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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2015–0150; 4500030113]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Sonoran Desert Tortoise as an Endangered or Threatened Species

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 Sonoran desert tortoise (*Gopherus morafkai*) as an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). After review of the best available scientific and commercial data, we find that listing the Sonoran desert tortoise is not warranted at this time. However, we ask the public to submit to us any new information that becomes available concerning the threats to the Sonoran desert tortoise or its habitat at any time.

DATES: The finding announced in this document was made on October 6, 2015.

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS–R2–ES–2015–0150. 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, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: Steve Spangle, Field Supervisor, Arizona Ecological Services Field Office (see **ADDRESSES**); by telephone at 602–242–0210; or by facsimile at 602–242–2513. 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 Act (16 U.S.C. 1531 *et seq.*), requires that, for any petition to revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we will determine that the petitioned action is: (1) Not warranted, (2) warranted, or (3) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are endangered or threatened, 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 Actions

On December 30, 1982, we published a notice of review, which determined the desert tortoise (*Gopherus agassizii*) throughout its range in the United States and Mexico to be a Category 2 Candidate species (47 FR 58454); this determination was reaffirmed on September 18, 1985 (50 FR 37958). Category 2 Candidate status was granted to species for which information in our possession indicated that a proposed listing as threatened or endangered was possibly appropriate, but for which sufficient data were not available to make a determination of listing status under the Act. On April 2, 1990, we issued a final rule designating the Mojave population of the desert tortoise (occurring north and west of the Colorado River) as a threatened species under the Act (55 FR 12178). Currently, the Mojave population of the desert tortoise is recognized as a distinct population segment (DPS) under the Act. As part of the Mojave DPS rulemaking, we designated any desert tortoise from the Sonoran population as threatened when observed outside of its known range, due to similarity of appearance under section 4(e) of the Act. On December 5, 1996, we published a rule that discontinued the practice of keeping a list of Category 2 Candidate species (61 FR 64481). From 1996 to 2010 (see below), the Sonoran populations of desert tortoise did not have any Federal status inside their known range (south and east of the Colorado River).

On October 15, 2008, we received a petition dated October 9, 2008, from WildEarth Guardians and Western Watersheds Project (petitioners) requesting that the Sonoran population of the desert tortoise be listed under the Act as a distinct population segment (DPS), as threatened or endangered rangewide (in the United States and Mexico), and critical habitat be designated. On August 28, 2009, we made our 90-day finding that the petition presented substantial scientific information indicating that listing the Sonoran DPS of the desert tortoise may be warranted. The finding and notice of our initiation of a status review was published in the **Federal Register** on August 28, 2009 (74 FR 44335). On December 14, 2010, we published our 12-month finding that listing the Sonoran DPS of the desert tortoise was warranted, but precluded by other higher priority actions, and the entity was added to our list of candidate species (75 FR 78094).

Candidate status for the Sonoran DPS of desert tortoise was reaffirmed in the 2011 Candidate Notice of Review (76 FR 66370; October 26, 2011). In 2012, new information was assessed that elevated the Sonoran populations of the desert tortoise to a full species (*Gopherus morafkai*). We noted this taxonomic change in the 2012 Candidate Notice of Review and revised its accepted nomenclature to ''Sonoran desert tortoise'' (77 FR 69994; November 21, 2012). We also reaffirmed its candidate status in the Candidate Notices of Review published in 2012 (77 FR 69994; November 21, 2012), 2013 (77 FR 70104; November 22, 2013), and 2014 (79 FR 72450; December 5, 2014).

In 2011, the Service entered into two settlement agreements regarding species on the candidate list at that time (Endangered Species Act Section 4 Deadline Litigation, No. 10–377 (EGS), MDL Docket No. 2165 (D.D.C. May 10, 2011)). This finding fulfills our obligations regarding the Sonoran desert tortoise under those settlement agreements.

Species Information

We collaborated with species experts from public and private sectors to complete the Species Status Assessment Report for the Sonoran Desert Tortoise (SSA Report; Service 2015, entire), which is available online at *http://www.regulations.gov,* Docket No. FWS–R2–ES–2015–0150, and at *https://www.fws.gov/southwest/es/Arizona.* The SSA Report documents the results of the comprehensive biological status review for the Sonoran desert tortoise (tortoise) and provides an account of the species' overall viability through forecasting of the species' condition in the future (Service 2015, entire). In the SSA

Report, we summarized the relevant biological data and a description of past, present, and likely future risk factors and conducted an analysis of the viability of the species. The SSA Report provides the scientific basis that informs our regulatory decision regarding whether this species should be listed as an endangered or threatened species under the Act. This decision involves the application of standards within the Act, its implementing regulations, and Service policies (see Finding below). The SSA Report contains the risk analysis on which this finding is based, and the following discussion is a summary of the results and conclusions from the SSA Report. We solicited peer review of the draft SSA Report from five qualified experts. Responses were received from four of the reviewers, and the SSA Report was modified as appropriate.

Species Description

The Sonoran desert tortoise was first described by Cooper in 1863 (pp. 118–123). Since that time, the Sonoran desert tortoise was recognized as a population of the desert tortoise (*Gopherus agassizii*) until advanced genetic analysis supported elevating the Sonoran population of the desert tortoise as a unique species, Morafka's desert tortoise (*Gopherus morafkai*) (Murphy *et al.* 2011, p. 53). As a result, the Sonoran desert tortoise is recognized as a distinct species (*G. morafkai*) but retains its common name of ''Sonoran desert tortoise'' as recommended in Crother *et al.* (2012, pp. 76–77) to avoid potential confusion of the abbreviation for Morafka's desert tortoise with that of the Mojave desert tortoise (*G. agassizii*).

The Sonoran desert tortoise occupies portions of western, northwestern, and southern Arizona in the United States, and the northern two-thirds of the Mexican State of Sonora. In Arizona, adult Sonoran desert tortoises range in total carapace (top shell) length from 8 to 15 inches (in) (20 to 38 centimeters (cm)), with a relatively high domed shell (Arizona Game and Fish Department (AGFD) 2001, p. 1; Brennan and Holycross 2006, p. 54). The maximum recorded length for a Sonoran desert tortoise in Arizona is 19.4 in (49 cm) total carapace length (Jackson and Wilkinson-Trotter 1980, p. 430). The hind limbs are very stocky and elephantine; forelimbs are flattened for digging and covered with large conical scales (AGFD 2001, p. 1; Brennan and Holycross 2006, p. 54). Male Sonoran desert tortoises are differentiated from females by having elongated gular (throat) shields, chin glands visible on each side of the lower jaw (most evident during the breeding season), and a concave plastron (bottom shell) (AGFD 2001, p. 1).

Sonoran desert tortoises are coldblooded species, which rely on their environment to regulate body temperature (thermoregulation). They feed on a variety of vegetation and spend the majority of their time in underground shelters, coming out mainly to drink, forage, and breed. Tortoises, especially young, small tortoises, are subject to predation by a variety of natural predators, including lizards, snakes, and mammals.

In general and compared to many other animals, tortoises have relatively low fecundity (females lay about 5 eggs on average every other year), are slow-growing (they may take 15 years to reach sexual maturity), are long-lived (they may live more than 50 years in the wild), experience high survivorship in the wild, and have a relatively long generation time (25 years). The Sonoran desert tortoise's breeding season generally occurs from July through October.

Habitat and Range

The tortoise occurs primarily in rocky, steep slopes and bajadas (broad slope extending from the base of a mountain range out into a basin) in various desertscrub habitat types. Tortoise home range size varies with precipitation levels, contracting during wet years and expanding during dry years in response to the availability of forage plants (Averill-Murray and Klug 2000, p. 67). Estimates for average home range sizes for males have varied from 0.04 to 0.10 square miles (sq mi) (10 to 26 hectares (ha)); females generally have smaller home ranges, with averages ranging from 0.01 to 0.09 sq mi (2.6 to 23 ha) (Barrett 1990, p. 203; Averill-Murray and Klug 2000, pp. 55–61; Averill-Murray *et al.* 2002a, pp. 150–151).

We conducted a coarse geospatial analysis (see *Overview of Analytical Tools*) of potential habitat based on elevation, slope, and vegetation type across the species' range. We categorized the potential habitat as high, medium, or low suitability based on the presence of the habitat features that support tortoises (a combination of elevation, vegetation type, and slope). This rangewide geospatial analysis resulted in a prediction of approximately 38,000 sq mi (9.8 million ha) of potential tortoise habitat (see Map 1—Current Sonoran Desert Tortoise Predicted Potential Habitat). Of this total, 64 percent occurs in the United States, and 36 percent occurs in Mexico.

