

# U.S. FISH AND WILDLIFE SERVICE SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

## Scientific Name:

Gopherus polyphemus

## Common Name:

Gopher tortoise

## Lead region:

Region 4 (Southeast Region)

## Information current as of:

04/23/2012

## Status/Action

Funding provided for a proposed rule. Assessment not updated.

Species Assessment - determined species did not meet the definition of the endangered or threatened under the Act and, therefore, was not elevated to the Candidate status.

New Candidate

Continuing Candidate

Candidate Removal

Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status

Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species

Range is no longer a U.S. territory

Insufficient information exists on biological vulnerability and threats to support listing

Taxon mistakenly included in past notice of review

Taxon does not meet the definition of "species"

Taxon believed to be extinct

Conservation efforts have removed or reduced threats

\_\_\_ More abundant than believed, diminished threats, or threats eliminated.

## **Petition Information**

\_\_\_ Non-Petitioned

X Petitioned - Date petition received: 01/18/2006

90-Day Positive:09/09/2009

12 Month Positive:07/27/2011

Did the Petition request a reclassification? **No**

### **For Petitioned Candidate species:**

Is the listing warranted(if yes, see summary threats below) **Yes**

To Date, has publication of the proposal to list been precluded by other higher priority listing?  
**Yes**

Explanation of why precluded:

We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, the majority of our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements; meeting statutory deadlines for petition findings or listing determinations; emergency listing evaluations and determinations; and essential litigation-related administrative and program management tasks. 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. For information on listing actions taken over the past 12 months, see the discussion of Progress on Revising the Lists, in the current CNOR which can be viewed on our Internet website (<http://endangered.fws.gov/>).

### **Historical States/Territories/Countries of Occurrence:**

- **States/US Territories:** Alabama, Florida, Georgia, South Carolina
- **US Counties:**County information not available
- **Countries:**Country information not available

### **Current States/Counties/Territories/Countries of Occurrence:**

- **States/US Territories:** Alabama, Florida, Georgia, South Carolina
- **US Counties:** Baldwin, AL, Barbour, AL, Bullock, AL, Butler, AL, Clarke, AL, Coffee, AL, Conecuh, AL, Covington, AL, Crenshaw, AL, Dale, AL, Escambia, AL, Geneva, AL, Henry, AL, Houston, AL, Marengo, AL, Monroe, AL, Pike, AL, Russell, AL, Wilcox, AL, Alachua, FL, Baker, FL, Bay, FL, Bradford, FL, Brevard, FL, Broward, FL, Calhoun, FL, Charlotte, FL, Citrus, FL, Clay, FL, Collier, FL, Columbia, FL, DeSoto, FL, Dixie, FL, Duval, FL, Escambia, FL, Flagler, FL, Franklin, FL, Gadsden, FL, Gilchrist, FL, Glades, FL, Gulf, FL, Hamilton, FL, Hardee, FL, Hendry, FL, Hernando, FL, Highlands, FL, Hillsborough, FL, Holmes, FL, Indian River, FL, Jackson, FL,

