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Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Forks Springsnail and Threatened Status for San Bernardino Springsnail Throughout Their Ranges and Designation of Critical Habitat for Both Species; Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2009–0083; 4500030114]

RIN 1018–AV84

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Three Forks Springsnail and Threatened Status for San Bernardino Springsnail Throughout Their Ranges and Designation of Critical Habitat for Both Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine endangered status for the Three Forks springsnail (*Pyrgulopsis trivialis*) and threatened status for the San Bernardino springsnail (*Pyrgulopsis bernardina*); and designate critical habitat for both species under the Endangered Species Act of 1973, as amended (Act). In total, approximately 17.2 acres (6.9 hectares) are designated as critical habitat for Three Forks springsnail in Apache County, Arizona, and approximately 2.0 acres (0.8 hectares) for San Bernardino springsnail in Cochise County, Arizona. This final rule implements the Federal protections provided by the Act for these species.

DATES: This rule becomes effective on May 17, 2012.

ADDRESSES: This final rule and associated final economic analysis are available on the Internet at *http://www.regulations.gov* or *http://www.fws.gov/southwest/es/arizona/.* Comments and materials received, as well as supporting documentation used in preparing this final rule, are available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 West Royal Palm Road, Suite 103, Phoenix, AZ 85021; telephone 602–242–0210; facsimile 602–242–2513.

FOR FURTHER INFORMATION CONTACT: Steve Spangle, Field Supervisor, Arizona Ecological Services Field Office (see **ADDRESSES** section). If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Purpose of the Regulatory Action

Under the Endangered Species Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. The Endangered Species Act sets forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants.

Under the Act, a species may be determined to be endangered or threatened based on any of the following five factors: (1) Destruction, modification, or curtailment of its habitat or range; (2) Overuse; (3) Disease or predation; (4) Inadequate existing regulations; or (5) Other natural or manmade factors. Based on our analysis under the five factors, we find that there are threats of sufficient imminence, intensity, or magnitude to cause a substantial decrease in distribution, or loss of viability of both the Three Forks springsnail and San Bernardino springsnail. Therefore, these species qualify for listing, which can only be done by issuing a rule.

We have made the following findings for the Three Forks springsnail related to these criteria:

- Historically, the Three Forks springsnail is known to have occurred in numerous springs and seeps in Apache County, Arizona. In recent years, the species' range has been reduced to the point that it has only been found at two spring complexes.
- Because the species is so limited in range, the magnitude of threats that are occurring now are high, and those that may impact the species in the foreseeable future are high as well.
- A recent high-intensity fire that burned around the only remaining populations of the Three Forks springsnail has caused the habitat of the species to be currently threatened with destruction, modification, and curtailment due to soil erosion and sedimentation during storm events.
- Also, we have found that predation by nonnative crayfish is currently threatening the Three Forks springsnail across its entire range.
- In addition to the current threats, the Three Forks springsnail is also at a high risk of extinction due to threats that could affect the species in the foreseeable future, such as the use of fire retardant chemicals during future wildfires, the potential spread and competition with New Zealand springsnails, and the potential for climate change and drought to dry its springhead habitat.
- Due to its endemic nature, the Three Forks springsnail may be more vulnerable to extinction from both present and future threats.

We have made the following findings for the Three Forks springsnail related to the five factor criteria:

- The historical range of the San Bernardino springsnail in the United States may have included several springs in Cochise County, Arizona. The current range of the species in the United States is now believed to be limited to two springs.
- The San Bernardino springsnail was recently discovered to occur at five sites in Sonora, Mexico, in at least nine springs.
- San Bernardino springsnail is not presently in danger of extinction throughout its entire range, based on the immediacy, severity, and extent of the threats.
- However, we have determined that, while significant threats are not operative now, they are likely to cause the species to become in danger of extinction in the foreseeable future.
- The species' habitat is likely to be threatened in the foreseeable future with destruction, modification, and curtailment in part of its range due to the potential use of fire retardant chemicals in the United States, and throughout its entire range in both the United States and Mexico due to potential springhead inundation, and water depletion and diversion.
- Also, we found that the San Bernardino springsnail is likely to become in danger of extinction in the foreseeable future throughout its entire range due to the potential invasion and predation by nonnative crayfish, invasion and competition with New Zealand springsnails, and climate change and drought drying its springhead habitat.
- Due to the species' endemic nature, the San Bernardino springsnail may be more vulnerable to extinction in the foreseeable future from these potential threats throughout its entire range.

Summary of the Major Provisions of the Regulatory Action

This document consists of: (1) A final rule to list the Three Forks springsnail as endangered; (2) a final rule to list the San Bernardino springsnail as threatened; and (3) final critical habitat designation for both species.

On April 12, 2011, we proposed listing these species as endangered with critical habitat. On November 17, 2011, we proposed revision of the previously proposed critical habitat for the Three Forks springsnail, based on new information indicating the species was

more widely distributed. We also announced the receipt of new information confirming that populations of springsnails in Sonora, Mexico, are San Bernardino springsnail. Since the publication of the proposed rule, we have made the following changes in the final rule:

- We previously proposed to list the San Bernardino springsnail as endangered, but upon review of additional information regarding the status of, and threats to, the springsnail in Mexico, we have determined the species meets the definition of threatened instead of endangered. We believe the species is likely to become an endangered species within the foreseeable future rather than being in danger of extinction now.
- For the San Bernardino springsnail, we expanded the Summary of Factors Affecting the Species to include a discussion factors throughout the species' entire range, including the United States and Mexico.

We obtained opinions from knowledgeable individuals with scientific expertise to review our technical assumptions, analysis, adherence to regulations, and whether or not we had used the best available information. These peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the final listing and critical habitat rule. As a result, we determine endangered status for the Three Forks springsnail and threatened status for the San Bernardino springsnail. We also designate critical habitat for both species. In total, approximately 17.2 acres (6.9 hectares) are designated as critical habitat for Three Forks springnail in Apache County, Arizona, and approximately 2.0 acres (0.8 hectares) for San Bernardino springsnail in Cochise County, Arizona.

Previous Federal Actions

We first identified the Three Forks springsnail as a candidate for listing on October 30, 2001 (66 FR 54808). We first identified the San Bernardino springsnail as a candidate for listing on December 6, 2007 (72 FR 69034). Candidates are those fish, wildlife, and plants for which we have on file sufficient information on biological vulnerability and threats to support preparation of a listing proposal, but for which development of a listing regulation is precluded by other higher priority listing activities.

On May 4, 2004, the Center for Biological Diversity petitioned the Service to list 225 species of plants and animals as endangered under the provisions of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*), including the Three Forks springsnail. On June 25, 2007, we received a petition from Forest Guardians to list 475 species in the southwestern United States as threatened or endangered under the provisions of the Act, including the San Bernardino springsnail. In our most recent annual Candidate Notice of Review dated November 10, 2010 (75 FR 69222), we retained a listing priority number (LPN) of 2 for the Three Forks springsnail and the San Bernardino springsnail in accordance with our priority guidance published on September 21, 1983 (48 FR 43098). An LPN of 2 reflects threats that are both imminent and high in magnitude, as well as the taxonomic classification as a full species.

On April 12, 2011, we proposed listing the Three Forks springsnail and San Bernardino springsnail as endangered with critical habitat (76 FR 20464) under the Act (16 U.S.C. 1531 *et seq.*). Proposed critical habitat for the Three Forks springsnail included spring ecosystems within Apache County, Arizona, and for the San Bernardino springsnail spring ecosystems within Cochise County, Arizona.

On November 17, 2011, we reopened the comment period on the proposed rule, and announced the availability of a draft economic analysis (76 FR 71300). At that time, we proposed revision of the previously proposed critical habitat for the Three Forks springsnail, based on new information indicating that the species was more widely distributed along Boneyard Creek. We also announced the receipt of new information confirming that populations of springsnails in Sonora, Mexico, are San Bernardino springsnails.

Summary of Comments and Recommendations

We requested written comments from the public on the proposed listing and designation of critical habitat for the Three Forks springsnail and San Bernardino springsnail during two comment periods from April 12 to June 13, 2011, and November 17 to December 19, 2011. We did not receive any requests for a public hearing, and thus, none was held. We also contacted associated Federal, State, and local agencies, scientific organizations, and other interested parties and invited them to comment on the proposed rule and draft economic analysis during the two comment periods.

During the 2 comment periods, we received 11 letters addressing the proposed listing and critical habitat designation. We did not receive any comments on the draft economic analysis associated with this rulemaking. However, all other substantive information provided during the comment periods has either been incorporated directly into this final determination as appropriate or addressed below.

Peer Review

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from five knowledgeable individuals with scientific expertise that included familiarity with the species, the geographic region in which the species occur, and conservation biology principles. We received responses from three of the peer reviewers.

We reviewed all comments received from peer reviewers for substantive issues and new information regarding critical habitat for the two springsnails. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and suggestions to improve the final critical habitat rule. Peer reviewer comments are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Reviewer Comments

Comment (1): Peer reviewers made a number of technical scientific suggestions regarding our discussions and presentations of biological terminology, springsnail ecology, species' descriptions, habitat associations, and species distribution.

Our response: We have revised the language accordingly in this final rule.

Comment (2): One peer reviewer stated that livestock grazing is a threat to Three Forks springsnail and their habitats, because the current fence around Boneyard Bog is inadequate as evidenced by the recent presence of 25 to 35 cattle grazing near spring-seeps on numerous occasions.

Our response: Based on communication with staff from the Apache-Sitgreaves National Forests and Arizona Game and Fish Department (AGFD), the current fence around Boneyard Bog is adequate, and they have not observed livestock within the fenced exclosure. Also, since 2001, the AGFD has been conducting annual springsnail surveys (Nelson *et al.* 2002, entire) and since 1997 the Apache-Sigreaves National Forests have been implementing special management to minimize potential livestock trespass (USFS 2011b, p. 184). For further information, see Ungulate discussion

under Factor A analysis for this species, below.

Comment (3): One peer reviewer stated that it is clear the abundance and distribution of both species has declined since studies were first conducted, and the proposed rule supports listing of both species.

Our response: The Three Forks springsnail and San Bernardino springsnail have declined in abundance and distribution, and the available information continues to support listing.

Comment (4): One peer reviewer suggested that the amount of occupied habitat (particularly spring surface area) is a superior metric over abundance of individual snails for assessing status of springsnails.

Our response: When we assess the status of a species, we take into consideration the factors that may impact the species' continued existence, as well as the species' life history processes. In regards to a springsnail's abundance, we agree that limits on springsnail productivity appear to be more closely related to the availability of suitable habitat rather than number of individuals, because springsnails exhibit high fecundity. The availability of suitable habitat is one of the components we take into consideration when assessing the status of the springsnails.

Comment (5): One peer reviewer noted that numerous scattered springs along Boneyard Creek, downstream of Boneyard Bog Springs and upstream of Three Forks Springs, are inhabited by springsnails that are likely Three Forks springsnails and should be included as critical habitat.

Our response: We agree, and based on this new information indicating that the species was more widely distributed along Boneyard Creek, in November 17, 2011 (76 FR 71300), we proposed to revise the previously proposed critical habitat for the Three Forks springsnail by increasing the size of the Boneyard Bog Springs Unit, and by adding an additional unit, the Boneyard Creek Springs Unit.

Comment (6): One peer reviewer noted that recent genetic work shows that San Bernardino springsnails inhabit springs in Sonora, Mexico, on the Rancho San Bernardino, and the proposed rule does not contain a threats assessment for that portion of its range.

Our response: The genetic information was not available in early 2011 when the proposed rule was published in the **Federal Register**. We have reviewed this new information and conducted a threats assessment for San Bernardino springsnail across its entire range as part of this final rule.

Comment (7): One peer reviewer suggested that the discussion under Wildfire Suppression warrants reevaluation to avoid overstating the effects of aerial retardant on populations of Three Forks springsnail at Three Forks Springs.

Our response: The available evidence regarding the effects of fire retardant on Three Forks springsnail does not constitute definitive proof that exposure to drift resulted in the extirpation of the species from Three Forks Springs. However, we are required to utilize the best scientific and commercial information available, and conclude the information we have cited meets the criteria. It is unlikely that retardant residue traveled upstream within spring-runs, and if springsnails were exposed to retardant it would have been drift from high-elevation drops. Fire retardant chemicals are known to be toxic to aquatic life, including those fire retardants used in the Three Forks Fire in 2004. We find the inability of surveyors to locate the species at Three Forks Springs since 2005, the season immediately following suspected exposure to drift, to be a compelling reason to suspect retardant-related toxicity. However, we acknowledge the speculative nature of this conclusion, as well as technical errors, such as overestimating the amount of retardant used to fight the fire, and have revised the language accordingly in this final rule.

Comment (8): One peer reviewer did not believe sufficient evidence was provided to conclude that elk wallowing threatens the integrity of an entire spring system.

Our response: Field observations, largely from Service biologists, have provided anecdotal evidence that wet seeps and boggy areas characterized by elk wallows are not occupied by Three Forks springsnails, and are unsuitable for the species. Even though elk wallowing is a factor that seems to be impacting the Three Forks springsnail's habitat, we do not believe it is occurring at a scale that would cause the extinction of Three Forks springsnail on its own. However, in combination with the other threats identified in this five-factor analysis, we think elk wallowing may be contributing to the species' risk of extinction by reducing its long-term viability.

Comment (9): One peer reviewer stated that it is unclear from the information in the proposed rule if inundation continues to be a threat, particularly at House Pond.

Our response: The San Bernardino springsnail is mainly found near spring vents (area where water emerges from underground) and in association with high water velocity. Inundation can alter the springsnail's preferred habitat by increasing water depth, reducing water velocity, and causing shifts in substrate (the base on which an organism lives) composition, vegetation, and water chemistry. Because of inundation's ability to alter the springsnail's preferred habitat, we consider springhead inundation to be a threat to the San Bernardino springsnail's continued existence. For more details on this issue, please see *Factor A* analysis for the San Bernardino springsnail, below.

Comment (10): One peer reviewer indicated that the threat of groundwater depletion to the San Bernardino springsnail is not clearly demonstrated.

Our response: The use of the phrase ''groundwater depletion'' has been revised in this final rule, because it did imply an unverified connection to identifiable groundwater pumping or withdrawal. The loss of habitat and the springsnail population at Snail Spring was clearly due to the loss of water flow. However, the underlying hydrologic mechanism that caused the spring to dry is unclear. Additionally, because that population is now extirpated, the threat from water depletion is no longer acting upon the species at that site. We have revised the language accordingly in this final rule.

Comment (11): One peer reviewer questioned the potential effects of glyphosate. The reviewer stated the use of the herbicide glyphosate (Roundup®) on the John Slaughter Ranch Museum was not well documented, and the pesticide has low toxicity for freshwater mollusks.

Our response: Based on a more in-depth evaluation of the available information, the possible detrimental effects of glyphosate exposure to springsnails are not well supported. We have revised the language accordingly in this final rule.

Comment (12): One peer reviewer questioned our conclusions regarding the potential effects of nonnative crayfish (*Orconectis virilis*) on the Three Forks springsnail.

Our response: Our conclusion regarding the threat of crayfish predation on the Three Forks springsnail is based on the fact that nonnative crayfish are known predators of aquatic snails (Fernandez and Rosen 1996, pp. 24–25; Parkyn *et al.* 1997, p. 690), and are relatively recent invaders of Three Forks springsnail habitats. We also drew our conclusion from field observations that noted a concurrent decline in springsnail abundance in conjunction with an increase in crayfish

abundance. Therefore, based upon the best available information, we consider nonnative crayfish predation to be a threat to the Three Forks springsnail.

Comment (13): One peer reviewer asked how haplotype differentiation would factor into the need to repopulate Three Forks Springs to ensure the ecological representation of the Three Forks springsnail.

Our response: We believe information on genetic diversity will be a critical element in determining the most appropriate manner in which to promote recovery of the Three Forks springsnail, particularly at Three Forks Springs. It is our goal to maintain the genetic diversity of the species, and we have commissioned a genetic study to review the genetic relationships between and among Three Forks springsnails within each critical habitat unit. The decision of whether or not to allow natural repopulation from upstream populations, or to conduct active translocations, will be determined in the context of a recovery team comprising Service personnel, species experts, and other stakeholders.

Comment (14): One peer reviewer stated that Tule Spring does not appear conducive to occupation by San Bernardino springsnail, particularly in regard to the presence of the primary constituent elements (PCEs), and should not be designated as critical habitat.

Our response: Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographic area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. We have determined that Tule Spring is essential to the conservation of the San Bernardino springsnail, because it provides redundancy of the species if a population were to become established there either through natural or artificial reintroductions.

Comments From the States

Section 4(i) of the Act states the Secretary shall submit to the State agency a written justification for his failure to adopt regulations consistent with the agency's comments or petition. We received two comment letters from the AGFD. The majority of AGFD's comments were similar to those expressed by peer reviewers, and have been addressed above (see our responses (3), (5), (8), and (14) under *Peer Reviewer Comments*).

Comment (15): The AGFD stated that, due to new information on its status and distribution, the San Bernardino springsnail is at less risk to extinction, and they would support not listing this species.

Our response: We have reviewed the new information indicating the San Bernardino springsnail is more widespread than previously believed, particularly in Sonora, Mexico. We have included these sites in our five-factor analysis, and have concluded that sufficient threats still exist to warrant listing the species as threatened.

Comments From the U.S. Forest Service

We did not receive comments from the U.S. Forest Service (USFS) specifically on the proposed rule. However, we did receive a map from the USFS during the open comment period on the proposed rule to designate critical habitat for the Chiricahua leopard frog (*Lithobates chiricahuensis*) (76 FR 58441, September 21, 2011) outlining the area they are considering as the Three Forks Recommended Research Natural Area (RNA) and Associated Features.

Public Comments

Several commenters made numerous comments similar to those expressed by peer reviewers, and which have been addressed above (see our responses (3), (5), (6), (11), and (14) under *Peer Reviewer Comments*).

Comment (16): One commenter noted that current husbandry research indicates that the Three Forks springsnail requires a consistent environment in order to thrive, particularly in the context of water quality and temperature.

Our response: We have compiled the available information regarding ongoing research on captive populations of Three Forks springsnail and incorporated this information into the final rule as appropriate.

Comment (17): One commenter stated that, at the time of public comment, the Wallow Fire was burning in the White Mountains, potentially threatening remaining populations of Three Forks springsnail.

Our response: We have compiled the available information regarding the Wallow fire and incorporated it into the final rule as appropriate. Wildfire has been known to have negative effects on springsnails, and most Three Forks springsnail sites were severely burned. However, reporting indicates that aerial fire retardants were not applied along Boneyard Creek, because the fire burned too hot and fast. At this time, we do not know what effect the Wallow Fire will have on the long-term viability of Three Forks springsnail. We will continue to work with the USFS, AGFD, and interested stakeholders, to monitor and conserve the species.