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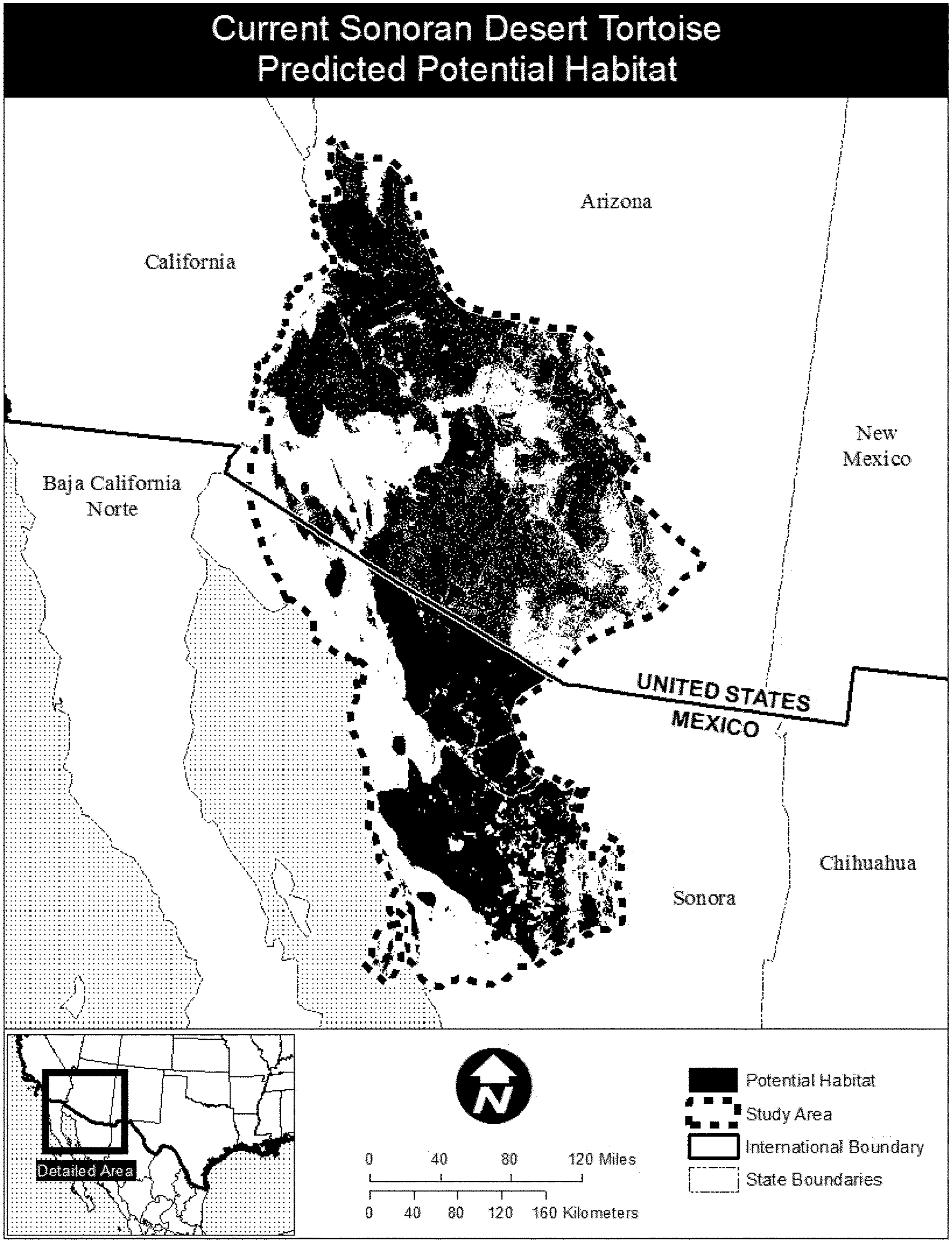
Map 1—Current Sonoran Desert Tortoise Predicted Potential Habitat



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Species Needs

Individual tortoises need access to plants, shelters, and freestanding water. A variety of plants are used for forage, shelter for thermoregulation, and cover from predators. Access to shelter sites is also important for predator avoidance and thermoregulation. Freestanding water is needed for hydration. Finally, tortoises need enough available space to complete movements to support life-history functions of feeding and breeding. Tortoises have a specific combination of habitat needs (forage plants, cover, shelter sites, water), but those habitat needs can be found throughout a wide geographic area.

For the Sonoran desert tortoise to maintain viability over the long term, it needs populations of adequate size and distribution to support resiliency, redundancy, and representation. While we do not know the size of a viable population of Sonoran desert tortoise, populations with larger numbers of individuals have improved chances of withstanding stochastic events (a measure of resiliency). The tortoise also needs to have resilient populations spread across its range, supported by suitable habitat quantity and quality, to provide for rangewide redundancy (species ability to withstand catastrophic events such as potential large-scale drought) and representation (species genetic and ecological diversity to maintain adaptive capacity).

Overview of Analytical Tools

We used two analytical tools to synthesize and summarize our understanding of the best available information about the current and future conditions of the tortoise. These tools include a geospatial analysis of habitat and a population simulation model. Here we describe these tools conceptually to provide context for the discussions that follow. More explanation of these tools is available in the SSA Report (Service 2015, entire).

One tool we used was a coarse geospatial analysis to determine the extent of potential habitat based on elevation, slope, and vegetation type across the species' range. Potential habitat was categorized by suitability (high, medium, and low) based on presence of habitat features that support tortoises. We then categorized the potential habitat into primary, secondary, or tertiary quality categories. The categorization of habitat quality is based on the current suitability of potential habitat (high, medium, and low) and the possible presence of risk factors that could have population-level effects (see *Risk Factors* discussion below). The habitat quality analysis was conducted under two alternative assumptions related to the effects of the risk factors (high or low threats) and two alternative assumptions regarding the effects of conservation measures (high or low management). We were able to use the results of this geospatial analysis to estimate the amount and condition of current and future potential habitat, as well as evaluate the scope of various stressors on the landscape. It is important to note that potential habitat is categorized as high, medium, and low suitability, and habitat quality (a combination of potential habitat and risk factors) is categorized as primary, secondary, and tertiary.

Another tool we used was a population simulation model. The population model takes a given starting abundance of tortoises and calculates the future abundance over time by applying reproductive and survival rates (*i.e.,* vital rates). These vital rates are the proportion of the total tortoises in a population that are surviving, being adding to the population through reproduction, or being removed from the population each year. By calculating the number of tortoises being added to the population through reproduction and taken away from the population through death each year, it allows us to project the change in the abundance of tortoises over time based on those vital rates.

We used a combination of geospatial analysis and population simulation modeling to project the condition of tortoise populations. The geospatial analysis predicts the amount and condition of habitats available to tortoises currently and in the future, and the population simulation model projects the abundance of tortoises that can be supported by that habitat based on rates of survival, growth, and reproduction (*i.e.,* vital rates). The population simulation model projects higher densities of tortoises in higher quality habitat. As a result, the population simulation model projects abundance based on both the amount and condition of habitats.

The geospatial analysis and population simulation model combine to project the amount, condition, and distribution of potential habitat; and the abundance, growth rate, and quasi-extinction risk for tortoise populations. We are using the term quasi-extinction to encompass the idea that, before a species actually goes extinct, it will decline to a point where extinction will likely be inevitable as a result of genetic and ecological impacts, even though it has multiple surviving individuals. Because there is a great deal of uncertainty around where the precise quasi-extinction threshold is for each species, our population simulation model assesses a higher and lower threshold of quasi-extinction. Taking into account these and other uncertainties, results of the population simulation modeling are presented as a range in the following discussions.

Finally, in the models, areas in the United States and Mexico were treated as two separate areas of analysis because there are meaningful differences in the quality and level of information available about status and risk factors between the two areas, and because there are actual differences in habitat quality due to differences in land management between the two countries.

Risk Factors

We reviewed the potential risk factors (*i.e.,* threats, stressors) that could be affecting the tortoise. Owing to the relatively wide geographic range of the species, individual tortoises may be impacted by a variety of factors. However, in this document we will discuss only those factors in detail that could meaningfully impact the status of the species. Concerns about the tortoise's status revolve around six primary risk factors: (1) Altered plant communities; (2) altered fire regimes; (3) habitat conversion of native vegetation to developed landscapes; (4) habitat fragmentation; (5) human–tortoise interactions; and (6) climate change and drought.

We evaluated each of these factors in detail for their potential to have population- and species-level effects to the Sonoran desert tortoise. While many of them could be having effects on individual tortoises, most have not been shown or are not expected to have population-level effects on the species. Some factors may have population-level effects, but, because of the long lifespan, relatively high abundance, and wide range of the Sonoran desert tortoise, these effects would likely take many decades or longer to have measurable impacts on the species if they occur. In addition, many of these factors are ameliorated to some degree by ongoing conservation efforts or land management considerations; an estimated 73 percent of potential habitat in the United States has some conservation management, and 55 percent of potential habitat in the United States was included in a recent interagency conservation agreement committing Federal land managers to continuing conservation efforts for the tortoise (see *Conservation Measures and Land Management*).