Jefferson, FL, Lafayette, FL, Lake, FL, Lee, FL, Leon, FL, Levy, FL, Liberty, FL, Madison, FL, Manatee, FL, Marion, FL, Martin, FL, Miami-Dade, FL, Monroe, FL, Nassau, FL, Okaloosa, FL, Okeechobee, FL, Orange, FL, Osceola, FL, Palm Beach, FL, Pasco, FL, Pinellas, FL, Polk, FL, Putnam, FL, Santa Rosa, FL, Sarasota, FL, Seminole, FL, St. Johns, FL, St. Lucie, FL, Sumter, FL, Suwannee, FL, Taylor, FL, Union, FL, Volusia, FL, Wakulla, FL, Walton, FL, Washington, FL, Appling, GA, Atkinson, GA, Bacon, GA, Baker, GA, Ben Hill, GA, Berrien, GA, Bleckley, GA, Brantley, GA, Brooks, GA, Bryan, GA, Bulloch, GA, Burke, GA, Calhoun, GA, Camden, GA, Candler, GA, Charlton, GA, Chatham, GA, Chattahoochee, GA, Clay, GA, Coffee, GA, Colquitt, GA, Cook, GA, Crawford, GA, Crisp, GA, Decatur, GA, Dodge, GA, Dooly, GA, Dougherty, GA, Early, GA, Echols, GA, Effingham, GA, Emanuel, GA, Evans, GA, Glynn, GA, Grady, GA, Houston, GA, Irwin, GA, Jeff Davis, GA, Jefferson, GA, Jenkins, GA, Johnson, GA, Lanier, GA, Laurens, GA, Lee, GA, Liberty, GA, Long, GA, Lowndes, GA, Macon, GA, Marion, GA, McIntosh, GA, Miller, GA, Mitchell, GA, Montgomery, GA, Peach, GA, Pierce, GA, Pulaski, GA, Quitman, GA, Randolph, GA, Richmond, GA, Schley, GA, Screven, GA, Seminole, GA, Stewart, GA, Sumter, GA, Talbot, GA, Tattall, GA, Taylor, GA, Telfair, GA, Terrell, GA, Thomas, GA, Tift, GA, Toombs, GA, Treutlen, GA, Turner, GA, Twiggs, GA, Ware, GA, Washington, GA, Wayne, GA, Webster, GA, Wheeler, GA, Wilcox, GA, Wilkinson, GA, Worth, GA, Aiken, SC, Allendale, SC, Barnwell, SC, Hampton, SC, Jasper, SC

- **Countries:**Country information not available

## **Land Ownership:**

An estimated 3.4 million acres (1.4 million ha) of Longleaf Pine habitat currently exist in the southeastern United States. 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, entire). The range of the gopher tortoise is frequently associated with the Longleaf Pine ecosystem. Since there has been no rangewide survey of gopher tortoises, and there are only a limited number of comprehensive surveys over relatively small geographic areas, modeling efforts were used to identify potential habitat where tortoises may be present. A total of about 23.5 million acres (9.5 million ha) of potential primary, secondary, and foraging habitat is estimated to currently occur within the eastern portion of the tortoise’s range (Hector and Beyeler 2010, p. 12). Nearly 88 percent of the potential habitat is estimated to be in private ownership, and the remainder is controlled by local, State, Federal, or private conservation entities.

## **Lead Region Contact:**

ARD-ECOL SVCS, Lorna Patrick, 850-769-0552, lorna\_patrick@fws.gov

## **Lead Field Office Contact:**

ALABAMA ESFO, Matthew Hinderliter, 601 321-1132, matthew\_hinderliter@fws.gov

## **Biological Information**

### **Species Description:**

The gopher tortoise is the only tortoise (family Testudinidae) east of the Mississippi River; one of four species in the genus *Gopherus* in North America. It is larger than any of the other terrestrial turtles in this region, with a domed, dark–brown to grayish–black carapace (upper shell) up to 14.6 inches (37.0 cm) long, weighing up to 13 lbs (6 kg). The plastron (lower shell) is yellowish and hingeless. A fossorial species, its hind feet are elephantine or stumpy, and the forelimbs are shovel–like, with claws used for digging. In

comparison to females, males are smaller; usually have a larger gland under the chin, a longer gular (throat) projection, and more concave (curved in) plastron. Hatchlings are up to 2 inches (5 cm) in length, with a somewhat soft, yellow–orange shell.

## **Taxonomy:**

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 (species classification) relative *G. flavomarginatus* (Bolson tortoise) should be the only members of genus *Gopherus*, placing the other members of this genus *G. berlandieri* (Texas tortoise) and *G. agassizii* (desert tortoise) 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.

## **Habitat/Life History:**

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). Ruderal (i.e., disturbed or atypical) habitats include roadsides and utility rights–of–way, grove/forest edges, fencerows, and clearing edges. In the western range, soils contain more silt, and xeric (dry) conditions are less common west of the Florida panhandle (Cruel 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). 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).

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 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 et al. 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; Macdonald and Mushinsky 1988, p. 351; Mushinsky et al. 2006, 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 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 (1995, 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 (areas on the edges of landscapes) 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.