Comment (18): One commenter questioned what actions the Service was taking to alter established policies identified in the preamble to the proposed rule under The Inadequacy of Existing Regulatory Mechanisms.

Our response: Many regulatory mechanisms discussed are under the purview and discretion of other Federal and State agencies. The Service has no regulatory authority to affect change to existing regulatory mechanisms of other agencies. However, we do work under the authorities of the Act to assist and coordinate with other agencies to ensure their actions are protective of threatened and endangered species and their critical habitats.

Comment (19): One commenter stated additional suitable springs in the vicinity of habitat currently occupied by the San Bernardino springsnail should be designated as critical habitat.

Our response: Other than those discussed in this final rule, the commenter did not provide nor do we have any information on other springs in the vicinity of habitat currently occupied by the San Bernardino springsnail in the United States to evaluate for critical habitat. Although several springs in Sonora, Mexico, provide habitat for the species, we do not designate critical habitat in foreign countries.

Comment (20): One commenter stated that the Service should consider designation of critical habitat throughout the historical ranges of both species, and include areas that are not currently occupied.

Our response: In this final critical habitat designation, we are including both occupied and unoccupied units, for both species. In accordance with section 3(5)(A) of the Act, we are designating critical habitat in specific areas within the geographic area occupied by the species at the time of listing, which contain the physical and biological features essential for the conservation of the species, and which may require special management, as well as specific areas outside the geographic area occupied by the species at the time of listing, and are essential to the conservation of the species. In this final rule, the unoccupied units we designated as critical habitat are areas within the historical ranges of both species.

Summary of Changes From the Proposed Rule

Since the publication of the April 12, 2011 (76 FR 20464), proposed rule to list and designate critical habitat for the

Three Forks springsnail and San Bernardino springsnail, and the November 17, 2011 (76 FR 71300), proposed revision of the critical habitat for the Three Forks springsnail, we have made the following changes in this final rule:

(1) We previously proposed to list the San Bernardino springsnail as endangered, but upon review of additional information, which we described in the notice announcing the availability of a draft economic analysis (76 FR 71300; November 17, 2011), regarding the status of, and threats to, the springsnail in Mexico, we have the determined the species meets the definition of threatened instead of endangered. Based on the best available information at this time, the species is likely to become an endangered species within the foreseeable future rather than being in danger of extinction now.

(2) For the San Bernardino springsnail, we expanded the Summary of Factors Affecting the Species to include a discussion of factors throughout the species' entire range, including the United States and Mexico.

Endangered Status for Three Forks Springsnail and Threatened Status for San Bernardino Springsnail

It is our intent to discuss below only those topics directly relevant to the listing of the Three Forks springsnail as endangered, and the San Bernardino springsnail as threatened, in this section of the final rule.

Species Information

Both the Three Forks springsnail and San Bernardino springsnail are members of the genus *Pyrgulopsis* in the family Hydrobiidae. In the arid Southwest, springsnails are largely relicts of the wetter Pleistocene Epoch (2.5 million to 10,000 years ago), and are typically distributed across the landscape as geographically isolated populations exhibiting a high degree of endemism (found only in a particular area or region) (Bequart and Miller 1973, p. 214; Taylor 1987, pp. 5–6; Shepard 1993, p. 354; Hershler and Sada 2002, p. 255).

Springsnails are strictly aquatic, and respiration occurs through an internal gill. Springsnails in the genus *Pyrgulopsis* are egg-layers with a single small egg capsule deposited on a hard surface (Hershler 1998, p. 14; Pearson 2011, p. 3). The larval stage is completed in the egg capsule, and upon hatching, tiny snails emerge into their adult habitat (Brusca and Brusca 1990, p. 759; Hershler and Sada 2002, p. 256). The sexes are separate, and females are noticeably larger than males. Mobility is limited, and significant migration likely does not occur, although aquatic snails have been known to disperse by becoming attached to the feathers of migratory birds (Roscoe 1955, p. 66; Dundee *et al.* 1967, pp. 89–90). Springsnails in the family Hydrobiidae feed primarily on periphyton, which is a complex mixture of algae, detritus, bacteria, and other microbes that live upon submerged surfaces in aquatic environments (Mladenka 1992, pp. 46, 81; Hershler and Sada 2002, p. 256; Lysne *et al.* 2007, p. 649). The life span of most aquatic snails is 9 to 15 months (Pennak 1989, p. 552); the survival of one species in the genus *Pyrgulopsis* in the laboratory was nearly 13 months (Lysne *et al.* 2007, p. 3).

Hydrobiid snails occur in springs, seeps, spring runs, and a variety of waters, but particularly spring systems that produce running water. Snails in the genus *Pyrgulopsis* are rarely found in mud or soft sediments (Hershler 1998, p. 14), and are typically more abundant in gravel-to cobble-size substrates (Frest and Johannes 1995, p. 203; Malcom *et al.* 2005, p. 75; Martinez and Thome 2006, pp. 12–13; Lysne *et al.* 2007, p. 650). These substrate types provide a suitable surface for springsnails to graze and lay eggs (Taylor 1987, p. 5; Hersler 1998, p. 14).

Proximity to springheads, where water emerges from the ground, plays a key role in the life history of springsnails. Many springsnail species exhibit decreased abundance farther away from spring vents, presumably due to their need for stable water chemistry and flow provided by spring waters (Hershler 1984, p. 68; Hershler 1998, p. 11; Hershler and Sada 2002, p. 256; Martinez and Thome 2006, p. 14; Tsai *et al.* 2007, p. 216). They are sensitive to water quality, and each species is usually found within relatively narrow habitat parameters (Sada 2008, p. 59). Several habitat parameters, such as substrate, dissolved carbon dioxide, dissolved oxygen, temperature, conductivity, pH, and water depth, have been shown to influence the distribution and abundance of *Pyrgulopsis* snails (O'Brien and Blinn 1999, pp. 231–232; Mladenka and Minshall 2001, pp. 209–211; Malcom *et al.* 2005, p. 75; Martinez and Thome 2006. pp. 12–15; Lysne *et al.* 2007, p. 650; Tsai *et al.* 2007, p. 2006; Martinez and Rogowski 2011, pp. 218–220). Dissolved salts such as calcium carbonate may also be important factors because they are essential for shell formation (Pennak 1989, p. 552).

Three Forks Springsnail

The Three Forks springsnail was originally described as *Fontelicella trivialis* by Taylor (1987, pp. 30–32) and later *Pyrgulopsis confluentis* by Hershler and Landye (1988, pp. 32–35) from a spring-fed pond at Three Forks, Apache County, Arizona. The species was renamed *Pyrgulopsis trivialis* by Hershler (1994, pp. 68–69). We have carefully reviewed the available taxonomic information (Landye 1973, p. 49; Taylor 1987, pp. 30–32; Hershler and Landye 1988, pp. 32–35; Hershler 1994, pp. 68–69; Hurt 2004, p. 1176), and conclude that Three Forks springsnail is a valid taxon (entity). The Three Forks springsnail is a variably sized species, with a shell height (length) of 0.06 to 0.19 inches (in) (1.5 to 4.8 millimeters (mm). A detailed description of the identifying characteristics of the Three Forks springsnail is found in Taylor (1987, pp. 30–32), Hershler and Landye (1988, pp. 32–35), and Hershler (1994, pp. 68–69).

Historically, the Three Forks springsnail is known to have occurred in numerous springs and seeps along Boneyard Creek and its confluence with the North Fork East Fork Black River in the White Mountains on the Apache-Sitgreaves National Forests, in Apache County, east-central Arizona. In recent years, the springnail was found only in the Three Forks Springs, Boneyard Bog Springs, and Boneyard Creek Springs. Each of these spring complexes comprise few to many spring vents (Table 1) and are found in shallow canyon drainage or open mountain meadows at 8,200 feet (ft) (2,500 meters (m)) in elevation. These springs are spread across 3.7 miles (mi) (6 kilometers (km)) of perennial flowing stream. The species has been found in free-flowing springheads, concrete boxed springheads, spring runs, spring seeps, and shallow ponded water (Martinez and Myers 2008, p. 189). Unfortunately, the species was extirpated from Three Forks Springs in 2004 following the Three Forks Springs Fire (see a more detailed discussion on the effects of this fire under *Factor A* analysis for this species, below).

TABLE 1—OCCUPANCY OF THE THREE FORKS SPRINGSNAIL IN SPRINGS ALONG BONEYARD CREEK AND NORTH FORK EAST FORK BLACK RIVER, ARIZONA

Area of recent occurrence	Number of springs	Currently occupied	Year of last verified occupancy
Three Forks Springs	At least 8	No	2003
Boneyard Bog Springs	At least 8	Yes	2010
Boneyard Creek Springs	At least 11	Yes	2010

Martinez and Myers (2008, pp. 189–194) found that presence of Three Forks springsnail was associated with gravel and pebble substrates, shallow water up to 2.4 in (6 centimeters (cm)) deep, high conductivity, alkaline waters of pH 8, and the presence of pond snails (*Physa gyrina*). Martinez and Rogowski (2011, p. 218) found that density of Three Forks springsnail was greater in water depths less than 2.2 in (5.6 cm), where density of pond snails was less than 5.5 per square yard (4.6 per square meter), and where distance from the springhead was less than 2.6 ft (0.8 m). In captivity, the species selected water depths of 3.2 in (8.1 cm) in an aquarium that ranged from 1.9 in (4.8 cm) to 7.5 in (19.1 cm) in depth (Rogowski 2011, p. 1). It has been shown that density of Three Forks springsnail is significantly greater on gravel and cobble substrates (Martinez and Rogowski 2011, p. 220; Martinez and Myers 2002, p. 1), though the species has been reported as ''abundant'' in the fine-grained mud of a 0.03-acre (ac) (0.01-hectare (ha)) pond at Three Forks Springs (Taylor 1987, p. 32). Abundance has been found to decrease downstream from springheads (Martinez and Rogowski 2011, p. 218, Nelson *et al.* 2002, p. 11), consistent with studies of other springsnails (Hershler 1984, p. 68; Hershler 1998, p. 11; Hershler and Sada 2002, p. 256; Martinez and Thome 2006, p. 14; Tsai *et al.* 2007, p. 216). The Three Forks springsnail was known to occur in ponded springboxes and the big pond at Three Forks, prior to extirpation. Although research indicates the species exhibits higher density in shallower water, the species does not appear to be intolerant of deeper ponded water. In captive settings, the number of observed living springsnails declined along with decreasing water temperature (Phoenix Zoo 2009, p. 2), and the species preferred temperatures near 71.6 degrees Fahrenheit (°F) (22 degrees Celsius (°C)) (Rogowski and Martinez 2010, p. 1; Rogowski 2011, p. 1).

The Three Forks springsnail was historically abundant within all spring ecosystems where found, though with patchy micro-distribution. Nelson *et al.* (2002, p. 5) reported Three Forks springsnail densities of approximately 72 snails per square yard (60 snails per square meter) at Three Forks Springs, and approximately 945 per square yard (790 snails per square meter) at Boneyard Bog Springs. The highest number recorded at a single spring-brook occurred in a 254-square yards (213-square meters) area at Three Forks Springs in 2002, where tens of thousands of individual snails were estimated (Martinez 2009, pp. 31–32). Unfortunately, the Three Forks springsnail was last documented at Three Forks Springs in 2003. The AGFD has been conducting annual surveys since 2001 (Nelson *et al.* 2002, entire), and they have been reporting very low numbers of the springsnails at Three Forks Springs since 2005 (Cox 2007, p. 1; Bailey 2008, p. 1; Grosch 2010, p. 1). However, no voucher specimens (specimens collected to verify species identification) were actually collected until 2011, when it was discovered that the small snails from Three Forks Springs were not Three Forks springsnails (Sorensen 2011a, p. 1), but rather air-breathing, land snails belonging to the family Pupillidae. Based on this new information, the species is not currently considered to be extant at Three Forks Springs. Fortunately, the species continues to be abundant at Boneyard Bog Springs and Boneyard Creek Springs.

San Bernardino Springsnail

The San Bernardino springsnail was originally described as *Yaquicoccus bernardinus* by Taylor (1987, pp. 34–35) and later *Pyrgulopsis cochisi* by Hershler and Landye (1988, p. 41) from a spring in the San Bernardino Creek drainage, Cochise County, Arizona. The species was renamed *Pyrgulopsis bernardina* by Hershler (1994, pp. 21–22). We have reviewed the available taxonomic information (Landye 1973, p. 34; Landye 1981, p. 21; Hershler and Landye 1988, p. 41; Taylor 1987, p. 34; Hershler 1994, p. 21; Hurt 2004, p. 1176; Varela Romero and Myers 2010, p. 9), and conclude that San Bernardino springsnail is a valid taxon. The San Bernardino springsnail has a narrow-conic shell and a height of 0.05 to 0.07 in (1.3 to 1.7 mm). A detailed description of the identifying characteristics of the San Bernardino springsnail is found in Taylor (1987, pp. 35–35); Hershler and Landye (1988, p. 41), and Hershler (1994, pp. 21–22).

The historical range of the San Bernardino springsnail in the United States may have included several springs along the Rio San Bernardino (also known as San Bernardino Creek or Black Draw) within the headwaters of the Rio Yaqui in Cochise County, southern Arizona around 3,806 ft (1,160 m) elevation on what is now the San Bernardino National Wildlife Refuge (NWR) and the State-owned John Slaughter Ranch Museum, including Snail Spring, Horse Spring, Goat Tank Spring, and perhaps Tule Spring (Cox *et al.* 2007, pp. 1–2; Service 2007, pp. 82–83; Malcom *et al.* 2005, p. 75; Malcom *et al.* 2003, p. 2; Velasco 2000, p. 1). The current range of the species in the United States is now believed to be limited to two springs on the John Slaughter Ranch Museum, Goat Tank Spring and Horse Spring (Martinez 2010, p. 2) (Table 2). Surveys by SBNWR staff confirmed the presence of San Bernardino springsnails in Horse Spring in 2009 (Martinez 2010, p. 2). Also, Horse Spring is now known to be directly connected via an underground pipeline to Goat Spring (which is occupied by thousands of springsnails), so the liklihood of springsnails being at both sites is high.

The species was formerly collected and very abundant at Snail Spring on the John Slaughter Ranch Museum (Malcom *et al.* 2003, p. 17; Malcom *et al.* 2005, p. 74), but now appears to be extirpated having last been confirmed from that site in 2005 (Cox *et al.* 2007, p. 1; Malcom 2007, p. 1; Service 2007, p. 83; Martinez 2010, p. 1; Varela Romero and Myers 2010, p. 2).

TABLE 2—OCCUPANCY OF SAN BERNARDINO SPRINGSNAIL IN SPRINGS IN THE SAN BERNARDINO BASIN, ARIZONA, AND CAJÓN BONITO BASINS, MEXICO

Spring or springs complex	Number of springs	Currently occupied	Year of last verified occupancy
Goat Tank	1	Yes	2010.
Horse	1	Yes	2009.
Snail	1	No	2002.
Tule	1	No	Unknown.
Ojo El Chorro	At least 1	Yes	2010.
Los Ojitos	At least 1	Yes	2010.
Ojo El Ojito	At least 2	Yes	2010.
Ojo Agua Fria	At least 2	Yes	2010.
Ojo Caliente	At least 3	Yes	2010.

According to recent genetic studies, the San Bernardino springsnail occurs at five sites in Sonora, Mexico, in the San Bernardino and Cajón Bonito Basins, including Ojo El Chorro, Los Ojitos, Ojo El Ojito, Ojo Agua Fria, and Ojo Caliente (Liu and Hershler 2005, p. 293; Varela and Myers 2010, pp. 5–9). All five of these sites are located on privately owned ranches. The springs where the San Bernardino springsnail is found at these sites are typical ciénega ecosystems (wet, marshy areas at the foot of a mountain, in a canyon, or on the edge of a grassland where *groundwater* bubbles to the surface) occurring near 3,806 ft (1,160 m) in elevation (Minckley and Brunelle 2007, pp. 421–422), and most of the sites contain several springheads occupied by the species (Varela and Myers 2010, pp. 6–8) (Table 2).

Malcom *et al.* 2005 (pp. 71, 75–76) showed that density of San Bernardino springsnail was positively associated with cobble substrates, high vegetation density, faster water velocity, high dissolved oxygen, water temperatures ranging from 57 to 72 °F (14 to 22 °C), and pH values between 7.6 and 8.0. San Bernardino springsnail density exhibited positive relationships to sand and cobble substrates, vegetation density, and water velocity, and negative relationships to silt and organic substrates, and water depth (Malcom *et al.* 2005, pp. 75–76).

Limited information is available on population sizes for the San Bernardino springsnail. Malcom *et al.* (2003, p. 7; 2005, p. 74) estimated former average springsnail density as 66,893 per square yard (55,929 individuals per square meter) at Snail Spring from September 2001 to March 2002. The species formerly occurred in low population numbers at Goat Tank Spring, but has since exhibited an increase in abundance following the modification of a metal cover on the spring-box (Radke 2010, p. 1; Service 2011, pp. 117–118).

Summary of Factors Affecting the Three Forks Springsnail

Section 4 of the Act and implementing regulations at 50 CFR 424 set forth procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (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. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Each of these factors is discussed below.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Wildfire and Suppression

Fire frequency and intensity in southwestern forests are altered from historical conditions (Dahms and Geils 1997, p. 34; Danzer *et al.* 1997, pp. 1–2). Before the late 1800s, surface fires generally occurred at least once per decade in montane forests with a pine component (Swetnam and Baisan 1996, p. 15), landscapes similar to those within which the Three Forks springsnail occurs. During the early 1900s, frequent widespread ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, such as grasses. Coupled with fire suppression, changes in fuel load began to alter forest structure and natural fire regime (Dahms and Geils 1997, p. 34). An absence of low-intensity ground fires allowed a buildup of woody fuels that resulted in infrequent, but very hot, stand-replacing fires (fires that kill all or most of above-ground parts of dominant vegetation, changing the above-ground structure substantially) (Danzer *et al.* 1997, p. 9; Dahm and Geils 1997, p. 34).

In the past decade, USFS's lands around, or adjacent to, Three Forks springsnail habitats have been burned by wildfires, including the Three Forks Fire in 2004, and the Wallow Fire in 2011. These fires developed into hot crown fires (fires burning in tree canopies), while the Wallow Fire also exhibited very hot, stand-replacing effects. The lack of vegetation and forest litter following intense fires can expose soils to surface erosion during storms, often causing sedimentation and erosion in downstream drainages (DeBano and Neary 1996, pp. 70–75). This can cause infilling of substrates and shifts in water chemistry within spring systems.