Altered Plant Communities

Altered plant communities are a concern due to the presence of nonnative grasses in tortoise habitats. Nonnative grass species can compete with native grass species for space, water, and nutrients, thereby affecting native plant species density and species composition within invaded areas (Stevens and Fehmi 2008, pp. 383–384; Olsson *et al.* 2012a, entire; 2012b, pp. 10, 18–19; McDonald and McPherson 2011, pp. 1150, 1152; Franklin and Molina-Freaner 2010, p. 1664). This process is primarily driven by the timing and amount of precipitation. Geospatial analysis of available data indicates that about 15 percent of the current predicted suitable habitat for tortoises in Arizona and 20 percent in Mexico may have nonnative vegetation.

Presence of nonnative grasses does not preclude use of an area by tortoises, but it may impact tortoises by reducing available plants for forage and cover. Reduced access to quality native plants may cause tortoises to expend additional time and energy foraging, thereby reducing fitness and exposing them to additional predation. However, tortoises can and do utilize nonnative grasses as forage, and no studies have confirmed that the nonnative species are significantly less nutritious to tortoises. Reduction in plant cover can negatively impact thermoregulation and increase exposure to predators. A reduction in cover plants used by tortoises can limit thermoregulatory opportunities and reduce periods of potential surface activity, making individuals more susceptible to dehydration, as well as increase predation risk when the individuals are active on the surface (Gray 2012, entire).

Theoretically, the effects of nonnative grasses on individual tortoises discussed above may manifest in population-level effects if reduced fitness and increased predation resulted in population-level declines. However, such population-level effects have not been identified through long-term monitoring, despite the fact that some species of nonnative grass have occurred within monitoring plots for decades, nor have population-level effects been documented. Further, population-level effects, if they are occurring, would only become discernible (with current research and monitoring methods) over an extremely long period of time (decades to centuries) due to the life history and longevity of the species. Adequate time periods are well outside of both the existing period of monitoring and our ability to reasonably predict such population-level effects in the future.

Altered Fire Regime

The presence of nonnative plants has the potential to result in more severe, frequent fires in tortoise habitats than would have occurred naturally. In some conditions, wildfire can occur naturally in tortoise habitats, but fire has not historically been a significant influence in these habitats. In desertscrub communities that are free of nonnative grasses, wildfire has a long return interval and is rarely able to carry itself over a spatially significant area due to the extent of bare ground between vegetated patches. In areas invaded by nonnative grasses, the density of fine fuels increases while open space between vegetation decreases, causing changes in fire behavior and, ultimately, in the fire regime.

Altered fire regimes resulting in more severe, frequent fires may impact tortoises directly through exposure to fire and indirectly via impacts to plants used as forage and cover. Direct effects to tortoises can include fatality or injury through incineration, elevated body temperature, poisoning from smoke inhalation, and asphyxiation. Fire burns plants used for food and cover, which indirectly impacts tortoises by increasing forage effort and prolonging exposure to predators, both of which reduce fitness of individuals. The magnitude of the impact of fire on tortoises largely depends on the severity of the fire (*e.g.,* a less severe fire may leave patches of usable forage and microhabitat for shelter and thermoregulation).

The scope of fire as a risk factor in Arizona is associated with presence of nonnatives in conjunction with ignition sources and fire suppression. Geospatial analysis suggests that fire may be a concern in 23 percent of predicted suitable habitat in Arizona. However, despite the fact that many wildfire ignitions occur annually in desertscrub communities within the range of the Sonoran desert tortoise, aggressive wildfire suppression practices are widely implemented by agencies and municipalities across the landscape in desertscrub communities. As a result of these practices, a very limited amount of tortoise habitat has burned in comparison to the total area considered potential habitat for Sonoran desert tortoises across their range. We expect that aggressive wildfire suppression practices will continue in Arizona into the future in order to protect ecological values and human health and property and, therefore, do not expect this stressor to have an appreciable effect on Sonoran desert tortoises at the population-level in Arizona.

Geospatial analysis suggests that fire may be a concern in 20 percent of predicted suitable habitat in Mexico where fire occurs more regularly to manage buffelgrass (*Pennisteum cilare*) pastures. Buffelgrass is a nonnative species that is cultivated more widely in Mexico to support grazing. Fires set intentionally in Mexico to benefit buffelgrass pastures could potentially affect tortoise populations. However, while these buffelgrass pasture areas are within the absolute range of the tortoise, pastures are generally found in flat valley bottoms, and tortoises generally prefer rocky slopes, thus tortoises likely have reduced exposure to fire in cultivated pastures. Additionally, the best available information does not suggest that fires to benefit buffelgrass pastures in Mexico are affecting tortoises at a magnitude or frequency that would result in population-level effects. Therefore, we do not expect this stressor will have an appreciable effect on Sonoran desert tortoises in Mexico.

Habitat Conversion

Conversion of natural habitat via urban and agricultural development can have a variety of direct and indirect impacts on tortoises depending on the intensity and size of the development. Habitat conversion can directly impact tortoises via fatalities during the construction or development process. If tortoises survive the initial construction, conversion may impact tortoises by making areas entirely unusable (*i.e.,* nonhabitat) or by removing forage and cover sites thus making the habitat less productive for tortoises. Habitat areas converted to dense urban uses likely displace animals into surrounding areas, if adjacent suitable habitat exists. Tortoises that survive the initial development, but are not entirely displaced, likely have reduced access to plants used as forage and cover and, therefore, likely have reduced fitness and are subject to additional predation. Habitat conversion may also result in fragmentation that can impact short- and long-range movements (see *Habitat Fragmentation* discussion below). However, population-level effects to Sonoran desert tortoises from habitat conversion have not been documented in the literature.

To assess the potential historical loss of habitat due to conversion to urban landscape, we calculated the amount of area currently designated as urban land within the range boundary of the Sonoran desert tortoise. About 1,279 sq mi (331,260 ha) of area is currently designated as urban in Arizona. If all of this urban area had previously been potential tortoise habitat, which is unlikely, this area would represent approximately 5 percent of all estimated historical habitat. In Mexico, about 53 sq mi (13,730 ha) of area is designated as urban. This represents less than 1 percent of all estimated historical habitat. Even considering additional areas potentially lost historically due to agricultural or other development (which we have not quantified due to data limitations), historical habitat loss appears to be relatively small.

Looking into the future, urban development in Arizona is expected to occur primarily within a zone referred to as the Sun Corridor Megapolitan, driven primarily by its association with major transportation routes and other existing infrastructure. In a northward direction from the U.S.-Mexico border, this development zone occurs within the range of the Sonoran desert tortoise along Interstate (I)–19, I–10, and I–17 (Gammage *et al.* 2008 entire; 2011 entire). Additional suburban development zones are expected to occur along I–40 near Kingman and along State Route 93, which connects Wickenburg to Kingman, especially if the latter route is converted into an interstate (proposed I–11). The majority of projected development in Arizona is not anticipated to occur in potential tortoise habitat. However, we expect as much as 9 percent of potential tortoise habitat in Arizona could be developed within the next 50–100 years. In contrast, an estimated 73 percent of potential tortoise habitat in Arizona is not likely subject to development due to land ownership and management. These areas are lands managed for a purpose not compatible with widespread development including military lands, state and municipal parks, and areas owned by Bureau of Land Management, Bureau of Reclamation, National Park Service, Forest Service, and U.S. Fish and Wildlife Service. Small areas on these land ownership types may experience development, but significant urban development in these areas is unlikely.

In Arizona, the number of acres dedicated to irrigated agriculture has been on the decline (U.S. Department of Agriculture 2009, p. 273). These areas are likely being converted into areas re-zoned for residential or commercial purposes or, rarely, left fallow for natural recovery. This observed declining trend of agricultural use will likely continue in Arizona, unless farming practices or technology change, or a novel crop significantly influences market forces and reverses this trend. Therefore, we do not anticipate appreciable future habitat conversions in Arizona due to agricultural development. Additionally, areas that may be converted to agricultural uses likely would not be preferred tortoise habitat because these uses generally occur in flat valley bottoms while tortoises prefer rocky slopes.