The burrows of a gopher tortoise are the habitat and center of normal feeding, breeding, and sheltering activity. Gopher tortoises can excavate many burrows over their lifetime, and typically use several each year. Burrows may extend for more than 40 feet (12 m), can be up to 12 feet (3.7 m) deep, and provide shelter from predators, winter cold and summer heat. Tortoises spend most of their time within burrows and emerge during the day to bask in sunlight, to feed, and reproduce. Tortoises breed from May through October (e.g. Landers et al. 1980, p. 353; McRae et al. 1981, p. 178; Wright 1982, pp. 54-55; Eubanks et al. 2002, p. 470), but females do not reproduce every year (estimated at 80 to 85 percent; Smith et al. 1997, p. 598). Females excavate a shallow nest to lay and bury eggs, typically between early May and late June, and usually in the apron of soil at the mouth of the burrow. Range-wide, average clutch size varies from about four to 10 eggs per clutch, and incubation lasts 85 to 100 days.

Home range size and movements increase with age and body size, and home range area tends to vary with habitat quality, becoming larger in areas of poor habitat (Auffenberg and Iverson 1979, p. 558). Males typically have larger home ranges than females. Mean home ranges of individual tortoises in Alabama, Florida, and Georgia have varied from 1.3 – 5.2 acres (3.2 – 2.2 ha) for males and 0.2 – 2.5 acres (0.09 – 1.0 ha) for females (McRae et al. 1981, p. 175; Diemer 1992, p. 160; Tuma 1996, p. 33; Eubanks et al. 2002, p. 468).

### **Historical Range/Distribution:**

The gopher tortoise occurs in the southeastern Atlantic Coastal Plain from southern South Carolina west through Georgia, Alabama, and Mississippi to eastern Louisiana, and south through peninsular Florida. The eastern portion of the gopher tortoise's range includes Alabama (east of the Tombigbee and Mobile Rivers), Florida, Georgia, and South Carolina.

### **Current Range Distribution:**

The current range for the eastern population of the gopher tortoise aligns with the historic range which 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. 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 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. 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 2011, entire).

### **Population Estimates/Status:**

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 and 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, 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.

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 indicate that tortoise populations typically occur in fragmented and degraded habitat, are small, and densities of individuals are low within populations. 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). From population modeling efforts, we can draw two very general conclusions: 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. Although tortoises will be seen for long periods of time throughout their range, it is not because their populations are stable or increasing, but because they are long-lived. 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, very few show evidence of population increases or stability – most indicate declines.

### **Distinct Population Segment(DPS):**

A species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. The Act defines “species” as follows: “The term ‘species’ includes any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature.” For the 12-Month Finding on a Petition To List the Gopher Tortoise as Threatened in the Eastern Portion of Its Range (76 FR 45130 45162), the status of the gopher tortoise throughout all of its range was considered (including where it is currently listed as threatened), in order to comprehensively evaluate the status of the species. Therefore, the listable entity is the species (gopher tortoise) throughout its range, and not separated into eastern and western distinct population segments.

## **Threats**

## **A. The present or threatened destruction, modification, or curtailment of its habitat or range:**

This is by far the biggest threat facing the continued existence of the gopher tortoise. There are many direct and indirect factors contributing to this threat, including (but not limited to): 1) habitat fragmentation by roads (potentially causing road mortality, reproductive isolation, small and discontinuous populations, and edge effects such as increased predation); 2) habitat destruction from activities such as urbanization, phosphate strip-mining, and sand extraction (potentially causing direct mortality and/or displacement of tortoises to undesirable habitats); and 3) habitat modification (either deliberately or from inattention), including conversion of longleaf pine forests to other silvicultural or agricultural habitats, shrub/hardwood/sand pine encroachment (mainly from fire exclusion or insufficient fire management), and establishment and spread of invasive species (potentially causing the aforementioned indirect effects due to canopy closure and decline of available forage/groundcover).

Gopher tortoise habitat in the eastern portion of its range has been destroyed or modified in the past due to 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). Additionally, loss of natural pine forests has resulted from urban development, conversion of xeric vegetative communities to citrus, phosphate mining (Kautz 1998, p. 184; FWC 2006, pp. 4 and 8), and degradation of natural pine forest due to lack, or insufficient use, of prescribed fire (FWC 2006, p. 10; Bailey and Smith 2007, p. 8; Yager et al. 2007, p. 428). 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 (Service 1990, pp. 8-10). 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 Florida, future urban development may result in the loss of about 700,000 acres (283,280 ha) or 20 percent of the remaining gopher tortoise habitat (not defined in publication) in Florida by 2060 (FWC 2008, p. 4). Some 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.