We do not expect that surface erosion would have affected spring ecosystems occupied by Three Forks springsnail following the Three Forks Fire, because the spring areas did not burn. In contrast, most of the areas around Boneyard Bog and Boneyard Creek Springs, which are occupied by the species, were burned by the Wallow Fire in 2011, and these occupied springs are at risk from ash and sediment erosion during anticipated storm-water flows (USFS 2011a, pp. 65–69). We believe the species evolved with frequent low-intensity wildfire, and likely exhibits some resiliency. However, there is cause for concern as fire-induced changes in habitat for the Koster's springsnail (*Juturnia kosteri*) in New Mexico, resulted in lower springsnail densities post-fire (Lang 2002, pp. 5–7; NMDGF 2006, p. 9). Conversely, Sada and Vinyard (2002, p. 282) noted the presence of large populations of the springsnail *P. glibba* in recently burned springs in Nevada. Initial reports indicate that Three Forks

springsnails were not observed in at least one spring within Boneyard Bog Springs that was affected by recent flooding and ash debris (Sorensen 2011a, p. 1). Because the Wallow Fire exhibited very hot, stand-replacing effects, and it burned around the entirety of the only two spring complexes (consisting of several springs) known to be occupied by the species, additional storm-water flows are likely to cause erosion and sedimentation to flow into the springsnail's habitat, thus potentially resulting in the species' decline to the point of extinction.

Although the Three Forks Fire in 2004 did not directly burn Three Forks springsnail habitats, fire suppression included application of aerial fire retardants (chemicals used to suppress fire). Fire retardants may be toxic to springsnails if they enter the aquatic systems the snails occupy. Some fire retardant chemicals are ammonia-based, which are toxic to aquatic wildlife; however, many formulations also contain yellow prussiate of soda (sodium ferrocyanide), which is added as an anticorrosive agent. Such formulations are toxic for fish, aquatic invertebrates, and algae (Angeler *et al.* 2006, pp. 171–172; Calfee and Little 2003, pp. 1527–1530; Little and Calfee 2002, p. 5; Buhl and Hamilton 1998, p. 1598; Hamilton *et al.* 1998, p. 3; Gaikowkski *et al.* 1996, pp. 1372–1373). Toxicity of these formulations is enhanced by sunlight (Calfee and Little 2003, pp. 1529–1533). Contamination of aquatic sites can occur via direct application, wind drift, or runoff from treated uplands.

During the 2004 fire season, it is suspected that surface waters within the Three Forks Springs area were exposed to fire retardant that could have drifted from high-elevation retardant releases from aircraft (USFS 2005, pp. 4, 12). During fire suppression activities related to the Three Forks Fire, approximately 54,122 gallons (204,874 liters) of aerial fire retardant were applied from aircraft (USFS 2005, p. 4). The nearest documented release into a waterway was 0.65 mi (1.05 km) from Three Forks Springs, though other undocumented aerial releases in the area could have been closer. Available data indicate that the Three Forks springsnail was still abundant in spring sites at Three Forks Springs in 2002 and 2003, prior to the fire (AGFD 2008, entire; Martinez 2009, pp. 31–32), but has not been detected since that time. Although a definitive connection between extirpation and exposure to fire retardant drift has not been made, it is reasonable to assume that drift from the documented use of fire retardant chemicals during the 2004 fires caused retardant-related toxicity, and thus, the inability of surveyors to locate the species at Three Forks Springs since. Fortunately, the species still persists at Boneyard Bog Springs and Boneyard Creek Springs, but there is the potential for future wildfires to occur near these occupied sites. Because of the toxic effects to springsnails from aerial fire retardant chemicals and the potential for exposure during future wildfires, we consider the use of fire retardant chemicals to be a threat to the Three Forks springsnail in the foreseeable future.

Ungulates

High-intensity ungulate (hoofed-mammal) grazing on spring ecosystems can alter or remove springsnail habitat and limit the distribution of springsnails, or result in extirpation. For instance, cattle trampling at a spring in Owens Valley, California, reduced banks to mud and sparse grass, limiting the occurrence of the endangered Fish Slough springsnail (*Pyrgulopsis pertubata*) (Bruce and White 1998, pp. 3–4). Additionally, a population of Chupadera springsnail, (*P. chupaderae*), endemic to Socorro County, New Mexico, was extirpated due to the impacts of intensive livestock grazing on its habitat (Arritt 1998, p. 10; NMDGF 2006, p. 13). Even though other springsnails have been impacted by high intensity ungulate grazing, we do not consider it to be factor for the Three Forks springsnail. Livestock have been fenced out of the springs where the Three Forks springsnail occurs since the mid- to late 1990s.

Although fencing excludes livestock from springs where the Three Forks springsnail occurs (USFS 2011b, p. 184), free-ranging elk (*Cervus elaphus*) can access all the springs. Elk are able to jump or cross the fencing in ways that livestock cannot. Because elk have been able to access the springs, some habitat modification from elk wallowing has been observed by Service personnel (Martinez 2000, p. 1; Nelson 2002, p. 2). In 2007 and 2008, erosive soil conditions related to elk wallowing were documented at Boneyard Bog Springs (Myers 2007, p. 2; Martinez 2008, p. 1). Intensive elk wallowing causes muddy conditions, soil loss, sparse grass, and stagnant, rather than flowing, water. These habitat conditions created by elk wallowing are typically unsuitable for the Three Forks springsnail, because the springsnail are mostly found in habitats with gravel and pebble substrates, and shallow running water (Martinez and Myers 2008, pp. 189–194). It appears that elk wallowing prevents spring seepage from developing into free-flowing spring-runs, which is the preferred habitat of the Three Forks springsnail. Although elk wallowing is a factor that seems to be impacting the Three Forks springsnail's habitat, it is not occurring at a scale that would cause the extinction of Three Forks springsnail on its own. However, in combination with the other threats identified in this five-factor analysis, elk wallowing may be contributing to the species' risk of extinction by reducing its long-term viability. Importantly, the AGFD is partnering with the conservation community to implement habitat improvements for the Three Forks springsnail, including the construction of fenced elk exclosures around targeted spring sites (Sorensen 2011b, p. 1).

Springhead Inundation

Springhead inundation refers to pooling of water over a spring vent, resulting in ponded water (sometimes relatively deep) that would otherwise exist as shallow, free-flowing water. As noted above in the species description, the Three Forks springsnail was known to occur in ponded springboxes and the big pond at Three Forks, prior to extirpation. Although research indicates the species exhibits higher density in shallower water, the species does not appear to be intolerant of deeper ponded water. Thus springhead inundation is not a threat for this particular species because it persists in deeper water than many other springsnails.

Summary of Factor A: At this time, the primary threats to the only known occupied habitats of Three Forks springsnails are soil erosion resulting from the high-intensity Wallow Fire that occurred in 2011, and the potential exposure of fire retardant chemicals during future wildfires. Also, elk wallowing may be contributing to the species' risk of extinction by reducing its long-term viability. However, springhead inundation does not appear to be a threat. Based on the best available information, the present or threatened destruction, modification, or curtailment of the Three Forks springsnail's habitat and range poses a significant threat to the species' continued existence across its entire range now, and into the foreseeable future.

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

The Three Forks springsnail has been subjected to a limited number of

scientific studies aimed at determining taxonomy, distribution, and habitat use. Although sampling can reduce population size of springsnails (Martinez and Sorensen 2007, p. 29), studies have not resulted in the removal of large numbers of snails, and we do not believe they have had discernible effects on any population. Unauthorized collecting has been identified as a threat to other snails, including springsnails (65 FR 10033, February 25, 2000; 58 FR 5938, January 25, 1993; 56 FR 49646, September 30, 1991), due to their rarity, restricted distribution, and generally well-known locations. However, there is currently no documentation of collection being a significant threat to the Three Forks springsnail.

In summary, the best available information indicates that the Three Forks springsnail is not threatened by overutilization for commercial, recreational, scientific, or educational purposes now, and we do not have any information to indicate that this will likely become a significant threat in the foreseeable future in any portion of its range.

C. Disease or Predation

Exceptionally heavy parasitism on the female reproductive system of the Three Forks springsnail has been observed on specimens from the extirpated Three Forks Springs population (Taylor 1987, p. 31). However, we have no information that parasitism exists in the remaining Three Forks springsnail populations at Boneyard Creek Springs and Boneyard Bog Springs.

In general, springsnails are vulnerable to predation by a variety of fish, amphibians, reptiles, mammals, and macroinvertebrates (Dillon 2000, p. 273; Raisanen 1991, p. 71). Nonnative crayfish are known predators of aquatic snails (Fernandez and Rosen 1996, pp. 24–25; Parkyn *et al.* 1997, p. 690), and are relatively recent invaders of Three Forks springsnail habitats. In a laboratory aquaria experiment that mimicked stream conditions found at Three Forks Springs, crayfish consumed snails and their eggs in the family Physidae (which occupy similar habitats as springsnails) within 1 week of introduction (Fernandez and Rosen 1996, pp. 24–25).

Prior to total extirpation at Three Forks Springs, Three Forks springsnails were no longer being found in concrete-boxed springheads where they had previously been observed in abundance (Myers 2000, p. 1; Martinez and Myers 2008, p. 191). The localized extirpation of the species from concrete-boxed springheads coincided with an invasion by nonnative crayfish. Because Arizona has no native crayfish species (Inman 1999, p. 6), the Three Forks springsnail likely did not evolve in the presence of crayfish predation. Therefore, the springsnail probably does not have an evolutionary mechanism to escape this type of predation. Recognizing the impact that nonnative crayfish were having on the Three Forks springsnail, AGFD personnel conducted an intensive crayfish trapping program aimed at reducing predatory pressure at Three Forks Springs (Nelson *et al.* 2002, pp. 4, 6). However, complete elimination of crayfish from an aquatic system is usually not possible (Helfrich *et al.* 2001, p. 4). This has been the case with the trapping effort at Three Forks Springs. More recently, crayfish have also been found in Boneyard Creek Springs and Boneyard Bog Springs. These efforts have not eliminated crayfish or prevented their spread along Boneyard Creek.

In summary, parasitism is not currently known to be a threat to the Three Forks springsnail, but this factor may need to be investigated further considering that it was observed on specimens in the past, and it has the potential to contribute to population declines (Dillon 2000, pp. 270–272). At this time, we have no information to indicate that parasitism is occurring within the remaining populations or that it might occur at a level in the future that affects the species' continued existence. On the other hand, we consider predation by nonnative crayfish to be a threat to the Three Forks springsnail across its entire range, because the springsnail has been locally extirpated from concrete-boxed springheads after the nonnative crayfish invaded.

D. The Inadequacy of Existing Regulatory Mechanisms

The primary causes of the Three Forks springsnail's decline are soil erosion following high-intensity wildfire, application of aerial fire retardant, and predation by nonnative crayfish. Existing Federal, State, and local laws have been unable to prevent loss of habitat or populations, and the existing regulatory mechanisms are not expected to prevent causes of Three Forks springsnail decline in the future.

The policy for delivery of wildland fire chemicals near waterways on USFS lands is described in the Interagency Standards for Fire and Fire Aviation Operations, developed by the National Interagency Fire Center (NIFC; NIFC 2011). The policy directs the USFS to avoid aerial application of wildland fire chemicals within 300 ft (91 m) of waterways, and avoid any ground application of wildland fire chemicals into waterways (NIFC 2011, p. 3). The closest accidental delivery of fire retardant into a waterway was approximately 0.65 mi (1 km) upstream of Three Forks Springs (USFS 2005, p. 12), well over the 300-ft (91-m) buffer established by NIFC policy. Nevertheless, aquatic areas at Three Forks are suspected to have been affected by fire retardant drift.

In addition to the 300-ft (91-m) buffer, the USFS recently adopted a policy of establishing avoidance areas specifically for listed species (USFS 2011c, p. 6). Although the implementation of an avoidance zone will likely reduce the probability of exposure to aerial fire retardants, it cannot entirely eliminate the possibility of an accidental catastrophic event. Furthermore, although fire retardants containing sodium ferrocyanide are no longer used, USFS (2011c, pp. 121–123) acknowledges that fire retardants currently in use still contain substances toxic to aquatic invertebrates, including mollusks.

Take of the Three Forks springsnail is regulated by Arizona Game and Fish Commission Order 42, which establishes no open season (no collecting) for any snail species in the genus *Pyrgulopsis* (AGFD 2010, p. 29). Although Order 42 prohibits direct taking of individuals, it does not prohibit habitat modification. The species is also identified as a priority species in the State Wildlife Action Plan prepared by AGFD (AGFD 2006, pp. 136, 419). This plan helps guide AGFD and other agencies in determining what biotic resources should receive priority management consideration, but this plan is not legally binding on any agency.

In summary, current regulatory mechanisms are inadequate to protect Three Forks springsnail habitat from modification or destruction due to the threats of accidental application of aerial fire retardant. The USFS and State regulatory mechanisms are adequate to control scientific collecting, but this does not appear to be a threat to the species.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Invasive Competitors

The nonnative New Zealand mudsnail (*Potamopyrgus antipodarum*) is an invasive freshwater snail of the family Hydrobiidae that has become a concern for spring-dependent aquatic snails, including springsnails. The mudsnail is known to compete with and slow the growth of native freshwater snails,

including springsnails (Lysne and Koetsier 2008, pp. 103, 105; Lysne *et al.* 2007, p. 6). There is potential for mudsnail invasion into spring ecosystems, because the mudsnail can be easily transported and unintentionally introduced into aquatic environments via birds, hikers, researchers, and resource managers.

The mudsnail was first discovered in the United States in the Snake River, Idaho, in 1987, and has since spread to the Colorado River basin in the western United States (U.S. Geological Survey 2002, p. 1). Mudsnails were discovered in Utah in 2001, and since have dispersed rapidly through that State (Vinson 2004, p. 9). Since 2002, New Zealand mudsnails have been detected in Arizona along the Colorado River at Lees Ferry, Diamond Creek, Lake Mead, and Willow Beach Fish Hatchery (AGFD 2002, p. 1, Olson 2008, pp. 1–2, Montana State University 2008, p. 1, Sorensen 2010, p. 3).

The mudsnail has characteristics that enable it to out-compete and replace native springsnails. Mudsnails tolerate a wide range of habitats, and can reach densities exceeding tens of thousands per square meter, particularly in systems with high primary productivity (system with organisms that create organic molecules that serve as food for other organisms), constant temperatures, and constant flow (typical of spring systems), though faster moving water seems to limit colonization (Richards *et al.* 2001, pp. 378–379). Mudsnails can dominate the invertebrate composition of an aquatic system, accounting for up to 97 percent of invertebrate biomass (Hall *et al.* 2003, p. 409). In doing so, they can consume nearly all microorganisms attached to submerged substrates, making food no longer available for native species, such as springsnails (Hall *et al.* 2003, p. 409).

Invasion by mudsnails is not a current threat to the Three Forks springsnail. However, the New Zealand mudsnail is spreading throughout the State of Arizona. If they were to be introduced into the spring systems harboring the Three Forks springsnail, the effect could be devastating. Additionally, control would be difficult because mudsnails are small and cryptic, and chemical treatment to eradicate them would also eradicate springsnails. Because the New Zealand mudsnail can out-compete and replace native springsnails, we consider this nonnative competitor to be a potential threat to the Three Forks springsnail's continued existence in the foreseeable future.

Climate Change and Drought

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms ''climate'' and ''climate change'' are defined by the Intergovernmental Panel on Climate Change (IPCC). ''Climate'' refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term ''climate change'' thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

The Intergovernmental Panel on Climate Change (IPCC 2007, p. 7) summarized the likelihood of future trends in global climatic variables over most land areas, predicting: (1) Warmer and fewer cold days and nights, (2) warmer and more frequent hot days and nights, (3) more frequent warm spells and heat waves or both, (4) changes in precipitation patterns favoring an increased frequency of heavy precipitation events, and (5) an increase in area affected by drought. These global climate changes are expected to influence climatic patterns at regional and local scales.

At a regional scale, there is broad consensus among climate models that the southwestern United States and northern Mexico will become drier in the twenty-first century and that the trend is already underway (Seager *et al.* 2007). Seager *et al.* (2007, pp. 1181–1184) analyzed 19 computer models of different variables to estimate the future climatology of the southwestern United States and northern Mexico in response to predictions of changing climatic patterns. All but 1 of the 19 models predicted a drying trend, while 1 predicted a trend toward a wetter climate (Seager *et al.* 2007, p. 1181). A total of 49 projections were created using the 19 models, and all but 3 predicted a shift to increasing aridity (dryness) in the southwestern United States as early as 2021–2040 (Seager *et al.* 2007, p. 1181). Wetlands in the southwestern United States and northern Mexico are predicted to be at risk of drying (Seager *et al.* 2007, pp. 1183–1184), which has severe implications for aquatic ecosystems.

The current, multiyear drought in the southwestern United States is the most severe drought recorded since 1900 (Overpeck and Udall 2010, p. 1642). Numerous models predict a decrease in annual precipitation in the southwestern United States and northern Mexico. Solomon *et al.* (2009, p. 1707) predicted precipitation in the southwestern United States and northern Mexico will decrease by 9 to 12 percent. Christensen *et al.* (2007, p. 888) contend the projection of smaller warming over the Pacific Ocean than over the continent is likely to induce a decrease in annual precipitation in the southwestern United States and northern Mexico.

Maximum summer temperatures in the southwestern United States are expected to increase over time in response to changes in the climate system (Christensen *et al.* 2007, p. 887). Weiss and Overpeck (2005, p. 2075) examined low-temperature data over a 40-year timeframe from numerous weather stations in the Sonoran desert ecoregion and found: (1) Widespread warming trends in winter and spring, (2) decreased frequency of freezing temperatures, (3) lengthening of the freeze-free season, and (4) increased minimum temperatures per winter year. Additionally, the timing of precipitation may be altered, contributing to significant changes in vegetation communities. The IPCC (2007, p. 20) found that winter precipitation in the southwestern United States is predicted to decline by as much as 20 percent as a result of climate change, while summer precipitation may increase slightly.

Arid environments can be especially sensitive to climate change, because the biota that inhabit these areas are often near their physiological tolerances for temperature and water stress. Slight changes in temperature and rainfall, along with increases in the magnitude and frequency of extreme climatic events, can significantly alter species distributions and abundance (Archer and Predick 2008, p. 23). Nonnative plant species may respond positively, out-competing native vegetation (Smith *et al.* 2000, p. 79; Lioubimsteva and Adams 2004, p. 401), thereby increasing the risk of wildfire. Seasonal changes in rainfall may contribute to the spread of

invasive species, which are often capable of explosive growth, and able to out-compete native species (Barrows *et al.* 2009, p. 673).

There are three hydrologic predictions for anticipated effects from climate change in the southwestern United States. First, climate change is expected to shorten periods of snowpack accumulation, as well as lessen snowpack levels. With gradually increasing temperatures and reduced snowpack (due to higher spring temperatures and reduced winter-spring precipitation), annual runoff will be reduced (Garfin 2005, p. 42; Smith *et al.* 2003, p. 226), consequently reducing groundwater recharge. Second, snowmelt is expected to occur earlier in the calendar year, because increased minimum winter and spring temperatures could melt snowpacks sooner, causing peak water flows to occur much sooner than the historical spring and summer peak flows (Garfin 2005, p. 41; Smith *et al.* 2003, p. 226; Stewart *et al.* 2004, pp. 217–218, 224, 230), and reducing flows later in the season. Third, the hydrologic cycle is expected to become more dynamic on average with climate models predicting increases in the variability and intensity of rainfall events. This will modify disturbance regimes by changing the magnitude and frequency of floods. Warmer water temperatures, altered stream flow events and groundwater recharge, and increased demand for water storage and conveyance systems (Rahel and Olden 2008, pp. 521–522) may alter spring habitats by altering surface water flow and ground water supply.

In addition, increases in riverine system temperatures in drier climates will result in periods of prolonged low flows and stream drying (Rahel and Olden 2008, p. 526), and will increase demand for water storage and conveyance systems (Rahel and Olden 2008, pp. 521–522). Warmer water temperatures across temperate regions are predicted to expand the distribution of existing aquatic nonnative species. In a study that compared the thermal tolerances of 57 fish species with predictions made from climate change temperature models, Mohseni *et al.* (2003, p. 389) concluded that there would be 31 percent more suitable habitat for aquatic nonnative species, which are often tropical in origin and adaptable to warmer water temperatures. This could result in an expansion in the ranges of nonnative aquatic species to the detriment of native species.

Climate change and drought could eventually exacerbate existing threats to spring habitats in the southwestern United States. Increased and prolonged drought associated with changing climatic patterns could adversely affect spring habitats by reducing water availability, and altering food availability and predation rates. Drying of spring flow is of particular concern because springsnails depend on permanent flowing water for survival. At this time we have no specific information indicating that any springs occupied, or formerly occupied, by the Three Forks springsnail have experienced a decline in water flow due to climate change or drought. However, the best available information indicates that climate change and drought may be a factor in the foreseeable future that could adversely alter the Three Forks springsnail's habitat. Therefore, the potential impacts from climate change and drought could affect the Three Forks springsnail's continued existence in the future.

Endemism

Endemic species (organisms with narrowly distributed isolated populations) are often more susceptible to extinction from localized, catastrophic events. Biological and ecological factors that put a species at risk of extinction include specialized habitat preference, restricted distribution, poor dispersal ability, population size, fragmentation of range, and life history specialization (McKinney 1997, p. 497; O'Grady *et al.* 2004, p. 514). The Three Forks springsnail is a highly endemic species. It occurs only within two spring complexes with a very restricted distribution, has limited mobility, and is a strict aquatic specialist requiring spring systems to complete its life history function. Endemism is not a threat in and of itself, but the Three Forks springsnail's endemic nature may make them more vulnerable to extinction from other existing or potential threats. The remaining populations of Three Forks springsnail are less than 1 mi (1.6 km) apart, and their total overall range is approximately 11.1 ac (4.5 ha) in size. Because their range is so small, one catastrophic event, such as a high-intensity wildfire, could potentially result in the entire loss of the species.

Listing Determination for the Three Forks Springsnail

Section 3 of the Act defines an endangered species as any species that is ''in danger of extinction throughout all or a significant portion of its range'' and a threatened species as any species that ''is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' We find that the Three Forks springsnail is presently in danger of extinction throughout its entire range, based on the immediacy, severity, and extent of the threats described above. We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the species, and have determined that the Three Forks springsnail meets the definition of endangered under the Act, rather than a threatened species, because significant threats are occurring now and in the foreseeable future, at a high magnitude, and across the species' entire range, making the species in danger of extinction at the present time.

Based on the best scientific and commercial information available regarding the threats to the species, we have found that some serious threats are occurring now, while some will negatively impact the species in the foreseeable future. For instance, the high-intensity 2011 Willow Fire that burned around the only remaining populations of the Three Forks springsnail has caused the habitat of the species to be currently threatened with destruction, modification, and curtailment due to soil erosion and sedimentation during storm events. Also, we have found that predation by nonnative crayfish is currently threatening the Three Forks springsnail across its entire range. In addition to the current threats, the Three Forks springsnail is also at a high risk of extinction due to threats that could affect the species in the foreseeable future, such as the use of fire retardant chemicals during future wildfires, the potential spread and competition with New Zealand springsnails, and the potential for climate change and drought to dry its springhead habitat. Due to its endemic nature, the Three Forks springsnail may be more vulnerable to extinction from both present and future threats.

Under the Act and our implementing regulations, a species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. We find that the threats to the Three Forks springsnail occur at relatively high magnitudes throughout its entire range. Historically, the Three Forks springsnail is known to have occurred in numerous springs and seeps along Boneyard Creek and its confluence with the North Fork East Fork Black River in the White Mountains on the Apache-Sitgreaves National Forests, in Apache County, Arizona. In recent years, the species'

range has been reduced to the point that it has only been found at two spring complexes. These two remaining sites are restricted to less than 1 mi (1.6 km) along Boneyard Creek. Because the species is so limited in range, the magnitude of threats that are occurring now are high, and those that may impact the species in the foreseeable future are high as well. For example, one catastrophic event, such as a high-intensity wildfire, could potentially result in the entire loss of the species. Accordingly, our assessment and determination applies to the species throughout its entire range. In conclusion, based on the immediacy, severity, and extent of the threats, we have determined that the Three Forks springsnail meets the definition of endangered under the Act.

Summary of Factors Affecting the San Bernardino Springsnail

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Wildfire and Suppression

Wildfires are common in southern Arizona along the border with Mexico (U.S. Government Accountability Office 2011, pp. 9–12), though we have limited information on wildfire frequency or intensity in the San Bernardino or Cajón Bonito Basins where the San Bernardino springsnail occurs. Even so, nonnative buffelgrass (*Pennisetum ciliare* [= *Cenchrus ciliare*]) is a concern, because of its potential to occur in this area and its ecological effects related to wildfire. Since its introduction in the 1940s, buffelgrass has become widespread in southeastern Arizona and northeastern Sonora, Mexico (Stevens and Falk 2009, p. 417; Van Devender and Reina 2005, p. 161; Cohn 2005, pp. 1–2, Yetman 1994, pp. 1, 8). The introduction of this invasive species is known to result in the addition of fire as an ecological process in the normally fire-intolerant Sonoran desert ecosystems, changing the natural fire regime from infrequent, low-intensity, localized fires, to frequent, high-intensity, spreading fires (Van Devender and Reina 2005, p. 161; Stevens and Falk 2009, p. 418; Yetman 1994, pp. 8–9).

Buffelgrass has been documented up to 4,150 ft (1,265 m) in elevation (Arizona Sonora Desert Musuem 2012, p. 2), but because it is frost-intolerant, it is usually limited to elevations less than 3,300 ft (1,000 m) (Perramond 2000, p. 5). All the sites where the San Bernardino springsnail is found in both the United States and Mexico are near or above 3,806 ft (1,160 m) in elevation, suggesting that most spring sites where the springsnail occurs may be protected from buffelgrass invasion. However, climatic warming trends (see Climate Change discussion, below) may facilitate future invasion by buffelgrass, increasing the potential for high-intensity wildfire around spring sites occupied by San Bernardino springsnail. At this time, the best available information indicates that wildfire is not a current threat to the species. We have no information relating to actual impacts of wildfire on the San Bernardino springsnail or its habitat.

If a wildfire were to occur in the greater San Bernardino Basin, Arizona, we suspect suppression efforts in the United States could include the application of fire retardant chemicals via aircraft, because this is one of the methods typically used to fight wildfires in this region. Should San Bernardino springsnails be exposed to fire retardants, we would expect them to react negatively, for the same reasons discussed under Factor A of the Three Forks springsnail, above. Wind drift of fire retardant has been noted in an unconfirmed report up to five miles from a drop site. So if there were a fire in the San Bernardino Valley, and the U.S. used retardant tankers, drift of the chemicals might reach San Bernardino springsnail sites in Mexico, although we have no confirmation of this occurring.

Further, we have no information indicating that aerial fire retardants have been used in the area around the two spring sites at the John Slaughter Ranch Museum. We anticipate the probability of exposure to fire retardant to be low, because the two spring sites are surrounded by a substantial area of well-tended lawn turf, and this area is unlikely to burn. Should there be a fire near the John Slaughter Ranch Museum, we expect that conventional fire-fighting techniques, utilizing fire engines and ground-based suppression activities, would most likely be employed in fighting any fires near the two springs. Further, concerning the populations of San Bernardino springsnails recently discovered in Sonora, Mexico, we expect that similar on-the-ground fire-fighting techniques would be employed, as opposed to the application of fire retardant chemical from aircraft. However, there is a possibility that wildfire may occur in the San Bernardino Basin at some point in the future, and fire retardant exposure could happen. As such, exposure to fire retardant chemicals, especially exposure resulting from wind drift, could represent a threat to the species in the future.

Controlled Burning

Varela Romero and Myers (2010, pp. 7, 10) indicate that the Los Ojitos ciénega in Sonora, Mexico, has been exposed to fire intentionally set to control cattails (*Typha* sp.). They noted ash and loss of water flow post-fire, and could not locate springsnails in an area where springsnails had occurred a few months prior (Varela Romero and Myers, 2010, p. 7). As noted above, fire-induced changes in spring habitats can result in lower springsnail densities post-fire (Lang 2002, pp. 5–7; NMDGF 2006, p. 9). Although the available information is unclear regarding the relationship between fire at Los Ojitos and springsnail population viability, it appears that a controlled burn may have contributed to a decrease in springsnail abundance. It is premature to conclude that the species has been extirpated from Los Ojitos, considering that survey efforts have been limited and the genus appears to exhibit some resiliency to fire. Controlled burns are probably low-intensity wetland fires that do not exhibit the same effects as very hot, high-intensity, stand-replacing fires. Also, it is not clear if controlled burning is a regular management tool employed by the landowner that we can reasonably anticipate will reoccur with any frequency. However, controlled burning does seem likely to reoccur, considering that management of cattails with fire requires regular treatment. Although controlled burning likely impacts the species, we are unable to determine the long-term impacts on the San Bernardino springsnail or its habitat. We do not have any additional information on controlled burning at any other locality where San Bernardino springsnail occurs.

Ungulates

The general effects of ungulate grazing on springsnails and their habitats are discussed under Factor A for the Three Forks springsnail. As previously noted, high-intensity ungulate grazing at spring ecosystems can alter or remove springsnail habitat and limit the distribution of springsnails, or result in their extirpation (Arritt 1998, p. 10; Bruce and White 1998, pp. 3–4; NMDGF 2006, p. 13). For the San Bernardino springsnail, we do not consider ungulate grazing to be a threat. Cattle grazing does not currently occur on the San Bernardino NWR. A small number of cattle graze on the John Slaughter Ranch Museum, but they do not have access to spring sites. Horse Spring is located in a horse pen (Martinez 2010, p. 2), but it is unclear what effect, if any, the horses have on the spring. Low-

intensity cattle grazing does occur on the private ranches in Mexico, but the cows are removed from areas if they start impacting an area (Cuenca Los Ojos 2012, p. 1; Bodner 2005, p. 6). The San Bernardino Valley historically supported extensive cattle ranching (Hendrickson and Minckley 1984, pp. 142–144; Service 2007, pp. iii–iv), and livestock likely had access to all spring habitats within the Rio San Bernardino watershed at that time. At this time, we do not consider ungulate grazing to be a threat to the San Bernardino springsnail, because there is no information that the limited exposure of cattle grazing within the springsnail's range is affecting the species' continued existence.

Springhead Inundation

Springhead inundation refers to pooling of water over a spring vent, resulting in ponded water (sometimes relatively deep) that would otherwise exist as shallow, free-flowing water. As previously noted, the San Bernardino springsnail is mainly found near spring vents and in association with shallow water, but high velocity. Inundation can alter springsnail habitats by causing shifts in water depth, velocity, substrate composition, vegetation, and water chemistry. These changes in springhead habitat can cause reductions in the San Bernardino springsnail's distribution and abundance.

Springhead inundation has affected the San Bernardino springsnail's habitat on the John Slaughter Ranch Museum. Cox *et al.* (2007, p. 1) speculated that the species previously occurred in the springs now inundated by House Pond. But, we have no evidence to confirm that they actually occurred in these springs, nor do we have information that they currently exist in the pond. As such, we cannot verify that inundation has affected the species there. However, because the San Bernardino springsnail currently exists in Goat Tank and Horse Springs, which both are within several hundred feet (meters) of House Pond, it is reasonable to assume that the San Bernardino springsnail occurred in the springs now inundated by House Pond. Thus, based on the altered habitat caused by inundation, it is reasonable to assume that inundation does affect the species' continued existence in such areas.

Springs in Sonora, Mexico, appear to have been impounded, including springs at Los Ojitos ciénega and Ojo El Chorro (Varela Romero and Myers 2010, pp. 6, 7, 10). But fortunately, springsnails have been found in spring-runs draining into impounded ponds and in the outflows at these sites. Because springsnails seem to prefer flowing, rather than pooled water, it is possible that impoundments have affected the species at these sites. Springhead inundation appears to be a threat that has altered the San Bernardino springsnail's habitat in the past, but at this time we do not consider this threat to be ongoing. However, because of its ability to alter the springsnail's preferred habitat in such a way that could affect the species continued existence, springhead inundation could be a threat to the San Bernardino springsnail in the foreseeable future.

Water Depletion and Diversion

Spring ecosystems rely on water discharged at the surface from underground aquifers, and depletion of the underground aquifers can result in the drying of springs. The drying of springs can be severe for springsnails, because they are strictly aquatic organisms. Groundwater depletion has been recognized as a threat to the continued existence of other biota occurring in the Rio San Bernardino and associated springs, such as the Yaqui fishes (49 FR 34490, August 31, 1984; Service 1994, p. 17). Several populations of San Bernardino springsnail are believed to have been extirpated as water was depleted and diverted for domestic water use (Landye 1973, p. 34; Malcom *et al.* 2003, p. 2), though the springsnail's actual occurrence in these springs prior to desiccation was never verified by field surveys.

Two distinct aquifers exist in the San Bernardino Valley basin, one deep and the other shallow (Earman *et al.* 2003, p. 35). These aquifers exhibit different chemical and thermal properties. Many of the springs in the area are influenced by both the deep and the shallow aquifers (Earman *et al.* 2003, p. 166; Malcom *et al.* 2005, pp. 75–76). House Spring, Snail Spring, and Goat Tank Spring have different chemical compositions from one another, as well as from other springs in the area (Earman *et al.* 2003, p. 166). A study using radioactive isotopes to trace water flow into the springs indicated that some springs appear to be fed by the deep aquifer, some by the shallow aquifer and groundwater, and others are influenced by a mixing of the two water sources (Earman *et al.* 2003, p. 166).

The John Slaughter Ranch Museum has an irrigation system that relies on the shallow aquifer and surface water from House Pond to provide water for turf grass and a cattle pasture (Malcom *et al.* 2003, p. 18; Malcom 2007, p. 1; Cox *et al.* 2007, p. 2). Malcom (2007, p. 1) and Cox (2007, p. 1) both reported a visible decline in flow from Snail Spring and Tule Spring when this irrigation system was running. This indicates that House Pond is hydrologically connected to Snail Spring and Tule Spring. However, we have no hydrologic data verifying that this is the case. Regardless, Snail Spring no longer discharges flowing water from the springhead, and the San Bernardino springsnail is now extirpated from that site (Martinez 2010, p. 1; Varela Romero and Myers 2010, p. 2).

The cessation of water flow at Snail Spring dates back to 2002. Following several years of below-average precipitation, Arizona faced extreme drought during 2002, which was the driest year on record for many parts of the State (McPhee *et al.* 2004, p. 1). At that time, the San Bernardino NWR staff and the John Slaughter Ranch Museum manager tapped into the domestic water supply from House Spring to try to maintain the springsnail's habitat at Snail Spring (Smith 2003, p. 1; Malcom 2003, p. 18; Malcom 2007, p. 1). Use of this domestic water supply for maintaining springsnail habitat was intended as an emergency measure only, and ultimately could not be sustained. Since 2002, surface flows at Snail Spring were periodically augmented by water diverted from House Pond. Unfortunately, consistent water flow has not been maintained at Snail Spring since 2005, and the San Bernardino springsnail has not been found at that site since then (Cox *et al.* 2007, p. 1; Malcom 2007, p. 1; Service 2007, p. 83; Martinez 2010, p. 1).

The Service has the right to control the use of water on the John Slaughter Ranch Museum, through a warranty deed that reserves water rights to The Nature Conservancy (TNC 1982, pp. 1–20). The Nature Conservancy deeded the water rights on the John Slaughter Ranch Museum to the Service, but also deeded ''water use'' rights to the John Slaughter Ranch Museum itself, with a stipulation that the ranch use should not adversely affect wildlife. Therefore, the Service can withhold its consent for planned water uses and other activities by the owner and managers of the John Slaughter Ranch Museum if it determines that such activities may have an adverse effect on the fish and snail species occurring on the ranch. However, such action appears unnecessary at this time, as the San Bernardino NWR is proactively working with the John Slaughter Ranch Museum to moderate use of irrigation water and to find an alternative water source to restore flow at Snail Spring. To offset the John Slaughter Ranch Museum's

domestic water supply from House Spring, the San Bernardino NWR is working with the ranch to moderate use of irrigation water and to find an alternative water source to restore flow at Snail Spring. Two wells were drilled during December 2011 that are helping with restoration of flow at the spring. One well, a shallow well at the head of Snail Spring on the Slaughter Ranch, directly supplements Snail Spring to provide year round habitat for the springsnail. A second (off-site) deep well, located on San Bernardino NWR adjacent to Slaughter Ranch, will be used to augment the amount of water available for domestic water needs at Slaughter Ranch (Arizona Department of Water Resources 2012, p. 1; Service 2012, p. 1). Preliminary analysis indicates that water quality between the well and Snail Spring is similar (Service 2012, p. 1).

In 2010, loss of water flow was noted and reported for the Los Ojitos ciénega in Sonora (Varela Romero and Myers 2010, p. 7). The factors contributing to the loss of flow at that site are unknown, and may include manipulation of water control devices by land managers or extended drought conditions. We do not know if this loss of flow at Los Ojitos is temporary or permanent. At another site occupied by the San Bernardino springsnail, Varela Romero and Myers (2010, p. 10) noted water flow interruption at Ojo El Chorro and recommended monitoring of groundwater pumping and water diversions to determine if these were causing flow water loss. The water flow interruption at Ojo El Chorro must not be severe, because Varela Romero and Myers (2010, p. 10) reported a functioning spring system at that site. Water harvesting efforts (construction of structures that capture stormwater runoff) are ongoing on the Austin Ranch in the San Bernardino watershed in Mexico (Cuenca de Los Ojos 2012, entire). However, water depletion is still a threat to spring ecosystems throughout the watershed (Earman *et al.* 2003, p. 259; Earman *et al.* 2008, p. 15; Hadley 2006, p. 13; Varela-Romero and Myers 2010, p. 10).

We have no information indicating that other springs in the San Bernardino or Cajón Bonito Basins where the San Bernardino springsnail occurs have experienced water loss or reduced water flow. However, the San Bernardino ground water table is a desirable domestic water source, particularly in Mexico, and ground water use could eventually have severe negative consequences on the viability of springs and wetlands in the San Bernardino watershed (Earman *et al.* 2003, p. 259; Earman *et al.* 2008, p. 15; Hadley 2006, p. 13). Water depletion from future groundwater use could eventually contribute to the drying of springs throughout the range of the San Bernardino springsnail, placing the species at increased risk of extinction.

Pesticides

Pesticides, including glyphosate, the active ingredient in the herbicides Roundup® and Rodeo®, have been reportedly used adjacent to spring ecosystems on the John Slaughter Ranch Museum (Malcom *et al.* 2003, p. 17; Service 2005, p. 6). Spring endemic species are typically adapted to the unique environmental conditions provided by spring water and may be quite sensitive to shifts in water quality (Hershler 1998, p. 11), including those caused by contamination.

In the proposed rule, we discussed results presented by Tate *et al.* (1997, pp. 287–288) indicating that long-term exposure to glyphosate in a laboratory affected growth and development, egg-laying capacity, and hatching of the mimic lymnaea (*Pseudosuccinea columella*), an unrelated freshwater snail. As such, we were concerned that sublethal, as well as lethal, effects from the use of glyphosate or other pesticides used on the John Slaughter Ranch Museum may be affecting the San Bernardino springsnail. However, upon further evaluation, we found that, for freshwater mollusks, the aquatic formulation of glyphosate (Rodeo®) has an ecotoxicity rating of Class 0 (practically nontoxic), while the nonaquatic formulation (Roundup®) has a rating of Class 1 (slightly-to-moderately toxic) (White 2007, pp. 158, 198). Although glyphosate can be slightly-to-moderately toxic to aquatic organisms, particularly zooplankton (Montenegro-Rayo 2004, p. 34), and impacts including mortality have been documented in other snail species, Tate *et al.* (1997, pp. 287–288) found that glyphosate stimulates growth and development of snails at different concentrations. Normal use of glyphosate is not expected to detrimentally affect aquatic biota.

In the proposed rule, we also presented our concern that the pesticide may contaminate the food base for the springsnail. Upon further review, we find contamination of the food base to be unlikely. Glyphosate adsorbs strongly to sediments and soils, and would not be expected to leach to surface waters at high levels through surface runoff (USEPA 2008, pp. 8, 25). Although direct exposure from spray drift is a possibility, we do not anticipate adverse effects to the San Bernardino springsnail or its food base, because long-term exposure is unlikely to occur in a natural spring setting, as flowing water should allow for dissipation. Accordingly, we do not consider the proper use of the pesticide to threaten the San Bernardino springsnail's continued existence.

Sunlight Inhibition

Goat Tank Spring box is covered with a heavy metal lid that previously prevented significant sunlight penetration. The San Bernardino springsnail formerly occurred in very low population numbers at Goat Tank Spring, but has exhibited an increase in abundance following the modification of this cover to allow sunlight to enter the spring-box (Radke 2010, p. 1, Service 2011, pp. 117–118). Although this effort has successfully resulted in an increase in the abundance of springsnails, a large portion of the spring-box is still covered. The lack of direct sunlight into the aquatic environment likely inhibits primary production resulting in reduced availability of periphytic diatoms and algae, key habitat elements required by the San Bernardino springsnail. Radke (2010, p. 1) noted that the side of the spring-box, where the modified lid allows more light to enter, had a larger number of snails than the dark side of the spring-box. Although we do not believe this situation will result in the loss of the springsnail population at Goat Tank Spring, the continued maintenance of this lid likely prevents the population from realizing its full potential productivity.

Summary of Factor A: We have identified a number of impacts to the San Bernardino springsnail's habitat, which have operated in the past or that could impact the species in the foreseeable future. On the basis of this analysis, the potential use of fire retardant chemicals to fight wildfires, springhead inundation, and water depletion and diversion could result in destruction, modification, or curtailment of the San Bernardino springsnail's habitat throughout all of its range in the foreseeable future.

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

Purposes

Like the Three Forks springnsail, the San Bernardino springsnail has been subjected to a limited number of scientific studies aimed at determining taxonomy, distribution, and habitat use. The impacts to springsnails from collection are described under Factor B for the Three Forks springsnail. At this

time, there is no documentation of collection being a significant threat to the San Bernardino springsnail.

In summary, the best available information indicates that the San Bernardino springsnail is not threatened by overutilization for commercial, recreational, scientific, or educational purposes now, and we do not have any information to indicate that this will likely become a significant threat in the foreseeable future in any portion of its range.

C. Disease or Predation

We have no information regarding parasites on the San Bernardino springsnail. Also, we are unaware of the presence of nonnative predators within springs occupied by the San Bernardino springsnail. Field surveys have not detected the presence of nonnative crayfish within springs occupied by the San Bernardino springsnail, nor or we aware of any information indicating that crayfish have or will potentially invade the watersheds where the springsnail occurs. Additionally, current management activities are conducted on the private, State, and Federal lands to prevent the spread of nonnative species. Therefore, we do not consider disease or predation to be threats to the San Bernardino springsnail, now or in the future.

D. The Inadequacy of Existing Regulatory Mechanisms

In the proposed rule, we found the label restriction on Rodeo® (glyphosate) inadequate to protect the San Bernardino springsnail, because it does not restrict use within and near aquatic sites (DowAgroSciences 2006, p. 11). However, the low toxicity rating (as noted above in the Factor A discussion), and the fact that Rodeo® is an aquatic formulation, explains the lack of restrictions near aquatic sites. As such, we find the label restriction is adequate to protect the springsnail. Even so, Rodeo® still has the potential to negatively impact the springsnail if misused, but we have no evidence that it is being misused or is impacting the species. Although glyphosate is believed to be used on the John Slaughter Ranch Museum property, we have no reliable information regarding user application practices that would lead us to believe this pesticide is a threat to the San Bernardino springsnail.

Take of the San Bernardino springsnail is regulated by Arizona Game and Fish Commission Order 42, which establishes no open season (no collecting) for any snail species in the genus *Pyrgulopsis* (AGFD 2010, p. 29). Although Order 42 prohibits direct taking of individuals, it does not prohibit habitat modification. The species is also identified as a priority species in the State Wildlife Action Plan prepared by AGFD. This plan helps guide AGFD and other agencies in determining what biotic resources should receive priority management consideration. However, this plan is not legally binding on any agency.

In Mexico, the Secretaria de Medio Ambiente y Recursos Naturales has authority to designate species as threatened, or ''Amenzadas,'' based on recommendations from the Instituto Nacional de Ecología. Based on the best available information, the San Bernardino springsnail does not have special status in Mexico that would protect it from water depletion and diversion, controlled burning, or springhead inundation. Varela Romero and Myers (2010, p. 10) reported that these springsnails are not protected in Mexico, except that Mexican Federal permits are required to intentionally collect specimens for scientific study.

In summary, the primary factors likely to affect the San Bernardino springsnail's continued existence include the fire retardant chemicals, springhead inundation, and water depletion and diversion. Based on our analysis of the best available information, current regulatory mechanisms are inadequate to protect the San Bernardino springsnail's habitat from these threats in the United States and Mexico.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Invasive Competitors

The potential threat to springsnails from New Zealand mudsnails is described under Factor E for the Three Forks springsnail. Although invasion by New Zealand mudsnails is not considered an immediate threat, they are spreading into Arizona from Utah. If New Zealand mudsnails were to be spread into the spring systems harboring the San Bernardino springsnail, the effect could be devastating. Additionally, control would be difficult because mudsnails are small and cryptic, and chemical treatment to eradicate them would also eradicate springsnails. Because the New Zealand mudsnail can outcompete and replace native springsnails, we consider this nonnative competitor to be a potential threat to the San Bernardino springsnail's continued existence in the foreseeable future.

Climate Change and Drought

The same potential effects of climate change described under Factor E for the Three Forks springsnail apply to the San Bernardino springsnail. Loss of water flow has already manifested itself within the range of the San Bernardino springsnail, coinciding with extreme drought in the case of Snail Spring. Continued drying related to drought will likely exacerbate potential drying of springs and may lead to population declines and localized extirpations. In addition to loss of water flow, continued drying trends could exacerbate the terrestrial spread of buffelgrass, making San Bernardino springsnail habitats vulnerable to wildfires in the future. As such, we find that climate change and drought could threaten the San Bernardino springsnail in the future throughout its entire range.

Endemism

The increased vulnerability posed by endemism as described under Factor E for the Three Forks springsnail applies to the San Bernardino springsnail. Basically, the San Bernardino springsnail has suffered reductions in overall distribution and abundance, as evidenced at Snail Spring and Los Ojitos. We consider the San Bernardino springsnail to be an endemic species, because it only occurs at two sites in the United States and five sites in Mexico. Also, their populations are very restricted in distribution, have limited mobility, and are strictly aquatic specialists of spring ecosystems. Endemism is not a threat to the species in and of itself, but the San Bernardino springsnail's endemic nature may make them more vulnerable to extinction from other potential threats in the future.

Listing Determination for the San Bernardino Springsnail

Section 3 of the Act defines an endangered species as any species that is ''in danger of extinction throughout all or a significant portion of its range'' and a threatened species as any species that ''is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' We find that the San Bernardino springsnail is not presently in danger of extinction throughout its entire range, based on the immediacy, severity, and extent of the threats described above. However, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the species, and have determined that the San Bernardino springsnail meets the definition of

threatened under the Act, rather than endangered, because significant threats are not operative now, but are likely to cause the species to become in danger of extinction in the foreseeable future. Thus the San Bernardino springsnail meets the definition of a threatened species, because it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Based on the best scientific and commercial information available regarding the threats to the species, we have found that threats do not rise to the level such that the San Bernardino springsnail is in danger of extinction now. However, significant threats may rise to a level in the foreseeable future that the species is likely to become an endangered species throughout all or a significant portion of its range. The species' habitat is likely to be threatened in the foreseeable future with destruction, modification, and curtailment in part of its range due to the potential use of fire retardant chemicals in the United States, and throughout its entire range in both the United States and Mexico due to potential springhead inundation, and water depletion and diversion. Also, we found that the San Bernardino springsnail is likely to become in danger of extinction in the foreseeable future throughout its entire range due to the potential invasion and predation by nonnative crayfish, invasion and competition with New Zealand springsnails, and climate change and drought drying its springhead habitat. Due to the species' endemic nature, the San Bernardino springsnail may be more vulnerable to extinction in the foreseeable future from these potential threats throughout its entire range.

Unlike the Three Forks springsnail, there are more currently occupied sites with San Bernardino springsnail populations, and the current severe threats of fire and crayfish predation identified for the Three Forks springsnail are not currently operative on the San Bernardino springsnail. The site locations in the United States for the two species are separated by over 125 mi (200 km); the environmental conditions are different for the two species (i.e. landscape setting), and the threat type, magnitude, and immediacy are different for the two. Therefore, while the Three Forks springsnail meets the definition of an endangered species under the Act, we have determined that the San Bernardino springsnail meets the definition of threatened under the Act, rather than endangered, because significant threats are not immediately affecting the species and are not at a high enough magnitude that they are causing the species to be presently in danger of extinction throughout all or a significant portion of its range.

Under the Act and our implementing regulations, a species may warrant listing if it is endangered or threatened throughout all or a significant portion of its range. The San Bernardino springsnail is an endemic species occurring at two sites in the United States and five sites in Mexico. We find that all threats to the San Bernardino springsnail could potentially occur throughout its entire range in the foreseeable future. Accordingly, our assessment and determination applies to the species throughout its entire range.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection measures required of Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed, preparation of a draft and final recovery plan, and revisions to the plan as significant new information becomes available. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. The recovery plan identifies site-specific management actions that will achieve recovery of the species, measurable criteria that determine when a species may be downlisted or delisted, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (comprising species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available from our Web site (*http://www.fws.gov/endangered*), or from our Arizona Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private and State lands.

Funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for nonfederal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of Arizona would be eligible for Federal funds to implement management actions that promote the protection and recovery of the Three Forks springsnail. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants.*

Please let us know if you are interested in participating in recovery efforts for the Three Forks springsnail and the San Bernardino springsnail. Additionally, we invite you to submit any new information on these species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its

critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(1) requires Federal agencies, in consultation with the Service, to carry out programs for the conservation of listed species. Section 7(a)(4) requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is subsequently listed, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may adversely affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

For the Three Forks springsnail and San Bernardino springsnail, Federal agency actions that may require consultation as described in the preceding paragraph include activities approved under a forest management plan, a refuge comprehensive management plan, and activities that require a permit from the Army Corps of Engineers pursuant to section 404 of the Clean Water Act.

The USFS has established a closure around Three Forks Springs to prevent unauthorized access. The AGFD has implemented a crayfish trapping program and a Three Forks springsnail monitoring program. A captive refugium for Three Forks springsnail has been established at the Phoenix Zoo, in coordination with USFS and AGFD. We intend to continue working with the USFS, AGFD, the Phoenix Zoo, and a private landowner who owns property near Boneyard Bog Springs to develop conservation actions for the Three Forks springsnail.

Efforts to rehabilitate habitat on the San Bernardino NWR at Tule Spring were initiated (Service 2003, p. 2), with the intention of potentially introducing San Bernardino springsnails. However, the inconsistency of water flow complicated the habitat reestablishment effort. There was not enough free-flowing water to support San Bernardino springsnail reintroduction at Tule Spring. The San Bernardino NWR is currently looking for opportunities to augment the water supply to complete the habitat restoration efforts at Tule Spring and reintroduce springsnails. Also, the Service is seeking to acquire, through donation, the John Slaughter Ranch Museum for incorporation into the San Bernardino NWR. This would provide tremendous opportunities to protect, manage, and enhance springs on the property. However, it is uncertain if this transaction will occur. The Service is continuing to work with AGFD and the John Slaughter Ranch Museum to develop conservation actions for the San Bernardino springsnail, including the development of a domestic water well to augment surface water flow.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. The prohibitions, codified at 50 CFR 17.21 for endangered wildlife, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import, export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving threatened or endangered wildlife species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22 for endangered species. With regard to endangered wildlife, a permit must be issued for the following purposes: For scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of species proposed for listing. The following activities could potentially result in a violation of section 9 of the Act; this list is not comprehensive:

(1) Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of the species, including import or export across State lines and international boundaries, except for properly documented antique specimens at least 100 years old, as defined by section 10(h)(1) of the Act;

(2) Introduction of nonnative species that compete with or prey upon the Three Forks springsnail and San Bernardino springsnail, such as the introduction of competing, nonnative species to the State of Arizona;

(3) Unauthorized release of biological control agents that attack any life stage of this species;

(4) Unauthorized modification of the springs or water flow of any stream or removal or destruction of emergent aquatic vegetation in any body of water in which the Three Forks springsnail or San Bernardino springsnail are known to occur; and

(5) Unauthorized discharge of chemicals or fill material into any waters in which the Three Forks springsnail or San Bernardino springsnail are known to occur.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Arizona Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means the use of all methods and procedures that are necessary to bring any endangered species or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical and biological features within an area, we focus on the principal biological or physical constituent elements (primary constituent elements, such as roost sites, nesting grounds, seasonal wetlands, water quality, tide, soil type) that are essential to the conservation of the species. Primary constituent elements are the specific elements of physical or biological features that, together, provide for a species' life-history processes and are essential to the conservation of the species.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. For example, an area currently occupied by the species, but that was not occupied at the time of listing, may be essential to the conservation of the species and may be included in the critical habitat designation. We designate critical habitat in areas outside the geographical area occupied by a species at its time of listing only when a designation limited to its then current range would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to:
(1) Conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to insure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) the prohibitions of section 9 of the Act if actions occurring in these areas may affect the species. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Physical or Biological Features

In accordance with section 3(5)(A)(i) and 4(b)(1)(A) of the Act and regulations at 50 CFR 424.12, in determining which areas within the geographical area occupied at the time of listing to designate as critical habitat, we consider the physical or biological features (PBFs) that are essential to the conservation of the species, and which may require special management considerations or protection. These include, but are not limited to:

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, or rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

We derive the specific PBFs from studies of the species' habitats, ecology, and life history as described below. We have determined that the Three Forks springsnail and San Bernardino springsnail require the following physical or biological features:

Space for Individual and Population Growth and Normal Behavior

The Three Forks and San Bernardino springsnails occur where water emerges from the ground as free-flowing springs and spring runs. Within spring ecosystems, proximity to springheads is important due to their need for

appropriate water chemistry, substrate, and flow characteristics of springheads. The Three Forks springsnail inhabits free-flowing springs, concrete boxed springheads, spring runs, spring seeps, and shallow pond water. In the United States, the San Bernardino springsnail inhabits free-flowing springs, a concrete boxed springhead, and spring runs. Therefore, based on the information above, we identify free-flowing springs, spring runs, spring seeps, and shallow pond water to be physical or biological features for both species.

Food, Water, Air, Light, or Other Nutritional or Physiological Requirements

Martinez and Myers (2008, pp. 189–194) found the presence of Three Forks springsnail was associated with gravel and pebble substrates, shallow water up to 6 cm (2.35 in) deep, high conductivity, alkaline waters of pH 8, and the presence of pond snail, *Physa gyrina.* Three Forks springsnail density is significantly greater on gravel and cobble substrates (Martinez and Rogowski 2011, p. 220; Martinez and Myers 2002, p. 1), though the species has been reported as ''abundant'' in the fine-grained mud of a 0.01 ha (0.02 ac) pond at Three Forks Springs (Taylor 1987, p. 32). Flowing water is essential to provide for the species' life-history processes.

The density of San Bernardino springsnails is positively associated with cobble substrates, higher vegetation density, faster water velocity, higher dissolved oxygen, water temperature of 57 to 72 °F (14 to 22 °C), and pH values between 7.6 and 8.0 (Malcom *et al.* 2005, pp. 71, 75–76). San Bernardino springsnail densities are higher in sand and cobble substrates, higher vegetation density, and higher water velocity, but lower in silt and organic substrates, and deeper water (Malcom *et al.* 2005, pp. 75–76). Flowing water is essential to provide for the species' life-history processes.

Three Forks and San Bernardino springsnails consume periphyton on submerged surfaces. Periphyton is a complex mixture of algae, detritus, bacteria, and other microbes that grow attached to submerged surfaces such as cobble or larger plants, such as watercress. Periphyton are primary producers of energy (organisms at the beginning of a food chain that produce biomass from inorganic compounds) and can be sensitive indicators of environmental change in flowing waters. Production of periphyton is essential to provide forage to support physiological health. Therefore, based on the information above, we identify substrates with periphyton to be a physical or biological feature for both species.

Cover and Shelter

Three Forks springsnail and San Bernardino springsnail utilize cobble, gravel, sand, woody debris, aquatic vegetation, and leaf matter for cover and shelter. These features are necessary to provide some protection from predators and competitors. Therefore, we identify cobble, gravel, sand, woody debris, aquatic vegetation, and leaf matter for cover and shelter to be a physical or biological feature for both species.

Sites for Breeding, Reproduction, and Rearing and Development of Offspring

Substrate characteristics can influence the productivity of Three Forks and San Bernardino springsnails. Suitable substrates are typically firm, characterized by cobble, gravel, sand, woody debris, and aquatic vegetation such as watercress, though this is influenced by water flow and depth. Suitable substrates increase productivity by providing suitable egg laying sites, protection of young from predators, and provision of food resources. Therefore, based on the information above, we identify substrates with cobble, gravel, pebble, sand, silt, and aquatic vegetation, for egg laying, maturing, feeding, and escape from predators to be physical or biological features for both species.

Habitats That Are Protected From Disturbance or Are Representative of the Historical, Geographical, and Ecological Distribution of the Species

The Three Forks springsnail and the San Bernardino springsnail have restricted geographic distributions. Endemic species whose populations exhibit a high degree of isolation are extremely susceptible to extinction from both random and nonrandom catastrophic natural or human-caused events. Therefore, it is essential to maintain the spring systems upon which the species' depend. Adequate spring sites, free of disturbance, must exist to promote population expansion and viability. This means reasonable protection from disturbance caused by soil erosion following wildfires, exposure to fire retardant, water depletion and diversion, springhead inundation, and nonnative species. Therefore, based on the information above, we identify spring sites free of disturbance to be a physical or biological feature for both species.

Primary Constituent Elements for the Three Forks and San Bernardino Springsnails

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of the Three Forks springsnail and San Bernardino springsnail in areas occupied at the time of listing, focusing on the features' primary constituent elements. We consider primary constituent elements to be the specific elements of physical or biological features that, together, provide for a species' life-history processes and are essential to the conservation of the species.

Based on the above needs and our current knowledge of the life history, biology, and ecology of these species and the habitat requirements for sustaining the essential life-history functions of these species, we have determined that the PCEs specific to the Three Forks springsnail and San Bernardino springsnail are:

(1) Adequately clean spring water (free from contamination) emerging from the ground and flowing on the surface;

(2) Periphyton (attached algae), bacteria, and decaying organic material for food;

(3) Substrates that include cobble, gravel, pebble, sand, silt, and aquatic vegetation, for egg laying, maturing, feeding, and escape from predators; and

(4) Either an absence of nonnative predators (crayfish) and competitors (snails) or their presence at low population levels.

Special Management Considerations or Protections

When designating critical habitat, we assess whether the specific areas within the geographic area occupied by the species at the time of listing contain features that are essential to the conservation of the species and which may require special management considerations or protections. The features essential to the conservation of the Three Forks springsnail and San Bernardino springsnail may require special management considerations or protections to reduce the following threats: Soil erosion following high-intensity wildfires, exposure to fire retardant, springhead inundation, water depletion and diversion, and the introduction of nonnative predators and competitors.

For these springsnails, special management considerations or protection are needed both within and outside of critical habitat areas to

address threats. Management activities that could ameliorate threats include (but are not limited to) protecting against: (1) Wildfire and fire retardant used to fight wildfires, (2) predation by nonnative crayfish, (3) water depletion and diversion, (4) potential competition from nonnative New Zealand mudsnails or predation by nonnative crayfish, and (5) harm from livestock and other ungulates through fencing to protect spring habitats from damage. Special management is also needed for the purposes of adaptive management, and includes continuing to conduct research on the springsnails, and on critical aspects of their biology (for example, reproduction, sources of mortality, sensitivity to contaminants, dispersal behavior, anti-predator behavior, etc.).

Criteria Used To Identify Critical Habitat

As required by section 4(b)(1)(A) of the Act, we used the best scientific and commercial data available to designate critical habitat. We reviewed available information pertaining to the habitat requirements of the Three Forks springsnail and San Bernardino springsnail. In accordance with the Act and its implementing regulation at 50 CFR 424.12(e), we considered whether designating additional areas—outside those currently occupied as well as those occupied at the time of listing—are necessary to ensure the conservation of the species. We are designating critical habitat in areas within the geographical area occupied by the species at the time of this final listing rule. We also are designating specific areas outside the geographical area occupied by the species at the time of this final listing rule that were historically occupied, but are presently unoccupied, because we have determined that such areas are essential for the conservation of the species. We are designating all habitat in the United States containing PCEs that we consider to be currently occupied, and unoccupied springs that are essential for the conservation of the species. We are not designating critical habitat in Sonora, Mexico, because we do not designate critical habitat outside the United States.

We assessed the critical life-history components of these springsnail species, as they relate to habitat, and used this information to identify which areas to designate as critical habitat. Three Forks and San Bernardino springsnails require unpolluted spring water in springheads and spring runs; periphyton, bacteria, and decaying organic material for food; rock-derived substrates for egg-laying, maturing, feeding, and escape from predators; and absence or tolerable levels of nonnative predators and competitors. The areas designated as critical habitat for the Three Forks springsnail and the San Bernardino springsnail contain these PCEs that are essential to these life-history processes of the species.

Units were designated based on sufficient elements of physical or biological features being present to support the Three Forks springsnail's and San Bernardino springsnail's life-history processes. Some units contain all of the identified elements of physical or biological features and supported multiple life processes. Some units contain only some elements of the physical or biological features necessary to support the Three Forks springsnail's and San Bernardino springsnail's particular use of that habitat. Each specific area will be described below, including a discussion of why that area meets the definition of critical habitat.

When determining critical habitat boundaries within this final rule, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features for the Three Forks springsnail and San Bernardino springsnail. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this final rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger a section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological features in the adjacent critical habitat.

Final Critical Habitat Designation

For the Three Forks springsnail, we are designating critical habitat in two areas currently occupied, and one area currently unoccupied by the species, but considered to have been historically occupied. We have determined that the unoccupied unit, Three Forks Springs, is essential for the conservation of the species, because the geographic area occupied at the time of this final listing rule is not sufficient for recovery. The currently occupied areas represent a portion of the former range and are vulnerable to a single catastrophic event. When developing conservation strategies for species whose life histories are characterized by short generation time, small body size, high rates of population increase, and high habitat specificity, greater emphasis should be placed on the maintenance of multiple populations as opposed to protecting a single population (Murphy *et al.* 1990, pp. 41–51).

For the San Bernardino springsnail, we are designating critical habitat in two springs currently occupied and two springs not currently occupied by the species. The unoccupied springs are essential to the conservation of the species, because the geographic area that is currently occupied is not sufficient for recovery. Even though five additional sites have been recently discovered in Sonora, Mexico, there are currently only two occupied units in the United States and all seven sites where the species occurs are close enough in they are vulnerable to a single catastrophic event. So, we are designating the unoccupied units of Snail and Tule Springs to increase species' redundancy, resiliency, and representation. (Resiliency of a species allows the species to recover from periodic disturbance. Redundancy of populations may be needed to provide a margin of safety for the species to withstand catastrophic events. Adequate representation ensures that the species' adaptive capabilities are conserved and genetic diversity is maintained.)

The critical habitat units we describe below constitute our current and best assessment of the areas that meet the definition of critical habitat for the Three Forks springsnail and the San Bernardino springsnail. Table 3 summarizes the threats and current occupancy of the designated critical habitat units. Table 4 provides approximate areas (ac/ha) and land ownership of the units.

TABLE 3—THREATS AND OCCUPANCY IN AREAS CONTAINING FEATURES ESSENTIAL TO THE CONSERVATION OF THE THREE FORKS AND SAN BERNARDINO SPRINGSNAILS

Critical habitat unit	Threats requiring special management or protections	Currently occupied
Three Forks springsnail		
Three Forks Springs Unit	Soil erosion following wildfires, fire retardant use, nonnative predators, drought, and potential introduction of nonnative snails.	No.
Boneyard Bog Springs Unit	Soil erosion following wildfires, fire retardant use, nonnative predators, drought, and potential introduction of nonnative snails.	Yes.
Boneyard Creek Springs Unit	Soil erosion following wildfires, fire retardant use, nonnative predators, drought, and potential introduction of nonnative snails.	Yes.
San Bernardino springsnail		
Snail Spring Unit	Water depletion, drought, potential introduction of nonnative snails, and potential exposure to fire retardant chemicals through wind drift.	No.
Goat Tank Spring Unit	Water depletion, drought, potential introduction of nonnative snails, and potential exposure to fire retardant chemicals through wind drift.	Yes.
Horse Spring Unit	Water depletion, drought, potential introduction of nonnative snails, and potential exposure to fire retardant chemicals through wind drift.	Yes.
Tule Spring Unit	Fire retardant use, water depletion, drought, and potential introduction of nonnative snails	No.

TABLE 4—OWNERSHIP AND APPROXIMATE AREA OF CRITICAL HABITAT UNITS FOR THE THREE FORKS AND SAN BERDARDINO SPRINGSNAILS

Critical habitat unit	Ownership	Total area in acres (hectares)
Three Forks springsnail		
Three Forks Springs Unit	Federal	6.1 ac (2.5 ha)
Boneyard Bog Springs Unit	Federal	5.3 ac (2.1 ha)
Boneyard Creek Springs Unit	Federal	5.8 ac (2.3 ha)
Total		17.2 ac (6.9 ha)
San Bernardino springsnail		
Snail Spring Unit	State	1.129 ac (0.457 ha)
Goat Tank Spring Unit	State	0.005 ac (0.002 ha)
Horse Spring Unit	State	0.078 ac (0.032 ha)
Tule Spring Unit	Federal	0.801 ac (0.324 ha)
Total		2.013 ac (0.815 ha)

We present brief descriptions of all units, and reasons why they meet the definition of critical habitat for the Three Forks springsnail and San Bernardino springsnail, below. Unit descriptions are presented separately for each species.

Three Forks Springsnail

Three Forks Springs Unit

The Three Forks Springs Unit is a complex of springs, spring runs, spring seeps, a segment of an unnamed stream connecting them, and a small amount of upland area encircling them to make a single, contiguous unit of approximately 6.1 ac (2.5 ha) in the vicinity of UTM Zone 12 coordinate 655710, 3747260 in Apache County, Arizona. The entire unit is in Federal ownership and managed by the Apache-Sitgreaves National Forests. The unit encompasses eight major springheads and spring runs, each flowing a short distance of several meters to an unnamed tributary of the Black River. Two of the spring runs flow into a shallow pond and has an outflow run to the unnamed tributary. The springs complex contains spring seeps along the spring runs and the tributary. The tributary itself provides habitat connectivity. The area within the designated unit contains a small amount of upland area adjacent to the springheads, spring runs, spring seeps, and the tributary segment. The moist soils and vegetation in the adjacent uplands (approximately 3.3 ft (1.0 m) from surface water) produce periphyton (food for snails) and protect the substrate.

Currently, the Three Forks Springs Unit is not occupied. However, the Three Forks Springs' first documented occupancy was in 1973 (Landye 1973, p. 49), and the species was abundant here until 2004 (AGFD 2008, entire), at which time the waters are suspected to have been contaminated by wildfire retardant drift. The last documented occurrence of the Three Forks springsnail at Three Forks Springs was in 2003 (AGFD 2008, entire). Fire retardant becomes nontoxic within a few days of contact with water, so currently, the Three Forks Springs Unit contains all of the PCEs. The unit is essential for the conservation of the species, because: (1) It has the ability to support all of the Three Forks springsnail life processes, (2) the geographic area occupied at the time of this final listing rule is not sufficient for recovery, and (3) it increases the species' population redundancy. There are only two currently occupied areas representing a portion of the species' former range, and these two small areas

cause the species to be vulnerable to extinction from a single, catastrophic event.

Threats to the Three Forks springsnail in this unit include the soil erosion following wildfires, fire retardant chemicals, drought, nonnative crayfish, and potential introduction of nonnative New Zealand mudsnails.

Boneyard Bog Springs Unit

The Boneyard Bog Springs Unit is a complex of springs, spring runs, spring seeps, and the segment of Boneyard Creek connecting them, and a small amount of upland area encircling them to make them a single unit of approximately 5.3 ac (2.1 ha), in the vicinity of UTM Zone 12 coordinate 659970, 3750730, in Apache County, Arizona. The entire unit is in Federal ownership and managed by the Apache-Sitgreaves National Forests. The unit encompasses eight major springheads and spring runs, each of which flows several yards (meters) to Boneyard Creek, a tributary of the Black River. The spring complex contains spring seeps along the spring runs and the tributary. We are designating a contiguous critical habitat unit that includes the springheads, spring runs, seeps, and that portion of Boneyard Creek that connects the spring runs. Boneyard Creek is occupied where spring seeps are present along it, and the unit will provide for springsnail movement downstream, and is essential for habitat connectivity. This unit contains approximately 3.3 ft (1.0 m) in width of upland area on each side of the springheads, spring runs, spring seeps, and tributary segment, because the moist soils and vegetation in the adjacent uplands provide food for the snails.

This unit is currently occupied and contains all the PBFs essential for the conservation of the species. Also, the PBFs that may require special management are adequately flowing springs, runs, and seeps that are free of contaminants and disturbance from nonnative species. Special management is needed to protect against the threats of wildfire, fire retardant used to fight wildfires, elk wallowing, predation by nonnative crayfish, drought, and potential competition from nonnative New Zealand mudsnails.

Boneyard Creek Springs Unit

The Boneyard Creek Springs Unit is a complex of springs, spring runs, spring seeps, and the segment of Boneyard Creek connecting them, and a small amount of upland area encompassing them, in a single, contiguous unit of approximately 5.8 ac (2.3 ha), in the vicinity of UTM Zone 12 coordinate 658300, 3749790, in Apache County, Arizona. The entire unit is in Federal ownership and managed by the Apache-Sitgreaves National Forests. The unit encompasses at least 11 major springheads and spring runs, which each flow a distance of several meters (yards) to Boneyard Creek, a tributary of the Black River. The spring complex contains spring seeps along the spring runs and the tributary. We are designating as critical habitat a contiguous unit that includes the springheads, spring runs, seeps, and that portion of Boneyard Creek that connects the spring runs. Boneyard Creek is occupied where there are spring seeps along it, and it should provide for springsnail movement downstream and is essential for habitat connectivity. The area within the unit contains approximately 3.3 ft (1.0 m) in width of upland area on each side of the springheads, spring runs, spring seeps, and tributary segment. The moist soils and vegetation in the adjacent uplands produce food for the snails and protect the substrate they use.

The Boneyard Creek Springs Unit is currently occupied and contains all the PBFs essential for the conservation of the species. The PBFs that may require special management are adequately flowing springs, runs, and seeps that are free of contaminants and disturbance from nonnative species. Threats to the Three Forks springsnail in this unit that may require special management include wildfire, fire retardant used to fight wildfires, predation by nonnative crayfish, drought, and potential competition from nonnative New Zealand mudsnails.

San Bernardino Springsnail

Snail Spring Unit

The Snail Spring Unit encompasses 1.129 ac (0.457 ha) in Cochise County, Arizona. The entire unit is owned by the State of Arizona and managed by the John Slaughter Ranch Museum. The spring is approximately 16 ft (5 m) in diameter, and has a spring run that goes south from the spring approximately 77 ft (23 m) to a manmade ditch, which runs 34 ft (10 m) to a dirt road. It passes under the road in a 12-ft (4-m) culvert, then flows approximately 56 ft (17 m) below the road. We are not designating the road as critical habitat, but we are designating the culvert beneath the road, because it contains flowing water that provides PCE 1. The spring and spring run down to the ditch are dry and unoccupied, though they contain PCE 3, substrate. The ditch is unoccupied, though all the PCEs are present. We are including as part of this critical habitat designation a 3.3-ft (1-m) upland area on each side of the spring, spring run and ditch, because moist soils and upland vegetation are necessary to produce food for the snails and protect the substrate they use. Because of the small size of the spring, spring run, and ditch, we are precluded from mapping them precisely due to inaccuracies inherent in the use of satellites for locating and mapping. Therefore, for mapping purposes we created a circle that encompasses them. The critical habitat is the spring, spring run, ditch and buffer within the 249-ft (76-m) diameter circle centered on UTM coordinate 663858, 3468182 in Zone 12.

The Snail Spring Unit is currently unoccupied by the San Bernardino springsnail, but it was historically occupied. This Snail Spring Unit is essential for the conservation of the species, because it will provide population redundancy following future reintroduction of the species.

Goat Tank Spring Unit

This unit encompasses 0.005 ac (0.002 ha) in Cochise County, Arizona. The entire unit is in State ownership and managed by the John Slaughter Ranch Museum. The spring is contained within a square concrete box approximately 2 ft by 3 ft (0.6 m by 0.9 m). There is also some spring seepage emanating from the base of a cottonwood tree about 6.6 ft (2 m) from the spring-box. We are designating as critical habitat a 3.3-ft (1-m) upland area on each side of the springbox and spring seepage, because it has moist soils and vegetation that produces food for the snails and protects the substrate the snails use. Because of the small size of the spring-box and spring seepage, we are precluded from mapping them precisely due to inaccuracies inherent in the use of satellites for locating and mapping. Therefore, for mapping purposes we created a circle that encompasses them. The critical habitat designation is the spring-box, spring seepage, and buffer within the 16-ft (5-m) diameter circle centered on UTM coordinate 663725, 3468162 in Zone 12.

This unit is occupied at the time of this final listing rule, and contains all the PBFs essential for the conservation of the species. The PBFs which may require special management are free-flowing springs and habitat free of disturbance from nonnative competitors. Threats to the San Bernardino springsnail in this unit that may require special management include water depletion and drought. Water depletion has affected the species with a loss of flowing water at nearby

Snail Spring in the recent past (Cox *et al.* 2007, p. 2; Smith *et al.* 2003, p. 1; Malcom *et al.* 2003, p. 18). Also, potential threats may be posed by nonnative snails, should they be introduced, and by fire retardant chemicals, should they be applied in other portions of the San Bernardino Valley and carried into this unit by wind drift.

Horse Spring Unit

This unit encompasses 0.078 ac (0.032 ha) in Cochise County, Arizona. The entire unit is State-owned and managed by the John Slaughter Ranch Museum. The spring emerges from a PVC pipe, which is enclosed in a spring-box, and water flows out in a spring-run that is approximately 1.6 ft (0.5 m) wide and 51 ft (16 m) in length. We are designating as critical habitat a 3.3-ft (1-m) buffer of upland area on each side of the springhead and spring-run, because it has moist soils and vegetation that produce food for the snails and protect the substrate they use. Because of the small size of the springhead and spring-run, we are precluded from mapping them precisely due to inaccuracies inherent in the use of satellites for locating and mapping. Therefore, for mapping purposes we created a circle that encompasses them. The designated critical habitat is the spring-box, spring seepage, and buffer within the 66 ft (20 m) diameter circle centered on UTM coordinate 663772, 3468091 in Zone 12.

The Horse Spring Unit is occupied at the time of this listing, and contains all the PBFs essential for the conservation of the species. The PBFs which may require special management are free-flowing springs and habitat free of disturbance from nonnative competitors. Threats to the San Bernardino springsnail in this unit that may require special management include groundwater depletion and drought. Groundwater depletion has affected the species with a loss of flowing water at nearby Snail Spring in the recent past (Cox *et al.* 2007, p. 2; Smith *et al.* 2003; p. 1, Malcom *et al.* 2003, p. 18), and may threaten this site in the future. Also, potential threats may be posed by nonnative snails, should they be introduced, and by fire retardant chemicals, should they be applied in other portions of the San Bernardino Valley and carried into this unit by wind drift.

Tule Spring Unit

This unit encompasses 0.801 ac (0.324 ha) in Cochise County, Arizona. The entire unit is in Federal ownership and managed by the San Bernardino NWR. The spring forms a pond approximately 75 ft (23 m) north-south and 43 ft (13 m) east-west, and it has a spring-run that is approximately 71 ft (22 m) in length. The spring run emerges from the southeastern side of the spring pond, runs northeast for approximately 41 ft (13 m) to a manmade ditch, which runs southeast 30 ft (9 m). We are designating as critical habitat a 3.3-ft (1-m) buffer of upland area on each side of the spring, spring-run, and ditch, because it has moist soils and vegetation that produce food for the snails and protect the substrate they use. Although there is a pond at this location, the seeps where the water emerges are not located within the pond. The pond is included in the designation, because, along with the spring, seeps, spring run, ditch, and upland buffer, it comprises an inter-related, functioning aquatic system important for the springsnails and the fish. The water from the pond will maintain a springbrook, and the springbrook will drain into other ponds.

Because of the small size of the spring, spring-run, and ditch, we are precluded from mapping them precisely due to inaccuracies inherent in the use of satellites for locating and mapping. Therefore, for mapping purposes we created a circle that encompasses them. The critical habitat is the spring, spring-run, ditch and buffer within the 210-ft (64-m) diameter circle centered on UTM coordinate 664259, 3468499 in Zone 12.

The Tule Spring Unit is currently unoccupied by the San Bernardino springsnail at the time of this listing, but is considered to have been historically occupied (Malcom *et al.* 2003, p. 19), and shares a common aquifer and similarities in water chemistry, temperature, and hydrology with Snail Spring. We consider the Tule Spring Unit to be essential to the conservation of the species, because it contains all the PCEs necessary for the life-history processes, and it provides population redundancy following future reintroduction of the species.

Threats to the San Bernardino springsnail in this unit include the potential use of fire retardant chemicals, water depletion, drought, and the potential introduction of nonnative snails.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7 of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. Decisions by the courts of appeals for the Fifth and Ninth Circuit Courts of Appeals have invalidated our definition of ''destruction or adverse modification'' (50 CFR 402.02) (see *Gifford Pinchot Task Force* v. *U.S. Fish and Wildlife Service,* 378 F. 3d 1059 (9th Circuit 2004) and *Sierra Club* v. *U.S. Fish and Wildlife Service et al.,* 245 F.3d 434, 442F (5th Circuit 2001), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional (or retain those PCEs that relate to the ability of the area to periodically support the species) to serve its intended conservation role for the species.

If a species is listed or critical habitat is designated, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. As a result of this consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect, or are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. We define ''Reasonable and prudent alternatives'' at 50 CFR 402.2 as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action;

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction;

(3) Are economically and technologically feasible; and

(4) Would, in the Director's opinion, avoid jeopardizing the continued existence of the listed species or

destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive project redesign or relocation of the project. Costs associated with implementing reasonable and prudent alternatives are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may have been affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies may sometimes need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Federal actions that may affect the Three Forks springsnail or the San Bernardino springsnail or their designated critical habitat require section 7(a)(2) consultation under the Act. On private lands in the United States, examples of Federal actions include, but are not limited to, Environmental Protection Agency authorization of discharges under the National Pollutant Discharge Elimination System and registration of pesticides; Federal Highway Administration approval of funding of road or highway infrastructure and maintenance; Corps authorization of discharges of dredged and fill material into waters of the United States under section 404 of the CWA; U.S. Department of Agriculture (USDA) Natural Resources Conservation Service technical assistance and other programs; USDA—Rural Utilities Service infrastructure or development; U.S. Department of Homeland Security activities in regard to immigration enforcement and regulation; the Department of Housing and Urban Development Small Cities Community Development Block Grant and home loan programs; or a permit from us under section 10(a)(1)(B) of the Act. Federal actions not affecting listed species or critical habitat, and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or permitted, do not require section 7(a)(2) consultations. In addition to several of the specific examples above, other Federal actions that may require consultation on Federal lands include land-management actions implemented by the applicable Federal land management agency.

Application of the ''Adverse Modification'' Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species, or would retain those PCEs that relate to the ability of the area to periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PCEs to an extent that appreciably reduces the conservation value of critical habitat for the Three Forks springsnail or the San Bernardino springsnail. As discussed above, the role of critical habitat is to support the life-history needs of the species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving Federal actions that may adversely modify such habitat, or that may be affected by such designation.

Activities that, when carried out, funded, or authorized by a Federal agency, may affect critical habitat and, therefore, should result in consultation for the Three Forks springsnail and the San Bernardino springsnail include, but are not limited to:

(1) Actions that would reduce the quantity of water flow within the spring systems designated as critical habitat.

(2) Actions that would result in the inundation of springheads within the spring systems designated as critical habitat.

(3) Actions that would degrade water quality within the spring systems designated as critical habitat.

(4) Actions that would reduce the availability of course, firm aquatic substrates within the spring systems that are designated as critical habitat.

(5) Actions that would reduce the occurrence of native aquatic macrophytes, algae, and/or periphyton within the spring systems designated as critical habitat.

(6) Actions that would cause, promote, or maintain the presence of nonnative predators and competitors at unacceptable levels within the spring systems designated as critical habitat.

Exemptions

Application of Section 4(a)(3) of the Act

The Sikes Act Improvement Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

(1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;

(2) A statement of goals and priorities;

(3) A detailed description of management actions to be implemented to provide for these ecological needs; and

(4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108–136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: ''The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense (DOD), or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.''

There are no DOD lands with a completed INRMP within the critical habitat designation. Therefore, we are not exempting lands from this final designation of critical habitat for the San Bernardino or Three Forks springsnails pursuant to section 4(a)(3)(B)(i) of the Act.

Exclusions

Application of Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary must designate and revise critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any

particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. The statute on its face, as well as the legislative history, is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor in making that determination.

Under section 4(b)(2) of the Act, the Secretary may exclude an area from designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise his discretion to exclude the area only if such exclusion would not result in the extinction of the species.

Exclusions Based on Economic Impacts

Under section 4(b)(2) of the Act, we consider the economic impacts of specifying any particular area as critical habitat. In order to consider economic impacts, we prepared a draft economic analysis of the proposed critical habitat designation and related factors (Industrial Economics 2011). The draft economic analysis, dated October 24, 2011, was made available for public review on November 17, 2011 (76 FR 71300). We accepted comments on the draft analysis until December 19, 2011. Following the close of the comment periods, a final analysis of the potential economic effects of the designation was completed on January 11, 2012, taking into consideration the public comments and any new information (Industrial Economics 2012).

The intent of the final economic analysis (FEA) is to quantify the economic impacts of all potential conservation efforts for Three Forks springsnail and San Bernardino springsnail; some of these costs will likely be incurred regardless of whether we designate critical habitat (baseline). The economic impact of the final critical habitat designation is analyzed by comparing scenarios both ''with critical habitat'' and ''without critical habitat.'' The ''without critical habitat'' scenario represents the baseline for the analysis, considering protections already in place for the species (e.g., under the Federal listing and other Federal, State, and local regulations). The baseline, therefore, represents the costs incurred regardless of whether critical habitat is designated. The ''with critical habitat'' scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical habitat above and beyond the baseline costs; these are the costs we consider in the final designation of critical habitat. The analysis forecasts both baseline and incremental impacts likely to occur with the designation of critical habitat.

The FEA also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on government agencies, private businesses, and individuals. The FEA measures lost economic efficiency associated with residential and commercial development and public projects and activities, such as economic impacts on water management and transportation projects, Federal lands, small entities, and the energy industry. Decision-makers can use this information to assess whether the effects of the designation might unduly burden a particular group or economic sector. Finally, the FEA considers economic impacts to activities from 2012 (the year of this final critical habitat designation) through 2024 (the length of guidance and information for project and activity decisionmaking for the Apache-Sitgreaves National Forest's Land Management Plan). The FEA quantifies economic impacts of Three Forks springsnail and San Bernardino springsnail conservation efforts associated with the following categories of activity: pesticide use, wildfire suppression, and ungulate grazing (Industrial Economics 2012, p. ES–1).

Only minor administrative impacts are likely to result from the designation of critical habitat. This result is attributed to several factors, including: (1) Four of the seven proposed units already receive extensive protection from the Federal agencies managing the parcels; (2) three of the four federally-owned units are occupied, and thus, will require consultation regardless of the designation; (3) reintroduction of the San Bernardino springsnail to the unoccupied units is planned regardless of critical habitat designation; and (4) project modifications necessary to avoid adverse modification are indistinguishable from those necessary to avoid jeopardizing the species, because the species' existence heavily depends upon the spring systems in which they occur.

We anticipate seven potential section 7 consultations related to activities on federally managed lands. Both the Apache-Sitgreaves National Forests and San Bernardino NWR will need to address the springsnails in their management plans to prevent adverse modification of these units. Given the presence of springsnails in the Apache-Sitgreaves National Forests, the five consultations would occur without the designation. We anticipate the U.S. Forest Service will reinitiate two programmatic consultations, one for the Apache-Sitgreaves National Forests' Management Plan, and one for its nationwide plan on the use of fire retardants across national forests. Additionally, we anticipate up to three formal consultations, one for the response to the 2011 Wallow Fire, one for potential long-term burn area rehabilitation after the Wallow Fire, and one for salvaging trees within the fire perimeter. Incremental impacts are limited to the additional administrative costs (approximately $48,500) of considering the potential for the plans and projects to adversely modify critical habitat.

The San Bernardino NWR will likely reinitiate one programmatic consultation with the Service regarding its management plan, and participate in one formal consultation to reintroduce the springsnail to the Tule Spring Unit. Because the Service plans to reintroduce the springsnail at this site regardless of whether critical habitat is designated, incremental costs are limited to the administrative costs ($22,200) of considering adverse modification during the consultations.

Because we do not have information regarding the timing of likely consultations, we conservatively assume costs are incurred immediately following promulgation of this final rule. Total undiscounted costs are $70,700. In conformance with the Office of Management and Budget guidance, we also report present-value impacts and impacts on an annualized basis applying real discount rates of 3 and 7 percent. No small entities are anticipated to be affected by the designation. Also, we do not anticipate

impacts to the supply, distribution, or use of energy related to this critical habitat designation.

Our economic analysis did not identify any disproportionate costs that are likely to result from the designation. Consequently, the Secretary is not exerting his discretion to exclude any areas from this designation of critical habitat for the Three Forks and San Bernardino springsnails based on economic impacts. A copy of the final economic analysis with supporting documents may be obtained by contacting the Arizona Ecological Services Field Office (see **ADDRESSES**) or by downloading from the Internet at *http://www.regulations.gov.*

Exclusions Based on National Security Impacts

Under section 4(b)(2) of the Act, we consider whether there are lands owned or managed by the DOD where a national security impact might exist. In preparing this rule, we have determined that the lands within the designated critical habitat for the Three Forks and San Bernardino springsnails are not owned or managed by the DOD, and therefore, anticipate no impact to national security. There are no areas excluded based on impacts on national security.

Exclusions Based on Other Relevant Impacts

Under section 4(b)(2) of the Act, we consider any other relevant impacts, in addition to economic impacts and impacts on national security. We consider a number of factors including whether the landowners have developed any HCPs or other management plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at any Tribal issues, and consider the government-to-government relationship of the United States with Tribal entities. We also consider any social impacts that might occur because of the designation.

We have determined that the designation does not include any Tribal lands. We anticipate no impact to Tribal lands, partnerships, or HCPs from this critical habitat designation. Additionally, there are currently no conservation plans for the private lands containing springs occupied by the San Bernardino springsnail. Accordingly, the Secretary is not exercising his discretion to exclude any areas from this designation based on other relevant impacts.

Required Determinations

Regulatory Planning and Review

The Office of Management and Budget (OMB) has determined that this rule is not significant and has not reviewed this rule under Executive Order 12866. OMB bases its determination upon the following four criteria:

(a) Whether the rule will have an annual effect of $100 million or more on the economy or adversely affect an economic sector, productivity, jobs, the environment, or other units of the government.

(b) Whether the rule will create inconsistencies with other Federal agencies' actions.

(c) Whether the rule will materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

(d) Whether the rule raises novel legal or policy issues.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 et seq., as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency must publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended RFA to require Federal agencies to provide a statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities. In this final rule, we are certifying that the critical habitat designations for Three Forks and San Bernardino springsnails will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

According to the Small Business Administration, small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term ''significant economic impact'' is meant to apply to a typical small business firm's business operations.

To determine if the rule could significantly affect a substantial number of small entities, we consider the number of small businesses affected within particular types of economic activities. In Appendix A of the FEA, the analysis did not anticipate impacts to small entities as a result of this designation. We apply the ''substantial number'' test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define ''substantial number'' or ''significant economic impact.'' Consequently, to assess whether a ''substantial number'' of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat only affects activities authorized, funded, or carried out by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the species is present, Federal agencies already are required to consult with us under section 7 of the Act on activities they authorize, fund, or carry out that may affect the Three Forks springsnail. Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities (see Application of the

''Adverse Modification'' Standard section).

In our final economic analysis of the critical habitat designation, we evaluated the potential economic effects on small business entities resulting from conservation actions related to the listing of the species and the designation of critical habitat. The analysis is based on the estimated impacts associated with the rulemaking as described in the analysis and evaluates the potential for economic impacts. We did not anticipate any activities occurring within the next 13 years within or adjacent to the critical habitat we are designating that could potentially affect small businesses.

We determined from our analysis (Appendix A in FEA) that there will be no additional economic impacts to small entities resulting from the designation of critical habitat, because almost all of the potential costs of modification of activities and conservation identified in the economic analysis represent baseline costs that would be realized in the absence of critical habitat. The economic analysis estimates the overall annual incremental costs associated with the designation of critical habitat to be very modest, at approximately $70,700. All of these costs would derive from the added effort associated with considering adverse modification in the context of section 7 consultations.

In summary, we considered whether this designation would result in a significant economic effect on a substantial number of small entities. Based on our analysis and currently available information, we concluded that this rule will not result in a significant economic impact on a substantial number of small entities. Therefore, we are certifying that the designation of critical habitat for Three Forks and San Bernardino springsnails will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. The Office of Management and Budget (OMB) has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute ''a significant adverse effect'' when compared to not taking the regulatory action under consideration. As none of the outcomes that may constitute ''a significant adverse effect'' are relevant to this analysis, energy-related impacts within the critical habitat designation are not anticipated. The economic analysis finds that extraction, energy production, and distribution are not expected to be affected (Industrial Economics 2012, p. A–8). Thus, based on information in the economic analysis, energy-related impacts associated with Three Forks and San Bernardino springsnail conservation activities within critical habitat are not expected. As such, the designation of critical habitat is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.), we make the following findings:

(1) This final rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or tribal governments, or the private sector and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or [T]ribal governments,'' with two exceptions. It excludes ''a condition of Federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and [T]ribal governments under entitlement authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding,'' and the State, local, or [T]ribal governments ''lack authority'' to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; AFDC work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. ''Federal private sector mandate'' includes a regulation that would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply; nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not expect this rule to significantly or uniquely affect small governments. Small governments will be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. Therefore, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the Three Forks springsnail and San Bernardino springsnail in a takings implications assessment. Critical habitat designation does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. The takings implications assessment concludes that this designation of critical habitat does not pose significant takings implications for lands within or affected by the designation.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this final rule does not have significant Federalism effects. A

federalism impact summary statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this final critical habitat designation with appropriate State resource agencies in Arizona. We received comments from AGFD and have addressed them in the Summary of Comments and Recommendations section of this rule. The designation of critical habitat on Federal lands currently occupied by the Three Forks springsnail or San Bernardino springsnail imposes no additional restrictions to those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist local governments in long-range planning (rather than having them wait for case-by-case section 7 consultations to occur).

Where state and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with E.O. 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. This final rule uses standard property descriptions and identifies the physical or biological features within the designated areas to assist the public in understanding the habitat needs of the Three Forks springsnail and San Bernardino springsnail.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This final rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as endangered or threatened under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to NEPA in connection with designating critical habitat under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of the Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We have determined that there are no Tribal lands occupied at the time of listing with features essential for the conservation, and no Tribal lands that are essential for the conservation, of the Three Forks springsnail and San Bernardino springsnail. Therefore, we have not designated critical habitat on Tribal lands for the Three Forks springsnail and San Bernardino springsnail.

References Cited

A complete list of all references cited in this rule is available on the Internet at *http://www.regulations.gov* or upon request from the Field Supervisor, Arizona Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this document are the staff members of the Arizona Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500, unless otherwise noted.

■ 2. In § 17.11(h), add entries for ''Springsnail, San Bernardino'' and ''Springsnail, Three Forks'' to the List of Endangered and Threatened Wildlife in alphabetic order under SNAILS to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
SNAILS							
*	*	*	*	*	*		*
Springsnail, San Bernardino.	*Pyrgulopsis bernardina*.	U.S.A. (AZ) ..... Mexico (Sonora)	Entire	T	.....	17.95(f)	NA
*	*	*	*	*	*		*
Springsnail, Three Forks.	*Pyrgulopsis trivialis*	U.S.A. (AZ)	Entire	E	.....	17.95(f)	NA
*	*	*	*	*	*		*

■ 3. In § 17.95, amend paragraph (f) by adding entries for ''San Bernardino Springsnail (*Pyrgulopsis bernardina*)'' and ''Three Forks Springsnail (*Pyrgulopsis trivialis*)'' after the entry for ''Koster's Springsnail (*Juturnia Kosteri*) and Roswell's Springsnail (*Pyrgulopsis Roswellensis*),'' to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) Clams and Snails.

* * * * *

San Bernardino Springsnail (*Pyrgulopsis bernardina*)

(1) Critical habitat units are depicted for Cochise County, Arizona, on the map in paragraph (5) of this entry.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of the San Bernardino springsnail consist of four components:

(i) Adequately clean spring water (free from contamination) emerging from the ground and flowing on the surface;

(ii) Periphyton (attached algae), bacteria, and decaying organic material for food;

(iii) Substrates that include cobble, gravel, pebble, sand, silt, and aquatic vegetation, for egg laying, maturing, feeding, and escape from predators; and

(iv) Either an absence of nonnative predators (crayfish) and competitors (snails) or their presence at low population levels.

(3) Critical habitat does not include manmade structures other than the road culvert and concrete spring-boxes, which are included to protect the water flowing within them.

(4) *Critical habitat map units.* Data layers defining map units were plotted on 2007 USGS Digital Ortho Quarter Quad maps using Universal Transverse Mercator (UTM) coordinates in ArcMap. Because of the small size of the springs, spring runs and ditches, for mapping purposes we created a circle that encompasses them.

(5) *Note:* Index map of critical habitat for the San Bernardino springsnail follows:

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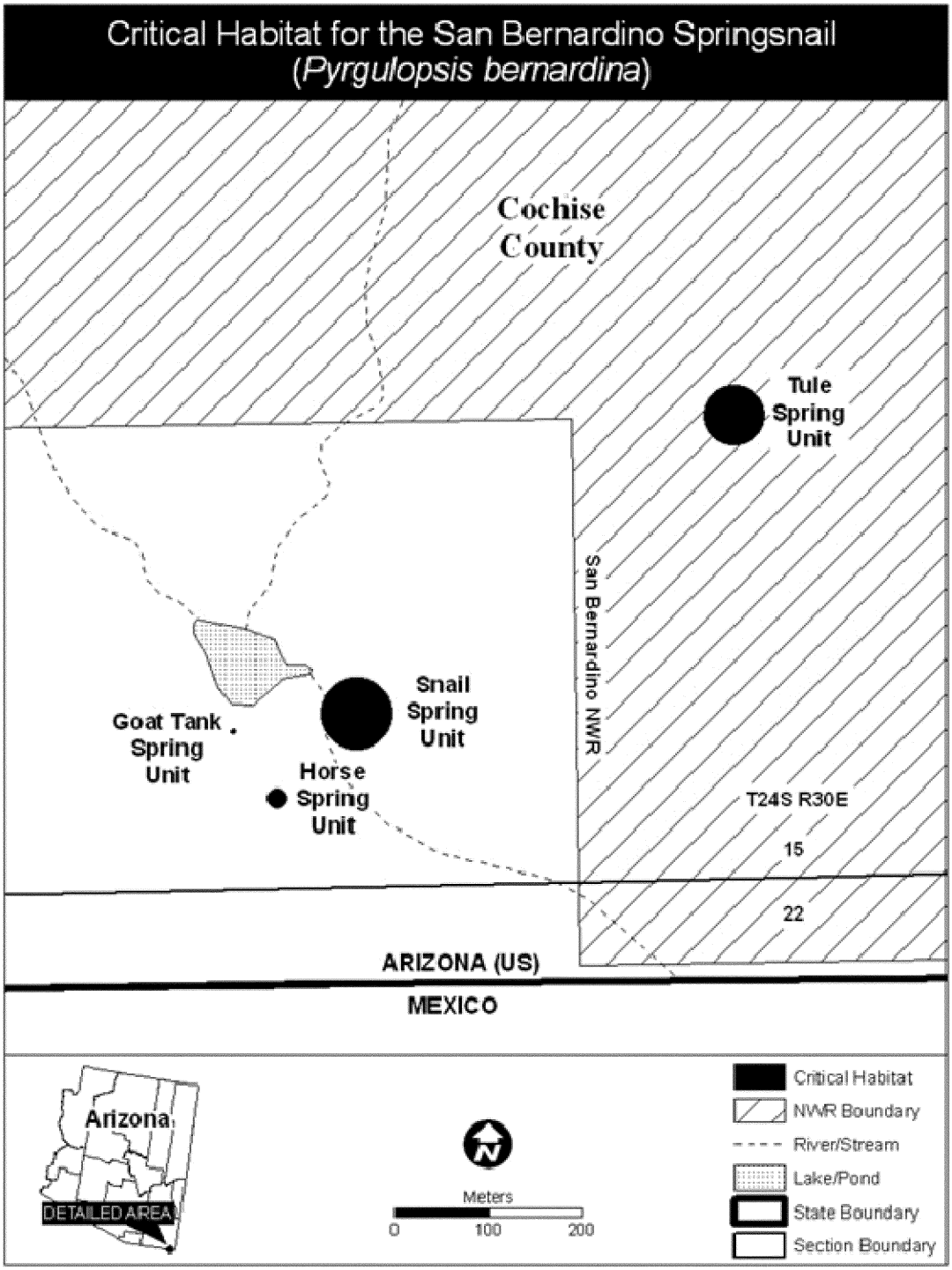


BILLING CODE 4310–55–C

(6) Snail Spring Unit contains approximately 0.457 ha (1.129 ac) in Cochise County, Arizona. This critical habitat unit is a spring approximately 5 m (16 ft) in diameter and has a spring run that goes south from the spring approximately 23.5 m (77 ft) to a manmade ditch, which runs 10.2 m (33.5 ft) to a dirt road. It passes under the road in a 3.5 m (11.5 ft) culvert, then flows approximately 17 m (56 ft) below the road. The culvert beneath the road is included in critical habitat, but not the road itself. We include a 1-m (3.3-ft) upland area on each side of the spring, spring run, and ditch. The critical habitat unit is the spring, spring run, ditch, and buffer within the 76-m (249-ft) diameter circle centered on UTM coordinate 663858, 3468182 in Zone 12 with the units in meters using North American Datum of 1983 (NAD 83).

(7) Goat Tank Spring Unit contains approximately 0.002 ha (0.005 ac) in Cochise County, Arizona. The unit is a spring contained entirely within a square concrete box approximately 0.61 by 0.91 m (2 by 3 ft) and spring seepage emanating from the base of a cottonwood tree about 2 m (7 ft) from the spring-box. This unit includes a 1-m (3.3-ft) upland area on each side of the spring box and spring. The critical habitat is the spring-box, spring seepage,

and buffer within the 5-m (16.4-ft) diameter circle centered on UTM coordinate 663725, 3468162 in Zone 12 with the units in meters using North American Datum of 1983 (NAD 83).

(8) Horse Spring Unit contains approximately 0.032 ha (0.078 ac) in Cochise County, Arizona. The unit is a spring and springrun approximately 0.5 m (1.6 ft) wide and 15.5 m (50.9 ft) in length. We include a 1-m (3.3-ft) upland area on each side of the springhead and spring-run. The designated critical habitat unit is the spring-box, spring seepage, and buffer within the 20-m (66-ft) diameter circle centered on UTM coordinate 663772, 3468091 in Zone 12 with the units in meters using North American Datum of 1983 (NAD 83).

(9) Tule Spring Unit contains approximately 0.324 ha (0.801 ac) in Cochise County, Arizona. The unit is a spring, which forms a pond approximately 23 m (75 ft) north-south and 13 m (43 ft) east-west, and it has a spring run that is approximately 22 m (71 ft) in length. The spring run emerges from the southeastern side of the spring pond, runs northeast for approximately 12.5 m (41 ft) to a manmade ditch, which runs southeast 9.2 m (30 ft). This unit includes a 1-m (3.3-ft) upland area on each side of the spring, spring run, and ditch. The designated critical habitat unit is the spring, spring-run, ditch, and buffer within the 64-m (210-ft) diameter circle centered on UTM coordinate 664259, 3468499 in Zone 12 with the units in meters using North American Datum of 1983 (NAD 83).

Three Forks Springsnail (*Pyrgulopsis trivialis*)

(1) Critical habitat units are depicted for Apache County, Arizona, on the map at paragraph (5) of this entry.

(2) Within these areas, the primary constituent elements of the physical or biological features essential to the conservation of the San Bernardino springsnail consist of four components:

(i) Adequately clean spring water (free from contamination) emerging from the ground and flowing on the surface;

(ii) Periphyton (attached algae), bacteria, and decaying organic material for food;

(iii) Substrates that include cobble, gravel, pebble, sand, silt, and aquatic vegetation, for egglaying, maturing, feeding, and escape from predators; and

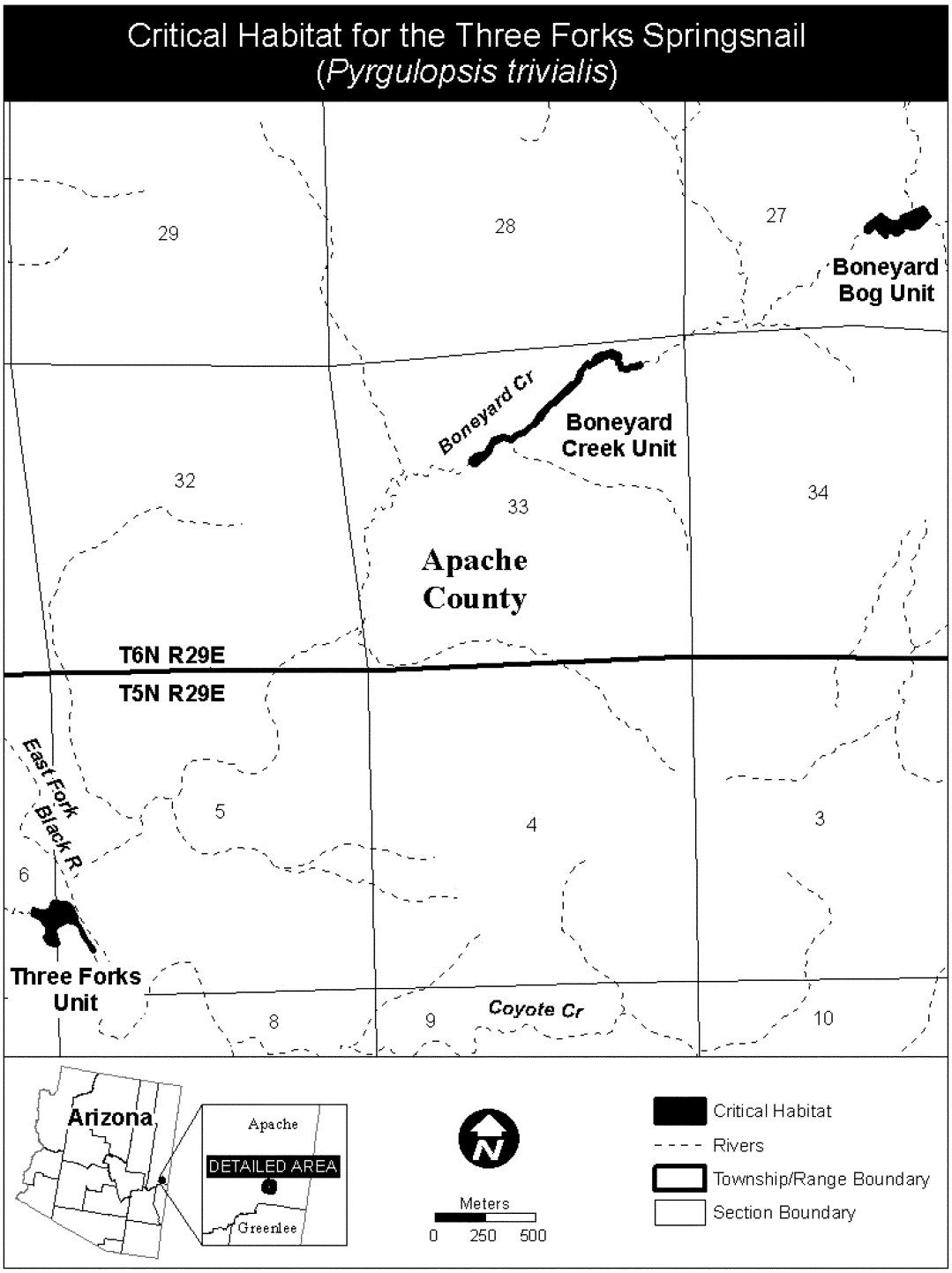
(iv) Either an absence of nonnative predators (crayfish) and competitors (snails) or their presence at low population levels.

(3) Critical habitat does not include manmade structures other than concrete spring-boxes, which are included to protect the flowing water within them.

(4) Critical habitat map units were plotted on 2007 USGS Digital Ortho Quarter Quad maps using Universal Transverse Mercator (UTM) coordinates in ArcMap.

(5) *Note:* Index map of critical habitat for the Three Forks springsnail follows:

BILLING CODE 4310–55–P



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(6) Three Forks Springs Unit (2.5 ha; 6.1 ac). The Three Forks Spring Unit consists of all areas within boundary points with the following coordinates in UTM Zone 12 with the units in meters using North American Datum of 1983 (NAD 83): 655708, 3747262; 655714, 3747269; 655746, 3747258; 655777, 3747256; 655802, 3747270; 655808, 3747288; 655815, 3747304; 655877, 3747299; 655898, 3747291; 655911, 3747271; 655922, 3747253; 655932, 3747227; 655932, 3747209; 655939, 3747196; 655948, 3747186; 655958, 3747165; 655969, 3747142; 655979, 3747116; 655998, 3747094; 656013, 3747078; 656022, 3747061; 656023, 3747050; 656013, 3747052; 656001, 3747065; 655991, 3747086; 655973, 3747112; 655963, 3747133; 655951, 3747166; 655931, 3747191; 655906, 3747198; 655886, 3747201; 655869, 3747198; 655836, 3747179; 655826, 3747158; 655830, 3747123; 655841, 3747098; 655838, 3747083; 655818, 3747085; 655785, 3747097; 655771, 3747122; 655782, 3747144; 655784, 3747170; 655752, 3747216; 655715, 3747232; 655707, 3747242; Thence returning to 655708, 3747262.

(7) Boneyard Bog Springs Unit (2.1 ha; 5.3 ac). The Boneyard Bog Springs Unit consists of all areas within boundary points with the following coordinates in UTM Zone 12 with the units in meters using North American Datum of 1983 (NAD 83): 659968, 3750753; 659990, 3750731; 660021, 3750713; 660060, 3750717; 660070, 3750742; 660176, 3750787; 660190, 3750781; 660199, 3750758; 660208, 3750744; 660159, 3750685; 660125, 3750680; 660088, 3750684; 660081, 3750690; 660072, 3750691; 660072, 3750676; 660076, 3750675; 660076, 3750664; 660069, 3750664; 660067, 3750663; 660060, 3750654; 660052, 3750648; 660034, 3750649; 660029, 3750654; 660027, 3750663; 660008, 3750659; 659997, 3750649; 659997, 3750639; 659988, 3750639; 659982, 3750641; 659958, 3750660; 659954, 3750671; 659945, 3750675; 659942, 3750688; 659933, 3750685; 659904, 3750662; 659889, 3750669; 659885, 3750687; 659902, 3750702; 659919, 3750712; Thence returning to 659968, 3750753.

(8) Boneyard Creek Springs Unit (2.3 ha; 5.8 ac). The Boneyard Creek Springs Unit consists of all areas within boundary points with the following coordinates in UTM Zone 12 with the units in meters using North American Datum of 1983 (NAD 83): 658758, 3750008; 658765, 3749996; 658763, 3749984; 658732, 3749975; 658714, 3749981; 658698, 3749968; 658661, 3749971; 658655, 3749981; 658655, 3749998; 658642, 3750000; 658638, 3750024; 658623, 3750034; 658606, 3750036; 658580, 3750029; 658568, 3750020; 658553, 3750013; 658537, 3750005; 658519, 3749993; 658507, 3749985; 658492, 3749992; 658479, 3749976; 658469, 3749960; 658467, 3749945; 658460, 3749935; 658452, 3749913; 658405, 3749863; 658371, 3749841; 658343, 3749805; 658312, 3749789; 658273, 3749741; 658272, 3749733; 658268, 3749725; 658261, 3749722; 658254, 3749720; 658242, 3749699; 658211, 3749682; 658184, 3749655; 658140, 3749634; 658119, 3749610; 658074, 3749624; 658024, 3749603; 657999, 3749549; 657932, 3749492; 657916, 3749492; 657904, 3749509; 657912, 3749527; 657933, 3749545; 657982, 3749559; 658020, 3749623; 658072, 3749642; 658111, 3749632; 658129, 3749649; 658174, 3749667; 658201, 3749691; 658223, 3749705; 658246, 3749743; 658311, 3749811; 658336, 3749826; 658403, 3749893; 658410, 3749904; 658420, 3749908; 658434, 3749917; 658447, 3749962; 658473, 3749991; 658493, 3750013; 658509, 3750003; 658523, 3750019; 658528, 3750030; 658538, 3750043; 658564, 3750055; 658584, 3750053; 658598, 3750061; 658616, 3750068; 658657, 3750052; 658658, 3750032; 658656, 3750020; 658667, 3750002; 658666, 3749982; 658692, 3749984; 658712, 3749994; 658730, 3749994; Thence returning to 658758, 3750008.

* * * * *

Dated: April 4, 2012.

Eileen Sobeck,

Acting Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 2012–8811 Filed 4–16–12; 8:45 am]

BILLING CODE 4310–55–P