to 442 active and inactive burrows in 2005, and then to 657 active and inactive burrows in 2010. Using a burrow occupancy correction factor of 0.614, FWC concluded that the tortoise population increased from 271 to 403 individuals over the 11-year monitoring period. The reason(s) for the observed increase in population size was not described (*e.g.*, increased immigration or increased recruitment).

A survey was completed in 2010 on a 100 ha (246 ac) parcel representing about 27 percent of available potential gopher tortoise habitat on Fort White Wildlife and Environmental Area, Florida. Burrow estimates for all potential habitat equaled 1994 ± 95 burrows, or 1810 to 2185 burrows with a 95 percent confidence interval (Sullivan 2010).

Georgia: In seven southwest Georgia counties, tortoise burrow surveys conducted at randomly selected forest units with suitable soils for gopher tortoises found that 64 percent of the parcels contained no gopher tortoise burrows (Hermann *et al.* 2002, p. 292). On parcels that were occupied, burrow densities ranged from 0.04 per ha (0.02 per ac) to 2.2 per ha (0.9 per ac) with a mean of 1.1 per ha (0.4 per ac) (Hermann *et al.* 2002, p. 293). Suitable soils that had non-timber agriculture, hardwoods, and planted pine plantations were about 6 times less likely to have burrows and contained 20 times fewer tortoise burrows than open pine sites (Hermann *et al.* 2002, p. 294–295).

Recently, burrow surveys using line-transect distance sampling and burrow scoping were attempted on 20 wildlife management areas, State parks, and other public lands in southern Georgia. No tortoises were observed at one parcel, and seven others had burrow densities that were insufficient to accurately estimate population levels (Smith *et al.* 2009, p. 361). Thirteen sites contained populations ranging in 48–321 individuals with densities of 0.21–1.65 tortoises per ha (0.08–0.68 tortoises per ac). In general, burrow size class distribution were skewed toward adult tortoises suggesting low recruitment of juveniles.

One-time burrow surveys from Kings Bay Naval Submarine Base in southeastern Georgia indicated a total of 200 active burrows including juvenile and hatchling-sized burrows. The majority of burrows occurred in ruderal, edge, or transition habitat, sandhill, and young pine (Tuberville *et al.* 2009, p. 7). Area of gopher tortoise habitat for Kings Bay Naval Submarine Base was not provided. Native pine forests were degraded and in need of management (Tuberville *et al.* 2009, p. 8).

Surveys on 12 study sites at Fort Benning, Georgia, during 1995 found active and recently used burrow densities ranging from 0.05–1.2 per ha (0.02–0.49 per ac) (Styrsky 2010, p. 405). About 2,700 active burrows were estimated on Fort Benning during 1998 surveys, and with nearly 25,375 ha (62,700 ac) of potential habitat, this equates to about 0.11 active burrows per ha (0.04 burrows per ac) (Southeast Regional Partnership for Planning and Sustainability 2009, p. 11, 27). Surveys on Fort Gordon, Georgia, located 147 active burrows, which contained about 4,570 ha (11,300 acres) of tortoise habitat or about 0.03 active burrow per ha (0.01 per ac). During 2009 surveys on Fort Stewart, Georgia, 4,045 active burrows were located with a reported 5,790 ha (14,300 ac) of tortoise habitat or about 0.70 burrows per ha (0.28 per ac) (Southeast Regional Partnership for Planning and Sustainability 2009, p. 11, 27).

Okeefenokee NWR surveyed two tracts of 11 and 18 ha (26 and 45 ac) in 2010 and found. The 11 ha tract had 73 active, and 35 inactive, burrows and the 18 ha tract had 31 active and 16 inactive, respectively. Surveys on a 102 ha (250 ac) tract on the Eufaula NWR in both Georgia and Alabama found 30 active tortoise burrows.

South Carolina: Little is known about the population status of the tortoise in Aiken County or in the Coosawhatchie region (Bennett and Buhlmann 2005, p. 2). The Aiken Gopher Tortoise Heritage Preserve contains a small population that is believed to be in decline (Bennett and Buhlmann 2005, p. 2). Augmentation into this population is ongoing, and the effects of these translocations are not known (Bennett 2010). Tortoises on the Tillman Sand Ridge Heritage Preserve have been surveyed in the past (Auffenberg and Franz 1982, entire; Wright 1982, entire; Tuberville and Dorcas 2001, entire), and population estimates from these studies indicate a historical decline in the adult population of gopher tortoises. Recent assessments suggest this population may be stabilizing or growing, but several more years of monitoring will be necessary to confirm this trend (Bennett 2010). No other natural tortoise populations are known in South Carolina.

Multi-State Surveys: A one-time survey on 22 tracts of commercial forest containing 88 stands known to support gopher tortoises was conducted in late 2009 and early 2010 (National Council for Air and Stream Improvement, Inc.

2010, p. 15). Surveys covered 1,938 ha (4,789 ac) of longleaf pine (n = 47 stands), loblolly pine (n = 16 stands), and slash pine (n = 14 stands)), sandpine (n = 4 stands), and recently harvested stands (n = 7) in Alabama, Florida, Georgia, and Mississippi. Potentially active and abandoned gopher tortoise burrow density averaged 2.8 per ha (1.1 per ac) and 1.8 per ha (0.7 per ac), respectively, for each stand.

Population Modeling: In the absence of field surveys and long-term monitoring, models may be used to project the status of populations in the future based on a specific set of assumptions and assignment of demographic parameters. There have been four substantive modeling efforts evaluating the long-term persistence of gopher tortoises (Tuberville *et al.* 2009, pp. 5–10). Two early modeling efforts focused on estimating the minimum number of tortoises needed for a population to persist for 200 years (Cox *et al.* 1987, p. 28). Although relatively small population sizes (40–50 adults) were modeled to persist over the model duration, all populations declined and were projected to go extinct at some point in the future depending on model parameters.

Miller *et al.* (2001, p. 1) assessed the likelihood of tortoises being extirpated from Florida over a 100-year period when evaluating all known tortoise populations or only those on public lands considering a variety of assumptions regarding survivorship, carrying capacity constraints, disease, *etc.* (Miller *et al.* 2001, pp. 12–26). The model results suggest that gopher tortoises have greater than 80 percent chance of persisting in Florida over the next 100 years whether looking at all known populations or only those on public lands (Miller *et al.* 2001, pp. 27–28). Furthermore, they concluded that populations as small as 50 individuals can have conservation value under favorable conditions, but under less favorable habitat conditions populations larger than 250 individuals would be necessary to protect against extinction due to stochastic factors that increase hatchling and adult mortality (Miller *et al.* 2001, p. 28).

The most recent modeling effort recognized the need to evaluate the viability of individual populations, rank populations most appropriate for in-situ protection, and determine if nonviable populations are more likely to contribute to conservation through augmentation or translocation (Tuberville *et al.* 2009, p. 9). All model scenarios resulted in a population decline of one to three percent per year, which varied as a function of habitat quality and location within the range (Tuberville *et al.* 2009, p. 17). Only modeled populations with at least 250 tortoises were able to persist for 200 years, which is substantially different than earlier model results.

We can draw two very general conclusions from the models described above. First, gopher tortoise populations are likely to decline in the future under a wide array of demographic and environmental conditions that exist today. Second, gopher tortoise populations, although declining, and in some cases functionally extinct, will persist for 100 to 200 years. The effect of these may be that tortoises will be seen for long periods of time throughout their range, not because their populations are stable or increasing, but because they are long-lived.

Other efforts have focused on identifying the minimum area needed to support viable gopher tortoise populations. As described above, Cox (1987, pp. 30–31) used viability modeling to estimate that 50 individual tortoises would persist and calculated that 10–20 ha (25–50 ac) would be required to support a population of this size. Breininger *et al.* 1994 (p. 64) concluded that based on burrow densities on Kennedy Space Center, Florida, it would require 30–35 ha (74–86 ac) to support a population of 50 tortoises. Eubanks *et al.* 2002 (pp. 469–470) estimated that 50 tortoises would require 19–41 ha (47–101 ac) based on burrow densities and 25–81 ha (62–200 ac) based on home range size estimates. More recently McCoy and Mushinsky (2007, p. 1404–1405) used a variant of the density-area method to evaluate minimum patch size for the gopher tortoise. Where tortoise populations were spatially constrained (*e.g.*, not able to disperse) tortoise populations were estimated to require about 100 ha (247 ac), and unconstrained populations required 143–250 ha (353–618 ac). Furthermore, if metapopulation dynamics are important to the long-term persistence of gopher tortoises, then the minimum patch size for unconstrained populations must be multiplied by the number of populations necessary to constitute a viable metapopulaton (*e.g.*, 429–750 ha or 1,060–1,853 ac for three populations in a metapopulation, *etc.*) (McCoy and Mushinsky 2007, p. 1405).

The density of tortoises affects their social interactions and recent research has shown that when tortoise densities fall below 0.4 individuals per ha (0.2 per ac), social interactions decrease dramatically because it takes too much energy to search for mates (Guyer 2010). This decrease in socialization is predicted to limit mate selection opportunities because male tortoises will not travel great distances to find females and, therefore, females will not be able to select among several potential mates. Viability of low-density populations is expected to decline due to adverse genetic impacts. Comparison of density data from other studies to the threshold data from this study indicates that many extant gopher tortoise populations are below the density threshold identified above. Successful conservation of the gopher tortoise will require active habitat management to provide opportunities for tortoise populations to exceed the threshold density necessary to ensure long-term persistence in longleaf pine forests (Guyer 2010).

Recently, segmented regression models were developed to evaluate the relationship between area of habitat occupied by gopher tortoises and abundance of gopher tortoises to define how many individuals constitute a population and how much area is required for such a population. Data synthesized from 21 study sites in Alabama, Georgia, and Mississippi with varying tortoise population numbers indicated that an average gopher tortoise population consists of 444 burrows, covers 755 ha (1,865 ac), and contains 240 tortoises (Styrsky *et al.* 2010, p. 407). This average population contained a density of 0.3 tortoises per ha (0.1 per ac), which is below the threshold identified by Guyer (2010) for maintaining a persistent population. The authors noted that this average tortoise population was calculated based on a variety of existing landscapes that differed in their current management and past land use history and, therefore, did not represent what a population of tortoises might be in areas that were all managed with frequent fire and contained the uneven-aged trees of old-growth longleaf pine forests. Thus, it is likely that tortoises could persist on smaller parcels, but only if habitat were aggressively managed (Styrsky *et al.* 2010, p. 408). Lack of prescribed fire or ineffective use of prescribed fire is known to be a substantial impediment to the restoration and maintenance of gopher tortoise habitat throughout much of its range. The model results depict a typical tortoise population as one occupying a large area. This seems congruent with existing habitat conditions that are reported throughout much of the tortoise's range. Therefore, the model results show that most existing conservation lands contain too few tortoises and too little suitable habitat to support persistent tortoise populations.

Expert Opinion: Expert opinion is often used in combination with available data or in the absence of data to gather information and draw conclusions on wildlife resource issues (Lawrence *et al.* 1997, p. 1; Johnson and Gillingham 2004, pp. 1037–1038). In 2003, a group of 21 individuals from academia, State, and Federal agencies and nongovernmental organizations with knowledge of gopher tortoise biology and conservation gathered to discuss the ecology, status, and management of the gopher tortoise (Smith *et al.* 2006, p. 1). In addition, the group completed a questionnaire that indicated about 86 percent of the participants felt that the gopher tortoise was declining and 76 percent indicated the decline would require additional legal protection in the next 50 years. About 43 percent felt that local or regional extinction was likely within a 50-year period. Slightly less than five percent thought populations were increasing. Major threats identified by the participants included: Fire suppression or lack of growing-season fire, management of high-density pine forests, predation, road mortality, disease, translocation, and habitat degradation due to invasive plants. Participants felt that many populations on protected areas were too small (<100 individuals) to be viable long term (Smith *et al.* 2006, p. 327).

Summary of the Status of the Gopher Tortoise

A wide variety of information is available on the number and density of gopher tortoises and their burrows from many areas throughout their range. These data resulted from numerous surveys/censuses using a variety of methodologies ranging from one-time censuses to repeated surveys over several decades. The diversity of data poses a challenge when trying to evaluate the status of a species from a landscape perspective. For example, in some areas we have more data (*e.g.,* Florida and in portions of the listed range), and we have higher confidence in drawing conclusions about status of tortoises in these areas. In other areas, where there is little or no data, our confidence in assessing the status of tortoises is lower. Because of disparities in the type of data collected, methodologies in collecting data, and differences in the scope of studies, it is not possible to simply combine datasets to evaluate the status of the gopher tortoise throughout its range. Instead, we considered each individual dataset in the context of all other best available science to form general conclusions about the status of the gopher tortoise.

In the western portion of their range, gopher tortoise populations are small and occur in fragmented habitat. The largest and most substantial gopher tortoise populations in the western portion of its range occur on the De Soto National Forest in southern Mississippi. Long-term monitoring here indicates a decline in population sizes, a tendency towards adult-dominated populations, and a lack of, or very low, recruitment. Results of smaller-scale surveys of forest lands in Mississippi and public and private lands in Louisiana are largely consistent with findings on the De Soto National Forest. There are no known populations large enough (*e.g.,* > 250 individuals) to persist long-term based on projections resulting from recent modeling efforts.

The gopher tortoise is more widespread and abundant in parts of the eastern portion of its range, particularly southern Georgia and central and northern Florida. Long-term monitoring data indicate that many populations have declined and most are relatively small and fragmented. Smaller-scale, short-term or one-time surveys throughout the unlisted portion of the range indicate that tortoise populations typically occur in fragmented and degraded habitat, are small, and densities of individuals are low within populations. Unlike the western portion of the range, there are several known populations of tortoises in the eastern portion of the range that appear to be sufficiently large to persist long-term (*e.g.,* Camp Blanding Joint Training Center, FL; Chassahowitzka Wildlife Management Area, FL; Fort White Wildlife and Environmental Area, FL; Jennings Forest Wildlife Management Area, FL; Three Lakes Wildlife Management Area, FL; Fort Benning, GA; Fort Stewart, GA; River Creek Wildlife Management Area, GA; Townsend Wildlife Management Area, GA). There are about 80 other public parcels in Florida that contain a substantial amount of potential gopher tortoise habitat but surveys or censuses of these areas have not been conducted to estimate the number of tortoises present (FWC 2011b).

Evaluation of Listable Entity

The Service makes listing decisions on entire species or subspecies that may be threatened or endangered throughout all or a significant portion of their range, and on distinct population segments (DPS) of vertebrate animals. In determining what listable entity we are evaluating, we often are guided by specificity of petition requests or have historic listing actions on the same or similar species. In general, however, we consider the largest listable entity addressed within a petition, but we have the flexibility to consider listing actions broader than those requested in petitions.

The petition refers to gopher tortoises as a population and as various numbers of populations in certain geographic areas. Since the petition referenced both a single population and multiple populations, but consistently referred to the eastern portion of its range, we concluded that the petitioner's intent was to request listing the gopher tortoise east of the Mobile and Tombigbee Rivers in Alabama, Florida, Georgia, and South Carolina as threatened. As stated above, the species is already listed under the Act as a threatened species west of the Mobile and Tombigbee Rivers in Alabama, Louisiana, and Mississippi. To avoid confusion, our 90-day finding clarified that we would refer to the petitioner's description of the eastern population of the gopher tortoise as the gopher tortoise in the eastern portion of its range. We will continue to use that language in this 12-month finding. Furthermore, our 90-day finding indicated that, to comprehensively evaluate the status of the gopher tortoise, we would consider its status throughout all of its range, including where it is currently listed as threatened. Since this 12-month finding also evaluates the rangewide status of the gopher tortoise, we are considering the listable entity as the species throughout its range. Based on the information above, we have determined that the species, *Gopherus polyphemus,* is a listable entity.

Summary of Information Pertaining to Five Factors

Section 4 of the Act (16 U.S.C. 1533), and implementing regulations (50 CFR 424), set forth procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In making this finding, information pertaining to the gopher tortoise, in relation to the five factors provided in

section 4(a)(1) of the Act, is discussed below.

In considering what factors might constitute threats to a species, we must look beyond the exposure of the species to a particular factor to evaluate whether the species may respond to that factor in a way that causes actual impacts to the species. If there is exposure to a factor and the species responds negatively, the factor may be a threat and, during the status review, we attempt to determine how significant a threat it is. The threat is significant if it drives, or contributes to, the risk of extinction of the species such that the species warrants listing as endangered or threatened as those terms are defined in the Act. However, the identification of factors that could impact a species negatively may not be sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that these factors are operative threats that act on the species to the point that the species may meet the definition of endangered or threatened under the Act.

Additionally, in the summary section of each of the five factors we determine the magnitude and immediacy of the threat pursuant to our List and Recovery Priority Guidance (48 CFR 43908). Magnitude of threat is categorized as low, moderate, or high. Species facing the greatest threats to their continued existence would receive the highest listing priority (*e.g.,* highest magnitude of threat). There are two categories of immediacy of threat: Imminent and nonimminent. Imminent threats are those identifiable threats that are currently affecting a species. Nonimminent threats are those that are not currently affecting a species.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of the Gopher Tortoise's Habitat or Range

Gopher tortoise habitat in both the eastern and western portions of its range has been destroyed or modified in the past due to: (1) Conversion of natural pine forests to intensely managed planted pine plantations or naturally regenerated stands (Hermann *et al.* 2002, p. 296; Siry 2002, p. 335; Conner and Hartsell 2002, pp. 373–376); (2) loss of natural pine forests resulting from urban development, conversion of xeric vegetative communities to citrus, and phosphate mining (Kautz 1998, p. 184; FWC 2006, p. 4 and 8); and (3) degradation of natural pine forest due to lack, or insufficient use, of prescribed fire (Florida Fish and Wildlife Conservation Commission 2006, p. 10; Bailey and Smith 2007, p. 8; Yager *et al.* 2007, p. 1). Several of these same factors are cited in the gopher tortoise recovery plan as historical processes that resulted in habitat destruction and modification in the western portion of the tortoise's range, as well (Service 1990, pp. 8–10). Additional details of these historic threats can be found in our 90-day finding (74 FR 46401) and Florida Fish and Wildlife Conservation Commission (2006, pp. 4–6).

The conversion of native southern pine forests to intensively managed pine forests (planted pine plantations or regenerated forests) is anticipated to continue in the future (Bailey and Smith 2007, p. 8), although the rates of projected conversion vary. The future rate of conversion to pine plantations may be lower than in the past because rates of conversion seem to have declined over the past decade compared to the rates of conversion documented in the 1980s and 1990s.