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).

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. 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.

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).

## **B. Overutilization for commercial, recreational, scientific, or educational purposes:**

The primary threat associated with this factor is the harassment and mortality of gopher tortoises associated with the unregulated harvest of rattlesnakes, specifically the eastern diamondback rattlesnake (*Crotalus adamanteus*). Rattlesnakes use the gopher tortoise burrows for daily sheltering, as overwintering sites, and to escape from fire. The technique of pouring noxious liquids (gasoline) down tortoise burrows in order to capture the exiting snakes undoubtedly harms or harasses the resident tortoise, and is thought to be used primarily to collect the snakes for rattlesnake “round-ups” (Means 2009, p. 133). Before 2012 there were only three of these round-ups remaining (events offering prizes for the largest rattlesnake, followed by the killing of the snakes for skins and meat); however, this year the Claxton, GA round-up was converted to a wildlife festival, where snakes will no longer be harvested from the wild.

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 round-ups 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 two 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. However, public pressure to convert the two remaining rattlesnake round-ups (one in Alabama, the other in Georgia) to wildlife festivals, in addition to recent regulations prohibiting the gassing of tortoise burrows (Florida, Georgia, and Alabama) should help to diminish this threat to the tortoise.

### **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, 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 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).

An obstacle in the assessment of this threat's magnitude is the lack of data concerning levels of Mycoplasma seroprevalence (in blood) across populations and across states. Currently, all tortoises in the listed range are tested for the presence of Mycoplasma antibodies prior to relocation. Additionally, as part of the guidelines for the establishment of conservation banks in the listed range (Service 2009, p. 6), all resident tortoises at the bank are tested as well, and the Service reserves the right to further evaluate and determine whether a prospective property with seropositive tortoises can accept relocated seronegative tortoises, or vice versa. However, this testing method is not always 100 percent reliable. According to the Florida Gopher Tortoise Management Plan (FWC 2007, p. 39), previous attempts to control the spread of URTD by requiring serological testing of a sample of tortoises prior to relocation were recognized as ineffective, and the requirement was suspended in August 2006. The degree to which exposure to the pathogen correlates to clinical signs of URTD or death is still unclear, as are the effectiveness of the testing mechanisms, the degree of transfer between animals, and the potential for decreased resistance to the disease based on stresses from habitat modification or relocation. The threat of disease across the range is an ongoing challenge while we learn more about the potential pathogens in the environment and how populations respond to them.

Nest depredation by vertebrates typically has been considered substantial; from studies in southern Georgia, Landers et al. (1980, p. 353) estimated about 90 percent of nests were destroyed by predators; a study in Alabama documented about 46 percent of nests (n = 11) were destroyed (Marshall 1986, p. vii). Documented predators of nests, hatchlings, and juvenile gopher tortoises include raccoons (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), striped skunks (*Mephitis mephitis*), opossum (*Didelphis virginiana*), nine-banded armadillos (*Dasybus novemcinctus*), red-tailed hawks (*Buteo jamaicensis*), cottonmouths (*Agkistrodon piscivorus*), eastern diamondback rattlesnakes (*Crotalus adamanteus*), coachwhips (*Coluber flagellum*), eastern indigo snakes (*Drymarchon couperi*), and red imported fire ants (RIFA – *Solenopsis invicta*; see Epperson and Heise 2003 and references therein, pp. 315-316). Dogs and large canids are the most common predator of adult tortoises (Causey and Cude 1978, pp. 94-95; Hinderliter 2008, p. 344). As is the case with most turtle species, predation pressures are highest for gopher tortoises in the first year post-hatching, and diminish gradually over the next several years. In a current head-starting study in the listed range (Camp Shelby, MS), documented predation by mammals was fairly constant on tortoises across all age groups (hatchling through 5-year-olds); however, 91 percent of the documented predation by RIFA was on hatchling tortoises (M. Hinderliter, unpubl. data). The gopher tortoise has evolved to persist with the pressures of native predators, although the range expansions of armadillos and coyotes, combined with the introduction and invasion of other species (e.g. RIFA, constrictor snakes, tegu lizards) has re-defined predation as a serious threat that needs to be addressed.