Within the species' range in Sonora, Mexico, and according to recent reports, urban development is also expected to continue into the future, but at a slower pace and smaller scale than Arizona. Hermosillo is the largest population center in Sonora (approximately 778,000 per the 2014 census) and could expand north and east, which could potentially affect adjacent tortoise populations (Rosen *et al.* 2014a, pp. 22–23). Limited urban expansion could also be predicted for a small number of other communities within Sonora (Rosen *et al.* 2014a, pp. 22–23). With respect to agriculture in Sonora, the majority occurs on large river deltas, which are not occupied by tortoises (Rosen *et al.* 2014a, pp. 22–23). Therefore, neither urban nor agricultural development is considered to be significantly affecting tortoise populations over a large area in Sonora currently, or into the future.

Habitat Fragmentation

Habitat fragmentation via infrastructure and other forms of linear development may impact tortoises by restricting movement within and between home ranges, direct fatality, and enabling human collection. The source of habitat fragmentation is any linear feature such as roads of varying capacities, railroad tracks, and canals. These forms of linear development are largely ubiquitous across the range of the tortoise; however, the severity of the impact of linear development depends on the permeability of the feature to tortoise movement.

Tortoises move within and outside their home ranges for different purposes depending on sex, age class, and size class. Tortoises will move to find preferred plant forage species that may be in season (Oftedal 2007, entire); to a different shelter site with a different exposure, depth, or substrate (Averill-Murray and Klug 2000, p. 62); or to search for potential mates (Averill-Murray *et al.* 2002a, pp. 139–144). Tortoises will also move to disperse outside of their home ranges, with distances ranging from a few hundred yards to several miles or more (Edwards *et al.* 2004, entire). When individuals are unable to successfully complete these movements within their home ranges or on the landscape, basic natural-history functions can be compromised to varying degrees. Individual tortoises may spend more time active and exposed if they are unable to access preferred sites for forage and shelter, which may result in reduced fitness.

Fragmentation can also be a concern if it prevents movements between populations. This degree of fragmentation could impact species' representation through effects on genetic diversity, and it could impact species' redundancy if recolonization of an area extirpated by a stochastic event is precluded.

Roads can also be a source of injury, mortality, and collection. Unlike some other species, tortoises do not appear to avoid roads and are thus susceptible to impacts there. However, the severity of these kinds of impacts is likely correlated with road width, road type (*e.g.,* rugged, improved gravel, paved), speed limits, traffic volume, availability of washes or other means of crossing under roads, and quality of tortoise habitat being transected. See ''Human–Tortoise Interactions'' for further discussion of these kinds of impacts.

More severe effects to tortoise individuals and populations as a result of fragmentation are possible where fragmenting features are less permeable to tortoises or where fragmenting features are more dense. For example, a multi-lane road is less permeable to tortoises than a single lane dirt road. Similarly, an area bisected by multiple roads and canals is likely to have a greater affect on tortoises because there are multiple obstacles to navigate while moving through an area. In these situations, impacts to tortoises could be more severe because there is higher potential for human interactions, and fragmentation of home ranges and populations may be more complete.

While the effects of fragmentation, as discussed above, could theoretically manifest in population-level effects, there is no evidence of such population-level effects. Population-level effects due to fragmentation would only become discernible (with current research and monitoring methods) over an extremely long period of time (decades to centuries) due to the life history and longevity of the species. Adequate time periods are well outside of both the existing period of monitoring and our ability to reasonably predict such population-level effects in the future.

Human–Tortoise Interactions

Inadvertent or purposeful human interactions with tortoises can result in injury or death of tortoises. Human interactions can also result in collection of tortoises, thereby removing them from the wild population. Sources of interaction include roads, wild–urban interface zones, and general recreation areas. Human interaction can lead to either inadvertent or intentional impacts to tortoises. Inadvertent interactions can have incidental effects on tortoises that are not otherwise the intent or purpose of the activity itself. Examples of activities that could lead to human interactions with tortoises (when in occupied tortoise habitat) include the use of vehicles (Lowery *et al.* 2011, entire), target shooting, hunting, hiking, rock crawling, trail bike riding, rock climbing, and camping (Howland and Rorabaugh 2002, pp. 339–342; AGFD 2010, p. 9). In addition, dogs that escape captivity or are intentionally abandoned can form feral packs, which have been shown to impact individual Sonoran desert tortoises (Zylstra 2008, entire). Other forms of human interaction with tortoises are direct and intentional, such as collection of wild tortoises, release of captive tortoises into wild populations, or physically handling wild tortoises (Grandmaison and Frary 2012, entire).

These types of human interactions with tortoises occur at highest frequency in the wild–urban interface zone and are thought to lessen with increasing distance from human population centers (Zylstra *et al.* 2013, pp. 112–113). In fact, one study found that adult tortoise survivorship has been shown to improve with increasing distance from urbanized areas; specifically, the odds of a Sonoran desert tortoise surviving 1 year increases 13 percent for each 6.2-mile (mi) (10-kilometer (km)) increase in distance from a city of at least 2,500 people (Zylstra *et al.* 2013, pp. 112–113).

To assess the potential geographic scope of human interactions, we calculated the acreage of predicted potential habitat areas within 6.2-mi (10-km) rings of cities greater than 2,500 in population size. While the potential for human interactions exists beyond these areas, we assumed that the closer tortoises are to human population centers, the more likely that these interactions will occur. Overall, 29 percent of predicted potential tortoise habitat occurs within 12.4 mi (20 km) of urban areas in Arizona and 9 percent in Sonora.

While the effects of human interactions, as discussed above, could theoretically manifest in population-level effects, there is no evidence of such population-level effects. Population-level effects due to human interactions would only become discernable (with current research and monitoring methods) over an extremely long period of time (decades to centuries) due to the life history and longevity of the species. Adequate time periods are well-outside of both the existing period of monitoring and our ability to reasonably predict such population-level effects in the future.

Climate Change and Drought

There is unequivocal evidence that the earth's climate is warming based on observations of increases in average global air and ocean temperatures, widespread melting of glaciers and polar ice caps, and rising sea levels, with abundant evidence supporting predicted changes in temperature and precipitation in the southwestern deserts (IPCC 2014, entire). Predicted temperature trends for the region encompassing the range of the Sonoran desert tortoise include warming trends during winter and spring, lowered frequency of freezing temperatures, longer freeze-free seasons, and higher minimum temperatures during the winters (Weiss and Overpeck 2005, p. 2075). In this same region, predictions of potential changes in precipitation due to climate change are less certain, but climate scientists largely agree that annual precipitation totals are likely to decrease as compared to historical averages (Seager *et al.* 2007, entire; Cook *et al.* 2015, p. 4). Climate models generally agree that winter and spring precipitation may be influenced by climate change, with predicted decreases in precipitation during these seasons. However, modeling results vary considerably with respect to how climate change could affect summer (monsoon) precipitation in Arizona and northern Mexico. While annual precipitation totals are predicted to decrease, summer precipitation totals may increase (IPCC 2007, p. 20), with wide fluctuation in scope and severity of summer precipitation events.

Climate change may impact Sonoran desert tortoises, primarily through impacts on drought severity and duration as a result of increased air temperature and reduced precipitation. Increased drought severity and duration may impact tortoise access to freestanding water for drinking and plants for forage and cover. Climate change is predicted to reduce precipitation in the southwest and, therefore, has potential to reduce availability of freestanding water. Reduced precipitation could also reduce abundance of plants available for forage and cover, thereby increasing energy expenditures while finding forage, impairing thermoregulation, and exposing tortoises to predators. All of this can result in reduced fitness and rates of reproduction and survival. Sonoran desert tortoises evolved in a desert ecosystem and have adaptations to withstand drought; however, long-term climate change may stress tortoises beyond those tolerances.

One study has shown a measurable effect to tortoise populations due to drought. Zylstra *et al.* (2013, pp. 113–114) showed that, in tortoise populations that experience localized, prolonged drought conditions, annual adult survival can decrease by 10–20 percent, and abundance of adults can be reduced by as much as 50 percent or more in local instances. However, when drought conditions affecting these populations subsided, Sonoran desert tortoise numbers began to increase, reaching near pre-drought status, and the overall rate of change in population size was found to be greater than 1, indicating overall positive population growth in the populations monitored for a period of more than 20 years (Zylstra *et al.* 2013, pp. 112–114).

We anticipate that climate change is likely to have population-level impacts to Sonoran desert tortoises to some degree in the future. However, the severity, scope, and timing of those impacts are unknown because the intensity of the environmental changes is unknown and the response at the species level is unknown. In particular, output from climate change models exhibits noticeably increasing confidence intervals, and therefore increased uncertainty, beyond the 50- to 75-year timeframe (Seager *et al.* 2007, p. 1182). Based on the best available information, we cannot predict the magnitude of environmental change or the severity of the species' response over time with a reasonable degree of certainty. However, due to the potential for climate change to affect tortoises, we carefully analyzed this risk factor to the best of our ability in our population model (see *Future Condition and Viability* below).