In 2000, natural pine forests made up 11 percent of the forest industry's land holdings in the southern United States, but is projected to decline to two percent by 2020 (Siry 2002, p. 335). Similarly, in 2000, natural pine forests made up about 14 percent of nonindustrial forest holdings, but this was projected to decrease to 10 percent by 2020 (Siry 2002, p. 335). Forestland management modeling indicates that in Arkansas, Louisiana, and Mississippi, future establishment of pine plantations are likely to occur at the expense of hardwood forests and natural pine forests (Sohngen and Brown 2006, p. 706). Although only a portion of the study area in Arkansas, Louisiana, and Mississippi encompasses the current range of the gopher tortoise, projections from this three-state assessment suggested that up to 135,000 ha (333,500 ac) per year of planted pine may be established each year over the next 25 years and that up to 35,000 ha (about 86,500 ac) of natural pine forest would be destroyed each year over the same 25-year period to accommodate a portion of the expected increase in pine plantations (Sohngen and Brown 2006, p. 706).

The area covered by pine plantations in the south has been modeled and under certain scenarios is projected to increase by about 4 to 10 million ha (10 to 25 million ac) by 2040 (Prestemon and Abt 2002, pp. 18–20). We could not determine the area within the gopher tortoise's range that was projected to be converted to pine plantations. Overall, projected decreases in the area of private timberland in natural forest management types are expected to come from increases in pine plantations and the liquidation of forests to accommodate urban development (Prestemon and Abt 2002, p. 21).

The destruction of gopher tortoise habitat in Florida due to urban development has temporarily eased due to the recent economic downturn (FWC 2010b, p. 1). We suspect similar trends exist throughout the remainder of the tortoise's range. However, with economic recovery, we anticipate a return of urban development in coastal urban centers and throughout much of peninsular Florida. Zwick and Carr (2006, pp. 2, 4–6) modeled human population growth in Florida and concluded that of 2.8 million ha (7.0 million ac), 1.1 million ha (2.7 million ac) of land will be converted to urban use by 2060. In Florida, future urban development may result in the loss of about 283,300 ha (700,000 ac) or 20 percent of the remaining gopher tortoise habitat (not defined in publication) in Florida by 2060 (Florida Fish and Wildlife Conservation Commission 2008, p. 4).

Others have predicted a loss of up to 50 percent of forest lands in central Florida and up to 25 percent in north Florida and southeast Alabama (Prestemon and Abt 2002, p. 18). In 10 coastal Georgia counties, the human population is expected to increase 51 percent by 2030 (Center for Quality Growth and Regional Development 2006 p. 4), but no estimate of impact on native habitats was provided. Within the five counties of the Mississippi gulf region future development is expected to impact gopher tortoise habitat. Evidence of this potential growth can be found in the Mississippi Gulf Region and Wastewater Plan, as well, which outlines water, wastewater, and stormwater infrastructure improvements that are intended to support existing and future growth patterns, particularly new house construction and economic development (Mississippi Department of Environmental Protection 2010, pp. ES1–ES2).

In addition to habitat loss, gopher tortoise habitat will continue to be degraded due to fragmentation, conversion to intensively managed pine forests, and lack, or ineffective use of prescribed fire. The spatial and temporal scale of fragmentation from silvicultural activities will vary depending on location, size, and timing of these activities, but frequent alterations of intensely managed pine forests are unlikely to support stable tortoise populations (Diemer 1992, p. 288). Typically, gopher tortoises move from intensively managed pine forests when canopies begin to close to roadsides and then to adjacent clearcuts or other peripheral habitats, if they are

available (Auffenberg and Franz 1982, p. 102; Diemer 1992, p. 288). These peripheral areas are often road shoulders, which may give the impression that population numbers are high, even though the adjacent pine plantation is largely unoccupied (FWC 2001, p. 4). Gopher tortoises are known to abandon areas that had been recently converted to pine plantations FWC (2001, p. 4).

Early-aged pine plantations may provide open, grassy habitat that can be colonized by gopher tortoises for several years, but these populations are typically short-lived because within 10 to 15 years pine canopies shade out ground vegetation and tortoises either die or disperse (Auffenberg and Franz 1982, p. 111). Large, closed-canopy pine plantations without forage resources may also serve as barriers to tortoise movement (Jones and Dorr 2004, p. 462). Generally, conversion to pine plantations and intensively managed regenerated pine forests results in poor habitat quality that support smaller populations of gopher tortoises (Hermann *et al.* 2002, p. 296).

Gopher tortoise habitat is fire-dependent, and naturally ignited fires and prescribed burning maintains an open canopy and reduces forest floor litter that combine to allow penetration of sunlight necessary for ground cover growth and gopher tortoise nest thermoregulation. In natural and planted pine stands, frequent burning is the most important management tool in sustaining gopher tortoise habitat (Landers and Buckner 1981, p. 6; Breininger *et al.* 1994, p. 63). In suitable habitats, periodic burning or shrub removal can increase gopher tortoise carrying capacity (Stewart *et al.* 1993, p. 79). Landers (1980, p. 7) found that mixed stands of longleaf pine, turkey oak, and other scrub oaks that were burned every 2 to 4 years produced the densest tortoise colonies. In south-central Florida, tortoises moved into areas that were frequently burned and abandoned areas that were unburned or burned less frequently (Ashton *et al.* 2008, p. 527). However, recently burned potential (but unoccupied) habitat may not be colonized by tortoises if fire has been suppressed in surrounding habitat making it unsuitable for tortoises.

Even though management efforts may restore habitat, previous fire-suppression can result in abandonment of adjacent habitat and create dispersal barriers (Ashton *et al.* 2008, p. 528). Breininger *et al.* (1994, p. 63) determined that burned habitats had more herbaceous ground cover and gopher tortoises than unburned oak-palmetto. Landers and Buckner (1981, p. 5) determined that burned plantations and longleaf pine scrub oak ridges had nest densities four times higher than in unburned plantations and ridges. Landers and Speake (1980, p. 518) recorded that herbaceous ground cover was 2.3 times higher and gopher tortoise density was 3.1 times higher in a frequently burned slash pine plantation as in an adjacent unburned natural sandhill area.

Loss and alteration of gopher tortoise habitat from fire exclusion or fire suppression has a significant effect on survival of the gopher tortoise (Boglioli *et al.* 2000, p. 704). Although burning has been accepted as a management tool, increased urbanization has limited its use in many locations (Ashton and Ashton 2008, p. 78). Many southeastern pine forests have dense canopies, more mid-canopy shrubs, and herbaceous ground cover decline due to fire suppression (Yager *et al.* 2007, p. 428). Tortoise population life expectancy was shorter than normal in fire-suppressed savanna communities (Auffenberg and Iverson 1979, p. 562). Population reduction was directly correlated with the degree and rate of successional habitat modification (Auffenberg and Iverson 1979, p. 562). Auffenberg and Franz (1982, p. 108) recorded a decrease of 1.5 tortoises per hectare every 5 years on an unburned site for 16 years. Fire exclusion may reduce tortoise numbers by 60 to 80 percent in 8 years (Diemer 1989, p. 3) or 100 percent in 16 years (Auffenberg and Franz 1982, p. 108). In south-central Florida, sandhill and scrubby flatwoods were abandoned by gopher tortoise after about 20 years of fire exclusion (Ashton *et al.* 2008, p. 528).

Fire suppression and the decline of prescribed fire in both natural pine forests and pine plantations have resulted in a substantial decline in gopher tortoise habitat (Service 1990, pp. 9–10, FWC 2006, p. 10). Auffenburg and Franz (1982, p. 106) reported that tortoise densities are highest in fire-adapted associations (sand pine-scrub oak and longleaf pine-oak) or early successional stages (beach scrub and old-field). In the absence of fire, each of these associations would eventually be replaced by predominantly evergreen hardwood communities, in which tortoises are generally less abundant (Auffenburg and Franz 1982, pp. 106–107). In Florida, and likely many other areas, some public land managers do not have the resources to implement effective habitat management programs (Howell *et al.* 2003, p.10). In a questionnaire to land managers in Florida, the Service asked what challenges they faced in effectively using prescribed fire to manage scrub, a fire-maintained ecosystem. Many respondents indicated that funding, staff, and smoke management issues substantially reduced their ability to burn (Service 2006, Excel spreadsheet; Thomson 2010, p. 12). Recent communications with FWC indicate that they are having some success in reaching their burning goals, noting that 39,360 ha (97,260 ac) acres were burned on FWC-lead areas during 2009. Since 2006, FWC has had at least 86 percent of their lands within the recommended fire return interval (Johnson 2011). However, there is little question that at the landscape level, maintaining adequate burning programs is a serious challenge and fire suppression is a significant issue if not in Florida, certainly throughout the majority of the species range.

Thomson (2010, p. 39) indicated that the proposed restoration and long-term management of gopher tortoise habitat in Florida would cost an estimated $103 to $156 million and necessitate the contracting or hiring of 80 to 120 additional full-time staff. Existing economic conditions in Florida have resulted in substantive changes in recent land management budget allocations. For example, in fiscal year 2009–2010, land management funding covering a wide variety of programs was reduced by $69.5 million. Recent funding reductions for land management and the uncertainty of when adequate land management funding will be available is likely to preclude the FWC from fully meeting habitat restoration targets. Other States within the range of the gopher tortoise have experienced reduced budgets in recent years that are expected to continue in the near future (McNichol *et al.* 2010, entire). Some of these funding limitations may result in fewer land management activities that would benefit the gopher tortoise (Georgia Environmental Action Network 2010, p.1)

Conservation Efforts To Reduce Habitat Destruction, Modification, or Curtailment

When considering the listing of a species, section 4(b)(1)(A) of the Act requires us to consider efforts by any State, foreign nation, or political subdivision of a State or foreign nation to protect the species. Such efforts would include measures by Native American Tribes and organizations. Also, Federal, Tribal, State, and foreign recovery actions (16 U.S.C. 1533(f)), and Federal consultation requirements (16 U.S.C. 1536) constitute conservation measures. In addition to identifying

these efforts, under the Act and our policy implementing this provision, known as Policy for Evaluation of Conservation Efforts (PECE) (68 FR 15100; March 28, 2003), we must evaluate the certainty of an effort's effectiveness on the basis of whether the effort or plan establishes specific conservation objectives; identifies the necessary steps to reduce threats or factors for decline; includes quantifiable performance measures for the monitoring of compliance and effectiveness; incorporates the principles of adaptive management; is likely to be implemented; and is likely to improve the species' viability at the time of the listing determination. In general, in order to meet these standards for the gopher tortoise, conservation efforts must, at minimum, report data on existing populations, describe activities taken toward conservation of the species, demonstrate either through data collection or best available science how these measures will alleviate threats, provide for a mechanism to integrate new information (adaptive management), and provide information regarding certainty of the implementation (*e.g.,* funding and staffing mechanisms).

The gopher tortoise is frequently associated with longleaf restoration, even being cited as an umbrella species for the ecosystem (Fenwood 2010). An estimated 1.4 million ha (3.4 million ac) of longleaf currently exist in the southeastern United States (Gaines 2010). Fifty-five percent of this acreage is in private ownership, 34 percent is in Federal ownership, and 11 percent is in State or local ownership (Gaines 2010). There are numerous ongoing initiatives and incentives to conserve gopher tortoise and restore longleaf pine forests within the gopher tortoise's range (National Council for Air and Stream Improvement, Inc. 2010, pp. 7–14; Tall Timbers, 2010, p. 1; McWilliams 2009, p. 2). Restoration efforts vary from large-scale and comprehensive (*e.g.,* full-scale ecosystem restoration effort in Conecuh National Forest) to voluntary silvicultural management practices being undertaken by industrial and private timber landowners that are believed to improve tortoise habitat and can be compatible with timber and income production (*e.g.,* use of prescribed fire, lower basal area after thinning, lower planting densities, increased planting of longleaf pine, mid-rotation woody brush control with herbicide, and planting plans that provide continuous supply of early-age planted pines in the vicinity of known tortoise populations (Jones and Dorr 2004, p. 463; Plum Creek 2010, p. 5).

Below, we consider the variety of conservation measures that were discussed in documents submitted during the public comment period or known to us that could minimize or eliminate threats under Factor A. We also evaluate the benefit that these efforts may provide for tortoises, measures that could improve benefits for tortoises, as well as the certainty of effectiveness and implementation, as required under the PECE policy.

America's Longleaf Restoration Initiative

America's Longleaf Initiative (Initiative) is a collaborative and voluntary effort (involving more than 20 organizations and agencies) that seeks to ''define, catalyze, and support coordinated longleaf pine conservation efforts.'' The vision of the Initiative is to achieve ''functional, viable longleaf pine ecosystems with the full spectrum of ecological, economic and social values inspired through a voluntary partnership of concerned, motivated organizations and individuals,'' (*http://www.americaslongleaf.org,* Accessed 9/30/2010). In March 2009, the Initiative released the Range-Wide Conservation Plan for Longleaf Pine (Longleaf Pine Plan). The Longleaf Pine Plan calls for an increase of between 1.4–3.2 million ha (3.4–8.0 million ac) of additional longleaf pine forests within 15 years. It includes guiding principles, strategies, and cross-cutting approaches that are intended to be implemented through collaborative, voluntary efforts. The Longleaf Pine Plan also calls for habitat improvement in existing longleaf forests by seeking an increase from 0.6– to 1.2 million ha (1.5–3.0 million ac) in the ''desired longleaf woodland/open understory condition,'' using prescribed burning, mechanical treatments, and commercial thinning. It is acknowledged by the Initiative that approximately 80 percent of the restoration will need to occur on private lands.

As part of the Initiative, American Recovery and Reinvestment Act (ARRA) funding was provided in 2009, in the amount of $8.975 million, to the United States Department of Agriculture (USDA) Forest Service, Southern Region for longleaf restoration. State Foresters in North Carolina, South Carolina, Georgia, Alabama, and Florida each received $1.74 million to help address key items in the Longleaf Pine Plan (Gaines 2010). So far these grants have assisted States in establishing more than 3,237 ha (8,000 ac) of longleaf pine from North Carolina to Alabama and improved nearly 9,700 ha (24,000 ac) of longleaf pine stands using prescribed burning, mid-story treatment, invasive species control, and native understory plant establishment. They have also improved seedling capacity at State nurseries.

The Service's Partners for Fish and Wildlife Program has also administered approximately $800,000 in ARRA funds to the States of Alabama, Florida, and Georgia, which together has improved approximately 1,200 ha (3,000 ac) of longleaf habitat through implementation of prescribed fire plans and restoration of native groundcover, including the planting of approximately 600 ha (1,500 ac) of longleaf seedlings. Local implementation teams made up of Federal, State, and NGO members are in the process of forming. Joint Ventures (*i.e.,* public and private sector partners working together to conserve species and habitats) are also working on an effort to develop and define desired forest conditions to help provide technical guidance to land managers for this type of restoration. A regional inventory of longleaf acreages and activities, as well as associated mapping, is under way.

An initial Federal partnership (Memorandum of Understanding) between the Service, Forest Service, and the Department of Defense has been formed to provide leadership to achieve the goals of the Initiative. So far, about $20 million dollars has been spent on national forests resulting in approximately 210,000 ha (520,000 ac) of restoration throughout the range of longleaf pine. Also, for the past 3 years, military installations, which currently contain about 295,000 ha (730,000 ac) of longleaf (18 percent of remaining longleaf in the Southeast), have spent an average of $11 million per year on management of longleaf pine forests (Fenwood 2010).

In 2009, the Farm Services Agency (FSA) received $22 million for longleaf pine restoration and management on about 138,000 ha (342,000 ac) on private lands through the Conservation Reserve Program (CRP) (Gaines 2010). The FSA reported approximately 1,400 ha (3,452 ac) of pine seedlings were planted in 2009, bringing the cumulative total to about 32,000 ha (79,298 ac).

The Natural Resources Conservation Service also received $5 million in 2009 to establish/improve 30,750 ha (76,000 ac) of longleaf on private lands through assistance programs (*e.g.,* Environmental Quality Incentives Program, Wildlife Habitat Incentives Program, Forest Healthy Reserve Program, Conservation Technical Assistance) (Gaines 2010).

The Gopher Tortoise Candidate Conservation Agreement

Stakeholders within the range of the unlisted gopher tortoise representing the four States' fish and wildlife agencies, branches of the Department of Defense, U.S. Forest Service, Fish and Wildlife Service, and various NGOs recently drafted and executed a Candidate Conservation Agreement (CCA). The goal of the CCA, which focuses on the eastern range of the tortoise, is to organize a cooperative rangewide approach to gopher tortoise conservation and management in that portion of the range. The CCA uses a common conservation approach and framework and allows the signing parties to leverage knowledge and funding within it. The CCA is flexible and voluntary, so that different conservation and management actions can be adopted and implemented at varying levels by the signing parties. The stakeholders produce an annual report, which includes information on: Hectares included by protection level; hectares managed and restored; invasive exotics treated; population trends/survey results; population manipulation; research; land conservation; education and outreach; and legal protection measures (Southeast Regional Partnership for Planning and Sustainability 2010, p.1–2). The signatories of the CCA carry out a variety of efforts for tortoise conservation.

Department of Defense

The Army has four installations with gopher tortoise in the eastern portion of the range including: Fort Rucker, AL; Fort Benning, GA; Fort Gordon, GA; and Fort Stewart, GA. Conservation of gopher tortoise is included for each site within an Integrated Natural Resources Management Plan (INRMP). These 5-year plans provide for enhancement and protection of habitat and where necessary, relocation of tortoises to avoid harm from human impacts. The estimated area of habitat and potential habitat at all installations above is about 54,600 ha (135,000 ac). In 2009, management for gopher tortoise was conducted on 31,000 ha (76,500 ac), which included almost 28,300 ha (70,000 ac) of prescribed burning. Survey data indicates that the Army has 14,000 active burrows. Since 1997, 645 tortoises have been translocated at Army installations (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 17, 27, 35).

The U.S. Navy has four installations within the eastern range of the gopher tortoise that support populations (Kings Bay in southeastern Georgia, Naval Air Station (NAS) Jacksonville in northeastern Florida, and NAS Whiting Field and NAS Pensacola in the western Florida panhandle) and two that do not (*i.e.,* Naval Support Activity Panama City, FL and Naval Station Mayport, FL). Each installation has an INRMP that is active and current. From October 1, 2008, to September 30, 2009, the Navy managed over 4,850 ha (12,000 ac) of tortoise habitat, conducted prescribed burning on 602 ha (1,489 ac), reduced brush encroachment on 60 ha (147 ac), treated 28 ha (68 ac) for invasive species, and removed 95 feral hogs. Surveys indicated 685 active burrows and 304 inactive burrows across the installations, with an estimated population of 428 gopher tortoises. No issues with disease or predation were reported. No translocations were conducted. At NAS Whiting Field and NAS Pensacola, one research study was conducted involving DNA blood sampling. There were no reported losses or gains in habitat acreage. Brochures and informational signage were provided as community outreach. No new regulations, laws, or policies were implemented or changed, and there were no changes or additions to the CCA Agency Conservation Strategy (Southeast Regional Partnership for Planning and Sustainability 2010, p. 3).

The U.S. Air Force reports six installations with gopher tortoises or habitat in the eastern portion of the range including five in Florida: Avon Park Bombing Range; Eglin Air Force Base (AFB); MacDill AFB; Patrick AFB; and Tyndall AFB; and Moody AFB in Georgia. The Air Force reports over 178,000 ha (440,000 ac) of potential tortoise habitat, the vast majority of which is on Eglin AFB (155,600 ha or 384,500 ac). At Avon Park, a baseline survey is under way to obtain population size, density, and other basic demographic information. Also, 3,240 ha (8,000 ac) of tortoise habitat underwent a prescribed burn, and 216 ha (535 ac) were treated for invasive plants with herbicide. At the large scale, Eglin AFB has been conducting habitat management in order to maintain or improve gopher tortoise habitat conditions and at the smaller scale has conducted some surveys. In addition, they have relocated several tortoises to good habitat and away from project areas within Eglin.

MacDill AFB supports approximately 100 tortoises in several populations throughout the airfield and pine forest areas. In terms of habitat improvement, the installation spent annual funding to improve habitat areas and also worked to avoid construction in gopher tortoise areas (*e.g.,* found a suitable alternative site for the proposed Explosive Ordnance Disposal facility, which would have impacted tortoise habitat). Patrick AFB contains four major installations. Of these, Cape Canaveral Air Force Station has the largest population of gopher tortoises of the four sites. An accurate population estimate is not available at present because a population survey has not yet been completed for all sites. Management of gopher tortoise habitat includes mechanical cutting and controlled burning, as well as treatment and removal of invasive vegetation. Gopher tortoise relocations at Patrick AFB are conducted as laid out in the 45SW Gopher Tortoise Relocation Plan (Southeast Regional Partnership for Planning and Sustainability 2010, p. 4).

Gopher tortoises have been identified on three separate areas on Tyndall AFB (totaling 127 ha or 315 ac). These areas were surveyed in the past either for general biological information or in support of missions. Two activities that would benefit suitable tortoise habitat are used on the base: Longleaf pine restoration and frequent prescribed fire. At Moody AFB, gopher tortoise management is carried out through projects identified in the INRMP with concurrence by the Georgia Department of Natural Resources (GDNR) and the Service. Current projects include: Surveys and seasonal monitoring of known gopher tortoise populations; habitat improvement/restoration through burning, chemical release, and mechanical means; Upper Respiratory Tract Disease (URTD) disease surveillance; studies on movement of gopher tortoise in relation to military activities; and a gopher tortoise mark-recapture population demography study (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 3–5).

The Marine Corps conducts management activities for gopher tortoise at two installations in the eastern portion of the range that have/may have gopher tortoises and conduct some management. Marine Corps Support Facility Blount Island located in Jacksonville, FL, has 6 ha (15 ac) of tortoise habitat on which a burrow survey identified 30 active burrows and 15 inactive burrows in April of, 2009. The Marine Corps is currently evaluating the possibility of moving all gopher tortoises to a long-term protected site off the installation. The other site, Marine Corps Logistics Base Albany located in Albany, GA, has 566 ha (1,400 ac) of potential gopher tortoise habitat, on which it uses prescribed fire for maintenance and enhancement.

While no burrow surveys have been conducted at this site, one tortoise was killed in November 2009 by an automobile (Southeast Regional Partnership for Planning and Sustainability 2010, p. 5).

U.S. Forest Service

Gopher tortoises occur in both Covington and Escambia Counties, AL, on Conecuh National Forest. This site contains likely the largest aggregation of gopher tortoises in Alabama, though no estimates of numbers are available at this time. The gopher tortoise and its burrows are protected on the National Forest by timber sale specifications requiring protection of burrows and a Supervisor's Closure Order that bans the gassing of burrows. Management activities conducted for the restoration and maintenance of native fire ecosystems that support gopher tortoise include: prescribed fire, timber harvest to restore native overstory species (longleaf), timber thinning in mature longleaf stands, chemical treatment and eradication of cogongrass, propagation for future restoration needs, trapping and removal of feral hogs, native grass seed collection, and educational efforts through outreach and interpretation.

Management activities for the maintenance and restoration of gopher tortoise habitat in the National Forests of Florida in fiscal year 2009 (October 2008 through September 2009) included: Prescribed fire, timber thinning in mature longleaf stands, nonnative invasive species eradication, mechanical mowing of mid-story vegetation, road restoration activities, land enclosures via electric fence to prevent hog disturbance, hog hunts in gopher tortoise areas, seed collection and planting, and fire line restoration. Surveys for the gopher tortoise, as well as education efforts through signage in strategic locations in the forests were also completed (Southeast Regional Partnership for Planning and Sustainability 2010, p. 5).

U.S. Fish and Wildlife Service

Restoration efforts are occurring at most National Wildlife Refuges, including prescribed burning. Comprehensive Conservation Plans (CCPs) have been developed for most of the refuges, which include management and monitoring actions based on the priorities of the refuge. Other management may include restoration of priority areas, pine thinning, and exotic vegetation removal. There is a need for more monitoring of gopher tortoises at most refuge properties (Southeast Regional Partnership for Planning and Sustainability 2010, p. 5).

Alabama

Gopher tortoises occur in 16 counties within the lower coastal plain of Alabama. Total habitat within the State is currently unknown. On lands under ADCNR control or ownership, tortoises benefit from efforts primarily intended to restore historic longleaf pine habitats, if they currently occur at these sites. ADCNR owns or manages approximately 22,250 ha (55,000 ac) in the range of the gopher tortoise (*i.e.,* the Division of Wildlife and Freshwater Fisheries owns or manages three tracts of approximately 10,900 ha (27,000 ac) in the unlisted range of the tortoise; the State Lands Division manages 9,300 ha (23,000 ac) in six tracts within the unlisted range and 2,023 ha (5,000 ac) in Mobile County in the listed range). Through the State Wildlife Grant program, the ADCNR is providing funding for gopher tortoise research. Information on the life history of the species and State-funded research can be found on the department Web site, Outdoor Alabama (*http://www.outdooralabama.com*) (Southeast Regional Partnership for Planning and Sustainability 2010, p. 6).

Florida

Early regulations required payment of mitigation fees to offset impacts of development projects on gopher tortoises. Mitigation fees were subsequently used to purchase gopher tortoise habitat. During this regulatory process, about $55 million in mitigation funding was generated that resulted in fourteen acquisitions of property totaling about 6,200 ha (15,300 ac) specifically for gopher tortoise conservation. A $20 million dollar endowment exists to fund long-term management of these mitigation parcels.

More recently, the gopher tortoise was reclassified by the State to threatened with the approval of a Management Plan (Plan) in September 2007. The primary goal of the Plan is to '' 'restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida by addressing habitat loss '.'' Other specific objectives include conducting appropriate vegetation management to maintain gopher tortoise habitat (*e.g.,* prescribed burning); increasing the amount of protected habitat; restocking tortoises to protected, managed, suitable habitats where densities are low; and decreasing tortoise mortality on lands proposed for development. Each of these objectives contains measurements and benchmarks through which assessment of progress toward the goal can be achieved. The extensive list of conservation actions in the plan for the first 5-year cycle fall under the over-arching categories of ''regulations, permitting, local government coordination, law enforcement, habitat preservation and management, population and disease management, landowner incentives, monitoring and research, and education and outreach,'' (Southeast Regional Partnership for Planning and Sustainability 2010, p. 7).

An interagency working group was formed to address restocking tortoises onto State public lands where populations have been depleted. Staff also continue to coordinate with public and nonprofit organizations to encourage and provide incentives for gopher tortoise conservation on private lands. A more comprehensive summary of land management activities, surveys, and inventories will be forthcoming (Southeast Regional Partnership for Planning and Sustainability 2010, p. 7–8).

Georgia

In Georgia, 12,500 ha (30,889 ac) of tortoise habitat are permanently protected on State Parks, Wildlife Management Areas, Natural Areas, Public Fishing Areas, and Historic Sites. Beneficial land management on these properties for the tortoise, during the period October 1, 2008, to September 30, 2009, included prescribed burning of 7,350 ha (18,170 ac), thinning or clear-cutting of 1,350 ha (3,346 ac) of off-site planted pines, removal of invasive sand pine from 306 ha (758 ac), planting longleaf pine on 152 ha (375 ac), and planting native warm-season grasses on 101 ha (250 ac). The GDNR protected 1,527 ha (3,772 ac) of tortoise habitat during the reporting period through acquisition and conservation easements and contracted gopher tortoise surveys and population estimates on 19 total sites, including 14 State-owned sites. The State also conducted a project aimed at assessing the quality of sandhill habitat across the State, including time-constrained searches for tortoise burrows at 91 sites. A Candidate Conservation Agreement with Assurances was also developed for the repatriation of gopher tortoises at Plant Vogtle, Burke County, which is currently under review with the Service (Southeast Regional Partnership for Planning and Sustainability 2010, p. 8).

Research completed or funded by GDNR included a project on offspring survival and reproductive ecology of translocated gopher tortoises on St. Catherine's Island, comparison of methods used on sites in Georgia to the official population estimate methodology of Florida, researching the

predatory behavior of armadillos during gopher tortoise nesting season, and behavioral studies at Reed Bingham State Park on head-started (*i.e.,* eggs were collected from the wild and held in captivity and hatchlings were released to the wild) hatchlings (99 head-started hatchlings were released at the Park to combat the impact of nest predation on the site). Efforts to increase awareness for gopher tortoise conservation among the general public and professionals included publications, Web site materials, workshops, and events during 2009 (Southeast Regional Partnership for Planning and Sustainability 2010, p. 8).

South Carolina

Management of gopher tortoise habitat owned by South Carolina Department of Natural Resources including burning and mechanical treatment, as well as data analysis for research on gopher tortoise life history and ecology, was completed during the period October 1, 2008, to September 30, 2009. Staff within the agency is currently completing a conservation strategy for the gopher tortoise in South Carolina, intended to guide agency action for the conservation of the species (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 8, 25).

CCA Summary

Throughout the eastern portion of the range, the signatories of the CCA collectively report more than 1.8 million ha (4.5 million ac) of potential habitat, which includes private land projections in Florida, and approximately 24,338 tortoises. They also report that they have conducted more than 158,000 ha (390,000 ac) of burning and 142,000 ha (350,000 ac) of restoration benefitting gopher tortoises during the period October 1, 2008, to September 30, 2009. Though estimates of the number of tortoises at sites covered by the CCA are under 25,000, it is expected that over time these estimates will be refined upwards, as many sites have not been fully surveyed or reported. We also anticipate that the area reported as ''potential habitat'' may be refined to a smaller number as ''suitable habitat'' is better defined and more detailed analysis is conducted.

The full scope of the benefit to tortoise conservation from this effort is yet to be realized as many partners are still in the information gathering phase of implementation. Some signatories did not gather or report information during the first reporting cycle (Southeast Regional Partnership for Planning and Sustainability 2010, pp. 15, 25–26, 34, 38, 44, 54, 59, 62). We note that the agreement would be strengthened through formalization of commitments to fund activities (such as, tortoise population monitoring or longleaf restoration and management) into the future and legally binding commitments to complete restoration. In order to meet the criteria set forth under the PECE policy, certainty of effectiveness must be demonstrated through data on populations and habitat, while certainty of implementation could be demonstrated by formalized commitments and dedicated funding to carry out the habitat improvements.

Other Efforts Not Previously Addressed

Sustainable Forestry Initiative

Voluntary participation and certification under the Sustainable Forestry Initiative and internal conservation measures of the forest industry are likely to contribute to enhancing working forest landscapes for wildlife. The standards for southeastern forests provide general criteria for protecting rare, threatened, and endangered species and their habitat and maintaining ecological function and values (The Forest Management Trust 2005, pp. 18–19) and have utility in describing the general goals and objectives of the initiative. However, these do not address specific habitat requirements of the gopher tortoise.

Florida Forever Act

Florida statute 259.105 continues two decades of land acquisition and management for conservation and recreation purposes. Specifically, 259.105(1)(2)(a)11 mandates that the State of Florida must play a major role in the recovery and management of its imperiled species (*i.e.,* State and Federally listed species) through the acquisition, restoration, enhancement, and management of ecosystems that can support the major life functions of imperiled species. This statute also requires that any state lands acquired under the auspices of this law that contain imperiled species consider the habitat needs of these species during preparation of management plans for each parcel. Thus, over the 20 plus years of acquisition, restoration, and management of lands purchased under the Florida Forever Act and its predecessor statutes, there have been many additional acres of potential gopher tortoise habitat placed under public protection.

Georgia Forest Land Protection Act of 2008

Georgia's commitment to encourage the protection of forested landscapes through tax incentives may assist in reducing habitat destruction due to land use changes. However, the Georgia Forest Land Protection Act (O.C.G.A. 48–5–7–7) is intended to provide incentives to encourage protection of trees, fiber, or other wood and wood fiber products. Wildlife preservation and management may be allowed as secondary uses.

The Nature Conservancy's Southern Forest Project

The Nature Conservancy's Southern Forest Project is targeting the acquisition of about 24,000 ha (61,000 ac) of longleaf pine habitat in Florida, Georgia, and Alabama. Gopher tortoises are indicated as species likely to benefit from these acquisitions, but the amount of habitat that will be conserved and distribution of extant tortoise populations on these properties is not known.

Gulf Coast Plain Ecosystem Partnership

The Gulf Coast Plain Ecosystem Partnership includes 10 entities that entered into a 1996 Memorandum of Understanding (MOU). The MOU encompasses about 425,900 ha (1,052,400 ac) in northwest Florida and south Alabama. This area is known for its historic longleaf pine forests. The goal of the partnership is to enhance conservation and management of longleaf pine forests. We expect this partnership to enhance longleaf pine restoration, as evidenced by ongoing gopher tortoise habitat restoration and management efforts in the Conecuh National Forest.

American Forest Foundation Habitat Credit Trading Program

We believe that establishment of a voluntary habitat trading credit system has the potential for conservation and management of gopher tortoise habitat that might offset impacts to tortoise habitat elsewhere. This system would function similar to a conservation bank, but in a preregulatory capacity.

Summary

Long-term tortoise persistence is predicated on the presence of multi-aged pine forests on suitable soils (Mushinski *et al.* 2006, p. 364) with ground vegetation maintained by frequent fire. These conditions may be met without waiting for old growth pine forests to regenerate (Kirkman and Mitchell 2006, p. 1), but restoration of such forest communities may be difficult because of multiple-use mandates, limited funds, and the size and juxtaposition of properties to other developed lands (McCoy *et al.* 2006, p. 125). Furthermore, reestablishment of a

multi-aged pine forest ecosystem is complex, and mechanisms for achieving this goal are not well understood (Joseph W. Jones Ecological Research Center at Ichauway, 2010a, p. 1; Van Lear *et al.* 2005, pp. 159–162). Ongoing and planned restoration efforts will take time (*i.e.,* years) to achieve the desired vegetative community structure. Any behavioral or demographic response by tortoises to habitat manipulation will also take time (Yager *et al.* 2007, p. 444). Therefore, we acknowledge the difficulty of restoring a functioning longleaf pine ecosystem and the substantial commitment already made to conservation of a variety of species within the longleaf-wiregrass ecosystem [(*e.g.,* red-cockaded woodpecker (*Picoides borealis*))], as well as restoration of the ecosystem itself. Undoubtedly, many other species continue to benefit from a wide variety of longleaf restoration efforts currently occurring, even where tortoises may no longer occur.

There is certainly a benefit associated with restoring these systems where the gopher tortoise occurs. However, longleaf restoration also currently occurs well beyond the historic range of the tortoise and on soils/areas within the range that will likely never support viable tortoise populations. Also, gopher tortoise conservation is usually neither the only goal of longleaf restoration nor the primary goal of management activities in longleaf stands. Therefore, estimates of longleaf restoration acreage and potential habitat estimates for tortoises likely result in an overestimate of actual benefits to tortoise populations. Longleaf restoration may provide other potential benefits to tortoises, either by providing expanded habitat for existing populations or by providing new sites within the range as potential reintroduction sites that may assist in conservation of the species.

In total, we note that millions of hectares of longleaf restoration and management are targeted in the southeastern United States;, and that partners throughout the historic range of the tortoise and longleaf pine have made voluntary commitments to restore additional acreage and maintain existing forests. However, it is difficult to get an accurate picture of total numbers of tortoises currently residing in the southeastern United States and the overlap that exists with restoration efforts and existing tortoise populations. If numbers provided in the CCA are indicative of current conditions, it can be inferred that, though substantial potential habitat exists, there are hundreds of thousands of additional ha/ac in need of restoration and management. Additionally, the full value of these management efforts is not expected to occur for several decades. Tortoise population responses will likely be demonstrated through coordinated and continued monitoring for a number of years, though this will require dedicated staff and funding. We note that these efforts have likely alleviated some of the magnitude of the threat of habitat loss and degradation, though it is difficult to fully assess the degree to which this has occurred due to insufficient data.

The Service recognizes the importance of forming and supporting partnerships to achieve mutually identified goals and objectives. We encourage our partners to work with us to incorporate specific goals and objectives for the protection of gopher tortoises and their habitat, commit to long-term monitoring, without which it is difficult to evaluate the effectiveness of conservation measures intended to benefit tortoises (McCoy *et al.* 2006, p. 125), and develop adaptive management strategies as part of planned and ongoing conservation actions that have the potential to benefit the gopher tortoise. By doing so, we hope to improve management by tracking advances in the science. While we see the potential for substantial benefit to the tortoise that could be realized in the near future with continuation of these varied efforts, we have some difficulty demonstrating the necessary elements of many of these programs to satisfy the PECE policy. Without specific, binding commitments to monitor populations, provide long-term funding and support, and conduct management, it is impossible to predict both the certainty of effectiveness and certainty of implementation necessary under the PECE policy. We encourage our many partners, where possible, to take these steps, which would facilitate conservation of tortoise populations.

Summary of Factor A

We have identified a number of threats to gopher tortoise habitat which have resulted in the destruction and modification of habitat in the past, are continuing to threaten habitat now, and are expected to continue in the future because of inadequate regulations described in further detail in Factor D below. Rangewide, about 12 percent of potential gopher tortoise habitat is in either public ownership or some type of permanent or long-term conservation status. While habitat loss on private lands is not a certainty, the loss of habitat due to conversion of natural pine forests to more intense silvicultural management regimes is expected to be prominent in interior portions of the tortoise's range. We believe that tortoises in the vicinity of the coast in Georgia, Alabama, Louisiana, and Mississippi, as well as peninsular Florida are currently threatened with habitat loss and modification resulting from urban development. Habitat loss and fragmentation due to urban development is expected to continue in the future. Lack of, restrictions on, or inappropriate use of, prescribed fire is likely to continue in the future and adversely affect gopher tortoise habitat and extant populations, throughout the majority of the current range.

On the basis of this analysis, we find that the destruction, modification, or curtailment of the gopher tortoise's habitat is currently a threat and is expected to persist and possibly escalate in the future. While there are a number of conservation measures in place, at this time it is not reasonably certain that they are adequate to ameliorate this threat. Because this threat is ongoing and expected to continue over the coming decades, we consider the threat to be imminent. Considering the threat of habitat loss is reduced on the relatively large amount of habitat that is in public ownership and private conservation lands, we believe the magnitude of this threat is moderate. Based upon our review of the best commercial and scientific data available, we conclude that the present or threatened destruction, modification, or curtailment of its habitat or range is an imminent threat of moderate magnitude to the gopher tortoise, both now and in the foreseeable future.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Despite adoption of protective laws (see Factor D below), tortoise exploitation persists. Organized rattlesnake round-ups still occur in two communities in Georgia and one community in Alabama (Means 2009, p. 133). Furthermore, collection of rattlesnakes for skins, curios, and antivenom by individuals is unregulated in any of the States within the range of the gopher tortoise. Both individual and organized rattlesnake captures typically extract snakes from gopher tortoise burrows using noxious liquids or gases (The Humane Society 2009, p. 2), which undoubtedly harms or harasses gopher tortoises in active burrows. In January 2010, four men were arrested by Georgia Department of Natural Resources staff after they were found to have been gassing tortoise burrows to collect rattlesnakes in advance of the Whigham, GA, rattlesnake roundup. Although

tortoises are protected in all States, it appears that enforcement of applicable laws may not be entirely effective since rattlesnakes are still successfully harvested.

Conservation Efforts To Reduce or Eliminate Overutilization

Florida law specifically prohibits the use of gasoline or other chemical or gaseous substances to drive wildlife from their retreats (Florida Administrative Code 68 A.4–001(2). Georgia codes § 27–1–130 and 27–3–130 prohibit gassing of burrows, but excludes protection of venomous snakes. Alabama recently adopted regulation 220–2–.11 prohibiting the use of gas, noxious chemicals or gaseous substances into wildlife burrows, dens, or retreats. We believe these regulatory measures will reduce incidental mortality of gopher tortoises during rattlesnake collections. However, effective enforcement of these regulations would likely be enhanced with development of a regulated harvest of rattlesnakes or a prohibition on rattlesnake harvest.

Summary of Factor B

After reviewing available information we find that the unregulated harvest of rattlesnakes poses a current and future threat to the gopher tortoise. We anticipate this threat is imminent since rattlesnake roundups occur annually, and collections for these events and by individual collectors may occur throughout the year. We believe the impacts will be localized to areas near the three communities that still support rattlesnake roundups; consequently, the magnitude of threat is considered low. This threat has abated over the past several decades but still occurs in some rural areas. Conservation measures are insufficient to eliminate this risk. Overall, we consider the magnitude of threat to gopher tortoises due to rattlesnake collection to be low because there are few organized events, but the threat is imminent because harvests are ongoing. Based on this information, the overutilization for commercial, recreational, scientific, or educational purposes, in the form of unregulated harvest of rattlesnakes occupying tortoise burrows, is a threat to the gopher tortoise now and in the foreseeable future.

Factor C. Disease or Predation

A number of diseases have been documented in the gopher tortoise, including fungal keratitis (Myers *et al.* 2009, p. 582), iridovirus, herpesvirus, herpes virus, bacterial diseases related to *Salmonella, Mycoplasma,* and *Dermatophilus,* and numerous internal and external parasites (Ashton and Ashton 2008, pp. 39–41). Upper Respiratory Tract Disease (URTD) resulting from *Mycoplasma* infection has received the most attention recently and has been implicated in mortality of gopher tortoises on State and Federal lands in Mississippi and Florida where URTD was documented (Berish *et al.* 2010, p. 696). It is considered an emerging infectious disease which may threaten populations of free-ranging tortoises (Seigel *et al.* 2003, pp. 142–143). However, correlations between exposure to *Mycoplasma* spp. and population declines appear to be variable among geographic locations and often transient when viewed over a 10-year timeframe (McCoy *et al.* 2007, p. 173). In the case of a chronic disease in a long-lived species, actually quantifying low-level impact of an infectious, chronic disease on an annual basis can be problematic. (Ozgul *et al.* 2009, p. 795). Detecting the effects of this disease on tortoise populations will require long-term monitoring (Berish *et al.* 2010, p. 704).

Current hypotheses suggest that differences in virulence of *Mycoplasma* (Sandmeier *et al.* 2009, p. 1261) and increased susceptibility to infection due to environmental stressors (*e.g.,* poor habitat quality) may increase risk of URTD outbreaks and associated mortality. However, tortoises have natural antibodies to *Mycoplasma* spp. (Hunter *et al.* 2008, p. 464) and these natural immune mechanisms may explain why die-offs are not more prevalent throughout the gopher tortoise's range (Gonynor and Yabsley 2009, pp. 1–2; Sandmeier *et al.* 2009, pp. 1261–1262). In contrast, recent research suggests that susceptible tortoises in high-seroprevalence (number of individuals exposed to disease) populations have decreased apparent survival and when coupled with the increase in gopher tortoise shell remains at high-seroprevalence sites, there may be a low level of increased mortality in the initial stages of disease (Ozgul *et al.* 2009, p. 796). Also, Wendland *et al.* (2009, pp. 1257 and 1261) has suggested that juveniles may be less likely to be infected due to limited social interaction and, thereby, might provide a pool of tortoises to aid in later recruitment after a disease event, though these size classes are usually represented by a very small proportion of the overall population.

Since most gopher tortoise populations are not regularly monitored, it is difficult to estimate the exposure of gopher tortoises to URTDs throughout their range. Consequently, the magnitude of threat URTD poses to gopher tortoise populations and tortoise demographics is uncertain at this time (Karlin 2008, p. 1). We suspect that as monitoring efforts expand in time and space we will detect more incidences of URTD-related mortality and the relationship of disease to demography and habitat quality will be better understood.

Predators destroy more than 80 percent of gopher tortoise nests (Puckett and Franz 2001, p. 5). In one study in South Carolina, 17 of 24 (74 percent) nests were destroyed by predators (Wright 1982, p. 59). In Georgia, females are estimated to produce one clutch (approximately seven eggs per clutch in southern Georgia) annually; however, predators destroyed 87 percent of these clutches (Landers and Garner 1981, p. 46). In a study located on Camp Shelby in Mississippi, most (65 percent) hatchlings were killed within 30 days of hatching (Epperson and Heise 2003, pp. 320 and 322), and none survived to adult size. In northern Florida, hatchling gopher tortoises had a mortality rate of 94.2 percent during their first year of life (Alford 1980, p. 180). Due to predation, survivorship of tortoise hatchlings is low throughout their range, and in some cases no hatchlings survive past 1 year (Pike and Seigel, 2006, p. 128).

Of all predators, raccoons (*Procyon lotor*) were the most frequent to take tortoise eggs and young (Landers *et al.* 1980, p.358; Butler and Sowell 1996, p. 456), but); other predators include gray foxes (*Urocyon cinereoargenteus*), skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), coyotes (*Canis latrans*), snakes (*Agkistrodon piscivorous, Crotalus adamanteus, Drymarchon corais, Masticophis flagellum*), fire ants (*Conomyrma* sp., *Solenopsis invicta*), and red-tailed hawks (*Buteo jamaicensis*), which have all been known to take juveniles (Douglass and Winegarner 1977, p. 237; Fitzpatrick and Woolfenden 1978, p. 49; Landers *et al.* 1980, p. 358; Wilson 1991, p. 378; Butler and Sowell 1996, pp. 456–7; Wetterer and Moore 2005, p. 353; Pike and Seigel 2006, p. 128). Ashton and Ashton (2008, p. 27) listed 25 animals—12 mammals, 5 birds, 6 reptiles and 2 invertebrates—known to be predators of eggs, emerging neonates, hatchlings, and older tortoises. Adult gopher tortoises are less likely to experience predation except by canines (*e.g.,* domestic dogs, coyotes, foxes) and humans (Causey and Cude 1978, pp. 94–95; Taylor 1982, p. 79; Hawkins and Burke 1989, p. 99). It has been suggested by numerous authors that human presence may aid in the spread of some

predators through habitat fragmentation and the associated increase in edge effect (*e.g.,* fire ants) (Wetterer *et. al.* 2005, pp. 352–253), habitat disturbance from roads and infrastructure (*e.g.,* fire ants) (Stiles and Jones 1998, p. 343; Tschinkel 1986, p. 553), increased availability of supplemental food (*e.g.,* raccoons), reduction or elimination of top carnivores (*e.g.,* coyotes, foxes) (Joseph W. Jones Ecological Research Center at Ichauway, *http://www.jonesctr.org/research/projects/mesopredators/mesopredators_main.html,* accessed November 18, 2010), ecological perturbations allowing range expansion (*e.g.,* coyotes), and simply because some are domestic and associated with humans (*e.g.,* cats and dogs).

Most studies are recent and short term (Pike and Seigel 2006, p. 1) and have only evaluated predation over a relatively short period of time considering the lifespan and reproductive capacity of adult tortoises. The tortoise is a long-lived species, which should naturally experience high levels of mortality in early life stages; however, at the current rates of predation, a small increase in predation (either on the limited number of surviving hatchlings or on an adult female) could have a substantial effect on present and long-term recruitment. Sufficient evidence exists indicating that predation of eggs and young tortoises may limit recruitment in many populations. Low recruitment may confound a tortoise population's ability to withstand environmental stressors (*e.g.,* poor habitat quality, stochastic events) and chronic demographic effects due to small population size and reduced genetic diversity. In addition, there is substantial evidence that predation can work synergistically to further limit recruitment (Ashton and Ashton 2008, p. 28), which in many populations may already be limited by other factors (Ennen *et al.* 2010, pp. 35–36; Qualls 2010).

Conservation Efforts To Reduce or Eliminate Disease or Predation

In the listed portion of the gopher tortoise's range individual animals are translocated either to avoid entombment during land development activities or because they are considered waif tortoises by the State agency and the Service. Waif individuals may be those brought in by the public, those that are reproductively isolated, or individuals determined to be in danger (*e.g.,* crossing roads, burrows near road edges, *etc.*). At the time of capture, all waif tortoises and, for development projects, all tortoises at both the impact and relocation sites are evaluated to determine whether they have URTD symptoms through a physical examination and laboratory blood test. Tortoises that test positive for URTD antibodies are evaluated on a case-by-case basis, but generally are not relocated into a URTD-negative tortoise population.

Efforts to contain URTD in the listed portion of the range may prevent mixing of infected and noninfected tortoises during translocation, but these efforts may not reduce or eliminate the stressors that ultimately caused the infections. There have been few symptomatic tortoises found in the listed range, no recorded deaths from URTD, and very few URTD-positive tortoises, so the current testing program will likely prevent spread of URTD during translocations (Ginger 2010; Epperson and Heise 2001, pp. 52–53).

In the western portion of the range where it is listed, gopher tortoise conservation banks and other related sites must include fire ant monitoring and control as part of their management plan in an effort to reduce the effects of predation on tortoise eggs and hatchlings. Currently, the State of Georgia is also conducting head-starting experiments (*i.e.,* hatching eggs in controlled environments and releasing the hatchlings into the wild) to determine if this method can improve recruitment.

Summary of Factor C

Upper Respiratory Tract Disease (URTD) causes high morbidity (sickness) and apparently low mortality (death) in gopher tortoises, although localized mortality events may be substantial (Berish *et al.* 2010, p. 696). Predicting where and when populations will be affected is not currently possible, but we expect that further loss and degradation of habitat and isolation of populations will result in increasing stress on individual tortoises and populations. We believe that URTD-related mortality will become more prevalent under these conditions, and, therefore, we expect this threat to gopher tortoises will increase in the future throughout all of its range. Given our current state of knowledge, we believe the threat of disease is imminent and that because mortality associated with the presence of disease is not currently widespread and the sublethal effects are not understood, we believe the magnitude of impact is low.

Predation of eggs and young is common and substantial throughout the tortoise's range and may be a limiting factor in some parts of the western portion of the range. Predation is an imminent threat because it is ongoing, occurs annually, and occurs throughout much of the tortoise's range. Tortoise populations undoubtedly persisted historically in the face of this natural threat. However, tortoises are now faced with other anthropogenic (man-caused) threats and the combination of predation and other threats identified in this finding indicate that predation is a moderate threat. Based on this information, disease or predation is a threat to the gopher tortoise now and in the foreseeable future.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Federal Statutes and Regulations

In the listed portion of the tortoise's range, the Act prohibits take of tortoises without proper authorizations under sections 7 or 10(a)(1)(A). Consequently, activities that impact gopher tortoises in the listed range should be in compliance with the protective measures afforded by the Act. Even though the Act provides umbrella regulatory coverage for the gopher tortoise in the listed portion of its range, we also evaluated whether existing State statutes or regulations would be adequate in the absence of the prohibitions provided by the Act. These are described in more detail below.

The Department of the Interior, through the Service, administers the National Wildlife Refuge System. The National Wildlife Refuge System Administration Act (NWRAA) represents organic legislation that sets up the administration of a national network of lands and water for the conservation, management, and restoration of fish, wildlife, and plant resources and their habitats for the benefit of the American people (16 U.S.C. 668dd). Amendment of the NWRAA in 1997 required the refuge system to ensure that the biological integrity, diversity, and environmental health of refuges be maintained and requires development and implementation of a comprehensive conservation plan (CCP) for each refuge. The CCP must identify and describe the wildlife and related habitats in the refuge and actions needed to correct significant problems that may adversely affect wildlife populations and habitat (16 U.S.C. 668dd(e)). Gopher tortoise habitat within national wildlife refuges is protected from loss due to urban development. However, gopher tortoises are not indicator species for refuges within the species' range, so specific management goals and objectives have not been established for the tortoise on refuge property (Hunter 2010). Tortoises

may indirectly benefit from fire management programs intended to maintain and restore habitat for species such as the Florida scrub-jay (*Aphelocoma coerulescens*) and red-cockaded woodpecker (*Picoides borealis*), but no systematic monitoring programs are in place to evaluate gopher tortoise responses to land management activities within the refuge system.

The Department of Defense (DOD) must conserve and maintain native ecosystems, viable wildlife populations, Federal and State listed species, and habitats as vital elements of its natural resource management programs on military installations, to the extent these requirements are consistent with the military mission (DOD Instruction 4715.3). Amendments to the Sikes Act (16 U.S.C. 670 *et seq*) require each military department to prepare and implement an integrated natural resource management plan (INRMP) for each installation under its jurisdiction. The INRMP must be prepared in cooperation with the Service and State fish and wildlife agencies and must reflect the mutual agreement of these parties concerning conservation, protection, and management of wildlife resources (16 U.S.C. 670a). Each INRMP must provide for wildlife, land and forest management, wildlife-oriented recreation, wildlife habitat enhancement, wetland protection, sustainable public use of natural resources that are not inconsistent with the needs of wildlife resources, and enforcement of natural resource laws (16 U.S.C 670a). DOD regulations mandate that resources and expertise needed to establish and implement an integrated natural resource management program are maintained (DOD Instruction 4715.3). These regulations further define the IRNMP requirements and mandate that plans be revised every 5 years and that they ensure the military lands suitable for management of wildlife are actually managed to conserve wildlife resources (DOD Instruction 4715.3).

The effectiveness of individual INRMPs to protect gopher tortoises vary between and within military departments. The Army has identified the gopher tortoise as a priority species at risk, which has enabled greater resources to be allocated to conservation and study in the eastern portion of the tortoise's range (U.S. Department of the Army 2009, p. 1). The Army estimates that its installations contain about 62,950 ha (155,500 ac) of potential habitat of which 31,000 ha (76,500 ac) were managed in 2009 (Southeast Regional Partnership for Planning and Sustainable Development 2009, pp. 11, 17). The Air Force provides for the protection and conservation of State-listed species when practicable and with similar conservation measures as provided by state law when such protection is not in direct conflict with the military mission (U.S. Air Force 2004, p. 23). Examples include Eglin AFB's Threatened and Endangered Species Component Plan, which provides no specific habitat management strategies for the gopher tortoise, but assumes this species benefits from a number of land management practices such as prescribed fire in sandhills, predator control, and public outreach (Eglin Air Force Base 2006, pp. 12–24 to 12–28). Comparatively, Tyndall AFB's INRMP acknowledges threats to the gopher tortoise and the importance of the tortoise as an indicator species for sandhills, but the INRMP indicates that no information is available on tortoise distribution or abundance on the base. Tyndall's INRMP provides only recommendations for management actions to benefit the gopher tortoise and establishes no goals or objectives.

The Navy incorporates protective and management recommendations specific for the gopher tortoise into the INRMPs for Naval Submarine Base Kings Bay, Naval Air Station (NAS) Pensacola, NAS Jacksonville, and Naval Support Activity Panama City. However, the INRMP for NAS Whiting Field does not include specific management measures for the gopher tortoise (U.S. Navy 2010, entire). The Navy estimates that its installations contain 4,850 ha (12,000 ac) of potential tortoise habitat. Reports submitted by the Navy in response to our request for additional biological information on the tortoise indicate that in many instances natural pine forests within the installations were fire suppressed and largely unsuitable for gopher tortoises in 2007–2009 (*e.g.,* most tortoises were located in ruderal areas). The Navy reported that they managed slightly more than 648 ha (1,600 ac) in 2009 (Southeast Regional Partnership for Planning and Sustainable Development 2009, p. 17). We are aware of no specific guidelines adopted by the Marines for management measures that are specifically implemented to benefit the gopher tortoise.

The Forest and Rangeland Renewable Resources Planning Act (16 U.S.C. 36), as amended by the National Forest Management Act of 1976 (16 U.S.C. 1600–1614), requires that each national forest be managed under a forest plan which is revised every 10 years. Regulations governing preparation of forest plans are found in 36 CFR 219. The purpose of a forest plan is to provide an integrated framework for analyzing and approving future site-specific project and programs, including conservation of listed species. Identification and implementation of land management and conservation measures to benefit the gopher tortoise vary between forests. For example, on the national forests in Florida, the gopher tortoise is not designated as a species for which special management prescriptions are implemented, except that a nearly 8-meter (25-foot buffer around burrows are provided during silvicultural activities to comply with State requirements. Otherwise, there are no specific land management objectives for tortoises on the national forests in Florida. However, gopher tortoises are likely to benefit from the restoration of about 6,070 ha (15,000 ac) of offsite slash pine to longleaf pine, but this restoration objective contained no requirement for establishment of ground cover vegetation; consequently, the desired future condition may not maximize benefits to tortoises. Resource managers are implementing management prescriptions not called for in the forest plan to enhance longleaf-pine ground cover for gopher tortoises on the Ocala National Forest (Henchi 2010). The Apalachicola National Forest is currently assessing a proposed project to begin gopher tortoise habitat restoration efforts on up to 830 ha (2,000 ac) of currently unsuitable, but restorable, pine forests using herbicides to control hardwood midstory (U.S. Forest Service 2009a, pp. 1–2).

The Revised Land and Resource Management Plan for the National Forests in Alabama provides for the restoration of the coastal plain longleaf pine forest through various silvicultural prescriptions (U.S. Forest Service 2004, p. 3–38). The plan calls for the restoration and maintenance of mature longleaf forest on about 22,500 ha (55,000 ac) on the Conecuh National Forest over the next 30 years. Early efforts have resulted in the preliminary restoration of about 1,600 ha (4,000 ac), and an additional 2,700 ha (6,700 ac) of restoration work is currently being assessed (U.S. Forest Service 2009b, entire). Appropriate management of the coastal plain longleaf pine forest is expected to provide suitable to optimal habitat for wild turkey and suitable habitat for mid- to late-successional forest associates (U.S. Forest Service 2004, p. 3–39). The plan's objectives for red-cockaded woodpecker (*Picoides borealis*) management areas (longleaf pine stands) state that benefits to northern bobwhite quail (*Colinus*

virginianus), Bachman's sparrows (*Aimophila aestivalis*), prairie warblers (*Dendroira discolor*), brown-headed nuthatches (*Sitta pusilla*), southeastern American kestrel (*Falco sparverius*), wild turkey (*Meleagris galloparvo*) and white-tailed deer (*Odocoileus virginaianus*) are expected. Although not mentioned, we expect red-cockaded woodpecker habitat management will likely benefit the gopher tortoise (U.S. Forest Service 2004, p. 3–36). Surveys for the gopher tortoise on the Conecuh National Forest were initiated recently but are not complete. The extent to which ongoing longleaf pine restoration and red-cockaded woodpecker habitat management activities will benefit tortoises is uncertain and will not be known until longer term monitoring takes place.

The national forests in Mississippi are operating under a 1985 Land and Resource Management Plan that does not mention the gopher tortoise because it was not listed at the time the plan was finalized. No formal amendments have been made to the plan to address gopher tortoise or gopher tortoise habitat needs, but draft habitat management guidelines were informally adopted for use by the De Soto and Chickasawhay Ranger Districts. However, these guidelines were never formally adopted through Forest Supervisor signature, and they are currently outdated (Kilpatrick 2010). The existing plan is based on a 10-year timber entry and prescription cycle, which is inadequate for gopher tortoise habitat restoration and management (McDearman 2010). Despite the lack of established goals and targets for gopher tortoise and silvicultural management activities that are not conducive to gopher tortoise conservation, the De Soto and Chickasawhay Ranger Districts of the De Soto National Forest have developed intensive habitat restoration plans for the gopher tortoise, but these projects do not represent official objectives of the national forests in Mississippi. Furthermore, the Chickasawhay Ranger District has developed a stewardship program to restore all habitat on priority soils over a 5-year period, has recently added another stewardship project to include habitat on suitable soils, and has emphasized landscape-level connectivity between priority soils and non-priority soils with high gopher tortoise populations (Kilpatrick 2010). To date, 1,093 ha (2,700 ac) of habitat on priority soil areas have been restored and more than 2,000 ha (5,000 ac) have been improved as part of the landscape connectivity project.

Federal ownership of potential gopher tortoise habitat represents a portion of the public lands acreage accounting for 12 percent of all potential gopher tortoise habitats on public lands (Hoctor and Beyeler 2010, pp 14–15). While there are some regulatory and policy measures that protect gopher tortoises and their habitat on Federal lands, there are other properties that do not protect the tortoise or have conflicting land use mandates. We believe that Federal statutes (without protection afforded by the Act) and regulations are limited in their scope and effectiveness in protecting tortoises and their habitat.

State Statutes and Regulations

Alabama regulation (220–2–.92) makes it unlawful to take, capture, kill, or attempt to take, capture, or kill, possess, sell, or trade any State-listed wildlife for anything of monetary value, or offer to sell or trade listed wildlife for anything of monetary value. In 2009, Alabama banned the gassing of wildlife burrows/and dens, including gopher tortoise burrows.

Florida's rule (F.A.C. 68A–27.003) prohibits any person from taking, attempting to take, pursue, hunt, harass, capture, possess, sell, or transport any gopher tortoise or parts thereof or their eggs, or molest, damage, or destroy gopher tortoise burrows, except as authorized by a FWC permit or when complying with FWC guidelines for specific actions that may impact gopher tortoises or their burrows. Florida has also developed gopher tortoise permitting guidelines that direct regulatory actions (FWC 2009, entire), including mitigation, habitat management, and habitat acquisition objectives. As a result, Florida's regulations require that take of tortoises be authorized by State permit and that the impacts be considered and compensated. On Florida's wildlife management areas, regulations protect individual gopher tortoises because they are not listed as a game species, and, therefore, there are no legal seasons established for taking. Wildlife management area regulations prohibit destruction or modification of habitat, except for management and restoration activities.

The State of Florida recently enacted regulations that allow the FWC to issue permits authorizing incidental take of State-designated threatened species. The State considers whether proposed activities for which permits are sought will contribute to a Federal recovery plan or whether it furthers the objectives of the State's Plan; whether incidental take could reasonably be avoided, minimized, or mitigated; and other factors relevant to the conservation and management of State listed species, including the gopher tortoise. The regulations also direct staff to pursue statutory changes within 3 years to develop wildlife best management practices for agriculture in order to maintain State permit exemptions for incidental take. Florida's regulations, with full funding independent of mitigation and with implementation of effective BMP's may be an important conservation tool for the gopher tortoise.

In Georgia, Title 27, Chapter 3, Article 5 Endangered Wildlife Act of 1973 establishes statutory protection for protected species, including the gopher tortoise (Ga. Code Ann. § 27–3–130–133). Georgia Board of Natural Resources Rule (Chapter 391–4–10) mirrors the statute but includes permitting for research under a scientific collecting permit (O.C.G.A. § 27–2–12).

Louisiana concurred with the Federal listing of the gopher tortoise and State statute (LSA–R.S. 56:1901–07) subsequently made it unlawful to take, possess, transport, or export gopher tortoises from the State, as well as to process, sell, or offer for sale or shipment of gopher tortoises within the State.

Mississippi statute § 49–5–101–119, The Nongame and Endangered Species Conservation Act, makes it unlawful for any person to take, possess, transport, export, process, sell or offer for sale, or ship, and for any common or contract carrier knowingly to transport or receive for shipment any Federally or State-listed species. Mississippi Public Notice 3357.001 listed the gopher tortoise as endangered and afforded it the protections provided by the Nongame and Endangered Species Conservation Act.

South Carolina's Nongame and Endangered Species Conservation Act (Chapter 15, Sections 50–15–10 through 90) establishes the statutory framework to protect endangered and nongame species including making it unlawful to take, possess, transport, export, process, sell or offer for sale, or ship nongame wildlife deemed by the South Carolina Department of Natural Resources to be in need of management. State regulations (S.C. Code of Regulations 123–150) establish that the gopher tortoise is a State-listed endangered species (S.C. Code of Regulations 123–150), and the protective measures mirror those provided in the Nongame and Endangered Species Conservation Act.

Generally, State statutes and regulations provide measures to protect individual gopher tortoises from take but do not provide for protection of their habitat. However, on more than 70

percent of the potential habitat, there are no State regulations providing permitting oversight or requiring conservation benefit to gopher tortoises or their habitat on either private or public lands. In Georgia, for example, State statute requires that any rule and regulation promulgated for protected species (including the gopher tortoise) shall not affect rights in private property or in public or private streams, nor shall such rules and regulations impede construction of any nature (GA ST §§ 27–3–132(b)). Any implementing regulations promulgated in Georgia are constrained by these statutory requirements. Regulations cannot exceed the statutory requirement and, therefore, can only prohibit collection, killing, or selling of individual tortoises. Furthermore, regulations may be developed to protect gopher tortoise habitat on public lands. As a result, most conservation efforts in Georgia are focused on management and restoration of habitat on public lands (Georgia Department of Natural Resources, 2009, pp. 1–2). All other States within the range of the gopher tortoise have protective statutes, but, except for Florida, none have developed implementing regulations addressing impacts to gopher tortoise habitat.

Local Laws and Ordinances

We are aware of no local rules or regulations protecting gopher tortoises or their habitat beyond those requirements established by State statute and regulation. Florida's State Comprehensive Plan and Growth Management Act of 1985 (F.A.C. 163 Part II) requires each county to develop local comprehensive planning documents. Comprehensive plans contain policy statements and natural resource protection objectives, including protection of state and Federally listed species, but they are only effective if counties develop, implement, and enforce ordinances. Some Florida county governments have developed protective ordinances for State and Federally listed species, we are aware of no county or local regulations or ordinances that protect the gopher tortoise beyond existing State law in this or other States within the tortoise's range.

Conservation Efforts To Increase Adequacy of Existing Regulations

As we indicated above, the inadequacies of existing regulations in Factor D are inextricably linked to threats associated with the present or threatened destruction, modification, or curtailment of the gopher tortoise's habitat or range as explained under Factor A above. Similarly, the inadequacy of existing regulations has resulted in threats associated with overutilization as described in Factor B. Below, we summarize conservation efforts that are being implemented to address habitat-related threats.

The Alabama Department of Conservation and Natural Resources has established management guidelines for the gopher tortoise (2009, entire) that borrow from the Recommended Conservation Activities outlined in Appendix B of the gopher tortoise CCA. The goals of Alabama's plan are to identify and conserve gopher tortoise populations, develop and implement habitat management strategies, maintain or enhance gopher tortoise habitat, and monitor the response of tortoises to conservation and management actions. Habitat management, translocation of tortoises from small populations or development areas, and monitoring are key components of Alabama's gopher tortoise management plan although no target dates for accomplishments were established. Furthermore, funding sources for implementation of Alabama's gopher tortoise management plan were not identified.

Beginning in 2007, Florida implemented its Plan and associated regulatory framework. The Plan established a number of goals to conserve the gopher tortoise throughout Florida. Part of the Plan included adoption and implementation of a permitting system that was intended to eliminate tortoise mortality during development activities on public or private property. Florida's Plan established several objectives by 2022: (1) Through applied habitat management, improve tortoise carrying capacity of all protected, potential habitat on both public and private lands supporting gopher tortoises; (2) increase protected, potential habitat to about 791,000 ha (1,955,000 ac), which will require the protection of an additional 249,000 ha (615,000 ac) (an average of about 10,000 ha (25,000 ac) per year in public acquisition and an average of about 6,500 ha (16,000 ac) per year within the private sector); (3) restock 60,000 gopher tortoises to protected, managed, suitable habitats where they no longer occur or where densities are low; and (4) decrease mortality through a revised permitting program and relocate 180,000 tortoises (FWC 2007, p. iii).

The Florida legislature provided $3.7 million to implement the Plan in its first year and subsequently appropriated $2.1 million annually in addition to an ongoing appropriation of $1.1 million for habitat management. With this funding, about 28,328 ha (70,000 ac) of public and private property have benefitted from prescribed fire, prescribed fire preparation, and habitat restoration activities to improve gopher tortoise habitat. About 2,833 ha (7,000 ac) of private land has been protected through conservation easements and is currently under management. Since implementation of the Plan, Florida has acquired 1,752 ha (4,330 ac) of habitat as part of its tortoise mitigation park program, in addition to about 6,070 ha (15,000 ac) that was acquired as mitigation prior to adoption of the current Plan. As of July 2010, Florida officials have relocated 6,365 gopher tortoises pursuant to the Plan's new relocation and permit requirements (Burr 2010), but we have no data on whether the translocations are contributing to the establishment of viable gopher tortoise populations.

While Florida's Plan is ambitious, it could be improved with increased funding to ensure the Plan meets its habitat protection and management targets, both annually and throughout the Plan's full performance period. Currently, several elements of the Plan are dependent on demand for gopher tortoise mitigation, which requires that impacts to gopher tortoises occur. Slow economic conditions have resulted in less development and a corresponding decrease in impacts to tortoises. Therefore, lower numbers of tortoises have been relocated and less private property has been protected by conservation easement than were projected in the objectives of the Plan. Concurrently, the economic downturn has also lessened deleterious impacts to gopher tortoises associated with development. Given current economic conditions, we believe that several of the objectives of the Plan may be delayed or not fully achieved, but this may be offset by a substantial reduction in development, which eliminates gopher tortoise habitat. Florida does have a limited management endowment of $20 million, and the annual interest from this money generates about $1.1 million that is appropriated for gopher tortoise habitat management, but it is insufficient to cover all habitat management costs. If other States adopt a similar conservation strategy, we also recommend they seek dedicated funding that is independent of impacts to the tortoise.

In response to regulatory actions under the Act, several conservation measures have been undertaken that benefit tortoises in the listed portion of its range. The Pine Belt Regional Solid Waste Management Authority created the Plum Creek Gopher Tortoise

Conservation Area (PCGTCA) in Perry County, MS. The 42-ha (105-ac) conservation area is used to translocate tortoises from areas that are used to expand an existing landfill. Surveys of PCGTCA in 2008 found 151 burrows with an estimated tortoise population of 50–60 individuals.

The Mobile Area Water and Sewage System established a gopher tortoise conservation area so that small land owners could compensate for impacts to gopher tortoises during residential development in Mobile County, AL. The bank manages about 89 ha (220 ac) of sandhill habitat for the benefit of gopher tortoises.

South Alabama Utilities Gopher Tortoise Conservation Area created a 154-ha (380-ac) preserve for mitigating impacts to tortoises during installation of water lines in Mobile, Washington, and Choctaw Counties.

A 243-ha (600-ac) parcel in Mobile County, AL was purchased to protect gopher tortoises and serve as a recipient site for tortoises displaced by Alabama Department of Transportation (ALDOT)-sponsored projects. When purchased, the property contained a small tortoise population. With implementation of appropriate management, this site has the capacity to support an estimated population of 346 tortoises (Federal Highways Administration 2010, p. 1).

In Greene County, MS, the 498-ha (1,230-ac) Chickasawhay Gopher Tortoise Conservation Bank was established to accept tortoises displaced by development within the Bank's service area and to compensate impacts to tortoises. The Bank has a carrying capacity estimated at 270 gopher tortoises.

The tortoise conservation areas and banks protect and manage gopher tortoise in the listed portion of the tortoise's range and likely benefit the local tortoise populations. We are confident that these conservation measures will continue in the future and are adequately funded. However, these conservation measures are small in scope relative to the rangewide distribution of gopher tortoises.

Summary of Factor D

Current Federal, State, and local regulations establish adequate regulatory protection of individual tortoises from take, but implementation of these regulations varies. All do not adequately protect gopher tortoise habitat in private ownership and most do not address the management needs of the tortoise. This is problematic because of the total forested landscape in the southeastern United States, about 1.4 million ha (3.4 million ac) are longleaf pine forests, of which about 55 percent (0.8 million ha or 2.0 million ac) are privately owned (America's Longleaf 2009, p. 37). Within the gopher tortoise's range about 87 percent of the pine forests are privately owned (National Council for Air and Stream Improvement, Inc. 2010, p. 3). In the western portion of the tortoise's range, the Act provides a Federal regulatory umbrella that fills regulatory gaps that are inherent in other Federal statutes; State regulations; and local law, ordinances, or policies.

In the eastern portion of the tortoise's range, only Florida implements a regulatory program designed to mitigate the effects of habitat loss on private lands. The degree to which the Plan is effective in meeting the conservation needs of the species on private lands, particularly those under agricultural and silvicultural practices, will depend on the development and implementation of effective best management practices in the future, but these are not currently available. Even if all tortoise habitat acquisitions and protections identified in Florida's Plan were implemented, those conservation measures in combination with the current amount of habitat in public and private conservation ownership would result in about 22 percent of potential gopher tortoise habitat in the eastern portion of its range encompassed in protected lands. The amount of habitat on protected lands might increase substantially if other States considered developing and implementing similar tortoise management plans, but we are aware of no such efforts by any State in the eastern portion of the tortoise's range. As a result, we find that the current implementation of Florida's plan, in combination with the conservation commitments of Federal agencies and the military, will not protect up to 78 percent of the total potential habitat throughout the range of the gopher tortoise.

Threats due to inadequacy of existing regulatory mechanisms, particularly outside of Florida, are an imminent threat to the gopher tortoise throughout its range because the existing regulatory mechanisms that are currently in place are not sufficiently protecting tortoise habitat throughout its range. The magnitude of this threat is moderate because existing regulations protect individual tortoises throughout their range. These regulations have eliminated some forms of harassment and mortality (*e.g.*, capture for food, pets, races, *etc.*), but gopher tortoise habitat in private ownership is largely unprotected and is vulnerable to degradation or destruction throughout most of its range. Based on this information, the gopher tortoise is threatened due to the inadequacy of existing regulatory mechanisms, in combination with the other threats identified in this finding, both now and in the foreseeable future.

Factor E. Other Natural or Manmade Factors Affecting the Gopher Tortoise's Continued Existence

Early research associated movement of tortoises by humans (including translocation and relocation) with erosion of the existing baseline of habitat for the species (Diemer 1984, p. 132), disruption of social structure (Berry 1986, p. 122; Cox *et al.* 1987, p. 60), unnatural genetic mixing (Diemer 1984, p. 132, 133), and spread of disease (Diemer 1984, p. 133; Diemer 1989, p. 3; Cox *et al.* 1987, p. 60), particularly at unnaturally high densities (Diemer 1984, p. 133; Burke 1989, p. 305). Historically, dispersal of relocated tortoises from relocation sites has been shown to be high, (Lohoefener and Lohmeier 1986, pp. 37–40; Burke 1989, p. 299; Diemer 1989, p. 2; Mushinsky *et al.* 2006, p. 366), particularly during the first year post-relocation, though Ashton and Burke (2007, entire) have suggested that there is likely stabilization in subsequent years. With this in mind, translocation and relocation could be considered by some to be a threat to populations because these activities could result in long-term loss of tortoises through dispersal from populations, transmission of disease, loss of habitat, and unnatural genetic mixing. Furthering the concern about relocation was a general lack of follow-up studies, analysis, and dissemination of associated results for relocation projects (Burke 1989, p. 296). However, Mushinsky *et al.* (2006, p. 369) have suggested that, though ''gopher tortoise translocation is controversial, labor-intensive, and time consuming,'' ''* * * the future of the species may depend on perfecting translocation practices and procedures.''

A number of researchers have provided recommendations for improving translocation/relocation procedures for tortoises and other reptiles. Among these, Lohoefener and Lohmeier (1986, p. 40) recommended that only free-ranging tortoises (not captive) be used, that relocation sites be areas that supported tortoises in the past, that the sex ratio of the relocated animals be 1:1, that penning occur for at least 1 week, and that the animals be protected from human and animal predation. They also recommended that populations not be allowed to decline to

the point where relocation is necessary for the survival of the species.

Through time, specific measures have been added that have improved the practice. Dodd and Seigel (1991, pp. 344–346) recommended that translocations be undertaken only when the cause of decline in the recipient population was known and ameliorated. They went further to suggest that a number of other considerations should be included such as: Biological constraints of the species, genetic factors, demographic and biophysical constraints, and disease transmission risk; and providing sufficient space for feeding, reproduction, cover and social interaction, which should all be followed by long-term monitoring. Lohoefener and Lohmeier's (1986, pp. 37–38) recommendations on penning and starter burrows to improve success and lower post-relocation dispersal have been modified to increase duration of penning (Tuberville *et al.* 2005, p. 356), which has shown improved success. Ashton and Burke (2007, p. 786) recommended that relocations be conducted when they: Are economically and logistically justified, have a high probability of success, include at least 100 individual tortoises, occur in areas of high-quality habitat in the native range, and take place where habitat management will occur after translocation. With regard to disease transmission, Mushinsky *et al.* (2006, p. 369) recommended not relocating tortoises showing clinical signs of disease and ensuring protection and management of recipient sites.

Many of these improved practices for tortoise relocation have already made their way into many on-the-ground management projects, plans, and recommendations (see examples under Conservation Efforts Sections for Factors A and C), as well as regulatory agency guidance (Ginger 2010), in both the listed and unlisted portions of the range. Though long-term monitoring will be needed to evaluate the success of past and future relocation efforts, considerable effort has been invested to improve the practice. Several States are currently considering projects or have ongoing efforts to relocate tortoises. Their success or failure will be determined, in large part, by the degree of care taken in the effort and likely the employment of many of the above considerations. At this time, there is insufficient data to determine the degree to which unsuccessful relocations occurred in the past. We note, however, that improving practices (as described above) will likely result in long-term benefit to tortoises should they be incorporated into future efforts.

There is little information on the short-term and residual effects of herbicide application in forest management prescriptions on tortoises or their food plants (Jones and Dorr 2004, p. 462). However, typical forestry herbicides have low toxicity and environmental persistence (McNabb 1997, pp. 1–2; Michael and Neary 1991, p. 641; Miller and Miller 2004, p. 1050). Anticipated impacts associated with continued use of herbicides include temporary loss or reduction in available forage for tortoises that persist in and around intensely managed pine forests. Additionally, the use of herbicides in silvicultural practices results in the accelerated release of planted pines, which results in a more rapid canopy closure and subsequent degradation of ground cover. Some current forest management guidelines recommend aggressive use of herbicides to control not only woody vegetation but also herbaceous species (Yeiser and Ezell 2004, p. 23; Moorhead *et al.* 2002, p. 2) that may be important gopher tortoise forage. In reviewing publications about land management efforts in Florida, Menges and Gordon (2010, pp. 156–161) indicated that herbicide application typically results in the temporary decline of ground cover and should never be used as a surrogate for fire in sandhill and other fire-maintained vegetative communities. Others have demonstrated that herbicide application in combination with mid-rotation burning can increase ground cover when used in certain combinations (Miller and Chamberlain 2008, pp. 776–777; Jones *et al.* 2009a, p, 1168; Jones *et al.* 2009b, pp. 556–558). However, when used as a silvicultural management tool, the intended results of herbicide and prescribed fire are to control native and invasive plants that might compete with planted or managed pines.

Effective implementation of herbicide and fire management regimes can result in fast release of planted pines and shorter time to canopy closure. Therefore, the short-term gains of maintaining ground cover may be offset by more rapid canopy closure (Jones *et al.* 2009b, p. 559; Miller and Chamberlain 2008, p. 779). While these management efforts may have value to mobile species such as white-tailed deer and quail (Jones *et al.* 2009a, pp. 1169–1171), the value of these spatially and temporally limited habitat patches have not been demonstrated for the gopher tortoise. We believe that continued efforts to reduce herbaceous vegetation in newly planted pine plantations and mid-canopy at mid-rotation, respectively, may have short- and long-term detrimental effects to tortoises.

Habitat destruction and degradation of upland habitats (see Factor A analysis) has resulted in fragmentation of large tortoise populations and forced individuals into unsuitable habitats and onto highways (Diemer 1987, p. 75; Mushinsky *et al.* 2006, p. 358). Based on anticipated future habitat destruction resulting from urban development and resulting habitat degradation, we expect gopher tortoises will continue to disperse to find better quality habitat and will be at risk of being killed on highways. This threat is likely to increase as road densities increase and habitat patches become more isolated and more difficult to effectively manage (FWC 2006, p. 10). Highway mortality of gopher tortoises will be highest where there are improved roads and adjacent gopher tortoise populations. Tortoises in the vicinity of urban areas will be particularly vulnerable (Mushinsky *et al.* 2006, p. 362). This threat is ongoing and will continue to occur in the future in peninsular Florida and urban centers in coastal portions of Georgia, Alabama, and Mississippi where human populations are likely to increase in the future. Quantification of road mortality will be difficult because there is no current rangewide monitoring effort for tortoise road mortality.

Climate change will result in the loss and degradation of gopher tortoise habitat in the future, particularly in Florida. According to the Intergovernmental Panel on Climate Change Synthesis Report (IPCC 2007, p. 2), evidence of warming of the earth's climate is ''unequivocal,'' from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. Temperatures are predicted to rise from 2.0 °C to 5.0 °C (3.6 °F to 9.0 °F) for North America by the end of this century (IPCC 2007, p. 9). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing, and distribution), storms (frequency and intensity), and sea level rise. The 2007 IPCC report (p. 8) found a 90 percent probability of 18 to 58 centimeters (7 to 23 inches) of sea level rise by 2100. Rising sea levels will have direct and indirect impacts to gopher tortoises. In certain areas (*e.g.*, coastal tortoise populations), sea level rise may inundate habitat or substantially raise water table levels making currently occupied habitat unsuitable. The largest gopher tortoise population at risk from habitat loss and degradation due to climate change is on Merritt Island, Florida.

Indirect impacts to gopher tortoises and their habitat may occur due to the relocation of people from flood-prone urban areas to inland areas (Ruppert *et al.* 2008, p. 127), including the relocation of millions of people to currently undeveloped interior natural areas (Stanton and Ackerman 2007, p. 15). Others have proposed implementation of a large-scale systematic translocation of at-risk human populations to interior locations (Gilkey 2008, pp. 9–12). Alabama, Florida, Louisiana, and Mississippi's interior natural ecological communities will likely be impacted with the increasing need of urban infrastructure to support retreating coastal inhabitants. Increases in gopher tortoise habitat loss related to climate change would be in addition to the 20 percent loss projected to occur by 2060 due solely to people immigrating into Florida (FWC 2008, p. 2). Increasing threats of habitat loss due to coastal retreat is likely to also affect tortoise habitat inland from the Georgia, Alabama, and Mississippi coastal counties. The timing of these impacts will be dependent on the rate at which the sea level rises, and a gradual coastal retreat and concurrent impacts to gopher tortoises are likely during this time.

Finally, in our 90-day finding we indicated that delayed maturity and low reproductive rates exacerbate many of the threats described above (74 FR 46406). While these factors may limit the ability of gopher tortoise populations to respond quickly to conservation measures, they are part of the life-history strategy of this species. The magnitude of various threats considers the life history of the species throughout this finding.

Conservation Efforts To Reduce or Eliminate Other Natural or Manmade Factors

In addition to the protection of gopher tortoise habitat described in Factor D above, ALDOT also has installed fences along two of its road projects to minimize gopher tortoise road mortality. The two road projects (Highway 98 and State Road 158) cumulatively resulted in the installation of about 16 kilometers (10 miles) of gopher tortoise fencing.

The Mississippi Department of Transportation also used fencing to protect gopher tortoises as a result of work on State Route 63 in Green County. About 24 kilometers (15 miles) of fencing were erected, and road mortality has decreased from 1–2 tortoises annually to none.

These projects reduce or eliminate road mortality and contribute to sustainability of local tortoise populations. However, they are small in scope and do not substantively reduce the threat of gopher tortoise road mortality throughout its range, nor do they eliminate the habitat fragmentation caused by roads.

Summary of Factor E

Although improvements in relocation could be made, we do not consider this practice to be a threat at this time. However, we consider the underlying habitat loss and habitat degradation that necessitates relocation to be a threat, as stated above. The combined threats from silvicultural herbicides and road mortality are occurring now and are expected to continue in the future. These threats will be focused in areas of silvicultural production and roadways in and around urban areas, respectively. These threats are ongoing so they are imminent and the magnitude of threat is moderate for use of silvicultural herbicides, based primarily on our existing knowledge of the distribution of tortoises and their vulnerability to incompatible silvicultural forest management practices.

We know that road mortality occurs, but the extent to which it affects populations and the species as a whole is not well documented. As a result, the threat of road mortality is imminent because it is ongoing and will likely continue in the future. We have no information linking road mortality directly to population declines so the magnitude of this factor is not currently known. Climate change is not an imminent threat because we have not detected climate change-related impacts on gopher tortoise populations. We are uncertain about the magnitude of this threat because we do not currently understand all potential impacts of climate change on the gopher tortoise or human responses to mitigate its effects on human populations. Based on this information, the gopher tortoise is threatened due to other natural or manmade factors in the form of silvicultural herbicide use and road mortality, in combination with the other threats identified in this finding, both now and in the foreseeable future.

Summary of All Factors and Status

The current exact number of gopher tortoise populations and amounts of suitable and occupied habitat are uncertain. Population studies and surveys are incomplete. Of those completed, the only evidence of population increases is on Department of Defense lands in the Florida panhandle, but there are also decreases on these same installations. The remainder of the studies, in Georgia, South Carolina, Mississippi and Florida, indicate declines.

The amount of estimated potential habitat, about 11 million ha (over 27 million ac) spread across six states, might suggest that threats to habitat are not sufficient to warrant listing of the gopher tortoise as either endangered or threatened. However, as discussed above, this figure represents potential habitat. Much of this potential habitat is either not suitable, or of reduced suitability for reasons of soil type, vegetation structure and composition, or other factors, and almost half of this potential habitat is fragmented into parcels of less than about 101 ha (250 ac).

Most of the potential gopher tortoise habitat, about 88 percent, is privately held, and much of this is in silviculture. Silvicultural practices can be, but are not necessarily, compatible with gopher tortoise conservation. While much of this land is unlikely to be developed in the near term, private lands are also sensitive to economic conditions. These conditions affect potential conversion to other land uses as well as the viability of management treatments that impact species composition, harvest rates, thinning, and burning.

We also know that not all potential habitats on public lands are suitable gopher tortoise habitat. Few lands have been acquired expressly for gopher tortoise conservation. Thus, gopher tortoise habitat suitability is often a byproduct of other management treatments. Public lands, while less vulnerable to development, are still subject to economic pressures and constraints. Currently, public agency budgets are strained, and most are probably not adequate to provide for large-scale, intensive management specifically targeting gopher tortoise habitat. We know that periodic burning of gopher tortoise habitat is crucial to the conservation of the species. We also know that pressures to control wildfires for public safety and the adverse effects of smoke make burning more and more difficult.

Based on available data, we believe that, at the landscape level, gopher tortoises are still found mostly in isolated and fragmented populations throughout the six-state range. We know they are more abundant east of the Tombigbee River and are most abundant in central and north Florida and southern Georgia. In a few isolated locations they are relatively common and there are nine locations referenced in this finding where they are likely to persist long term. Many more large populations likely exist, but comprehensive surveys or censuses

have not been undertaken throughout much of the tortoise's eastern range. They are also more protected in Florida than elsewhere in the eastern portion of the range, and there is more protected habitat in Florida than in the rest of the range combined. Florida also has the strongest of the State laws protecting gopher tortoises and is the only State with a management plan for the species. But Florida is also the State facing the most development pressure in the foreseeable future, and while the State's Plan may provide considerable conservation benefits to the gopher tortoise, it is too early to evaluate its overall success.

Overall, our assessment is that gopher tortoise habitat is diminishing and that populations are declining. Disease and human-related impacts are documented threats to the species and sea level rise will likely also eliminate some coastal habitats. There are likely some viable gopher tortoise populations on both public and private lands in the eastern portion of the species' range. However, the extent to which these populations are sufficient in both number and security to ensure the long-term persistence of gopher tortoises throughout their range is unknown. The positive effects of recent commitments of landowners through the Candidate Conservation Agreement and more protective regulations in Florida are just beginning to be realized. Regardless, there are no programs in place that would ensure the maintenance of contiguous, suitable, occupied habitats to secure the species against stochastic events and to provide for sufficient genetic diversity.

Confounding the issue of threats is the biology of the species. Gopher tortoises are long-lived and slow to reproduce, and the planning horizon for gopher tortoise conservation far exceeds our ability to reliably project economic conditions and land uses. Individuals of the species could linger for decades in areas where reproduction is no longer successful, thus lending a false picture of security to the public and regulators. However, the risk of failing to act in a timely manner could have far-reaching and perhaps irreversible consequences for the species.

Absent a cohesive effort to protect and maintain sufficient habitats to ensure long-term persistence of the species, gopher tortoises will likely succumb to continued loss of habitat and degradation of habitat due to difficulties in applying prescribed fire as frequently as necessary. For example, while there are more than 1.6 million ha (4.0 million ac) of potential habitat in the western portion of the range, there are no known populations of more than 250 individuals, a number that some suggest is necessary as a minimum viable population.

Conservation of the species at this stage may be easy to accomplish relative to many listed species, particularly if sufficient habitats currently supporting large populations or having the capability to support large populations can be identified and secured, and protective and management measures implemented.

Finding

As required by the Act, we conducted a review of the status of the species and considered the five factors in assessing whether the gopher tortoise is in danger of extinction or likely to become so within the foreseeable future throughout all or a significant portion of its range. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the gopher tortoise. We reviewed the petition, information available in our files; other available published and unpublished information; and information submitted during the public comment period from military installations, the U.S. Forest Service, State forest agencies, State wildlife and conservation agencies, mineral and chemical producers, corporate and other private timber owners and various companies representing timber owners, agricultural interests, and gopher tortoise experts.

This status review identified threats to the gopher tortoise attributable to Factors A, B, C, D, and E. The primary threat to the gopher tortoise is from habitat destruction and modification (Factor A) in the form of conversion of native pine forests to intensively managed silvicultural pine forests, urban development, and habitat degradation due to lack of fire management. Under Factor B we conclude that overutilization for commercial, recreational, scientific, or educational purposes resulting from ongoing rattlesnake roundups are likely to continue to threaten the gopher tortoise now and into the future in the vicinity of roundup events. We consider predation under Factor C to be a serious ongoing threat. Disease is expected to become more problematic for gopher tortoises as additional habitat is lost and fragmentation increases. Stressors are likely to elevate risks of tortoises to upper respiratory tract disease, but these effects will likely be localized. Existing regulations (Factor D) do protect individual tortoises, but do not adequately protect habitat on private lands where the majority of the remaining potential tortoise habitat occurs. Under Factor E, we believe that incompatible use of silvicultural herbicides is an imminent threat. We consider disease, road mortality, and the effects of climate change identified under Factors C and E to be secondary threats.

As we discussed above, many tortoise populations will undoubtedly persist for 100–200 years albeit declining in numbers due to the species' longevity. Functionally, however, many of these populations may already be, or may soon become, extinct because there are not enough breeding individuals or their densities are too low to ensure that recruitment of young exceeds mortality generation after generation. Existing survey data indicate that many populations are below the 0.4 tortoise per ha (0.2 tortoise per ac) necessary for successful reproduction. The best science currently available indicate that most tortoise populations are in decline, and current efforts to reverse these trends with habitat management may be too late or are not yet being quantified.

There are almost 1.0 million ha (2.4 million ac) of potential gopher tortoise habitat in public ownership that are not susceptible to destruction. Provided these properties are managed appropriately in the future and site-specific management activities target restoration and maintenance of suitable habitat, gopher tortoises may persist in these areas for longer periods than they would without such protection and management efforts. However, based on model projections, many of the gopher tortoise populations on public lands may not be large enough to persist long term, regardless of how well their habitat is protected and managed.

Consequently, the protection and management of public lands may serve to extend the time that gopher tortoises remain on public lands, but these efforts may not be sufficient to overcome the adverse effects of environmental stochasticity, which often results in poor demographic performance in small populations. Protection of public lands and associated management efforts will likely ensure that the tortoise is not currently in danger of extinction throughout all or a significant portion of its range. Finally, we find that the observed and anticipated cumulative impacts of habitat loss, degradation, disease, inadequacy of existing regulations and other factors are threats of sufficient imminence, intensity, or magnitude to indicate that the gopher tortoise is in danger of extinction (endangered), or likely to become endangered within the foreseeable

future (threatened), throughout the eastern portion of its range.

On the basis of the best scientific and commercial information available, we find that the petitioned action to list the gopher tortoise in the eastern portion of its range is warranted and that its current status as a threatened species in the western portion of its range is appropriate. We will make a determination on the specific status of the gopher tortoise in the eastern portion of its range when we complete a proposed rule to list the gopher tortoise. At that time we will also assess and propose regulations as deemed necessary and advisable to provide for the conservation of the species. However, as explained in more detail below, an immediate proposal of a regulation implementing this action is precluded by higher priority listing actions, and we are making expeditious progress to add or remove qualified species from the Lists of Endangered and Threatened Wildlife and Plants.

We reviewed the available information to determine if the existing and foreseeable threats render the gopher tortoise in the eastern portion of its range at risk of extinction now such that issuing an emergency regulation temporarily listing the species throughout its range per section 4(b)(7) of the Act is warranted. We have determined that issuing an emergency regulation temporarily listing the gopher tortoise throughout its range is not warranted at this time because the immediacy of primary threats is such that the species is not in danger of extinction in the immediate future. However, if at any time we determine that issuing an emergency regulation temporarily listing the gopher tortoise throughout its range is warranted, we will initiate this action at that time.

Listing Priority Number

The Service adopted guidelines on September 21, 1983 (48 FR 43098), to establish a rational system for utilizing available resources for the highest priority species when adding species to the Lists of Endangered or Threatened Wildlife and Plants or reclassifying species listed as threatened to endangered status. These guidelines, titled ''Endangered and Threatened Species Listing and Recovery Priority Guidelines'' address the magnitude and immediacy of threats, and the level of taxonomic distinctiveness by assigning priority in descending order to monotypic genera (genus with one species), full species, and subspecies (or equivalently, distinct population segments of vertebrates). We assigned the gopher tortoise a Listing Priority Number (LPN) of 8 based on our finding that the species faces threats that are of moderate magnitude and are imminent. These threats include the present or threatened destruction, modification, or curtailment of its habitat; predation; the inadequacy of existing regulatory mechanisms; and use of incompatible silvicultural management activities. We consider overutilization, disease, and road mortality, and the effects of climate change to be minor threats. Our rationale for assigning the gopher tortoise an LPN of 8 is outlined below.

Under the Service's LPN Guidance, the magnitude of threat is the first criterion we look at when establishing a listing priority. The guidance indicates that species with the highest magnitude of threat are those species facing the greatest threats to their continued existence. These species receive the highest listing priority.

GIS analysis indicates that about 88 percent of remaining potential gopher tortoise habitat is in private ownership. Much of this habitat is susceptible to future conversion for silviculture, agriculture, and urban land uses because most existing regulatory mechanisms do not protect gopher tortoise habitat. The area covered by pine plantations in the south has been modeled and under certain scenarios is projected to increase between about 4–10 million ha (10–25 million ac) by 2040 (Prestemon and Abt 2002, pp. 18–20). Future urban development may result in the loss of about 283,300 ha (700,000 ac) or 20 percent of the remaining gopher tortoise habitat in Florida by 2060 (Florida Fish and Wildlife Conservation Commission 2008, p. 4). Others have predicted a loss of up to 50 percent of forest lands in central Florida and up to 25 percent in north Florida and southeast Alabama (Prestemon and Abt 2002, p. 18). Some gopher tortoise habitat in public ownership and on most private lands is currently threatened with degradation due to fire suppression or use of inadequate prescribed fire regimes. Reduced survival and low recruitment observed in many gopher tortoise populations throughout the species' range are thought to result from poor habitat quality due to fire suppression. This threat will continue in the future.

While the cumulative adverse effects of present or threatened destruction, modification, or curtailment of habitat span much of the gopher tortoises range, there are many ongoing longleaf pine restoration initiatives that have the potential to protect and enhance gopher tortoise habitat. As a result of these ongoing protection and management efforts, the magnitude of this threat is reduced. Nonetheless, due to the broad geographic area affected by this threat, the overall magnitude is moderate.

Under Factor C above, we determined that predation of gopher tortoise eggs and hatchlings resulted in 70 to 100 percent mortality. These rates of mortality are not uncommon among long-lived animals, but high mortality of eggs and young is likely to prolong, if not preclude, gopher tortoise recovery in areas where active land management may provide suitable habitat. This threat is widespread throughout the tortoise's range. Even though predation has been, and still is, a naturally occurring limiting factor, we consider it to be of moderate magnitude because it is probably working synergistically with other threats identified herein to impact gopher tortoises.

We considered the inadequacy of existing regulations to be a moderate threat throughout the eastern portion of the tortoise's range. Except for the State of Florida, no other State has adopted regulations that attempt to mitigate the effects of habitat loss and subsequent take of tortoises. In all States in the eastern portion of the range, silvicultural and agricultural lands are generally exempted from regulatory oversight; therefore, impacts to tortoises resulting from activities associated with silviculture or agriculture are not reviewed or mitigated. Nearly 88 percent of all remaining potential habitat is in private ownership, and much of this falls under silvicultural or agricultural uses. Consequently, potential future impacts to gopher tortoises resulting from inadequate regulations are expected to be substantial.

We also considered the adverse effects of incompatible uses of herbicides in silviculture to be a moderate threat to gopher tortoises primarily in the interior portions of Alabama, Georgia, Louisiana, and Mississippi. Aerial or broad-scale application of herbicides is used to reduce vegetative competition with newly planted pine seedlings and to reduce hardwood encroachment during mid-rotation thinning. Herbicide applications at the time of seedling planting result in mortality of ground cover plants that tortoises use for forage. Reduced forage may result in tortoises abandoning a site (if adjacent habitat is available) or poor physical condition due to lack of food. Poor physical condition may result in mortality, increased susceptibility to disease, and reduced reproductive fitness. This threat limited to silvicultural lands that use herbicides and those silvicultural lands that will use herbicides in the future. The area potentially affected by

this threat relatively large and is anticipated to increase in size in the future. As a result, we consider this threat to be of moderate magnitude.

Under our LPN Guidance, the second criterion we consider in assigning a listing priority is the immediacy of threats. This criterion is intended to ensure that the species that face actual, identifiable threats are given priority over those for which threats are only potential or that are intrinsically vulnerable but are not known to be presently facing such threats. The major threats are imminent because we have factual information that the threats are identifiable and that the gopher tortoise is currently facing them throughout all portions of its range. These actual, identifiable threats are covered in detail under the discussion of Factors A, C, D, and E of this finding and currently include habitat loss, fragmentation, and degradation; predation; inadequacy of regulatory mechanisms; and incompatible use of herbicides in silvicultural activities.

In addition to their current existence, we expect these threats to continue and likely intensify in the foreseeable future. Additional urban development in peninsular Florida and coastal portions of Alabama, the Florida panhandle, Georgia, and Mississippi is predicted in the future as is an increase in the acreage of planted pine in interior portions of these States. Use of prescribed fire in natural and planted pine stands is likely to decrease in the future due to legal liabilities. Resultantly, habitat loss, fragmentation, and degradation are imminent and likely to persist in the future. Predation will continue to be an imminent threat in the future because eradication or control of many nest and hatchling predators does not appear to be achievable over large areas. The inadequacy of existing regulations is a present threat throughout the eastern portion of the tortoise's range. While it is possible that additional regulatory protections may be adopted by local or State governments in the future, we are aware of no such efforts currently under way. Finally, the use of herbicides in silviculture has been used increasingly as a mechanism to reduce plant competition while minimizing environmental impacts (*e.g.,* ground disturbances). When used broadly, herbicides are nonselective and kill ground cover used by tortoises for forage. Because herbicide treatments are typically less expensive and labor intensive, we expect use of this management technique will continue in the future and possibly increase in acreage.

The third criterion in our LPN guidance is intended to devote resources to those species representing highly distinctive or isolated gene pools as reflected by taxonomy. The gopher tortoise is a valid taxon at the species level and, therefore, receives a higher priority than subspecies or DPSs, but a lower priority than species in a monotypic genus. The gopher tortoise faces medium-magnitude, imminent threats and is a valid taxon at the species level. Thus, in accordance with our LPN guidance, we have assigned the gopher tortoise an LPN of 8.

We will continue to monitor the threats to and the status of the gopher tortoise, and the species' status on an annual basis, and should the magnitude or the imminence of the threats change, we will revisit our assessment of the LPN.

Work on a proposed listing determination for the gopher tortoise is precluded by work on higher priority listing actions with absolute statutory, court-ordered, or court-approved deadlines and final listing determinations for those species that were proposed for listing with funds from Fiscal Year 2011. This work includes all the actions listed in the tables below under Preclusion and Expeditious Progress. Between the publication date of this notice and the final listing determination for the gopher tortoise, we will work with our private, State, and Federal partners to identify and implement conservation, management, and regulatory opportunities to remove or alleviate threats so that the listing priority is reduced or so that listing of the gopher tortoise is no longer warranted. Such opportunities may include, but are not limited to, improving the scientific base of knowledge, development and implementation of best management practices or management plans, impact avoidance and minimization measures, and Candidate Conservation Agreements and Candidate Conservation Agreements with Assurances.

With regard to specific actions that can be taken to reduce threats to the gopher tortoise under the five listing factors, we recommend the following. Threats under Factor A can largely be alleviated by restoring (*i.e.* mechanical vegetation reduction) and managing (*i.e.,* burning at short-term fire return intervals) appropriate habitat and continuing to secure habitat to support viable populations throughout the range. While the CCA has documented progress towards gopher tortoise conservation, additional data collection on existing populations, habitat, and effective management are still needed to demonstrate success. Threats under Factor B could be alleviated by eliminating the loss of tortoises incidental to the capture of other species. This could be accomplished by eliminating the legal harvest of species that may be found in gopher tortoise burrows. Threats under Factor C may require various precautionary measures in different parts of the range, but information collected for individual populations may demonstrate that either disease or predation risks might require additional measures such as disease screening to prevent spread of URTD or measures to prevent predation of nests and hatchlings. Threats under Factor D, which in turn contribute to habitat loss, may require additional protective measures for both individual populations and associated habitat and could include management of populations and habitat to enhance long-term viability. Threats under Factor E vary in their possible remediation. In the case of silvicultural herbicides, it is possible that in some areas fire management might provide a suitable alternative, however, additional measures such as timing of applications and alternative strategies should be considered. Harvest rotations could be adjusted to ensure suitable habitat is always adjacent to existing tortoise populations. Road mortality, has been alleviated by fencing in some locations. In areas with high tortoise densities additional fencing could be employed to reduce road mortality, though its use should be considered carefully, as it may inhibit dispersal.

Preclusion and Expeditious Progress

Preclusion is a function of the listing priority of a species in relation to the resources that are available and the cost and relative priority of competing demands for those resources. Thus, in any given fiscal year (FY), multiple factors dictate whether it will be possible to undertake work on a listing proposal regulation or whether promulgation of such a proposal is precluded by higher priority listing actions.

The resources available for listing actions are determined through the annual Congressional appropriations process. The appropriation for the Listing Program is available to support work involving the following listing actions: Proposed and final listing rules; 90-day and 12-month findings on petitions to add species to the Lists of Endangered and Threatened Wildlife and Plants (Lists) or to change the status of a species from threatened to endangered; annual ''resubmitted''

petition findings on prior warranted-but-precluded petition findings as required under section 4(b)(3)(C)(i) of the Act; critical habitat petition findings; proposed and final rules designating critical habitat; and litigation-related, administrative, and program-management functions (including preparing and allocating budgets, responding to Congressional and public inquiries, and conducting public outreach regarding listing and critical habitat). The work involved in preparing various listing documents can be extensive and may include, but is not limited to: Gathering and assessing the best scientific and commercial data available and conducting analyses used as the basis for our decisions; writing and publishing documents; and obtaining, reviewing, and evaluating public comments and peer review comments on proposed rules and incorporating relevant information into final rules. The number of listing actions that we can undertake in a given year also is influenced by the complexity of those listing actions; that is, more complex actions generally are more costly. The median cost for preparing and publishing a 90-day finding is $39,276; for a 12-month finding, $100,690; for a proposed rule with critical habitat, $345,000; and for a final listing rule with critical habitat, $305,000.

We cannot spend more than is appropriated for the Listing Program without violating the Anti-Deficiency Act (see 31 U.S.C. 1341(a)(1)(A)). In addition, in FY 1998 and for each fiscal year since then, Congress has placed a statutory cap on funds that may be expended for the Listing Program, equal to the amount expressly appropriated for that purpose in that fiscal year. This cap was designed to prevent funds appropriated for other functions under the Act (for example, recovery funds for removing species from the Lists), or for other Service programs, from being used for Listing Program actions (see House Report 105–163, 105th Congress, 1st Session, July 1, 1997).

Since FY 2002, the Service's budget has included a critical habitat subcap to ensure that some funds are available for other work in the Listing Program (''The critical habitat designation subcap will ensure that some funding is available to address other listing activities'' (House Report No. 107–103, 107th Congress, 1st Session, June 19, 2001)). In FY 2002 and each year until FY 2006, the Service has had to use virtually the entire critical habitat subcap to address court-mandated designations of critical habitat, and consequently none of the critical habitat subcap funds have been available for other listing activities. In some FYs since 2006, we have been able to use some of the critical habitat subcap funds to fund proposed listing determinations for high-priority candidate species. In other FYs, while we were unable to use any of the critical habitat subcap funds to fund proposed listing determinations, we did use some of this money to fund the critical habitat portion of some proposed listing determinations so that the proposed listing determination and proposed critical habitat designation could be combined into one rule, thereby being more efficient in our work. At this time, for FY 2011, we plan to use some of the critical habitat subcap funds to fund proposed listing determinations.

We make our determinations of preclusion on a nationwide basis to ensure that the species most in need of listing will be addressed first and also because we allocate our listing budget on a nationwide basis. Through the listing cap, the critical habitat subcap, and the amount of funds needed to address court-mandated critical habitat designations, Congress and the courts have in effect determined the amount of money available for other listing activities nationwide. Therefore, the funds in the listing cap, other than those needed to address court-mandated critical habitat for already listed species, set the limits on our determinations of preclusion and expeditious progress.

Congress identified the availability of resources as the only basis for deferring the initiation of a rulemaking that is warranted. The Conference Report accompanying Public Law 97–304 (Endangered Species Act Amendments of 1982), which established the current statutory deadlines and the warranted-but-precluded finding, states that the amendments were ''not intended to allow the Secretary to delay commencing the rulemaking process for any reason other than that the existence of pending or imminent proposals to list species subject to a greater degree of threat would make allocation of resources to such a petition [that is, for a lower-ranking species] unwise.'' Although that statement appeared to refer specifically to the ''to the maximum extent practicable'' limitation on the 90-day deadline for making a ''substantial information'' finding, that finding is made at the point when the Service is deciding whether or not to commence a status review that will determine the degree of threats facing the species, and therefore the analysis underlying the statement is more relevant to the use of the warranted-but-precluded finding, which is made when the Service has already determined the degree of threats facing the species and is deciding whether or not to commence a rulemaking.

In FY 2011, on April 15, 2011, Congress passed the Full-Year Continuing Appropriations Act (Pub. L. 112–10), which provides funding through September 30, 2011. The Service has $20,902,000 for the listing program. Of that, $9,472,000 is being used for determinations of critical habitat for already listed species. Also $500,000 is appropriated for foreign species listings under the Act. The Service thus has $10,930,000 available to fund work in the following categories: Compliance with court orders and court-approved settlement agreements requiring that petition findings or listing determinations be completed by a specific date; section 4 (of the Act) listing actions with absolute statutory deadlines; essential litigation-related, administrative, and listing program-management functions; and high-priority listing actions for some of our candidate species. In FY 2010, the Service received many new petitions and a single petition to list 404 species. The receipt of petitions for a large number of species is consuming the Service's listing funding that is not dedicated to meeting court-ordered commitments. Absent some ability to balance effort among listing duties under existing funding levels, the Service is only able to initiate a few new listing determinations for candidate species in FY 2011.

In 2009, the responsibility for listing foreign species under the Act was transferred from the Division of Scientific Authority, International Affairs Program, to the Endangered Species Program. Therefore, starting in FY 2010, we used a portion of our funding to work on the actions described above for listing actions related to foreign species. In FY 2011, we anticipate using $1,500,000 for work on listing actions for foreign species, which reduces funding available for domestic listing actions; however, currently only $500,000 has been allocated for this function. Although there are no foreign species issues included in our high-priority listing actions at this time, many actions have statutory or court-approved settlement deadlines, thus increasing their priority. The budget allocations for each specific listing action are identified in the Service's FY 2011 Allocation Table (part of our record).

For the above reasons, funding a proposed listing determination for the gopher tortoise is precluded by court-ordered and court-approved settlement agreements, listing actions with absolute

statutory deadlines, and work on proposed listing determinations for those candidate species with a higher listing priority (*i.e.,* candidate species with LPNs of 1–7).

Based on our September 21, 1983, guidelines for assigning an LPN for each candidate species (48 FR 43098), we have a significant number of species with a LPN of 2. Using these guidelines, we assign each candidate an LPN of 1 to 12, depending on the magnitude of threats (high or moderate to low), immediacy of threats (imminent or nonimminent), and taxonomic status of the species (in order of priority: Monotypic genus (a species that is the sole member of a genus); species; or part of a species (subspecies, or distinct population segment)). The lower the listing priority number, the higher the listing priority (that is, a species with an LPN of 1 would have the highest listing priority).

Because of the large number of high-priority species, we have further ranked the candidate species with an LPN of 2 by using the following extinction-risk type criteria: International Union for the Conservation of Nature and Natural Resources (IUCN) Red list status/rank, Heritage rank (provided by NatureServe), Heritage threat rank (provided by NatureServe), and species currently with fewer than 50 individuals, or 4 or fewer populations. Those species with the highest IUCN rank (critically endangered), the highest Heritage rank (G1), the highest Heritage threat rank (substantial, imminent threats), and currently with fewer than 50 individuals, or fewer than 4 populations, originally comprised a group of approximately 40 candidate species (''Top 40''). These 40 candidate species have had the highest priority to receive funding to work on a proposed listing determination. As we work on proposed and final listing rules for those 40 candidates, we apply the ranking criteria to the next group of candidates with an LPN of 2 and 3 to determine the next set of highest priority candidate species. Finally, proposed rules for reclassification of threatened species to endangered species are lower priority, because as listed species, they are already afforded the protection of the Act and implementing regulations. However, for efficiency reasons, we may choose to work on a proposed rule to reclassify a species to endangered if we can combine this with work that is subject to a court-determined deadline.

With our workload so much bigger than the amount of funds we have to accomplish it, it is important that we be as efficient as possible in our listing process. Therefore, as we work on proposed rules for the highest priority species in the next several years, we are preparing multi-species proposals when appropriate, and these may include species with lower priority if they overlap geographically or have the same threats as a species with an LPN of 2. In addition, we take into consideration the availability of staff resources when we determine which high-priority species will receive funding to minimize the amount of time and resources required to complete each listing action.

As explained above, a determination that listing is warranted but precluded must also demonstrate that expeditious progress is being made to add and remove qualified species to and from the Lists of Endangered and Threatened Wildlife and Plants. As with our ''precluded'' finding, the evaluation of whether progress in adding qualified species to the Lists has been expeditious is a function of the resources available for listing and the competing demands for those funds. (Although we do not discuss it in detail here, we are also making expeditious progress in removing species from the list under the Recovery program in light of the resource available for delisting, which is funded by a separate line item in the budget of the Endangered Species Program. So far during FY 2011, we have completed one delisting rule.) Given the limited resources available for listing, we find that we are making expeditious progress in FY 2011 in the Listing Program. This progress included preparing and publishing the following determinations:

FY 2011 COMPLETED LISTING ACTIONS

Publication date	Title	Actions	FR pages
10/6/2010	Endangered Status for the Altamaha Spinymussel and Designation of Critical Habitat.	Proposed Listing Endangered	75 FR 61664–61690.
10/7/2010	12-month Finding on a Petition to list the Sacramento Splittail as Endangered or Threatened.	Notice of 12-month petition finding, Not warranted.	75 FR 62070–62095.
10/28/2010	Endangered Status and Designation of Critical Habitat for Spikedace and Loach Minnow.	Proposed Listing Endangered (uplisting)	75 FR 66481–66552.
11/2/2010	90-Day Finding on a Petition to List the Bay Springs Salamander as Endangered.	Notice of 90-day Petition Finding, Not substantial.	75 FR 67341–67343.
11/2/2010	Determination of Endangered Status for the Georgia Pigtoe Mussel, Interrupted Rocksnail, and Rough Hornsnail and Designation of Critical Habitat.	Final Listing Endangered	75 FR 67511–67550.
11/2/2010	Listing the Rayed Bean and Snuffbox as Endangered.	Proposed Listing Endangered	75 FR 67551–67583.
11/4/2010	12-Month Finding on a Petition to List Cirsium wrightii (Wright's Marsh Thistle) as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 67925–67944.
12/14/2010	Endangered Status for Dunes Sagebrush Lizard.	Proposed Listing Endangered	75 FR 77801–77817.
12/14/2010	12-month Finding on a Petition to List the North American Wolverine as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78029–78061.
12/14/2010	12-Month Finding on a Petition to List the Sonoran Population of the Desert Tortoise as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78093–78146.

FY 2011 COMPLETED LISTING ACTIONS—Continued

Publication date	Title	Actions	FR pages
12/15/2010	12-Month Finding on a Petition to List *Astragalus microcymbus* and *Astragalus schmolliae* as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	75 FR 78513–78556.
12/28/2010	Listing Seven Brazilian Bird Species as Endangered Throughout Their Range.	Final Listing Endangered	75 FR 81793–81815.
1/4/2011	90-Day Finding on a Petition to List the Red Knot subspecies *Calidris canutus roselaari* as Endangered.	Notice of 90-day Petition Finding, Not substantial.	76 FR 304–311.
1/19/2011	Endangered Status for the Sheepnose and Spectaclecase Mussels.	Proposed Listing Endangered	76 FR 3392–3420.
2/10/2011	12-Month Finding on a Petition to List the Pacific Walrus as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 7634–7679.
2/17/2011	90-Day Finding on a Petition To List the Sand Verbena Moth as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 9309–9318.
2/22/2011	Determination of Threatened Status for the New Zealand-Australia Distinct Population Segment of the Southern Rockhopper Penguin.	Final Listing Threatened	76 FR 9681–9692.
2/22/2011	12-Month Finding on a Petition to List *Solanum conocarpum* (marron bacora) as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 9722–9733.
2/23/2011	12-Month Finding on a Petition to List Thorne's Hairstreak Butterfly as Endangered.	Notice of 12-month petition finding, Not warranted.	76 FR 9991–10003.
2/23/2011	12-Month Finding on a Petition to List *Astragalus hamiltonii, Penstemon flowersii, Eriogonum soredium, Lepidium ostleri,* and *Trifolium friscanum* as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded & Not Warranted.	76 FR 10166–10203.
2/24/2011	90-Day Finding on a Petition to List the Wild Plains Bison or Each of Four Distinct Population Segments as Threatened.	Notice of 90-day Petition Finding, Not substantial.	76 FR 10299–10310.
2/24/2011	90-Day Finding on a Petition to List the Unsilvered Fritillary Butterfly as Threatened or Endangered.	Notice of 90-day Petition Finding, Not substantial.	76 FR 10310–10319.
3/8/2011	12-Month Finding on a Petition to List the Mt. Charleston Blue Butterfly as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 12667–12683.
3/8/2011	90-Day Finding on a Petition to List the Texas Kangaroo Rat as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 12683–12690.
3/10/2011	Initiation of Status Review for Longfin Smelt	Notice of Status Review	76 FR 13121–31322.
3/15/2011	Withdrawal of Proposed Rule to List the Flat-tailed Horned Lizard as Threatened.	Proposed rule withdrawal	76 FR 14210–14268.
3/15/2011	Proposed Threatened Status for the Chiricahua Leopard Frog and Proposed Designation of Critical Habitat.	Proposed Listing Threatened; Proposed Designation of Critical Habitat.	76 FR 14126–14207.
3/22/2011	12-Month Finding on a Petition to List the Berry Cave Salamander as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 15919–15932.
4/1/2011	90-Day Finding on a Petition to List the Spring Pygmy Sunfish as Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 18138–18143.
4/5/2011	12-Month Finding on a Petition to List the Bearmouth Mountainsnail, Byrne Resort Mountainsnail, and Meltwater Lednian Stonefly as Endangered or Threatened.	Notice of 12-month petition finding, Not Warranted and Warranted but precluded.	76 FR 18684–18701.
4/5/2011	90-Day Finding on a Petition To List the Peary Caribou and Dolphin and Union population of the Barren-ground Caribou as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 18701–18706.
4/12/2011	Proposed Endangered Status for the Three Forks Springsnail and San Bernardino Springsnail, and Proposed Designation of Critical Habitat.	Proposed Listing Endangered; Proposed Designation of Critical Habitat.	76 FR 20464–20488.
4/13/2011	90-Day Finding on a Petition To List Spring Mountains Acastus Checkerspot Butterfly as Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 20613–20622.
4/14/2011	90-Day Finding on a Petition to List the Prairie Chub as Threatened or Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 20911–20918.
4/14/2011	12-Month Finding on a Petition to List Hermes Copper Butterfly as Endangered or Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 20918–20939.

FY 2011 COMPLETED LISTING ACTIONS—Continued

Publication date	Title	Actions	FR pages
4/26/2011	90-Day Finding on a Petition to List the Arapahoe Snowfly as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 23256–23265.
4/26/2011	90-Day Finding on a Petition to List the Smooth-Billed Ani as Threatened or Endangered.	Notice of 90-day Petition Finding, Not substantial.	76 FR 23265–23271.
5/12/2011	Withdrawal of the Proposed Rule to List the Mountain Plover as Threatened.	Proposed Rule, Withdrawal	76 FR 27756–27799.
5/25/2011	90-Day Finding on a Petition To List the Spottailed Earless Lizard as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 30082–30087.
5/26/2011	Listing the Salmon-Crested Cockatoo as Threatened Throughout its Range with Special Rule.	Final Listing Threatened	76 FR 30758–30780.
5/31/2011	12-Month Finding on a Petition to List Puerto Rican Harlequin Butterfly as Endangered.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 31282–31294.
6/2/2011	90-Day Finding on a Petition to Reclassify the Straight-Horned Markhor (*Capra falconeri jerdoni*) of Torghar Hills as Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 31903–31906.
6/2/2011	90-Day Finding on a Petition to List the Golden-winged Warbler as Endangered or Threatened.	Notice of 90-day Petition Finding, Substantial	76 FR 31920–31926.
6/7/2011	12-Month Finding on a Petition to List the Striped Newt as Threatened.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 32911–32929.
6/9/2011	12-Month Finding on a Petition to List *Abronia ammophila, Agrostis rossiae, Astragalus proimanthus, Boechera* (*Arabis*) *pusilla,* and *Penstemon gibbensii* as Threatened or Endangered.	Notice of 12-month petition finding, Not Warranted and Warranted but precluded.	76 FR 33924–33965.
6/21/2011	90-Day Finding on a Petition to List the Utah Population of the Gila Monster as an Endangered or a Threatened Distinct Population Segment.	Notice of 90-day Petition Finding, Not substantial.	76 FR 36049–36053.
6/21/2011	Revised 90-Day Finding on a Petition To Reclassify the Utah Prairie Dog From Threatened to Endangered.	Notice of 90-day Petition Finding, Not substantial.	76 FR 36053–36068.
6/28/2011	12-Month Finding on a Petition to List *Castanea pumila* var. *ozarkensis* as Threatened or Endangered.	Notice of 12-month petition finding, Not warranted.	76 FR 37706–37716.
6/29/2011	90-Day Finding on a Petition to List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Threatened or Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 38095–38106.
6/30/2011	12-Month Finding on a Petition to List a Distinct Population Segment of the Fisher in Its United States Northern Rocky Mountain Range as Endangered or Threatened with Critical Habitat.	Notice of 12-month petition finding, Not warranted.	76 FR 38504–38532.
7/12/2011	90-Day Finding on a Petition to List the Bay Skipper as Threatened or Endangered.	Notice of 90-day Petition Finding, Substantial	76 FR 40868–40871.
7/19/2011	12-Month Finding on a Petition to List *Pinus albicaulis* as Endangered or Threatened with Critical Habitat.	Notice of 12-month petition finding, Warranted but precluded.	76 FR 42631–42654.
7/19/2011	Petition To List Grand Canyon Cave Pseudoscorpion.	Notice of 12-month petition finding, Not warranted.	76 FR 42654–42658.

Our expeditious progress also includes work on listing actions that we funded in FY 2010 and FY 2011 but have not yet been completed to date. These actions are listed below. Actions in the top section of the table are being conducted under a deadline set by a court. Actions in the middle section of the table are being conducted to meet statutory timelines, that is, timelines required under the Act. Actions in the bottom section of the table are high-priority listing actions. These actions include work primarily on species with an LPN of 2, and, as discussed above, selection of these species is partially based on available staff resources, and when appropriate, include species with a lower priority if they overlap geographically or have the same threats as the species with the high priority. Including these species together in the same proposed rule results in considerable savings in time and funding, when compared to preparing separate proposed rules for each of them in the future.

ACTIONS FUNDED IN FY 2010 AND FY 2011 BUT NOT YET COMPLETED

Species	Action
Actions Subject to Court Order/Settlement Agreement	
4 parrot species (military macaw, yellow-billed parrot, red-crowned parrot, scarlet macaw) [5]	12-month petition finding.
4 parrot species (blue-headed macaw, great green macaw, grey-cheeked parakeet, hyacinth macaw).[5]	12-month petition finding.
4 parrots species (crimson shining parrot, white cockatoo, Philippine cockatoo, yellow-crested cockatoo).[5]	12-month petition finding.
Longfin smelt	12-month petition finding.
Actions With Statutory Deadlines	
Casey's june beetle	Final listing determination.
6 Birds from Eurasia	Final listing determination.
5 Bird species from Colombia and Ecuador	Final listing determination.
Queen Charlotte goshawk	Final listing determination.
5 species southeast fish (Cumberland darter, rush darter, yellowcheek darter, chucky madtom, and laurel dace).[4]	Final listing determination.
Ozark hellbender [4]	Final listing determination.
Altamaha spinymussel [3]	Final listing determination.
6 Birds from Peru & Bolivia	Final listing determination.
Loggerhead sea turtle (assist National Marine Fisheries Service) [5]	Final listing determination.
2 mussels (rayed bean (LPN = 2), snuffbox No LPN) [5]	Final listing determination.
CA golden trout [4]	12-month petition finding.
Black-footed albatross	12-month petition finding.
Mojave fringe-toed lizard [1]	12-month petition finding.
Kokanee—Lake Sammamish population [1]	12-month petition finding.
Cactus ferruginous pygmy-owl [1]	12-month petition finding.
Northern leopard frog	12-month petition finding.
Tehachapi slender salamander	12-month petition finding.
Coqui Llanero	12-month petition finding/Proposed listing.
Dusky tree vole	12-month petition finding.
Leatherside chub (from 206 species petition)	12-month petition finding.
Frigid ambersnail (from 206 species petition) [3]	12-month petition finding.
Platte River caddisfly (from 206 species petition) [5]	12-month petition finding.
Anacroneuria wipukupa (a stonefly from 475 species petition) [4]	12-month petition finding.
3 Texas moths (*Ursia furtiva, Sphingicampa blanchardi, Agapema galbina*) (from 475 species petition).	12-month petition finding.
2 Texas shiners (*Cyprinella* sp., *Cyprinella lepida*) (from 475 species petition)	12-month petition finding.
3 South Arizona plants (*Erigeron piscaticus, Astragalus hypoxylus, Amoreuxia gonzalezii*) (from 475 species petition).	12-month petitio finding.
5 Central Texas mussel species (3 from 475 species petition)	12-month petition finding.
14 parrots (foreign species)	12-month petition finding.
Fisher—Northern Rocky Mountain Range [1]	12-month petition finding.
Mohave Ground Squirrel [1]	12-month petition finding.
Western gull-billed tern	12-month petition finding.
HI yellow-faced bees	12-month petition finding.
Giant Palouse earthworm	12-month petition finding.
OK grass pink (*Calopogon oklahomensis*) [1]	12-month petition finding.
Ashy storm-petrel [5]	12-month petition finding.
Honduran emerald	12-month petition finding.
Southeastern pop snowy plover & wintering pop. of piping plover [1]	90-day petition finding.
Eagle Lake trout [1]	90-day petition finding.
32 Pacific Northwest mollusks species (snails and slugs) [1]	90-day petition finding.
42 snail species (Nevada & Utah)	90-day petition finding.
Spring Mountains checkerspot butterfly	90-day petition finding.
Eastern small-footed bat	90-day petition finding.
Northern long-eared bat	90-day petition finding.
10 species of Great Basin butterfly	90-day petition finding.
6 sand dune (scarab) beetles	90-day petition finding.
404 Southeast species	90-day petition finding.
Franklin's bumble bee [4]	90-day petition finding.
2 Idaho snowflies (straight snowfly & Idaho snowfly) [4]	90-day petition finding.
American eel [4]	90-day petition finding.
Leona's little blue [4]	90-day petition finding.
Aztec gilia [5]	90-day petition finding.
White-tailed ptarmigan [5]	90-day petition finding.
San Bernardino flying squirrel [5]	90-day petition finding.
Bicknell's thrush [5]	90-day petition finding.
Chimpanzee	90-day petition finding.
Sonoran talussnail [5]	90-day petition finding.
2 AZ Sky Island plants (*Graptopetalum bartrami* & *Pectis imberbis*) [5]	90-day petition finding.
I'iwi [5]	90-day petition finding.

ACTIONS FUNDED IN FY 2010 AND FY 2011 BUT NOT YET COMPLETED—Continued

Species	Action
Humboldt marten	90-day petition finding.
Desert massasauga	90-day petition finding.
Western glacier stonefly (*Zapada glacier*)	90-day petition finding.
Thermophilic ostracod (*Potamocypris hunteri*)	90-day petition finding.
Sierra Nevada red fox [5]	90-day petition finding.
Boreal toad (eastern or southern Rocky Mtn population) [5]	90-day petition finding.
High-Priority Listing Actions	
20 Maui-Nui candidate species [2] (17 plants, 3 tree snails) (14 with LPN = 2, 2 with LPN = 3, 3 with LPN = 8).	Proposed listing.
Chupadera springsnail [2] (*Pyrgulopsis chupaderae* (LPN = 2)	Proposed listing.
8 Gulf Coast mussels (southern kidneyshell (LPN = 2), round ebonyshell (LPN = 2), Alabama pearlshell (LPN = 2), southern sandshell (LPN = 5), fuzzy pigtoe (LPN = 5), Choctaw bean (LPN = 5), narrow pigtoe (LPN = 5), and tapered pigtoe (LPN = 11)).[4]	Proposed listing.
Umtanum buckwheat (LPN = 2) and white bluffs bladderpod (LPN = 9) [4]	Proposed listing.
Grotto sculpin (LPN = 2) [4]	Proposed listing.
2 Arkansas mussels (Neosho mucket (LPN = 2) & Rabbitsfoot (LPN = 9)) [4]	Proposed listing.
Diamond darter (LPN = 2) [4]	Proposed listing.
Gunnison sage-grouse (LPN = 2) [4]	Proposed listing.
Coral Pink Sand Dunes Tiger Beetle (LPN = 2) [5]	Proposed listing.
Miami blue (LPN = 3) [3]	Proposed listing.
Lesser prairie chicken (LPN = 2)	Proposed listing.
4 Texas salamanders (Austin blind salamander (LPN = 2), Salado salamander (LPN = 2), Georgetown salamander (LPN = 8), Jollyville Plateau (LPN = 8)).[3]	Proposed listing.
5 SW aquatics (Gonzales Spring Snail (LPN = 2), Diamond Y springsnail (LPN = 2), Phantom springsnail (LPN = 2), Phantom Cave snail (LPN = 2), Diminutive amphipod (LPN = 2)).[3]	Proposed listing.
2 Texas plants (Texas golden gladecress (*Leavenworthia texana*) (LPN = 2), Neches River rose-mallow (*Hibiscus dasycalyx*) (LPN = 2)).[3]	Proposed listing.
4 AZ plants (Acuna cactus (*Echinomastus erectocentrus* var. *acunensis*) (LPN = 3), Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*) (LPN = 3), Lemmon fleabane (*Erigeron lemmonii*) (LPN = 8), Gierisch mallow (*Sphaeralcea gierischii*) (LPN =2)).[5]	Proposed listing.
FL bonneted bat (LPN = 2) [3]	Proposed listing.
3 Southern FL plants (Florida semaphore cactus (*Consolea corallicola*) (LPN = 2), shellmound applecactus (*Harrisia* (=*Cereus*) *aboriginum* (=*gracilis*)) (LPN = 2), Cape Sable thoroughwort (*Chromolaena frustrata*) (LPN = 2)).[5]	Proposed listing.
21 Big Island (HI) species [5] (includes 8 candidate species—6 plants & 2 animals; 4 with LPN = 2, 1 with LPN = 3, 1 with LPN = 4, 2 with LPN = 8).	Proposed listing.
12 Puget Sound prairie species (9 subspecies of pocket gopher (*Thomomys mazama* ssp.) (LPN = 3), streaked horned lark (LPN = 3), Taylor's checkerspot (LPN = 3), Mardon skipper (LPN = 8)).[3]	Proposed listing.
2 TN River mussels (fluted kidneyshell (LPN = 2), slabside pearlymussel (LPN = 2) [5]	Proposed listing.
Jemez Mountain salamander (LPN = 2) [5]	Proposed listing.

[1] Funds for listing actions for these species were provided in previous FYs.
[2] Although funds for these high-priority listing actions were provided in FY 2008 or 2009, due to the complexity of these actions and competing priorities, these actions are still being developed.
[3] Partially funded with FY 2010 funds and FY 2011 funds.
[4] Funded with FY 2010 funds.
[5] Funded with FY 2011 funds.

We have endeavored to make our listing actions as efficient and timely as possible, given the requirements of the relevant law and regulations, and constraints relating to workload and personnel. We are continually considering ways to streamline processes or achieve economies of scale, such as by batching related actions together. Given our limited budget for implementing section 4 of the Act, these actions described above collectively constitute expeditious progress.

The gopher tortoise in the eastern portion of its range will be added to the list of candidate species upon publication of this 12-month finding. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

We intend that any proposed listing action for the gopher tortoise will be as accurate as possible. Therefore, we will continue to accept additional information and comments from all concerned governmental agencies, the scientific community, industry, or any other interested party concerning this finding.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the North Florida Field Office (see **ADDRESSES** section).

Author(s)

The primary authors of this notice are the staff members of the North Florida Ecological Services Field Office.

Authority

The authority for this action is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: July 19, 2011.

Daniel M. Ashe,

Director, Fish and Wildlife Service.

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