## **D. The inadequacy of existing regulatory mechanisms:**

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.

Current Federal, State, and local regulations establish adequate regulatory protection of individual tortoises from take, but implementation of these regulations varies. 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.

Tortoises are 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.

## **E. Other natural or manmade factors affecting its continued existence:**

Additional factors potentially threatening the continued existence of gopher tortoises include herbicide application, road mortality, climate change, and relocation/translocation effects; however, the magnitude, imminence, and current status of these potential threats are unknown. 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 climate change impacts on the tortoise or human responses to mitigate its effects on human populations. It is possible that sea level rise based on climate change will translate to a loss of coastal dune habitat, and temperature shifts could translate to behavioral responses such as timing of nesting and overwintering (potentially leading to reduced fitness), but at this point we do not understand enough about these potential threats. 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, both now and in the foreseeable future.

### **Conservation Measures Planned or Implemented :**

One of the major steps taken thus far in the non–listed range is the development of the Florida Gopher Tortoise Management Plan (FWC 2007, entire), which is currently undergoing a 5–year review. In it, the current cause of imperilment of the gopher tortoise, as identified by the final Biological Status Report (Enge et al. 2006, entire), is the rate of population decline, primarily due to habitat loss. Therefore, the overarching conservation goal of this management plan is to restore and maintain secure, viable populations of gopher tortoises throughout the species' current range in Florida by addressing habitat loss. Some of the conservation objectives currently under review to reach this goal are to: 1) improve tortoise carrying capacity of all protected, potential habitat on both public and private lands supporting gopher tortoises; 2) increase the acreage of protected, potential tortoise habitat; 3) restock tortoises to protected, managed, suitable habitats where they no longer occur or where densities are low; and 4) decrease gopher tortoise mortality on lands proposed for development through a redesigned FWC permitting system; responsible and humane relocation to protected, managed, suitable sites where their future survival and long–term population viability are very likely; improved enforcement effectiveness; and expanded partnerships with local governments in all urbanizing counties.

Another tool that has been implemented to establish baseline population levels, management plans, and reporting/survey methods is the Gopher Tortoise Candidate Conservation Agreement (CCA), which was completed in 2008 and whose signatories represent the States of Alabama, Florida, Georgia, and South Carolina fish and wildlife agencies, branches of the Department of Defense, U.S. Forest Service, Fish and Wildlife Service, and various NGOs. The goal of the CCA 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, pp. 1-2). For the Department of Defense, conservation of the gopher tortoise is included for each military installation 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.

There are many other collaborative efforts and agency/NGO–lead actions currently ongoing which are either targeting species–specific conservation for the gopher tortoise (i.e. NRCS Working Lands for Wildlife) or ecosystem based conservation plans (i.e. America’s Longleaf Restoration Initiative) which would benefit the tortoise. These organizations and initiatives are important in addressing the preservation and management needs across state lines and land ownership categories, specifically when they offer landowner incentives and cost–share programs.

## **Summary of Threats :**

Overall, the assessment is that gopher tortoise habitat is diminishing/degrading, populations are declining, and disease and human–related impacts are documented threats to the species. 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 is unknown. The positive effects of recent commitments of landowners through the CCA 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.

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. 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 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. Confounding the issue of threats is the biology of the species. As stated earlier, 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.

The threats discussed under factors A – E all contribute to the overall challenge facing the persistence of gopher tortoises across the range, although in terms of pure scale, the continued loss and degradation of habitat far outweigh any of the other threats to the species. Most of the threats occur range–wide, although

disease, harassment due to gassing burrows, and regulatory deficiencies seem to be less imminent in the listed range. Addressing the loss, fragmentation, and mismanagement of priority tortoise habitat is paramount; however, it is also the most challenging task due to economic and resource constraints. Conservation of the species at this stage requires that sufficient habitats currently supporting large populations or having the capability to support large populations be identified and secured, and protective and management measures implemented.