Cumulative Impacts

It is possible that several risk factors may be impacting Sonoran desert tortoise populations cumulatively now and into the future. Theoretically, for every additional risk factor occurring in a population area, the likelihood of population-level impacts increases. However, no areas are currently known to be in decline due to individual or cumulative impacts, including impacts from potential stressors that were not discussed in detail in this document, and just as with assessment of the individual risk factors, the theoretical population-level effects due to cumulative impacts at current and predicted levels would only become discernible (with current research and monitoring methods) over an extremely long period of time (decades to centuries) due to the life history and longevity of the species. Adequate time periods are well outside of both the existing period of monitoring and our ability to reasonably predict such population-level effects in the future.

Conservation Measures and Land Management

There are a number of conservation actions that have been implemented to minimize stressors and maintain or improve the status of the Sonoran desert tortoise, including a candidate conservation agreement (AIDTT 2015, entire) with AGFD, Bureau of Land Management, Department of Defense, National Park Service, U.S. Fish and Wildlife Service, Bureau of Reclamation, Customs and Border Protection, U.S. Forest Service, Natural Resources Conservation Service, and Arizona Department of Transportation (collectively referred to as ''Parties''). Candidate conservation agreements are formal, voluntary agreements between the Service and one or more parties to address the conservation needs of one or more candidate species or species likely to become candidates in the near future. Participants voluntarily commit to implement specific actions designed to remove or reduce stressors to the covered species, so that listing may not be necessary. The agreement for the Sonoran desert tortoise, which formalizes many existing conservation measures and land management practices, was completed by the Parties in March 2015 and was signed by the final signatory, the Service, on June 19, 2015. The agreement applies to approximately 13,000 sq mi (3.4 million ha) of Sonoran desert tortoise habitat in Arizona. This area represents approximately 55 percent of the species' predicted potential habitat in Arizona and 34 percent of its predicted potential habitat rangewide.

The agreement is designed to encourage, facilitate, and direct effective tortoise conservation actions across multiple agencies and entities having the potential to directly influence conservation of the species in Arizona. Parties to the agreement identified existing tortoise conservation measures and designed a comprehensive conservation framework for these measures that encourages coordinated actions and uniform reporting, integrates monitoring and research efforts with management, and supports ongoing conservation partnership formation. Management actions in the agreement include, but are not limited to, reducing the spread of nonnative grasses, reducing or mitigating dispersal barriers, reducing the risk and impact of desert wildfires, reducing the impact of off-highway vehicles, population monitoring, and reducing illegal collection of tortoises. A complete list of the stressor-specific conservation measures can be found in Appendix A of the CCA (AIDTT 2015).

Additionally, as discussed above, an estimated 73 percent of potential tortoise habitat in Arizona is not likely subject to development due to land ownership and management. These areas are lands managed for a purpose not compatible with widespread development including military lands, state and municipal parks, and areas owned by Bureau of Land Management, Bureau of Reclamation, National Park Service, Forest Service, and U.S. Fish and Wildlife Service. Small areas on these land ownership types may experience development, but significant development on these lands is unlikely.

Current Condition

Generally, the best available scientific information suggests that the Sonoran desert tortoise has not experienced any appreciable reduction in its overall range or abundance relative to presumed historical levels. Certainly some areas of former habitat have been lost due to conversion to urban and agricultural uses, but our geospatial analysis suggests that the magnitude of these loses is relatively minimal (see ''Habitat Conversion'' discussion above). This suggests that the species has potential to retain historical levels of resiliency, redundancy, and representation (and, therefore, viability) if the habitat condition now and into the future is in acceptable condition relative to risk factors.

As discussed above, we conducted a coarse geospatial analysis of potential habitat based on elevation, slope, and vegetation type across the species' range. This rangewide geospatial analysis resulted in a prediction of approximately 38,000 sq mi (9.8 million ha) of potential tortoise habitat. We then evaluated the current condition (status) of the tortoise by categorizing habitat into primary, secondary, or tertiary quality categories. The categorization of habitat is based on the current suitability of potential habitat (high, medium, and low) and the possible presence of risk factors that could have population-level effects. We used four geospatial layers to measure those risk factors: Land management, presence of nonnative vegetation, high fire risk potential, and proximity to urban areas. The habitat quality analysis was conducted under two alternative assumptions related to the effects of the risk factors (high or low threats) and two alternative assumptions regarding the effects of conservation measures (high or low management).

For the U.S. analysis area, this geospatial analysis resulted in 8 to 25 percent of potential tortoise habitat being categorized primary quality, 62 to 75 percent categorized as secondary quality, and 13 to 17 percent categorized as tertiary quality (see Table 1—Modeled Current Habitat Quality–Arizona). In Mexico, this analysis resulted in 0 to 2 percent of potential habitat being categorized as primary quality, 79 to 98 percent categorized as secondary quality, and 0.2 to 21 percent categorized as tertiary quality (see Table 2—Modeled Current Habitat Quality–Mexico). The amount in each category is presented as a range due to the four alternative assumptions related to the effects of risk factors and effects of conservation measures.

TABLE 1—MODELED CURRENT HABITAT QUALITY–ARIZONA

[Please note that some numbers do not add due to rounding]

	High management and low threats assumptions				Low management and high threats assumptions			
	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary	Total
Area (sq mi)	6,090	15,010	3,100	24,200	1,820	18,270	4,100	24,190
Area (ha)	1,577,300	3,887,570	802,900	6,267,770	471,380	4,731,910	1,061,900	6,265,190

TABLE 2—MODELED CURRENT HABITAT QUALITY–MEXICO

[Please note that some numbers do not add due to rounding]

	High management and low threats assumptions				Low management and high threats assumptions			
	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary	Total
Area (sq mi)	330	13,400	30	13,760	0	10.550	3,210	13,760
Area (ha)	85,470	3,470,580	7,770	3,563,820	0	2,732,440	831,390	3,563,830

We then used the amount of habitat in each quality category combined with reported density estimates for tortoises to produce rangewide abundance estimates under varying assumptions of habitat conditions and density estimates. The current rangewide abundance estimates ranged from 470,000 to 970,000 total adult tortoises. The current estimate in the United States was 310,000 to 640,000 adult tortoises, and the estimate in Mexico was 160,000 to 330,000 adult tortoises.

Future Condition and Viability

The tortoise continues to occupy a large portion of its historical range, with much of that range considered to be primary or secondary quality habitat. Looking to the future, the risk factors that could affect the tortoise include: (1) Altered plant communities; (2) altered fire regimes; (3) habitat conversion of native vegetation to developed landscapes; (4) habitat fragmentation; (5) human–tortoise interactions; and (6) climate change and drought. By its very nature, any status assessment is forward-looking in its evaluation of the risks faced by a species, and future projections will always be dominated by uncertainties, which increase as we project further and further into the future. This analysis of the tortoise is no exception. In spite of these uncertainties, we are required to make decisions about the species with the best information currently available. We have attempted to explain and highlight many of the key assumptions as part of the analytical process documented in the SSA Report (Service 2015). We recognize the limitations in available information, and we handled them through the application of scenario planning, geospatial modeling, and population simulation modeling.

As discussed above, to project the future condition of the tortoise, we used a combination of geospatial analysis and population simulation modeling. Essentially, the geospatial analysis predicts the amount and condition of habitats available to tortoises in the future, and the population simulation model projects the abundance of tortoises that can be supported by that habitat based on rates of survival, growth, and death. The geospatial analysis and population simulation model combine to project the amount, condition, and distribution of suitable habitat; and the abundance, growth rate, and quasi-extinction risk for tortoise populations.

The geospatial analysis includes direct consideration of projected habitat losses due to urban development (urban growth potential) and the potential for impacts to tortoises due to altered plant communities (invasive vegetation), altered fire regimes (fire risk), and human interactions (urban influence). Land management, as a surrogate for presence of fire suppression and other ongoing conservation activities, is also included in the geospatial analysis. Finally, the potential effect of climate change is included in the population simulation model by simulating an increasing extent of drought and variation in the magnitude of the effects of drought on tortoise survival.

For future scenarios in Arizona where we considered a potential loss of overall habitat due to urban development, we calculated an annual rate of habitat loss in each habitat quality category. We calculated this annual rate by dividing the area identified by Gammage *et al.* (2008, entire; 2011, entire) as potential for urban growth by 60 years. The Gammage *et al.* estimate was published in 2008 as a possible 2040 projection. However, this estimate was made at the height of an economic expansion during the mid-2000's, which is no longer a realistic assumption to carry forward. We therefore accounted for the slowed rate of urban growth by using the Gammage *et al.* projection to represent a potential future 60 years from the present. We have no data to reliably predict the potential for urban growth beyond 60 years. While the population simulation model continues to include loss of habitat to urban development beyond the 60 year horizon, the geospatial analysis does not because after the 60 year horizon, there is no information suggesting where those developments may occur. As a result, maps and calculations of area in the future conditions use the 60-year future. In contrast, the results of the population simulation model can be presented at any point in time. We have presented those results most often at the 50- and 75-year future conditions because this is the timeframe considered to be the foreseeable future for this decision (see *Threatened Species Throughout Range*).

We developed multiple future condition scenarios to capture the range of uncertainties regarding population-level effects to the tortoise. As we discussed above, with the exception of climate change and drought, none of the risk factors have been shown to result in population-level impacts to the tortoise. However, given that population-level effects may be occurring that current methodologies would not allow us to detect in the short term, we have included scenarios in the geospatial and population modeling that assume impacts from these factors may be greater than is currently understood. All of the scenarios we developed are considered to be within the realm of reasonable possibility. In other words, the worst- and best-case scenarios are not the absolutely worst and best scenarios that one could imagine, but are instead grounded in the realm of realistic uncertainty. Additionally, we have not identified a most likely future scenario. In many cases in this finding, we have only presented the results of the worst-case scenario, but that does not mean it is the most likely scenario.

The growth rates and quasi-extinction probabilities projected by the model provide a characterization of resiliency. Because each area of analysis (Arizona and Mexico) is treated as a large population, the characterization of resiliency applies at the scale of the area of analysis rather than at the scale of traditional populations within those areas. The resulting population growth rates for all time periods for all scenarios ranged from 0.9915 to 0.9969, indicating slightly decreasing numbers of tortoises in the areas of analysis. All of the scenarios showed declining overall abundances into the future in each of the areas of analysis. However, because of the relatively large current estimated population sizes and the long lifespan of these tortoises, our population simulation model suggests no measurable risks of quasi-extinction in the next 50 years in either the U.S.

or Mexican areas of analysis under any scenarios, even though slow population declines are projected. At 75 years, the risks of quasi-extinction increased, ranging from 0 in some scenarios to as high as 0.033 probability of quasi-extinction (in other words, a 3.3 percent risk of quasi-extinction in 75 years) in the worst-case future scenario for the Mexican analysis area. All but 3 (of 18) scenarios resulted in less than 0.01 probability of quasi-extinction in 75 years. When we look further into the future at 100 years, our simulation model suggests the risks of quasi-extinction for some scenarios increased to near 0.05 probability of quasi-extinction (ranging from 0 to 0.089, with 8 of 18 scenarios exceeding 0.03 probability of quasi-extinction). At 200 years, several scenarios exceeded 0.2 probability of quasi-extinction (ranging from 0.07 to 0.323, with 14 of 18 scenarios exceeding 0.1 probability of quasi-extinction).

We characterized the redundancy (number and distribution of tortoise populations) and representation (ecological diversity) indirectly through projecting the likely quality and quantity of tortoise habitat distributed across the species range under different scenarios. Generally, the scenarios that showed the best and worst result for tortoises in the Arizona area of analysis were also the best and worst case for the Mexican area of analysis. Under the worst-case future scenarios, the distribution of habitats in the United States (considering a 60-year future condition) is projected to include about 11,800 sq mi (3 million ha) of habitat categorized as primary or secondary quality. In Mexico, under the worst-case scenario, about 10,550 sq mi (2.7 million ha) of secondary quality habitat is projected to be maintained (no habitat was projected in the primary quality category). Other scenarios project more favorable conditions in both the United States and Mexico. The habitat quality under the worst-case condition is projected to be distributed across the species' range, although in Arizona the habitat for this scenario is quite reduced compared to more favorable scenarios or current conditions (see Map 2—Future Sonoran Desert Tortoise Predicted Potential Habitat). For this worst-case condition, the estimated abundance of tortoises expected to be supported by these habitats is 316,000 in 50 years and 278,000 in 75 years, which is a reduction of 33 percent in 50 years and 41 percent in 75 years, when compared to the current low end abundance estimates of 470,000.

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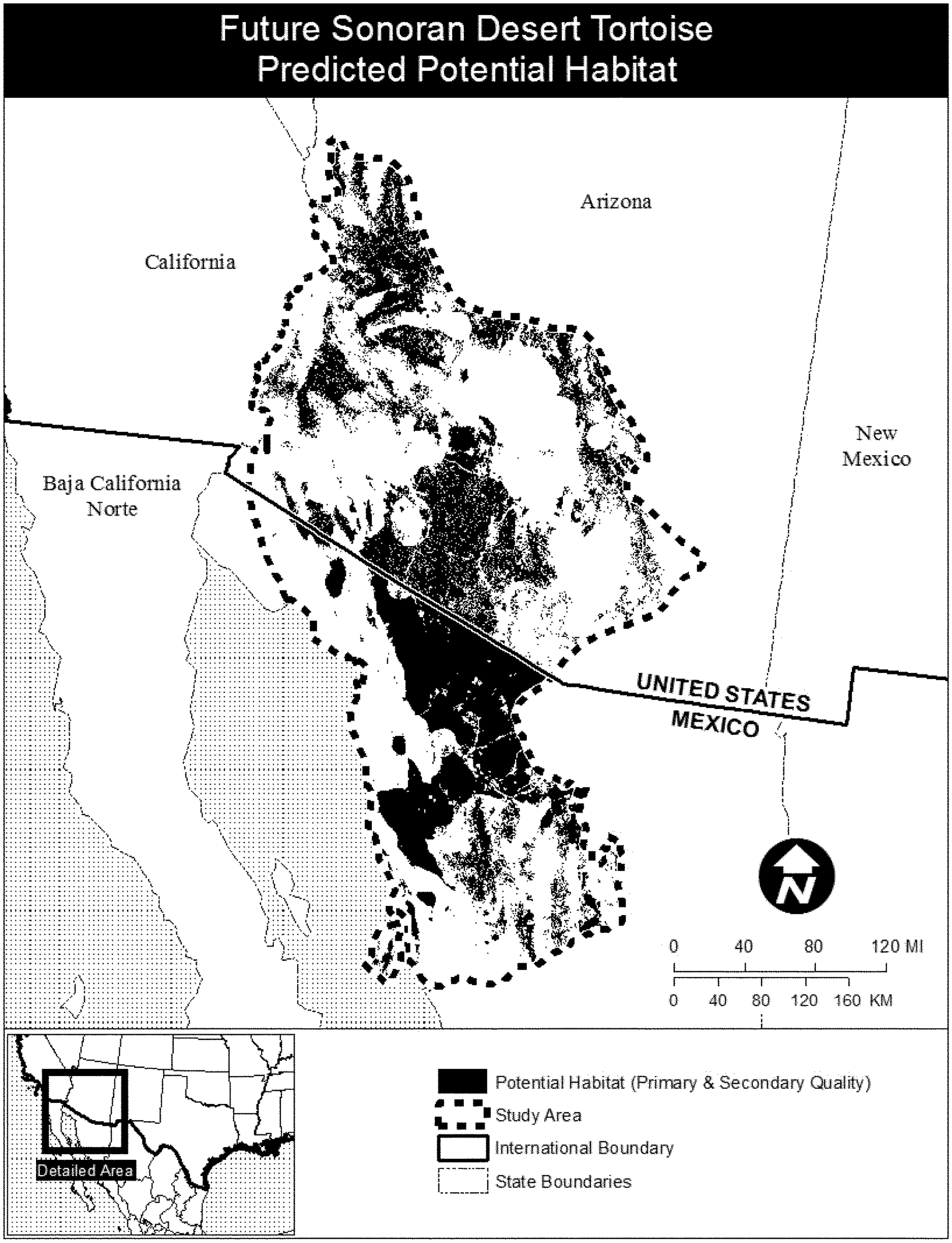
Map 2—Future Sonoran Desert Tortoise Predicted Potential Habitat



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Finding

Standard for Review

Section 4 of the Act, and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(b)(1)(a), the Secretary is to make endangered or threatened determinations required by subsection 4(a)(1) solely on the basis of the best scientific and commercial data available to her after conducting a review of the status of the species and after taking into account conservation efforts by States or foreign nations. The standards for determining whether a species is endangered or threatened are provided in section 3 of the Act. An endangered species is any species that is ''in danger of extinction throughout all or a significant portion of its range.'' A threatened species is any species that is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' Per section 4(a)(1) of the Act, in reviewing the status of the species to determine if it meets the definition of endangered or of threatened, we determine whether any species is an endangered species or a threatened species because of 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; and (E) other natural or manmade factors affecting its continued existence.

Summary of Analysis

The biological information we reviewed and analyzed as the basis for our findings is documented in the SSA Report (Service 2015, entire), a summary of which is provided in the Background section of this finding. The projections for the condition of future populations are based on our expectations of the potential risk factors (in other words, threats or stressors) that may have population-level effects currently or in the future. The six risk factors we evaluated in detail are: (1) Altered plant communities (Factor A from the Act); (2) altered fire regimes (Factor A); (3) habitat conversion of native vegetation to developed landscapes (Factor A); (4) habitat fragmentation (Factor A); (5) human-tortoise interactions (Factor E); and (6) climate change and drought (Factor A). We also reviewed the effects of environmental contaminants, grazing, and litter (Factor A); overutilization (Factor B); disease and predation (Factor C); regulatory mechanisms (Factor D); and undocumented human immigration (Factor E). However, we did not evaluate these latter factors individually in further detail because they are not known or suspected to have meaningful effects on the status of the tortoise.

For the six risk factors that were evaluated in detail, we used geospatial analysis to assess the scope of those factors currently and into the future. The geospatial model predicts the amount and condition of habitat based on application of several scenarios with varying degrees of effects. We then used a population simulation model to forecast the abundance of the species within those habitats. The results of this analysis are presented in terms of the amount, distribution, and condition of potential habitats; and the abundance, growth rates, and probabilities of quasi-extinction of tortoise populations. These are the metrics we use to describe the resiliency, redundancy, and representation of the species now and in the future in order to determine if the species is likely in danger of extinction now or in the foreseeable future.

Application of Analysis to Determinations

The fundamental question before the Service is whether the species warrants protection as endangered or threatened under the Act. To make this determination, we evaluated the projections of extinction risk, described in terms of the condition of current and future populations and their distribution (taking into account the risk factors and their effects on those populations). For any species, as population condition declines and distribution shrinks, the species' extinction risk increases and overall viability declines.

As described in the determinations below, we first evaluated whether the Sonoran desert tortoise is in danger of extinction throughout its range now (an endangered species). We then evaluated whether the species is likely to become in danger of extinction throughout its range in the foreseeable future (a threatened species). We finally considered whether the Sonoran desert tortoise is an endangered or threatened species in a significant portion of its range (SPR).

Endangered Species Throughout Range

Standard

Under the Act, an endangered species is any species that is ''in danger of extinction throughout all or a significant portion of its range.'' Because of the fact-specific nature of listing determinations, there is no single metric for determining if a species is currently in danger of extinction. We used the best available scientific and commercial data to evaluate the current viability (and thus risk of extinction) of the Sonoran desert tortoise to determine if it meets the definition of an endangered species.

Evaluation and Finding

Our review found that the Sonoran desert tortoise continues to occupy a very large portion of its estimated historical range. We estimate approximately 5 percent of historical range may have been lost due to conversion to urban uses. The remaining portion of the range is made up of approximately 38,000 sq mi (9.8 million ha) of modeled potential habitat, and we estimate that approximately 470,000 to 970,000 tortoises inhabit this area. This amount and distribution of habitat and tortoises supports sufficient resiliency to sustain the species into the near future. These levels of tortoises and suitable habitat are commensurate with historical levels, and there is no information available to suggest that the species will not persist at these levels. Furthermore, the habitat available and tortoise populations are spread widely over the known range of the species, suggesting that the species retains the redundancy and representation it had historically.

Additionally, given the current wide distribution of tortoise habitat and land uses therein, there are no known risk factors that are likely to reduce the status of the species significantly in the near term. The stressors facing the species are relatively slow-moving and, if impacts are seen, will likely be measurable over many years (dozens to hundreds). In other words, there are no immediate, high-magnitude threats acting on the species such that it would be expected to undergo a meaningful decline over the near term.

This current estimated abundance and distribution of tortoises across the species' range provides resiliency, redundancy, and representation to sustain the species into the near future. Because this estimate of the current condition and distribution of habitat and populations provides sufficient resiliency, redundancy, and representation for the species, we conclude that the current risk of extinction of the Sonoran desert tortoise is sufficiently low that it does not meet the definition of an endangered species under the Act.

Threatened Species Throughout Range

Having found that the Sonoran desert tortoise is not an endangered species throughout its range, we next evaluated whether the species is a threatened species throughout its range.

Standard

Under the Act, a threatened species is any species that is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The foreseeable future refers to the extent to which the Secretary can reasonably rely on predictions about the future in making determinations about the future conservation status of the species (U.S. Department of the Interior, Solicitor's Memorandum, M–37021, January 16, 2009). A key statutory difference between a threatened species and an endangered species is the timing of when a species may be in danger of extinction, either now (endangered species) or in the foreseeable future (threatened species).

Evaluation and Finding

In considering the foreseeable future as it relates to the status of the Sonoran desert tortoise, we considered the risk factors acting on the species and looked to see if reliable predictions about the status of the species in response to those factors could be drawn. We considered whether we could reliably predict any future effects that might affect the status of the species, recognizing that our ability to make reliable predictions into the future is limited by the variable quantity and quality of available data about impacts to the tortoise and the response of the tortoise to those impacts. For the tortoise, the most significant risk factor looking into the future is climate change. While we have high certainty that environmental conditions will change as a result of climate change, we do not have reasonable certainty about the extent of those changes or the species' response to the changes. In particular, output from climate change models exhibits noticeably increasing confidence intervals, and therefore increased uncertainty, beyond the 50- to 75-year timeframe (see, for example, Seager *et al.* 2007, p. 1182). We have chosen to use a timeframe of 50 to 75 years as the foreseeable future for this analysis because the available data does not allow us to reasonably rely on predictions about the future beyond that time period.

The Sonoran desert tortoise is not likely to be in danger of extinction in the foreseeable future (50–75 years) and, therefore, does not meet the definition of a threatened species throughout its range. There are two parallel lines of rationale to explain why the Sonoran desert tortoise does not meet the definition of a threatened species, one more qualitative and one more quantitative.

Most simply and qualitatively, the best available data does not show that any one or more risk factors are likely to result in meaningful population declines in the foreseeable future. Looking to the future, several risk factors may contribute to population- or species-level declines. These stressors sort into three general categories.

The first category of stressors is those that are low in magnitude or scope, like effects from human interactions (*e.g.,* collection, vehicle strikes) and habitat conversion. Human interactions can occur throughout the range of the species, but are usually relatively isolated events that generally would not make habitat unsuitable for other tortoises. Habitat conversion is likely limited largely to expansion of existing urban areas. As long as the scope of these stressors and tortoises' exposure to them remain narrow, as they are expected to for the foreseeable future, there is no information to suggest that population-level declines will result due to these stressors.

The second category of stressors is those that have the potential for population-level impacts, but for which we have limited to no data to support that conclusion at this time. Risk factors that fit into this category include altered plant communities, altered fire regime, and habitat fragmentation. Because the species is so long lived, population declines due to these kinds of stressors, if they are occurring, are very difficult to detect with current techniques in short-term studies. As a very simplistic mathematical example, if we presume a species with a generation time of 5 years is displaying a 10 percent population decline every generation, it would take about 35 years for an overall population decline of 50 percent to manifest. For the Sonoran desert tortoise, which has a generation time of approximately 25 years, it would take nearly 175 years for that 50 percent decline to manifest.

The last category includes stressors that are likely to impact tortoise populations in the future; however, those impacts are not likely to manifest measurable species responses during the foreseeable future. In other words, those impacts, should they occur, are not likely to occur at a meaningful level until after the time period that we can rely on as reasonably foreseeable. These stressors include the effects of climate change and drought. The magnitude of those impacts and the response of the species cannot be reasonably predicted at this time. These kinds of environmental changes that are relatively slow moving on the geological time scale are expected to take many decades or longer to manifest in measurable declines of the tortoise at the species level.

The Act does not require absolute proof of impacts and responses in order to consider an entity to be in danger of extinction. However, in order to draw a conclusion that a stressor (or cumulative stressors) will cause a species to be in danger of extinction, the best available information needs to show that an impact is likely to occur and that the species response would likely cause it to be in danger of extinction. Because we do not know what magnitude of impacts would likely cause a discernable response in tortoise populations, we cannot conclude that stressors are or will occur at a level that causes the species to be in danger of extinction.

Therefore, from a purely qualitative perspective, the tortoise is not facing any stressors that are likely to cause meaningful population declines within the foreseeable future that would cause the species to become in danger of extinction in the foreseeable future.

Taking a more quantitative approach, looking to the future, several risk factors could contribute to population- or species-level declines. Our geospatial and population simulation models consider the impacts of altered plant communities, altered fire regimes, habitat conversion, habitat fragmentation, human interaction, and climate change, including various scenarios to capture uncertainties around these risk factors and the model parameters. The results of these analyses project that even under worst-case future scenarios the distribution of habitats in the United States (considering a 60-year future condition) is projected to include about 11,800 sq mi (3 million ha) of habitat categorized as primary or secondary quality. In Mexico, even under the worst-case scenario, about 10,550 sq mi (2.7 million ha) of secondary quality habitat is projected to be maintained (no habitat was projected to be in the primary quality category). The abundance of tortoises predicted to be supported by these habitats is 316,000 to 698,000 in 50 years and 278,000 to 632,000 in 75 years. Further, our analysis projected no measurable risks of quasi-extinction in the next 50 years in either the U.S. or Mexican areas of analysis under any scenarios. At 75 years, the risks of quasi-extinction increased, ranging from 0 in some scenarios to as high as 0.033 probability of quasi-extinction (in other words, a 3.3 percent risk of quasi-extinction in 75 years) for the Mexican analysis area and 0.015 in the U.S. analysis area in the worst-case future scenario.

The relatively high abundance projected in the future condition suggests that the species is likely to retain sufficient resiliency, and the wide distribution of modeled habitats suggests the species is likely to retain sufficient redundancy and representation. Therefore, the low predicted risk of quasi-extinction combined with the large numbers and wide distribution of habitat and tortoises in the foreseeable future suggest the species will have sufficient resiliency, redundancy, and representation such that it will not become in danger of extinction in the foreseeable future. Therefore, we find that the Sonoran desert tortoise does not meet the definition of a threatened species.

Endangered or Threatened in a Significant Portion of the Range

Having found that the Sonoran desert tortoise is not endangered or threatened throughout all of its range, we next consider whether there are any significant portions of its range in which the Sonoran desert tortoise is in danger of extinction or likely to become so.

Standard

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so throughout all or a significant portion of its range. The Act defines ''endangered species'' as any species which is ''in danger of extinction throughout all or a significant portion of its range,'' and ''threatened species'' as any species which is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' 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.'' Last year, we published a final policy interpreting the phrase ''Significant Portion of its Range'' (SPR) (79 FR 37578, July 1, 2014). The final policy states that (1) if a species is found to be endangered or threatened throughout a significant portion of its range, the entire species is listed as an endangered species or a threatened species, respectively, and the Act's protections apply to all individuals of the species wherever found; (2) a portion of the range of a species is ''significant'' if the species is not currently endangered or threatened throughout all of its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range; (3) the range of a species is considered to be the general geographical area within which that species can be found at the time FWS or NMFS makes any particular status determination; and (4) if a vertebrate species is endangered or threatened throughout an SPR, and the population in that significant portion is a valid DPS, we will list the DPS rather than the entire taxonomic species or subspecies.

The SPR policy is applied to all status determinations, including analyses for the purposes of making listing, delisting, and reclassification determinations. The procedure for analyzing whether any portion is an SPR is similar, regardless of the type of status determination we are making. The first step in our analysis of the status of a species is to determine its status throughout all of its range. If we determine that the species is in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range, we list the species as an endangered species (or threatened species) and no SPR analysis will be required. If the species is neither endangered nor threatened throughout all of its range, we determine whether the species is endangered or threatened throughout a significant portion of its range. If it is, we list the species as an endangered species or a threatened species, respectively; if it is not, we conclude that listing the species is not warranted.

When we conduct an SPR analysis, we first identify any portions of the species' range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant and either endangered or threatened. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is endangered or threatened throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are affecting it uniformly throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the range that clearly do not meet the biologically based definition of ''significant'' (*i.e.,* the loss of that portion clearly would not be expected to increase the vulnerability to extinction of the entire species), those portions will not warrant further consideration.

If we identify any portions that may be both (1) significant and (2) in danger of extinction or likely to become so, we engage in a more detailed analysis to determine whether these standards are indeed met. As discussed above, to determine whether a portion of the range of a species is significant, we consider whether, under a hypothetical scenario, the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction or likely to become so in the foreseeable future throughout all of its range. This analysis considers the contribution of that portion to the viability of the species based on the conservation biology principles of redundancy, resiliency, and representation. (These concepts can similarly be expressed in terms of abundance, spatial distribution, productivity, and diversity.) The identification of an SPR does not create a presumption, prejudgment, or other determination as to whether the species in that identified SPR is endangered or threatened. We must go through a separate analysis to determine whether the species is endangered or threatened in the SPR. To determine whether a species is endangered or threatened throughout an SPR, we will use the same standards and methodology that we use to determine if a species is endangered or threatened throughout its range.

Depending on the biology of the species, its range, and the threats it faces, it may be more efficient to address the ''significant'' question first, or the status question first. Thus, if we determine that a portion of the range is not ''significant,'' we do not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we do not need to determine if that portion is ''significant.''

Evaluation and Finding

We evaluated the current range of the Sonoran desert tortoise to determine if there are any apparent geographic concentrations of potential threats to the species. Generally speaking, the risk factors affecting the tortoise occur throughout the range of the species; however, portions of the range that are within and near areas subject to urban development may be subject to impacts not found throughout the range of the species. If we assume that the entire area on unprotected land identified as having potential for urban development is developed and made entirely unusable to tortoises, that conversion would represent a loss of 9 percent of available habitat. At this scale, we have no information to suggest that the remaining 91 percent of available habitat would not continue to support sufficient resiliency and redundancy. Additionally, there is no information available that suggests there are unique genetic values in this area that would need to be maintained to support representation due to a lack of known genetic structuring for the tortoise. Based on this analysis, we conclude that the portion of the range of the tortoise outside the urban development area contains sufficient redundancy, resiliency, and representation that, even without the contribution of the urban development area, the tortoise would not be in danger of extinction. Therefore, we find that the Sonoran desert tortoise is not in danger of extinction in a significant portion of its range.

Conclusion

Our review of the best available scientific and commercial information indicates that the Sonoran desert tortoise is not in danger of extinction (endangered) nor likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range. Therefore, we find that listing the Sonoran desert tortoise as an endangered or threatened species under the Act is not warranted at this time, and as such the Sonoran desert tortoise will be removed from the candidate list.

We request that you submit any new information concerning the status of, or threats to, the Sonoran desert tortoise to our Arizona Ecological Services Field Office (see **ADDRESSES**) whenever it becomes available. New information will help us monitor the Sonoran desert tortoise and encourage its conservation. If an emergency situation develops for the Sonoran desert tortoise, we will act to provide immediate protection.

References Cited

A complete list of references cited is available in the SSA Report (Service 2015), available online at *http://www.regulations.gov*, under Docket Number FWS–R2–ES–2015–0150.

Author(s)

The primary author(s) of this notice are the staff members of the Arizona Ecological Services Field Office.

Authority

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

Dated: September 22, 2015.

Cynthia T. Martinez,

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. 2015–25286 Filed 10–5–15; 8:45 am]

BILLING CODE 4333–15P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R4–ES–2015–0142; 4500030113]

RIN 1018–BB09

Endangered and Threatened Wildlife and Plants; Proposed Threatened Species Status for the Suwannee Moccasinshell

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule; 12-month finding and status review.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Suwannee moccasinshell (*Medionidus walkeri*), a freshwater mussel species from the Suwannee River Basin in Florida and Georgia, as a threatened species under the Endangered Species Act of 1973, as amended (Act). If we finalize this rule as proposed, it would extend the Act's protections to this species. The effect of this regulation will be to add this species to the List of Endangered and Threatened Wildlife.

DATES: We will accept comments received or postmarked on or before December 7, 2015. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES** below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by November 20, 2015.

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically:* Go to the Federal eRulemaking Portal: *http://www.regulations.gov.* In the Search box, enter FWS–R4–ES–2015–0142, which is the docket number for this rulemaking. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on ''Comment Now!''

(2) *By hard copy:* Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R4–ES–2015–0142; U.S. Fish and Wildlife Service Headquarters, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments only by the methods described above. We will post all comments on *http://www.regulations.gov.* This generally means that we will post any personal information you provide us (see *Public Comments* below for more information).

FOR FURTHER INFORMATION CONTACT: Catherine T. Phillips, Project Leader, U.S. Fish and Wildlife Service, Panama City Ecological Services Field Office, 1601 Balboa Avenue, Panama City, FL 32405; by telephone 850–769–0552; or by facsimile at 850–763–2177. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if we determine that a species is an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the **Federal Register** and make a determination on our proposal within 1 year. Critical habitat shall be designated, to the maximum extent prudent and determinable, for any species determined to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designations of critical habitat can only be completed by issuing a rule.

This rule proposes the listing of the Suwannee moccasinshell (*Medionidus walkeri*) as a threatened species. The Suwannee moccasinshell is a candidate species for which we have on file sufficient information on biological vulnerability and threats to support