**For species that are being removed from candidate status:**

\_\_\_\_\_ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions(PECE)?

**Recommended Conservation Measures :**

- 1) Identify, prioritize, and protect viable tortoise populations;
- 2) Increase the size and/or carrying capacity of those viable population areas through applied management, land acquisition, or incentives to adjacent landowners to properly manage for tortoises; in order to allow for the potential expansion of those populations;
- 3) Maximize the amount of acreage appropriately maintained by prescribed fire, and determine the best alternative management tools;
- 4) Locate areas of “secondary priority” where re–stocking and restoration can most effectively be accomplished by creating large, contiguous tracts or habitat corridors that may be occupied by tortoises;
- 5) Adopt mitigation strategies across the range that address the ongoing need for relocation of tortoises, but do it in a way as to minimize loss of priority habitat (sandy soils, open forest structure, herbaceous groundcover), and provide perpetual protection of relocated tortoises and their habitat (e.g. conservation banks);
- 6) Identify and reduce the factors most negatively impacting juvenile tortoise recruitment, in part by studying areas with high recruitment and performing comparative analyses;
- 7) Collect data on existing populations on private lands to more accurately assess where conservation needs to be focused; provide education and incentives to private landowners to manage their land for tortoises; and
- 8) Establish a consensus between research and management communities about defining proper surveying/monitoring techniques and schedules; and defining habitat management goals (e.g. basal area, canopy cover, shrub cover, and stocking density) to be utilized in management plans across the range; and
- 9) Encourage the development and implementation of a model CCAA (programmatic or smaller scale) that details effective conservation objectives and habitat management goals.

The majority of these objectives address, either directly or indirectly, the primary threat to the gopher tortoise, which is the destruction, modification, or curtailment of its habitat. Other major threats such as disease and predation will ultimately be addressed in the process of meeting these objectives as well. This species will always require protection and management specific to its needs; however, successful conservation of the longleaf pine ecosystem will undoubtedly benefit tortoise populations, as it will for other native rare species such as the red-cockaded woodpecker and eastern indigo snake. Although these objectives put emphasis on the larger occupied tracts of high-quality habitat, the smaller isolated populations still play a pivotal role in the persistence of the species, and must be protected when possible. It is possible that in the future the conservation of the species will be placed solely on protecting sizable “refuges” of tortoises on large tracts of land; however, losing the smaller, isolated groups of tortoises may ultimately be detrimental to the species if, for instance, reduced genetic diversity causes tortoises to be more susceptible to disease.

One specific action needed to reach these conservation objectives is to work with partners to take full advantage of private lands management-based initiatives that become available, maximizing their scope. By reaching out to private landowners with existing or potential tortoise habitat, we need to demonstrate that they can either create a matrix of habitats across their lands or perform management that benefits the tortoise while still maintaining their lands for silvicultural, recreational, or agricultural use.

The CCA is a valuable tool connecting federal, state, and other entities, and has documented progress towards gopher tortoise conservation, although additional data collection on existing populations, habitat, and effective management are still needed to demonstrate success. It should continue to be utilized as a working document, and should include more information on habitat management and population goals and how to reach those goals. In terms of research needs, any studies which actively focus on the major threats to the species need to be supported; specifically population responses to habitat management, status and surveys of populations on private lands, habitat modeling to identify previously unknown tortoise habitat, and long-term effects of current habitat management or population manipulations.

Many of the larger populations of gopher tortoises occurring on National Forests and military installations are protected under site-specific management plans; however, many other large parcels of high-quality tortoise habitat under private ownership have not received the adequate protection to maintain a healthy population in perpetuity. Habitat acquisition has been and continues to be an important element of conservation strategies for this species. Past acquisition efforts have focused on securing high quality natural communities because of the values these habitats provide to tortoises, burrow commensals, and other wildlife species. However, since all acquisitions are dependent upon the presence of willing land sellers, state purchases often include both high quality natural habitats and those requiring restoration. Acquisition of quality native habitats will continue to be a priority, but disturbed or altered properties may also be purchased when they contribute towards recovery of the tortoise.

## **Priority Table**

Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/Population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/Population	6
Moderate to Low	Imminent	Monotypic genus	7
		<b>Species</b>	<b>8</b>
		Subspecies/Population	9
	Non-Imminent	Monotype genus	10
		Species	11
		Subspecies/Population	12

### Rationale for Change in Listing Priority Number:

#### Magnitude:

There is a broad geographic area affected by the destruction, modification, or curtailment of gopher tortoise habitat across the species' range, and reduced survival and low recruitment observed in many gopher tortoise populations throughout the range are thought to result from poor habitat quality due to fire suppression. A large percentage (estimated at 88 percent) of the potential tortoise habitat is under private ownership and is therefore largely uncategorized, unprotected, and vulnerable to degradation or destruction. Based on the high percentages documented in the literature (70 to 100 percent), nest/hatchling predation is viewed as a threat widespread throughout the range. High mortality is likely to impede the persistence and recovery of tortoise populations. Even though predation has been, and still is, a naturally occurring limiting factor, it has recently expanded to include additional predator species, and is probably working synergistically with other threats identified herein to impact gopher tortoises. Additionally, potential future impacts to gopher tortoises resulting from lack of implementation, compliance, and enforcement of regulations are expected to be substantial. 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. Although still in need of further data collection and research, threats such as overutilization, disease, road mortality, and the effects of climate change are perceived to be of lower magnitude; however, based on the other factors described, the overall magnitude of the threats to the gopher tortoise are moderate to low.

#### Imminence :

Much of the potential tortoise 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 10–25 million acres (~ 4–10 million ha) by 2040 (Prestemon and Abt 2002, pp. 18-20). Future urban development may result in the loss of about 700,000 acres (283,000ha)(or 20 percent of the remaining gopher tortoise habitat) in Florida by 2060 (FWC 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). Researchers have recently discovered environmental pathogens potentially affecting tortoise populations, and numbers of anthropogenically-enhanced predator populations seem to be increasing. Therefore, these threats are seen as imminent.

Yes  No Have you promptly reviewed all of the information received regarding the species for the purpose of determination whether emergency listing is needed?

### **Emergency Listing Review**

No  Yes Is Emergency Listing Warranted?

Although the range-wide modification and fragmentation of gopher tortoise habitat poses a moderate threat to the persistence of the species, and studies generally indicate population declines, there are some regulatory measures to protect tortoises in place in each state throughout the range. In a few studies, populations appear to be stable or even improving somewhat; therefore the species is not in immediate danger of becoming extinct, and emergency listing is not warranted.

### **Description of Monitoring:**

For documenting the current status of the species, the “12-Month Finding on a Petition To List the Gopher Tortoise as Threatened in the Eastern Portion of Its Range” (July 27, 2011) was utilized for the assessments of threats and population status. The conservation strategies listed in this document were sent to the field offices for review, and all recent literature and data are regularly updated through connections with the Gopher Tortoise Council. Annual reports are generated by the CCA gopher tortoise team, and the following conservation-related research on gopher tortoises is ongoing or recently completed by the members of the Agreement: 1) rare plant and animal inventories/surveys; 2) disease prevalence and impacts; 3) population responses to management actions; 4) effectiveness of re-stocking tortoises; 5) habitat assessments; and 6) population dynamics assessments. Effective tortoise monitoring programs have been established only in a few places range-wide, typically through state- or federally-managed lands. One of the primary goals of the CCA was to establish baseline population levels, and the next phase will be establishing consistent, regular monitoring schedules to accurately assess population stability, enhancement, or decline.

### **Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:**

Alabama, Florida, Georgia, South Carolina

### **Indicate which State(s) did not provide any information or comment:**

none

### **State Coordination:**

Input for the 12-month finding came from all the state agencies in the candidate range for the tortoise, as well as the various FWS field offices, military installations, and signatories to the gopher tortoise CCA. We

will continue to coordinate with the state, federal, and non-profit agencies to maintain updated records on restoration efforts and population analyses; we will also continue communication with the Gopher Tortoise Council to ensure a timely review of ongoing research pertaining to gopher tortoise conservation.

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**Approval/Concurrence:**

Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:



06/12/2012

Date

Concur:

11/06/2012

Date

Did not concur:

\_\_\_\_\_

\_\_\_\_\_ Date

Director's Remarks: