DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AI15

Endangered and Threatened Wildlife and Plants; Listing Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea as Endangered With Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), list the Roswell springsnail (*Pyrgulopsis roswellensis*), Koster's springsnail (*Juturnia kosteri*), and Noel's amphipod (*Gammarus desperatus*) as endangered and the Pecos assiminea (*Assiminea pecos*) as endangered with critical habitat under the Endangered Species Act of 1973, as amended (Act). These four invertebrates occur at sinkholes, springs, and associated spring runs and wetland habitats. They are found at one site in Chaves County, New Mexico, and Pecos assiminea is also found at one site in Pecos County, Texas, and one site in Reeves County, Texas.

These three snails and one amphipod have an exceedingly limited distribution, low mobility, and fragmented habitat. They are imperiled by introduced species, surface and groundwater contamination, oil and gas extraction activities within the supporting aquifer and watershed, local and regional groundwater depletion, severe drought, and direct loss of their habitat (*e.g.*, through burning or removing marsh vegetation, or flooding of habitat). This final rule will implement the Federal protection and recovery provisions of the Act for these invertebrate species. We are also designating critical habitat for the Pecos assiminea in Texas.

DATES: This final rule is effective September 8, 2005.

ADDRESSES: Supporting documentation for this rulemaking is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, 2105 Osuna Road NE., Albuquerque, New Mexico 87113.

FOR FURTHER INFORMATION CONTACT: Susan MacMullin, Field Supervisor, New Mexico Ecological Services Field Office (telephone, 505–761–4706; facsimile, 505–346–2542).

SUPPLEMENTARY INFORMATION:

Background

It is our intent to discuss only those topics directly relevant to this final listing determination. For more information on the four invertebrates, refer to the February 12, 2002, proposed rule (67 FR 6459). However, some of this information is discussed in our analyses below, such as the summary of factors affecting the species.

Springsnails

The Permian Basin of the southwestern United States contains one of the largest carbonate (limestone) deposits in the world (New Mexico Department of Game and Fish (NMDGF) 1998). Within the Permian Basin of the Southwestern United States lies the Roswell Basin. Located in southeastern New Mexico, this Basin has a surface area of around 31,080 square kilometers (km) (12,000 square miles [mi]) and generally begins north of Roswell, New Mexico, and runs to the southeast of Carlsbad, New Mexico. The Roswell Basin contains a deep artesian aquifer and a shallow surficial aquifer. The action of water on soluble rocks (*e.g.*, limestone and dolomite) has formed abundant ''karst'' features such as sinkholes, caverns, springs, and underground streams (White *et al.* 1995). These hydrogeological formations create unique settings harboring diverse assemblages of flora and fauna. The isolated limestone and gypsum springs, seeps, and wetlands located in and around Roswell, New Mexico, and Pecos and Reeves Counties, Texas, provide the last known habitats in the world for several endemic species of fish, plants, mollusks, and crustaceans. These species include the Roswell springsnail and Koster's springsnail of the freshwater snail family Hydrobiidae, Pecos assiminea of the snail family Assimineidae, and Noel's amphipod (Gammaridae). These species are distributed in isolated, geographically separate populations, and likely evolved from parent species that once enjoyed a wide distribution during wetter, cooler climates of the Pleistocene. Such divergence has been well-documented for aquatic and terrestrial macroinvertebrate groups within arid ecosystems of western North America (*e.g.*, Taylor 1987; Metcalf and Smartt 1997; Bowman 1981; Cole 1985).

North American snails of the family Hydrobiidae inhabit a great diversity of aquatic systems from surface to cave habitats, small springs to large rivers, and high energy riffles to slack water pools (Wu *et al.* 1997). Snails of the family Assimineidae are typically found in coastal brackish waters or along tropical and temperate seacoasts worldwide (Taylor 1987). Inland species of the genus *Assiminea* are known from around the world, and in North America they occur in California (Death Valley National Monument), Utah, New Mexico, Texas (Pecos and Reeves Counties), and Mexico (Bolsón de Cuatro Cíenegas).

The Roswell springsnail and Koster's springsnail are aquatic species. These snails have lifespans of 9 to 15 months and reproduce several times during the spring through fall breeding season (Taylor 1987; Pennak 1989; Brown 1991). Snails of the family Hydrobiidae are sexually dimorphic (there are characteristic differences between males and females), with females being characteristically larger and longer-lived than males. As with other snails in the family, the Roswell springsnail and Koster's springsnail are completely aquatic but can survive in seepage areas, as long as flows are perennial and within the species' physiological tolerance limit. These two snails occupy spring heads and runs with variable water temperatures (10 to 20 ° Celsius [C] (50 to 68 ° Fahrenheit [F])) and slow-to-moderate water velocities over compact substrate ranging from deep organic silts to gypsum sands and gravel and compact substrate (NMDGF 1998). Conversely, the Pecos assiminea seldom occurs immersed in water, but prefers a humid microhabitat created by wet mud or beneath vegetation mats, typically within a few centimeters (cm) (inches (in)) of running water.

Gastropods (snails) are a class of mollusks with a body divided into a foot and visceral mass and a head that usually bears eyes and tentacles. Like most gastropods, the Roswell springsnail, Koster's springsnail, and Pecos assiminea feed on algae, bacteria, and decaying organic material (NMDGF 1988). They will also incidentally ingest small invertebrates while grazing on algae and detritus (dead or partially decayed plant materials or animals).

These snails are fairly small; Koster's springsnail is the largest of the three snails, and is about 4 to 4.5 millimeters (mm) (0.16 to 0.18 in) long with a pale tan shell that is narrowly conical with up to 4¼ to 5¾ whorls or twists. The Roswell springsnail is 3 to 3.5 mm (0.12 to 0.14 in) long with a narrowly conical tan shell with up to 5 whorls. Pecos assiminea is the smallest of the three, with a shell length of 1.55 to 1.87 mm (0.06 to 0.07 in) and a thin, nearly transparent chestnut-brown shell that is regularly conical with up to 4½ strongly incised (shouldered) whorls and a broad oval opening. Although their shells are

similar, the Roswell springsnail is distinguished from Koster's springsnail by a dark, amber operculum (a lid which closes the shell opening when the animal is retracted) with white spiral streaks, while that of Koster's springsnail is nearly colorless. The genus *Assiminea* can be determined from other snail genera by an almost complete lack of tentacles, leaving the eyes within the tips of short eye stalks (Taylor 1987).

Taylor (1987) first described the Roswell springsnail from a ''seepage'' along the west side of an impoundment in Area 7 at Bitter Lake National Wildlife Refuge (BLNWR, Refuge), Chaves County, New Mexico. Since then, Mehlhop (1992, 1993) has documented the species on the BLNWR and in March 1995 also found it in a spring on private land (*i.e.*, North Spring) east of Roswell (NMDGF 1998). In 2004, the Roswell springsnail was determined to have been extirpated from this private land through habitat alteration (NMDGF 2005b). Monitoring efforts at BLNWR (1995 to 1998) led to the discovery of Roswell springsnail populations in Bitter Creek, the Sago Springs Complex, and a drainage canal along the west shoreline of Area 6. The Roswell springsnail is currently known only from BLNWR with the core population in the Sago Springs Complex and Bitter Creek. The Sago Springs complex is approximately 0.3 km long (1,000 linear feet), half of which is subterranean with flow in the upper reaches restricted to sinkholes. Bitter Creek is six times longer than the Sago Springs Complex and has a total length of 1.8 km (1.1 miles). Monthly monitoring and ecological studies of the Roswell springsnail initiated at BLNWR in June 1995 are ongoing (NMDGF 2005b, 2005c).

Roswell springsnail formerly occurred in several other springs in the Roswell area, but these habitats have dried up apparently due to groundwater pumping and no longer contain the species (Cole 1981; Taylor 1983, 1987). As noted, the Roswell springsnail historically occurred on private land at North Spring, but could not be found during surveys in 2004 (NMDGF 2005b). Pleistocene fossils of the Roswell springsnail are known from Berrendo Creek and the Pecos River in Chaves County (Taylor 1987). No populations are currently known from these areas.

Taylor (1987) first reported Koster's springsnail from Sago Spring at BLNWR. Another population was documented in 1995 at North Spring on private land east of Roswell and a second population was found at BLNWR on the west side of Area 3 during extensive surveys conducted between 1998 and 2001 (Warrick 2005). The species formerly occurred in several other springs in the Roswell area, but these habitats have since dried up due to groundwater pumping and no longer contain the species (Cole 1981; Taylor 1983, 1987; NMDGF 2005b). Pleistocene fossils of Koster's springsnail are known from North Spring River and South Spring Creek in Chaves County (Taylor 1987). Monthly monitoring and ecological studies of Koster's springsnail initiated at BLNWR in 1995 indicate the species is most abundant in the deep organic substrates of Bitter Creek (NMDGF 1998, 2005b). It also occurs at the Sago Springs Complex, but in lower numbers. The species has not been found in recent times along the western boundary of Area 3 in BLNWR (NMDGF 2005b). Koster's springsnail has recently been extirpated at North Spring east of Roswell (NMDGF 2005b).

Pecos assiminea is presently known from two sites at BLNWR, Chaves County, New Mexico, from a large population at Diamond Y Spring and its associated drainage (Diamond Y Springs Complex), Pecos County, Texas, and at East Sandia Spring, Reeves County, Texas. It was thought that Pecos assiminea occurred sporadically throughout the Bolsón de Cuatro Cínegas, Coahuila, Mexico (Taylor 1987); however, recent investigations indicate that the population in Mexico might be a different species (Hershler 2005). Investigations are currently underway to determine whether the animals found in the vicinity of Coahuila, Mexico, are Pecos assiminea (Hershler 2005).

Monitoring and ecological studies of Pecos assiminea initiated at BLNWR in 1995 showed the snail to be typically absent from substrate samples. Populations of Pecos assiminea occur sporadically along Bitter Creek, and a dense population was confirmed on moist vegetation and on muddy surfaces within 1 cm (0.39 in) of water in 1999 in an emergent marsh plant community around the perimeter of a sinkhole within the Sago Springs Complex (NMDGF 1999).

Noel's amphipod

Noel's amphipod, in the family Gammaridae, is a small freshwater crustacean. Inland amphipods are sometimes referred to as freshwater shrimp. Noel's amphipod is brown-green in color with elongate, kidney-shaped eyes, and flanked with red bands along the thoracic and abdominal segments, often with a red dorsal stripe. Males are slightly larger than females, and individuals range from 8.5 to 14.8 mm (0.33 to 0.58 in) long (Cole 1981, 1985).

Gammarids commonly inhabit shallow, cool, well-oxygenated waters of streams, ponds, ditches, sloughs, and springs (Holsinger 1976; Pennak 1989). Because they are light-sensitive, these bottom-dwelling amphipods are active mostly at night and feed on algae, submergent vegetation, and decaying organic matter (Holsinger 1976; Pennak 1989). Young amphipods depend on microbial foods, such as algae and bacteria, associated with aquatic plants (Covich and Thorp 1991). Most amphipods complete their life cycle in one year and breed from February to October, depending on water temperature (Pennak 1978). Amphipods form breeding pairs that remain attached for 1 to 7 days at or near the substrate while continuing to feed and swim (Bousfield 1989). They can produce from 15 to 50 offspring, forming a ''brood.'' Most amphipods produce one brood but some species produce a series of broods during the breeding season (Pennak 1978).

Noel's amphipod is one of three species of endemic amphipods of the Pecos River Basin occurring from Roswell, New Mexico, south to Fort Stockton, Texas, known collectively as the Gammarus-pecos complex (Cole 1985). Noel's amphipod is currently known from the following sites at BLNWR: Sago Springs Complex, Bitter Creek, along the western boundary of Area 6, Area 7 spring-ditch, and Hunter Marsh. It is also found in a spring just outside the BLNWR boundary on private property owned by the City of Roswell (G. Warrick 2005). Noel's amphipod was first described by Cole (1981) from a 1967 collection of amphipods taken from North Spring, east of Roswell. Based on morphological similarities, specimens collected from Lander Springbrook near Roswell were also identified as Noel's amphipod (Cole 1981). The amphipod was extirpated from Lander Springbrook between 1951 and 1960, and the North Spring population was lost between 1978 and 1988. The extirpations were attributed to regional groundwater depletions and habitat alterations (spring channelization) respectively (Cole 1981, 1985).

Previous Federal Actions

On November 22, 1985, we received a petition from Mr. Harold F. Olson, Director of the NMDGF, to add 11 species of New Mexican mollusks to the Federal list of endangered and threatened wildlife. Roswell springsnail (*Pyrgulopsis roswellensis,* formerly *Fontelicella roswellensis* (Hershler

1994)), Koster's springsnail (*Juturnia kosteri*, formerly *Durangonella kosteri* and *Tryonia* kosteri (Hershler *et al.* 2002)), and Pecos assiminea were among the 11 species. We determined that the petition presented substantial information that the requested action may be warranted and published a positive 90-day petition finding in the **Federal Register** on August 20, 1986 (51 FR 29671). A subsequent 12-month finding published in the **Federal Register** on July 1, 1987 (52 FR 24485), concluded that the petitioned action was warranted but precluded by other higher priority listing actions.

On August 29, 2001, the Service announced a settlement agreement in response to litigation by the Center for Biological Diversity, the Southern Appalachian Biodiversity Project, and the California Native Plant Society. Terms of the agreement required that we submit to the **Federal Register**, on or by February 6, 2002, a 12-month finding and accompanying proposed listing rule and proposed critical habitat designation for the four invertebrates addressed in this final rule. This agreement was entered by the court on October 2, 2001 (*Center for Biological Diversity, et al.* v. *Norton,* Civ. No. 01–2063 (JR) (D.D.C.)). A proposed rule to list the four invertebrates as endangered with critical habitat was published in the **Federal Register** on February 12, 2002 (67 FR 6459). On May 31, 2002, we reopened the public comment period for 90 days (67 FR 6459). In addition, we published newspaper notices inviting public comment and announcing the public hearing in the following newspapers in New Mexico: the Carlsbad Current-Argus, the Artesia Daily Press, the Roswell Daily Record, and the Albuquerque Journal. On June 18, 2002, we held a public hearing in Carlsbad, New Mexico, to solicit comments on the proposed rule.

On May 4, 2005, we announced the availability of the draft economic analysis and draft environmental assessment for the proposal to designate critical habitat for the four invertebrates (70 FR 23083). Section 4(b)(2) of the Act requires that we consider economic impacts, impacts to national security, and other relevant impacts prior to making a final decision on what areas to designate as critical habitat. We solicited data and comments from the public on these draft documents, as well as on all aspects of our proposal, so that we could consider these in this final determination.

Summary of Comments and Recommendations

In the notices announcing the public comment periods, we requested that all interested parties submit comments on the proposed listings and critical habitat designation, as well as on the associated draft economic analysis and draft environmental assessment, and we also requested information pertaining to any actions that affect the four invertebrates; their current status, ecology, distribution, and threats; and management or conservation efforts in place. We requested this information in order to make a final listing determination based on the best scientific and commercial data currently available. We also solicited four independent experts who are familiar with these species to peer review the proposed listing and critical habitat designation. Two of the peer reviewers submitted substantial comments, but did not support or oppose the proposal. During the public comment periods, we also received 967 written comments (952 written comments were identical, in the form of automatically generated emails), and 7 speakers gave verbal comments at the public hearing. Of those oral comments, one supported the proposal, two were opposed to the proposal, and four provided additional information. Of the written comments, 956 supported the proposal, 8 were opposed, and 3 were neutral but provided information. All substantive information provided during the public comment periods, written and verbal, either has been incorporated directly into this final determination or is addressed below. Similar comments are grouped together by issue.

Issue 1: Biological Concerns

(1) *Comment:* It is unlikely that *Melanoides tuberculata,* a fully aquatic animal, competes with Pecos assiminea, a semi-terrestrial species. On the other hand, the presence of introduced *Melanoides tuberculata* could pose a serious threat to aquatic species such as Koster's springsnail, Roswell springsnail, or Noel's amphipod.

Our Response: The commenter is correct. It is unlikely that *Melanoides* would be a competitor with Pecos assiminea and it is very likely that it may be a serious threat to Koster's springsnail, Roswell springsnail, and Noel's amphipod. We have a more complete discussion of the threat of introduced species under the section, ''Summary of Factors Affecting the Species'' below.

(2) *Comment:* The NMDGF concluded in 1999 that all four invertebrate species are stable on the BLNWR. There is no evidence that these species are at risk.

Our Response: All four invertebrates are classified as Endangered by the NMDGF under the Wildlife Conservation Act of 1974 (*i.e.*, State Endangered Species Act) (19 NMAC 33.6.8). As such, the NMDGF supports the listing and critical habitat designation for these species. They report that recent (1992 to present) population and habitat monitoring on BLNWR has documented the persistence of these species; however, they still face significant threats (Lang 2002, NMDGF 2005a). Our current understanding of the threats to the four invertebrates and their habitat are fully described under the ''Summary of Factors Affecting the Species'' section below.

(3) *Comment:* Oil and gas development activities in the vicinity of BLNWR pose no threat to the four invertebrates because the New Mexico Oil Conservation Division regulations for installation of oil and gas wells provide protections to limit impacts.

Our Response: The New Mexico Interstate Stream Commission (NMISC) and NMDGF submitted information that is consistent with the proposed rule, which indicated oil and gas, residential, or industrial development on the private lands immediately west of BLNWR may constitute a threat to spring water quality (Balleau *et al.* 1999; McCord *et al.* 2005; NMDGF 2005a) (see ''Summary of Factors Affecting the Species'' section below). The NMDGF also presented an overview of oil and gas production and potential risk to the four invertebrates (NMDGF 2005a). They note that, although there are no known cases of groundwater contamination by leaking oil or gas wells in the source-water capture zone for the Middle Area of BLNWR (discussed further under ''Water Quality'' section below), groundwater contamination from petroleum products has been documented north of Roswell (NMDGF 2005a).

There is a history of oil and gas industry operations on and adjacent to BLNWR, which have resulted in the spillage of oil and brine onto the BLNWR. For example, annual reports from 1994 to 1998 document four oil and gas related accidents on and immediately adjacent to BLNWR (NMDGF 2002; NMISC 2002). In May 1993, a private corporation began drilling a well on adjacent Bureau of Land Management (BLM) lands when they hit a water flow with a high chloride content (6,000 parts per million). The salt water was eventually contained, but serves as an example of

potential issues from oil and gas development (Service 2002). Additionally, in 1996, about 70 to 80 barrels of oil spilled within a berm on an adjacent oil well located on BLM lands (Service 2002). In 1997, an additional 11 barrels of crude oil leaked into the BLNWR boundary (Service 2002). In 1998, BLNWR personnel documented probable violations of New Mexico Oil Conservation Division regulations (*e.g.*, a substandard pit for drilling cuttings, fire hazards, lack of spillage notification) (Service 2002; NMISC 2002). In 2000, there was an additional oil spill on adjacent BLM lands (NMISC 2002).

Development of another 91 natural gas and oil wells has been anticipated on lands managed by the BLM within the source-water capture zone (NMDGF 2005a). Contamination of groundwater from underground leaks has the potential to occur in the future, but existing drilling and casing regulations by the State of New Mexico's Oil Conservation Division and requirements of the BLM for oil and gas drilling and operation in cave and karst areas (BLM 1997) are likely to substantially reduce this probability. The NMDGF indicates that a more likely pathway for petroleum-product contamination of groundwater is from leaking storage and transport facilities from the well site downstream to processing facilities (NMDGF 2005a). These may include leaking pipelines, overflowing storage tanks, leaking valves, and other sources. These data indicate that oil and gas production and distribution continue to threaten the four invertebrates.

(4) *Comment:* Contamination threats to the four invertebrates are not limited to oil and gas development, but also include fire effects. Immediate and short-term adverse effects have been demonstrated from the March 2000 Sandhill Fire (NMISC 2002).

Our Response: NMDGF recently reviewed the effects of fire on the invertebrates (NMDGF 2005a). We agree with their assessment and summarize much of the information below. We recognize that populations of these four invertebrates have the potential to be eliminated or habitat may be rendered unsuitable if fire results in complete combustion of vegetation and litter, high soil temperatures, significant amounts of ash flow, large changes in water chemistry (*e.g.*, dissolved oxygen), or extensive vegetation removal resulting in soil and litter drying. As such, we have also revised the ''Summary of Factors Affecting the Species'' section below to include a more detailed analysis on the threat of wildfire.

(5) *Comment:* Much of the literature is overly general in nature and is not site- or species-specific. Including such citations leaves readers to conclude that a particular author made a statement or presented data that specifically applies to the threats you believe exist for these invertebrates.

Our Response: In determining and evaluating threats to the four invertebrates, we used the best scientific and commercial data available. This included articles published in peer-reviewed journals, data collected by NMDGF, and comments received on the proposed rule, draft economic analysis, and environmental assessment. You are correct that some of our citations are not specific to these species or the geographic area. Nevertheless, the citations offer evidence that certain threats are real for the species because similar examples have been documented elsewhere.

(6) *Comment:* The allegation that fire caused significant decreases in invertebrate populations implies that quantitative sampling was conducted. The Service and NMDGF rarely conduct quantitative sampling, and the case may be overstated in your proposal.

Our Response: Extensive quantitative pre- and post-fire monitoring was conducted by the NMDGF (NMDGF 2005c). Immediately following the Sandhill fire, Lang (2001) documented a decrease in species richness of localized populations of aquatic macroinvertebrates. For example, in 1996 densities of Noel's amphipod at Dragonfly Spring were estimated at 11,625 per square meter (m^2). Out of 74 post-fire monitoring collections conducted from March 2000 to August 2004, only four Noel's amphipod were found (NMDGF 2005c).

(7) *Comment:* Does non-native vegetation such as saltcedar (*Tamarix* sp.) threaten the invertebrates? Will New Mexico's ability to eradicate or manage saltcedar be restricted if these species are listed?

Our Response: Saltcedar management or eradication activities would be subject to section 7 consultation requirements if a proposed project has the potential to affect the four invertebrate species or designated critical habitat. However, the environmental assessment found that some activities may be considered to be of benefit to the four invertebrate species (Service 2005). Examples of such beneficial actions could include removal and control of non-native vegetation, restoration of wetlands, and removal of non-native species.

Non-native saltcedar is present on BLNWR and The Nature Conservancy (TNC) lands at the Diamond Y Spring and East Sandia Springs preserves (Service 2005). This non-native species is currently being controlled where possible by BLNWR and TNC staff. Control and removal of non-native vegetation was identified as a factor responsible for extirpation of localized populations of Pecos assiminea in Mexico and New Mexico (Taylor 1987). However, it is possible that removal and control of saltcedar will improve habitat and hydrologic conditions at springs and seeps (Service 2005). See also ''Factor C'' under the ''Summary of Factors Affecting the Species'' section below.

(8) *Comment:* Have laboratory toxicity tests been conducted to determine the four invertebrates' sensitivity to low oxygen, sediments, or contaminants?

Our Response: To our knowledge, laboratory tests have not been conducted specifically on these species to determine their sensitivity to low oxygen, sediments, or contaminants.

(9) *Comment:* Equating the springsnails with Higgin's eye mussel is inappropriate. Clearly, clams and mussels are very different creatures than springsnails.

Our Response: The commenter is correct that mussels that live in the substrate and filter water to obtain nutrition are very different from springsnails that crawl on the substrate and scrape periphyton (various forms of algae and diatoms) off the substrate. Unfortunately, very little research has been done specifically on the effects of contaminants on springsnails and mussels are one of the most closely related groups available for comparison. However, this reference has been removed from this final rule.

(10) *Comment:* The relevance of South Spring River is not apparent in your discussion of Noel's amphipod. The South Spring River has been dry for many years.

Our Response: The discussion of Noel's amphipod and the dry South Spring River was included to document that this previously known population has likely been extirpated.

(11) *Comment:* Are crayfish known predators of springsnails?

Our Response: Crayfish are known to consume aquatic macrophytes and algae that springsnails rely on for grazing and egg laying (Service 2004b). In addition, crayfish have been cited as a threat and are known to directly prey upon aquatic invertebrates such as springsnails (*e.g.*, Three Forks springsnail (*Pyrgulopsis trivialis*)) (Arizona Game and Fish Department 2003; Service 2004b). Nevertheless, we have not observed any crayfish within habitat occupied by

these four invertebrates, with the exception of Diamond Y Springs Complex where an undescribed native crayfish occurs. See also ''Factor C'' under the ''Summary of Factors Affecting the Species'' section below.

(12) *Comment:* Effects to these species from prolonged drought, nutrient enrichment, and sedimentation are all unsubstantiated.

Our Response: There is no doubt that prolonged drought leading to spring diminishment or drying would have a negative impact on the invertebrates. Little research has been done specifically on springsnails to document their response to elevated nutrients, contaminants, or sedimentation. However, based on biological principles and effects observed in other related invertebrates, we can draw reasonable conclusions about what we would expect to happen to these species.

(13) *Comment:* Have surveys for these species been conducted at Bottomless Lakes State Park?

Our Response: Surveys were conducted on Bottomless Lakes State Park during the 1990s by the NMDGF and during the 1980s by D.W. Taylor. Perennial sinks west-northwest of Lea Lake and its outflow to the south, which eventually flows to the BLM Overflow Wetlands, were also surveyed for these invertebrates (Lang 2005). Although potentially suitable habitat for the four invertebrates is available at Bottomless Lakes State Park, these surveys failed to document their occurrence (New Mexico Energy Minerals and Natural Resources Department 2000; NMDGF 2005b).

(14) *Comment:* A new population of Noel's amphipod has been recently discovered on BLNWR.

Our Response: The commenter is correct. Noel's amphipod currently persists on BLNWR at the Sago Spring wetland complex (including Sinkhole No. 31), Bitter Creek, and along the western boundary of Area 6, in the west ditch along Area 7, and along the northwest fenceline of Hunter Marsh (NMDGF 2005c). A new population was discovered in 2004 in a spring belonging to the City of Roswell that borders BLNWR. This population is included in the listing portion of this final rule, but is not within the designation of critical habitat. The critical habitat designation does not include these private lands because section 4(b)(4) of the Act and the Administrative Procedure Act (5 U.S.C. 551 *et seq.*) requires that areas designated as critical habitat must first be proposed as such. Thus, we cannot make additions in this final rule to include areas that were not included in the proposed rule. Designation of such areas would require a new or revised proposal and subsequent final rule. Should critical habitat be considered in the future for the Noel's amphipod, we will consider this area in any such determination.

(15) *Comment:* The ongoing drought appears to be more of a threat to these species than groundwater pumping.

Our Response: We agree. Please refer to the ''Summary of Factors Affecting the Species'' for further discussion of this issue.

(16) *Comment:* The proposed rule lacks documentation of groundwater or surface contamination threats to the four invertebrates.

Our Response: Based upon public comments and information received, we have updated our analysis to include our current understanding of the threats from groundwater or surface contamination to the four invertebrates. Please see the ''Summary of Factors Affecting the Species'' section.

(17) *Comment:* The Pleistocene Era was mentioned several times in the proposed rule. Does the Service intend to recover these species to levels that were present during this historic era?

Our Response: No, section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to the List of Endangered and Threatened Wildlife and Plants. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1) of the Act. As detailed below in our analysis, we examine the listing factors and their application to the four invertebrates. The discussion of these species in relation to the Pleistocene Era was presented as evidence of an apparent historical decline in the numbers, range, and distribution. We did not intend to suggest that the four invertebrates need to be restored to Pleistocene Era levels to be considered recovered.

(18) *Comment:* Is there a plan to control introduced or exotic snails or other species that may prey upon or compete with the four invertebrates?

Our Response: BLNWR is managed for wildlife conservation, which includes restoration and maintenance of biological integrity, diversity, and environmental health. Major land management activities on BLNWR include water level management in impoundments to provide habitat for waterfowl, shorebirds, and other groups of species, habitat restoration, prescribed burning, control of saltcedar, and management of noxious weeds (Service 2005a). Management or removal of exotic species that compete with these invertebrates will be evaluated in the development of a recovery plan, but this management is currently conducted as appropriate. For example, removal of non-native fishes from Diamond Y Springs Complex using antimycin, netting, and trapping was conducted in the past for conservation of Leon Springs pupfish (Service 2005a). For further information and analysis concerning exotic species, please refer to the ''Factor C'' under the ''Summary of Factors Affecting the Species'' section.

Issue 2: Procedural and Legal Compliance

(19) Comment: In the proposed rule for the four invertebrate species, restrictions are proposed on groundwater pumping within the Pecos Basin, which would have serious effects on the water supply and use of water by the citizens of New Mexico.

Our Response: We disagree, the proposed rule did not propose restrictions on groundwater pumping. Consistent with our Interagency Cooperative Policy for Endangered Species Act Section 9 Prohibitions, published in the **Federal Register** on July 1, 1994 (59 FR 34272), we identified in the proposed rule those activities that we believe would or would not constitute a violation of the prohibitions identified in section 9 of the Act. The final Federal listing of these four invertebrates under the Act requires that Federal agencies consult with the Service on activities involving Federal funding, a Federal permit, Federal authorization,or other Federal actions. Consultation (under section 7 of the Act) is required when activities have the potential to affect the four invertebrates or designated critical habitat. The consultation will analyze and determine to what degree the species are impacted by the proposed action. Section 7 of the Act prohibits actions funded, authorized, or carried out by Federal agencies from jeopardizing the continued existence of a listed species or destroying or adversely modifying the listed species' critical habitat. This final Federal listing does not restrict groundwater pumping or any other actions.

The environmental assessment found that spring flows within the proposed critical habitat on BLNWR are already protected by existing water rights afforded by the New Mexico Office of the State Engineer's administration of the Roswell Basin. In 1967, water rights were adjudicated in the Roswell Basin, wells were metered, and pumping rates administered by the Office of the State Engineer (OSE). Currently, any

proposed change in use of water (underground or surface depletion) in the Roswell Basin will undergo analysis by OSE to determine if there would be impairment to existing water rights (McCord *et al.* 2005). The OSE will not allow such change if it impairs the Federal water right in any respect (NMISC 2005). Thus the spring flows on BLNWR should be protected from any changes in groundwater pumping near the refuge in the future.

In Texas, Pecos assiminea currently has no State or other regulatory protection. Some protection for the habitat of this species is provided with the ownership of the springs by TNC (Karges 2003). Groundwater pumping that could affect spring flows is subject to limited regulation in Texas. State agencies do not control groundwater pumping, and Texas courts have held that, with few exceptions, landowners have the right to take all the water that can be captured under their land (rule of capture), regardless of impacts to neighbors or natural resources. As noted in the economic analysis, within Texas further hydrological studies are necessary to determine the impact of groundwater pumping on surface and groundwater levels at Units 3 and 4. The TNC has stated that additional research on the delineation of watersheds is crucial to the sustainable, long-term conservation of the springs. If hydrological studies determine a link between the various aquifers, we would work with private landowners on a volunteer basis to minimize impacts to the Pecos assiminea from groundwater withdrawals.

(20) *Comment:* The groundwater depletion analysis fails to rely upon the best available science, does not utilize an accurate and reliable model, and mischaracterizes effects of groundwater pumping.

Our Response: Based upon new information we received during the comment periods, we revised our analysis from the proposed rule to reflect our current understanding regarding the threat of groundwater depletion on the four invertebrates and their habitat in New Mexico. Please refer to the ''Summary of Factors Affecting Species'' section.

(21) *Comment:* The status of these species will not improve if they are listed.

Our Response: Federal listing in and of itself does not improve the status of the species. Listing these species authorizes the development of a recovery plan. The recovery plan will likely identify both State and Federal efforts for conservation of these species and establish a framework for agencies and stakeholders to coordinate activities and cooperate with each other in conservation efforts. The plan will set recovery priorities and describe site-specific management actions necessary to achieve conservation and survival of the four invertebrates. See also response to comment 22 below for related information about the five factors described in section 4(a)(1) of the Act. Also note the discussion on section 7 consultation requirements in our response to comment 19 above.

(22) *Comment:* Why does the Service want to list these four invertebrates when they are already within protected areas?

Our Response: We have analyzed the threats to these species based upon the five factors described in section 4(a)(1) of the Act. Although these species occur on areas that are currently managed for conservation purposes, we have determined based on our analysis of the threats discussed below in the section ''Summary of Factors Affecting the Species,'' that these four invertebrate species are in danger of extinction throughout all or a significant portion of their respective ranges. Our analysis determined that these species are threatened by activities such as oil and gas production and development, groundwater pumping, and introduction of non-native species that are beyond the boundaries and/or the management protected areas where the species are found. Thus, the four invertebrates meet the definition of endangered species.

(23) *Comment:* If these species are listed, is there a possible effect to the U.S. Bureau of Reclamation with respect to delivery of irrigation water?

Our Response: Federal listing will require the Bureau of Reclamation (Reclamation) to consult with us on activities that have the potential to adversely affect the four invertebrates or designated critical habitat. None of Reclamation's current projects will be affected by the listing of the invertebrates and we are not aware of any future projects that may be affected by the listing. Delivery of irrigation water occurs via the Pecos River and we do not anticipate that listing these species will affect that activity.

(24) *Comment:* Will the listing of these species impede the ability of the State of New Mexico to meet Pecos Compact River obligations?

Our Response: No, the NMISC has been actively acquiring and leasing water rights to meet the State's delivery obligations to Texas as specified in the Pecos River Compact and pursuant to an Amended Decree entered by the U.S. Supreme Court. For example, between 1991 and 1999, $27.8 million was spent on the Pecos River water rights acquisition program. We do not anticipate that the listing of these species or the designation of critical habitat will alter the ability of the NMISC to meet Pecos River Compact delivery obligations. The amount of water being pumped from the Roswell Basin should not change; however, the use of water will change. For example, instead of being applied to fields, the water may be delivered to the Pecos River directly to meet Compact delivery obligations.

(25) *Comment:* Will oil and gas exploration be further restricted in areas designated as critical habitat?

Our *Response:* No, the Service does not anticipate that the designation of critical habitat will restrict oil and gas exploration. Section 7 consultation, when required, would analyze any impacts to the species and their designated critical habitat. The environmental assessment found that oil and gas projects with Federal involvement in the BLNWR and the surrounding area are already subject to stipulations for protecting groundwater (Service 2005). The Oil Conservation Division of the New Mexico Energy, Minerals, and Natural Resources Department regulates oil and gas well drilling and casing in part to prevent contamination of groundwater (19 NMAC 15.3).

BLNWR is excluded from the designation of critical habitat for the four invertebrate species, and critical habitat would not result in additional section 7 consultations on federally supported oil and gas projects. Oil and gas well development in the vicinity of Diamond Y Springs Complex and East Sandia Spring occurs on private lands with no Federal involvement. Therefore, section 7 consultations on the effects to designated critical habitat would likely not occur for these projects. For this reason, we do not believe there would be any additional restrictions to oil and gas exploration activities.

Issue 3: National Environmental Policy Act (NEPA) Compliance and Economic Analysis

(26) *Comment:* What has regulation or policy of Federal actions cost State and County governments before listing and critical habitat designation?

Our *Response:* Since the proposed listing of the four invertebrates species, there have been specific conservation actions implemented that have taken into account the protection of the species. An estimated $366,000 to $494,000 in costs have been incurred by Federal and State agencies for the four invertebrates (Service 2005b). These

costs are related to developing the New Mexico State recovery plan and have included monitoring the four invertebrates' habitat, consultant fees, staff time devoted to developing the plan, administrative costs related to past conferences under section 7 of the Act, and associated monitoring of invertebrate habitat. We did not find that County governments have incurred any costs related to the conservation of these species.

(27) *Comment:* Does the Service have an estimate of the costs required to recover the four invertebrates?

Our *Response:* The costs of actions to recover the four invertebrates will be estimated during the development of a recovery plan.

(28) *Comment:* The economic analysis should consider benefits of the critical habitat designation.

Our *Response:* In the context of a critical habitat designation, the primary purpose of the rulemaking (*i.e.*, the direct benefit) is to designate areas that have the features on which the species depend and that are in need of special management.

The designation of critical habitat may result in two distinct categories of benefits to society: (1) Use benefits; and (2) non-use benefits. Use benefits are simply the social benefits that accrue from the physical use of a resource. Visiting critical habitat to see endangered species in their natural habitat would be a primary example. Non-use benefits, in contrast, represent welfare gains from ''just knowing'' that a particular listed species'' natural habitat is being specially managed for the survival and recovery of that species. Both use and non-use benefits may occur unaccompanied by any market transactions.

A primary reason for conducting an economic analysis is to provide information regarding the economic impacts associated with a proposed critical habitat designation. Section 4(b)(2) of the Act requires the Secretary to designate critical habitat based on the best scientific data available after taking into consideration the economic impact, impact to national security, and any other relevant impact, of specifying any particular area as critical habitat. Economic impacts can be both positive and negative and by definition, are observable through market transactions.

Where data are available, the economic analysis attempts to recognize and measure the net economic impact of the proposed designation. For example, if the fencing of a species' habitat to restrict motor vehicles results in an increase in the number of individuals visiting the site for wildlife viewing, then the analysis would recognize the potential for a positive economic impact and attempt to quantify the effect (*e.g.*, impacts that would be associated with an increase in tourism spending by wildlife viewers). In this particular instance, however, the economic analysis did not identify estimates or measures of positive economic impacts that could offset some of the negative economic impacts analyzed earlier in this analysis.

While the Act requires the Service to specifically consider the economic impact of a designation, it does not require the Service to explicitly consider any broader social benefits (or costs) that may be associated with the designation. In fact, the Service believes that this is by Congressional design, because the Act explicitly states that it is the Federal government's policy to conserve all threatened and endangered species and the ecosystems upon which they depend. While section 4(b)(2) of the Act gives the Secretary discretion to exclude certain areas from the final designation, she is authorized to do so only if an exclusion does not result in the extinction of the species. Thus, the Service believes that explicit consideration of broader social values for the species and its habitat, beyond economic impacts, is not necessary as Congress has already clarified the importance our society places on conserving all threatened and endangered species and their natural habitats upon which they depend. In terms of carrying out its responsibilities under section 4(b)(2) then, the Service need only consider whether the economic impacts (both positive and negative) are significant enough to merit exclusion of any particular area without causing the species to go extinct.

(29) *Comment:* The economic analysis overstates costs by including past costs that occurred before the species was listed, costs that would result from the listing alone, and costs that derive from conservation efforts for other listed species. Similarly, the economic analysis includes costs of consultation with the Environmental Protection Agency (EPA) regarding Concentrated Animal Feeding Operations (CAFOs), which should be primarily associated with other listed species, and the listing of the four invertebrates, and not critical habitat designation.

Our Response: This analysis identifies those economic activities believed to most likely threaten the four invertebrates and their habitat and, where possible, quantifies the economic impact to avoid, mitigate, or compensate for such threats within the boundaries of the critical habitat determination. The economic analysis considers past impacts associated with species conservation efforts that have been incurred since the proposed listing and critical habitat determination in 2002. The impact of these efforts is considered relevant to understanding the potential impact of the listing and critical habitat determination. Further, due to the difficulty in making a distinction between listing and critical habitat effects within critical habitat boundaries, this analysis considers all future conservation-related impacts to be coextensive with the designation.

The consideration of co-extensive costs was mandated by the 10th Circuit Court of Appeals ruling in the New Mexico Cattle Growers Association case (248 F.3d at 1285), which directed us to consider all impacts, ''regardless of whether those impacts are attributable co-extensively to other causes.'' As explained in the economic analysis, due to possible overlapping regulatory schemes and other reasons, there are also some elements of the analysis which may overstate some costs.

Conversely, the 9th Circuit has recently ruled (''*Gifford Pinchot,*'' 378 F.3d at 1071) that the Service's regulations defining ''adverse modification'' of critical habitat are invalid because they define adverse modification as affecting both survival and recovery of a species. The Court directed us to consider that adverse modification should be focused on impacts to recovery. While we have not yet proposed a new definition for public review and comment, changing the adverse modification definition to respond to the Court's direction may result in additional costs associated with critical habitat definitions (depending upon the outcome of the rulemaking).

As described in section 1.2 of the economic analysis, coextensive effects may also include impacts associated with overlapping protective measures of other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation, including protections for other listed species. These measures may be in part precipitated by the consideration of the presence of the species and impending critical habitat determination. Because the quantified habitat conservation efforts, regardless of their primary impetus, afford protection to the four invertebrates, they likely contribute to the efficacy of the critical habitat determination efforts. The impacts of these actions are therefore considered relevant for understanding the full effect of the proposed critical habitat determination. Enforcement actions

taken in response to violations of the Act, however, are not included.

(30) *Comment:* The economic analysis inappropriately includes costs of delays in proposed drilling operations associated with industry appeals on applications for drilling permits. The oil and gas industry, however, is appealing environmental protections associated with their permits and burdening themselves. This should not be included as a cost of the critical habitat designation.

Our Response: Industry appeals regarding drilling applications are a result of the implementation of environmental regulations, including the Act, that recommend additional species and habitat conservation efforts be undertaken with the drilling activity. The economic impacts of these delays are therefore considered relevant in understanding the impact of conservation efforts for the four invertebrates.

(31) *Comment:* It is unclear from the economic analysis what additional protections from oil and gas activities may be provided by the Service for the four invertebrates as the economic analysis includes costs associated with the listing and with protections for other species, but no additional costs associated specifically with the critical habitat designation.

Our Response: This analysis identifies the types of modifications to economic activities that may be undertaken to avoid, mitigate, or compensate for threats to the species and habitat. The draft economic analysis acknowledges the difficulty in distinguishing between listing and critical habitat effects and therefore considers all future conservation-related impacts to be coextensive with the critical habitat designation. Further, the relative level to which multiple considerations, including that of other species, contribute to the undertaking of a conservation effort is unclear. The impacts quantified in the analysis are assumed to be in some part precipitated by the critical habitat designation for the four invertebrates. Absent information on the specific increment by which critical habitat designation contributes to the undertaking of these efforts, the total impact of the effort is quantified, and not a fraction solely due to critical habitat designation.

(32) *Comment:* The draft economic analysis relies on information provided by impacted industries to quantify the costs to those industries. These costs are inflated. For example, environmentally protective project modifications such as closed-loop systems can result in cost savings to the oil and gas industry. The draft economic analysis, however, only includes the costs to the industry of modifying projects to incorporate conservation measures for the species.

Our Response: As the commenter notes, the potential for cost savings associated with implementing environmentally protective technologies, such as closed-loop systems, is acknowledged in the draft economic analysis on page 4–7. However, the level of benefit these modifications may generate is unclear. Additionally, application of closed-loop systems is not ubiquitous. As the industry indicates, it is not always the most beneficial operations alternative. The draft economic analysis therefore includes the full cost of this modification to oil and gas operations as a high-end estimate of the impact of conservation efforts.

(33) *Comment:* The NMDGF's 2004 Biennial Review of threatened and endangered species in the State indicated that off-refuge land use practices within areas of the Roswell Artesian Basin (RAB), such as regional groundwater pumping for agriculture, municipal water supplies, and the oil and gas industries, threaten the invertebrate species. In contrast, a recent report prepared by the New Mexico Office of the State Engineer (OSE) provides the most recent information regarding the hydrology of the RAB. The report concludes that ''* * * an extended, extreme drought, and not groundwater depletion through human activity, would potentially threaten the future supply of water for the proposed critical habitat located within the BLNWR.''

Our Response: Paragraph 77 and section 4.2.2 of the draft economic analysis state that no hydrologic models currently exist to determine the impact of groundwater pumping of the RAB on the springs at the BLNWR. The revised economic analysis acknowledges recent information resulting from the OSE report. As the draft economic analysis does not quantify impacts of critical habitat designation to groundwater pumping; however, the quantitative results of this analysis are unchanged as a result of this comment.

Summary of Changes From the Proposed Rule

Based upon our review of the public comments, the economic analysis, environmental assessment, issues addressed at the public hearing, and any new relevant information that may have become available since the publication of the proposal, we reevaluated our proposed listing and critical habitat designation and made changes as appropriate. Other than minor clarifications and incorporation of additional information on the species' biology, this final rule differs from the proposal by:

(1) The exclusion of critical habitat on BLNWR because special management considerations are currently provided to the four invertebrates through current BLNWR management; and

(2) Changes to the primary constituent elements of critical habitat for the Pecos assiminea.

Summary of Factors Affecting the Species

Section 4 of the Act and implementing regulations (50 CFR 424) set forth the procedures for adding species to the Federal lists. A species may be determined to be threatened or endangered due to one or more of the five factors described in section 4(a)(1) of the Act. These factors and their application to the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod are as follows.

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

Several biological traits of a population have been identified as putting a species at risk of extinction (McKinney 1997; O'Grady 2004). Some of these characteristics include having a localized range, limited mobility, and fragmented habitat (McKinney 1997; O'Grady 2004). The four invertebrates have all of these characteristics. Having a small, localized range means that any perturbation, either natural (*e.g.*, drought) or anthropogenic (*e.g.*, water contamination) can eliminate many or all of the existing populations. Having a high number of individuals at a site provides no protection against extinction. Noel (1954) noted that the amphipod in Lander Spring was the most abundant animal present. It was extirpated from that site when the spring dried up (Cole 1985). The range reduction trend in these snail species (*e.g.*, by extirpation of once widely distributed but localized populations) is supported by the Pleistocene fossil record in conjunction with re-inventory of known site occurrences in which no individuals were detected (Noel 1954; Taylor 1987; Mehlhop 1992, 1993; NMDGF 1999). Fossil records indicate that at least one or more of these snail species were historically found at Berrendo Creek, North Spring, and South Spring Rivers, and along the Pecos River (NMDGF 1999). This evidence suggests an apparent historical decline in the numbers, range, and distribution of these species.

Limited mobility restricts the ability of the invertebrates to find and disperse to other suitable habitats or to move out of habitat that becomes unsuitable. Consequently, their range remains restricted and they are unable to avoid contaminants or other unfavorable changes to their habitat. Fragmented (unconnected) habitat restricts gene flow among populations and limits the ability of the invertebrates to recolonize habitats that have been disturbed but then recover. For example, three springs once contributed to Berrendo Creek in the Roswell Basin. If the population of springsnails in one of the springs was eliminated because of a toxic spill, after the habitat had recovered, the spring could have been colonized naturally by dispersal of animals from the other springs. In the currently fragmented habitats, dispersal is highly unlikely and if a population is extirpated the habitat probably will not be recolonized, further restricting the range.

In addition to the characteristics listed above that may put species at greater risk of extinction, habitat loss, introduced species, and habitat degradation can also lead to extinction (Meffe *et al.* 1994; Frankham *et al.* 2002). Each of these topics is discussed in detail. Curtailment of range and habitat of the four invertebrates has occurred primarily through the loss of suitable spring habitat. These species were most likely much more widely distributed throughout the Pecos River Basin during the wetter climatic period of the Pleistocene. As the climate became warmer and drier, the invertebrates were restricted to the remaining free-flowing springs. Fossil records indicate that two of the snail species were found at Berrendo Creek and along the Pecos River (Taylor 1987).

In addition, in the late 1800s, flow at North Spring, South Spring, and Berrendo Creek was 85 cubic feet per second (cfs) (2.4 cubic meters per second [cms], 60 cfs (1.7 cms), and 66 (1.9 cms) cfs, respectively (Fiedler and Nye 1933). These systems each provided abundant habitat for the invertebrates. Lander Spring, a tributary spring of South Spring, harbored Noel's amphipod (Noel 1954). The historic connection of these spring systems to the Pecos River most likely facilitated dispersal of the invertebrates throughout the basin downstream of this area.

In the 1880s, irrigated agriculture in the Roswell and Artesia Basins was limited to a few small farms (Fielder and Nye 1933). By the end of 1905, 485 artesian wells had been drilled and by 1927, 1,424 wells were pumping water (Fiedler and Nye 1933). One well, drilled for the Oasis Cotton Company, is estimated to have produced 9,000 gallons/minute (20 cfs) (Fiedler and Nye 1933, Jones and Balleau 1996). As a result of extensive groundwater pumping, the artesian head in the basin declined (Fiedler and Nye 1933). The amount of decline depended on location within the basin and ranged from 32 to 204 feet (9.7 to 62.2 meters) from original levels by 1927, and led to a decrease in area within the basin that had artesian flow (Fiedler and Nye 1933). Groundwater depletion continued until the mid-1970s, when it reached its maximum (McCord *et al.* 2005).

By 1926, South Spring was dry (Jones and Balleau 1996). Berrendo Spring still produced 8.3 cfs, about 12 percent of the original 1880s flow (Jones and Balleau 1996). Today, Berrendo Well produces less than 1 cfs (McCord *et al.* 2005). Lander Spring went dry in the late 1950s or early 1960s (Cole 1981), extirpating the population of Noel's amphipod, which in the early 1950s had been described by Noel (1954) as the most abundant animal in the spring. Discharge at North Spring is unknown. Jones and Balleau (1996) list its flow as 0 in 1926, but Cole (1981) described 3 small separate brooks that entered a pond on a private golf course in 1967. Surveys in 1995 at the site indicated that Roswell springsnail and Koster's springsnail were still present at the location (Noel's amphipod once occupied the site). Surveys in 2004 found none of the species, most likely due to habitat modification from pond enlargement (NMDGF 2005a). Surface flow at BLNWR was also diminished by artesian pumping. Springs adjacent to Salt Creek no longer flow, and surface flow from the Middle Area of BLNWR (sum of flow in upper Bitter Creek and Middle Area springs) was 15 cfs (0.4 cms) in 1937 and 5 cfs (0.14 cms) in 1995 (Jones and Balleau 1996). Aerial photos which show a larger, meandering channel for Bitter Creek are also evidence that discharge from Bitter Creek was once greater.

Groundwater pumping in the Roswell Basin led to the drying of several springs, many of which are known to have harbored one or more of the four invertebrates. It is not possible to determine the extent of the loss of invertebrate populations because many springs went dry long before these species were described or surveys could be conducted. Members of the family Hydrobiidae (including *Pyrgulopsis*) are susceptible to extirpation or extinction because they often occur in isolated desert springs (Hershler 1989; Hershler and Pratt 1990; Hershler 1994; Lydeard *et al.* 2004). At least three species in this genus have gone extinct (Hershler 1994). In addition, loss can not be measured simply by the number of artesian springs that are now not flowing. Many of these springs were large enough to form rivers that flowed for several miles and creeks such as Bitter Creek, while still flowing, are reduced in length. Most likely there was suitable habitat available for the invertebrates throughout the length of the streams.

Groundwater pumping in the Roswell Basin increased through the 1950s, when approximately 450,000 acre feet/year were extracted (McCord *et al.* 2005). Rates remained fairly stable through 1966 (McCord *et al.* 2005). In 1967, water rights were adjudicated in the Roswell Basin, wells were metered, and pumping rates administered by the Office of the State Engineer (OSE). Currently, any proposed change in use of water (underground or surface depletion) in the Roswell Basin will undergo analysis by OSE to determine if there would be impairment to existing water rights (McCord *et al.* 2005). The OSE will not allow such change if it impairs the Federal water right in any respect (NMISC 2005). Thus the spring flows on BLNWR should be protected from any changes in groundwater pumping near the Refuge in the future.

There was a drought in the 1950s that most likely affected the recharge of the groundwater in the Roswell Basin. In spite of controls on pumping initiated in 1968 and increased precipitation near Roswell in the 1960s and 1970s, artesian groundwater levels continued to decline until 1975 (McCord *et al.* 2005). Thus, it appears that there was a lag between the time of the drought and recovery in the artesian groundwater. Since 1999, New Mexico has been in a drought (Piechota *et al.* 2004). The current drought may also affect groundwater recharge but there may be a lag before the effect of the current drought is seen. However, through the drought of the 1950s, when pumping was at a maximum, several of the springs on BLNWR continued to flow (McCord *et al.* 2005). Groundwater pumping is currently about 100,000 acre feet/year less than it was during the drought of the 1950s and artesian groundwater levels have recovered to the levels they were at in 1950s (McCord *et al.* 2005). Consequently, we expect that there is some added margin of protection for the springs through this current drought.

However, the length or severity of the current drought cycle is not known and the Southwest may be entering a period of prolonged drought (MaCabe *et al.* 2004). Droughts of the twentieth century were eclipsed in severity by droughts in the last 2000 years, with some

characterized by longer duration (multidecadal) and greater spatial extent (Woodhouse and Overpeck 1998; Piechota *et al.* 2004). Certainly, without groundwater pumping or with pumping at reduced volume there would be a greater margin of safety for the springs. But the evidence suggests that the springs at BLNWR will flow in spite of relatively intense drought (*i.e.*, comparable to the drought of the 1950s) (McCord *et al.* 2005). It is unknown how the springs in Texas would respond to extended drought and the current level of groundwater pumping.

Drought could affect the springs through decreased flow. The springs do not have to dry out completely to have an adverse effect on populations. Droughts impact both surface and groundwater resources and can lead to diminished water quality and disturbed riparian habitats (Woodhouse and Overpeck 1998; MacRae *et al.* 2001). Decreased flow could lead to a decrease in habitat availability, increased water temperatures, lower dissolved oxygen levels, and an increase in salinity (MacRae *et al.* 2001). Any of these factors, alone or in combination, could lead either to the reduction or extirpation of a population.

The primary threat to Pecos assiminea in Texas is the potential failure of spring flow due to excessive groundwater pumping and/or drought, which would result in total habitat loss for the species. Diamond Y Spring is the last major spring still flowing in Pecos County, Texas (Service 2005c). Pumping of the regional aquifer system for agricultural production of crops has resulted in the drying of most other springs in this region (Brune 1981). Other springs that have already failed include Comanche Springs, which was once a large spring in Fort Stockton, Texas, about 12.9 km (8 mi) from Diamond Y. Comanche Springs flowed at more than 142 cfs (4.0 cms) (Brune 1981) and undoubtedly provided habitat for rare species of fishes and invertebrates, including springsnails. The spring ceased flowing by 1962 (Brune 1981) except for brief periods (Small and Ozuna 1993). Leon Springs, located upstream of Diamond Y in the Leon Creek watershed, was measured at 18 cfs (0.5 cms) in the 1930s and was also known to contain rare fish, but ceased flowing in the 1950s following significant irrigation pumping (Brune 1981). There have been no continuous records of spring flow discharge at Diamond Y Spring by which to determine any trends in spring flow.

Studies by Veni (1991) and Boghici (1997) indicate that the spring flow at Diamond Y Spring may come from the Rustler aquifers located west of the spring outlets. One significant factor that influences flows at the spring is the large groundwater withdrawals for agricultural irrigation of farms to the southwest in the Belding-Fort Stockton areas. Although TNC of Texas owns and manages the property surrounding the Diamond Y Springs Complex, it has no control over groundwater use that affects spring flow.

East and West Sandia Springs are at the base of the Davis Mountains just east of Balmorhea, Texas, and are part of the San Solomon-Balmorhea Spring Complex, the largest remaining desert spring system in Texas where the Pecos assiminea is found. The springs are included in a 97-hectare (ha) (240-acre (ac)) preserve owned and managed by TNC (Karges 2003). East Sandia Spring discharges at an elevation of 977 meters (3,224 feet) from alluvial sand and gravel (Schuster 1997). Brune (1981) noted that flows from Sandia Springs were declining. East Sandia may be very susceptible to over pumping in the area of the local aquifer that supports the spring. Measured discharges in 1995 and 1996 ranged from 0.45 to 4.07 cfs (0.013 to 0.11 cms) (Schuster 1997). The small outflow channel from East Sandia Spring has not been significantly modified and water flows into an irrigation system approximately 100 to 200 meters (328 to 656 feet) after surfacing. West Sandia Spring also occurs on the TNC preserve, but it ceased flowing in the past 10 years (Schuster 1997).

Phantom Lake Spring , another spring near the Sandia Springs, has experienced a longterm, consistent decline in flow. Discharge data have been recorded from the spring six to eight times per year since the 1940s by the U.S. Geological Survey (Schuster 1997). The record shows a steady decline of flows, from greater than 10 cfs (0.28 cms) in the 1940s to 0 cfs in 2000. The exact causes for the decline in flow from Phantom Lake Spring are unknown. Some of the obvious reasons are groundwater pumping of the supporting aquifer and decreased recharge of the aquifer from drought (Sharp *et al.* 1999; Sharp *et al.* 2003). The Texas Water Development Board (2005) concluded that because of the uncertainties of the regional flow system, it is difficult to assess why spring flow in Phantom Lake Spring has declined. Ashworth *et al.* (1997) noted the improper placement of new wells could have a detrimental effect on the springs. The Texas Water Development Board (2005) agreed with this conclusion. Because of the regional scale of the base flow, slow travel time, and the age of the waters issuing from the spring system, it is anticipated that any substantial pumping in the regional flow system will cause a decline in the spring flow in the San Solomon Springs system (including Phantom Lake, San Solomon, Giffin, and East Sandia springs) (Texas Water Development Board 2005).

Introduced Species

One threat not thoroughly explored in our proposed listing is that of introduced species. Introduced species are one of the primary threats contributing to species' extinction (Pimentel *et al.* 2000; Frankham *et al.* 2002) and are one of the most serious threats to native aquatic species (Williams *et al.* 1989; Lodge *et al.* 2000), especially in the Southwest (Miller *et al.* 1989; Minckley and Douglas 1991). It is estimated that approximately 50,000 non-native species have been introduced into the United States (Pimentel *et al.* 2000). While some of these introductions have been beneficial, many have caused dramatic declines in populations of native plants and animals (Pimentel *et al.* 2000). Because the distribution of the four invertebrates is so limited, and their habitat so restricted, introduction of a non-native species into their habitat could be devastating. Several non-native species have been very successful in invading spring ecosystems in the Southwest. For that reason, we discuss several invasive terrestrial and aquatic animal species that are present in the invertebrates' habitat or are not yet present but have caused problems in other similar habitats in the Southwest and would pose a threat to the four invertebrates if they were introduced.

Several invasive terrestrial plant species that may affect the invertebrates are present at BLNWR: saltcedar (*Tamarix ramossisima*), common reed (*Phragmites australis*), and Russian thistle (tumbleweeds) (*Salsola* spp.). In addition, one non-native, terrestrial snail species (*Rumina decollata*) will be discussed. These plants present unique challenges and threats to the habitat the four invertebrates occupy. Eradication of saltcedar is an ongoing management effort at BLNWR and on TNC property at Diamond Y Spring and East Sandia Springs preserves (Service 2005). The species is removed mechanically by hand (young sprouts), with heavy equipment for large trees, by cutting and burning, or by spraying with herbicides. Control and removal of non-native vegetation has previously been identified as a factor responsible for extirpation of localized populations of

Pecos assiminea in Mexico and New Mexico (Taylor 1987).

Saltcedar is seen as a threat to the spring habitats primarily through the amount of water it consumes and from the chemical composition of the leaves it drops on the ground and into the springs. Invertebrates in small spring ecosystems depend on food from two sources: that which grows in or on the substrate (aquatic plants, algae, and periphyton) and that which falls or is blown into the system (primarily leaves). Leaves from non-native plants that fall into the water are often less suitable food sources for invertebrates because of either their resins or their physical structure (Bailey *et al.* 2001). Saltcedar leaves add salt to the soil through its leaf litter (the leaves contain salt glands) (DiTomosoa 1998). Because saltcedar grows along the edge of water courses, it is possible that this could affect the soil chemistry of areas inhabited by Pecos assiminea. However, no research has been conducted specifically on the effect of saltcedar on Pecos assiminea.

The concentration of common reed at BLNWR has been increasing over the last few years and was seen to increase significantly in Bitter Creek after the Sandhill fire in 2000 (NMDGF 2005b, 2005c). It is unknown if the common reed present at BLNWR is of native origin or if it is introduced. Common reed grows in dense patches and reproduces primarily through an underwater rhizome (an elongated, horizontal stem). Dense stands of the plant choke the channel, slowing water velocity and creating more pool-like habitat. Pool-like habitat is less suitable for the Roswell and Koster's springsnails, which prefer flowing water. In addition, the dense stands of the plant can completely shade the water, inhibiting algal growth, one of the food items for the springsnails.

Russian thistle (tumbleweed) is another introduced plant species that can create problems within the spring ecosystem. Russian thistle is not a riparian species like saltcedar and common reed; however, it often ends up in the springs because wind blows the tumbleweeds into the spring channels. Noel (1954) noted that she had to pull Russian thistle out of Lander Spring so that she could take samples. In 2005, BLNWR conducted an emergency Intra-Service section 7 consultation for the removal of tumbleweeds from the Area 6 spring ditch. Wind had blown the tumbleweeds into the channel to a depth of 0.9 to 1.2 meters (3–4 feet), completely shading the water and overloading the small channel with organic material. While some amount of organic material from outside the spring ecosystem is necessary and desirable, it is not desirable to overload the system with so much organic material that it cannot be processed. In such situations, dissolved oxygen can drop to dangerously low levels as the material decomposes. Primary productivity (growth of algae and native aquatic plants like watercress) would be greatly reduced or prevented because of shading. Control of introduced terrestrial plant species is an on-going management activity at BLNWR that will have to be conducted carefully to have the least impact on the four invertebrates and their habitat.

Water Quality

These four species depend upon water for their survival. Therefore, water contamination is one of the most serious threats to these species. In order to assess the potential for water quality contamination, a study was completed in September 1999 to determine the sources of water for the springs at BLNWR. This study (Balleau *et al.* 1999) reported that the source of water that will reach the BLNWR springs over time periods ranging from 10 to 500 years includes a broad area beginning west of Roswell near Eightmile Draw, extending to the northeast to Salt Creek, and southeast to the BLNWR. Since this area delineates the groundwater source area of surface water on the BLNWR, it likewise represents pathways for contaminants to enter the species' habitat. This broad area sits within a portion of the Roswell Basin and contains a mosaic of Federal, State, and private lands with multiple land uses, including expanding urban development.

Contamination of groundwater sources from industry and commercial operations in and around Roswell is well documented. For example, perchloroethylene (PCE) was discovered in the McGaffey and Main groundwater plume in Roswell in 1994 (Environmental Protection Agency (EPA) 2001a, 2001b). It is suspected that a dry cleaning facility that operated from 1956 to 1963 is the source of the PCE. The New Mexico Environment Department subsequently detected PCE in 13 of 16 groundwater wells in a 1995 investigation (EPA 2001a, 2001b). Trichloroethylene was detected in alluvial and artesian aquifers on the south side of Roswell, at the former site of the Walker Air Force Base, beginning in 1991 (U.S. Army Corps of Engineers, *http://www.spa.usace.army.mil/ec/walker-rab/projectinfo.html*). Although there is no indication that either of these contaminants will enter springs occupied by the four invertebrates, these examples demonstrate that groundwater contamination can easily occur and have long-lasting effects.

Sediments and fish from Hunter Marsh, located on BLNWR, which received municipal wastewater from the City of Roswell, have elevated concentrations of polychlorinated biphenyl (PCB), polycyclic aromatic hydrocarbons (PAHs), selenium, copper, lead, zinc, and mercury (MacRae *et al.* 2001; Lusk 2005). Fish collected from Hunter Marsh and Hunter Oxbow contained PCB concentrations as high as 5 parts per million (ppm) (MacRae *et al.* 2001; Lusk 2005). A diet that contains more than 0.1 ppm total PCBs can have adverse effects on wildlife (MacRae *et al.* 2001). PAHs were found at concentrations as high as 7 ppm in sediment and fish, which exceeds criteria known to cause adverse effects to aquatic organisms (MacRae *et al.* 2001). Values of PCBs in sediment collected from Hunter Marsh are at levels associated with approximately 30 percent mortality to invertebrates (amphipods) (MacDonald *et al.* 2000; Ingersoll *et al.* 2000; Lusk 2005).

Urban development on the west side of BLNWR poses a risk to ground and surface water quality from sewage contamination (*i.e.*, septic discharge). The largest source of groundwater contamination in New Mexico is from household septic tanks and leach fields (NM Water Quality Control Commission 2002). Common pollutants associated with septic tank contamination include total dissolved solids, iron, manganese, sulfides, nitrate, organic chemicals, and microbiological contaminants such as bacteria viruses and parasites (NM Water Quality Control Commission 2002). Septic leachate is known to have contaminated groundwater resources in New Mexico (McQuillan *et al.* 1989); however, specific events have not been documented near BLNWR. Sinkholes west of BLNWR have been used for unregulated domestic refuse dumping. Refuse in the sinkholes has included domestic contaminants such as pesticides, herbicides, and waste oil (Lang 2002). The extent of groundwater contaminants generated from residences and illegal dumps near the BLNWR is unknown.

Wastewater from concentrated animal areas (*e.g.*, dairies, feed lots, chicken farms), septic tanks, and agricultural uses is a known contributor of nitrates to surface and underground water sources (Boyer and Pasquarell 1995). Nitrate levels in the underground aquifer near Roswell are known to be high. A significant source of the nitrates comes from surrounding dairy farms

(Sarah McGrath, New Mexico State Ground Water Bureau, pers. comm. 2001). The effects of nitrates on aquatic species are not entirely known because several outcomes may result from high-level nitrate contamination in aquatic systems. One outcome includes increased growth of algae resulting from increased nutrients in the aquatic system. Too much algae in an aquatic environment could result in periods of low dissolved oxygen and in extreme cases this could be lethal to the snails and the amphipod. At least two dairy farms are currently required to do remediation for their contribution of nitrates to water pollution, both surface and underground (Sarah McGrath, New Mexico State Ground Water Bureau, pers. comm. 2001).

Oil and Gas Operations

Oil drilling occurs throughout the Roswell Basin. This activity and associated actions can threaten the water quality of the aquifer on which these species depend. For example, oil and other contaminants from drilling activities throughout the basin could enter the aquifer supplying the springs inhabited by all four species when the limestone layers are pierced by drilling activities.

There are 196 natural gas and oil wells in the 12-township area encompassing the source-water capture zone for the Middle Area of BLNWR that are potential sources of contamination (New Mexico Petroleum Research Center 2002). Of these, 17 oil and gas leases are currently within the habitat protection zone, which encompasses 12,585 ac (5,093 ha) of Federal mineral estate within the water resource area for BLNWR (Service 2005a). A total of 20 natural gas wells currently exist on these leases. BLM has estimated a maximum potential development of 66 additional wells within the habitat protection zone, according to well spacing requirements established by the New Mexico Oil Conservation Division. 48 (Service 2005a). There were 200 (59 on State, 33 on Private, and 108 on Federal lands) ''intentions to drill'' (pursuit of required permits has been initiated by an applicant) filed for oil or natural gas on Federal lands in Chavez County, from 2002 through the last update in June 2004 (Go-Tech 2005).

There are numerous examples in which oil and gas operations have employed regulatory standards within the karst lands of the Permian Basin in New Mexico and other states, but these measures failed to protect groundwater resources and aquifer drawdown (NMISC 2002). To remediate (clean) the aquifer would be extremely difficult should it become contaminated by oil, chemicals, or organics such as nitrates. In most cases contamination of an underground aquifer by agricultural, industrial, or domestic sources is treated at the source. When a contamination site is discovered, techniques are used to address the source of the contamination. Rarely do remediation efforts pump water from the aquifer and treat it before sending it back. This is largely because these techniques are very costly and difficult to apply (Sarah McGrath, New Mexico State Ground Water Bureau, pers. comm. 2001). Because these invertebrate species are sensitive to contaminants, efforts to clean up pollution source sites after the aquifer has been contaminated may not be sufficient to protect these species and the aquatic habitat on which they depend.

Operations associated with oil and gas drilling such as exploration, storage, transfer, and refining are also potential threats to these species (Jercinovic 1982, 1984; Longmire 1983; Quarles 1983; Boyer 1986; Green and Trett 1989; Service 1997). Such extractive processes and industry operations are known to contaminate ground and surface waters (Jercinovic 1982, 1984; Longmire 1983; Quarles 1983; Boyer 1986; Richard 1988a, 1988b; Rail 1989; Richard and Boehm 1989a, 1989b; Jones and Balleau 1996). Moreover, large volumes of water (about 12 billion gallons (39,000 acre feet) in 1985) are produced concurrently with oil and gas extraction, especially in southeastern New Mexico (Boyer 1986). For example, in southeastern New Mexico, the average water-to-oil ratio produced in 1985 was 4.5 to 1 (Boyer 1986). This water may be injected into the ground in some areas to recover more oil, but can also be disposed of in permitted surface pits (Boyer 1986). This groundwater depletion and ground and surface water contamination can adversely impact aquatic mollusks (Eisler 1987, Green and Trett 1989) and threaten Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod populations at BLNWR (Service 1997).

Oil and gas activities also threaten the Pecos assiminea because of the potential groundwater or surface water contamination from pollutants (Veni 1991). The Diamond Y Springs Complex is within an active oil and gas extraction field. At this time there are still many active wells and pipelines located within a hundred meters of surface waters. In addition, a natural gas refinery is located within 0.8 km (0.5 mi) upstream of Diamond Y Spring. There are also old brine pits associated with previous drilling within feet of surface waters. Oil and gas pipelines cross the spring outflow channels and marshes where the species occurs, creating a constant potential for contamination from pollutants from leaks or spills. These activities pose a threat to the habitat of the Pecos assiminea by creating the potential for pollutants to enter underground aquifers that contribute to spring flow or by point sources from spills and leaks of petroleum products on the surface.

As an example of this threat, in 1992 approximately 10,600 barrels of crude oil were released from a 6-in (15.2 cm) pipeline that traverses Leon Creek above its confluence with Diamond Y Draw. The oil was from a ruptured pipeline at a point several hundred feet away from the Leon Creek channel. The site itself is about 1 mile (1.6 km) overland from Diamond Y Spring. The distance that surface runoff of oil residues must travel is about 2 miles (3.2) down Leon Creek to reach Diamond Y Draw. The pipeline was operated at the time of the spill by the Texas-New Mexico Pipeline Company, but ownership has since been transferred to several other companies. Texas Railroad Commission has been responsible for overseeing cleanup of the spill site. Remediation of the site initially involved aboveground land farming of contaminated soil and rock strata to allow microbial degradation. In recent years, remediation efforts have focused on vacuuming oil residues from the surface of groundwater exposed by trenches dug at the spill site. To date, no impacts on the rare fauna of Diamond Y Springs Complex have been observed, but no specific monitoring of the effects of the spill was undertaken (Service 2005b).

B. *Overutilization for commercial, recreational, scientific, or educational purposes.* Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod may occasionally be collected as specimens for scientific study, but these uses probably have a negligible effect on total population numbers. These species are currently not known to be of commercial value, and overutilization has not been documented. However, as their rarity becomes known, they may become more attractive to collectors. Although scientific collecting is not presently identified as a threat, unregulated collecting by private and institutional collectors could pose a threat to these locally restricted populations. We are aware of overcollection being a potential threat with other snails (*e.g.*, armored snail (*Pyrgulopsis* (*Marstonia*) *pachyta*) (65 FR 10033, February 25, 2000); Bruneau hot springsnail (*P.*

bruneauensis) (58 FR 5938, January 25, 1993); and Socorro springsnail (*P. neomexicana*) and Alamosa springsnail (*Tryonia alamosae*) (56 FR 49646, September 30, 1991)), due to their rarity, restricted distribution, and generally well known locations. Due to the small number of localities for the snails and the amphipod, these species are vulnerable to unrestricted collection, vandalism, or other disturbance. There is no documentation of collection as a significant threat to any of the species. Therefore, we believe that collection of the animals is a minor but present threat.

C. *Disease or predation.* Springsnails and amphipods are a food source for other aquatic animals. Juvenile springsnails appear vulnerable to a variety of predators. Damselflies (Zygoptera) and dragonflies (Anisoptera) were observed feeding upon snails in the wild (Mladenka 1992). Damselflies and dragonflies are native to and abundant at BLNWR and most likely prey upon both the springsnails and Noel's amphipod.

Springsnails are vulnerable to predation by fish (Kennedy 1977; Winemiller and Anderson 1997). Mladenka (1992) observed guppies feeding on springsnails in the laboratory. The non-native fish present at BLNWR (carp and mosquitofish) most likely also prey upon the springsnails and Noel's amphipod when they occur in the same habitats. The extent to which predation from non-native fish affects population size of the three aquatic invertebrates is not known. Predation pressure on Pecos assiminea is also unknown. However, if the land snail Rumina becomes established at BLNWR, the potential exists for it to predate on Pecos assiminea.

Infestation by trematodes (a flatworm or fluke, phylum Platyhelminthes) was noted by Taylor (1987) in populations of Koster's springsnail at Sago Spring, BLNWR. Digenetic trematodes (trematodes in the order Digenera) are parasitic and have the most complicated life histories in the animal kingdom involving two to four intermediate (vertebrate and/or invertebrate) hosts (Hickman *et al.* 1974). The first larval stage of the trematode nearly always uses a mollusk (snail or bivalve) as the first intermediate host (Hickman *et al.* 1974). Larval trematode parasites reduce or completely inhibit snail reproduction through castration (Minchella *et al.* 1985). The effect of the trematodes on the springsnail population is not known.

The terrestrial land snail (Rumina decollate) was introduced to the United States in the early 1800s in South Carolina and spread westward (Selander and Kaufman 1973). It was reported in Arizona in 1952 and California in 1966 but was well-established by the time it was discovered (Selander and Kaufman 1973). It is common in Texas (Selander and Kaufman 1973) and has been reported from the Roswell area in New Mexico (Lang 2005b). It inhabits gardens and agricultural areas but has also invaded riparian and other native habitats (Selander and Kaufman 1973). It is used in California as a biological control agent against the brown garden snail (Helix aspera) (Cowie 2001). It will consume native snails (Cowie 2001) as well as vegetation (Dundee 1984). For these reasons, Rumnia is a potential threat to Pecos assiminea.

Non-native aquatic species such as crayfish, fish, and aquatic snails are also a potential threat to the four invertebrates. There is only one species of crayfish native to New Mexico, but its distribution does not overlap with that of the four invertebrates (Hobbs 1991). Crayfish are typically opportunistic generalists (they will eat anything and everything) (Hobbs 1991). Predation on invertebrates is well-documented (Hobbs 1991; Lodge *et al.* 1994; Charlebois and Lamberti 1996; Strayer 1999). However, because they also feed on organic debris and vegetation and reduce algal biomass (Charlebois and Lamberti 1996), they could potentially compete with Roswell springsnail, Koster's springsnail, and Noel's amphipod for food resources. Currently non-native crayfish are not present at BLNWR or the sites in Texas. Diamond Y Springs Complex does have an undescribed native crayfish which we do not believe to be a concern for Pecos assiminea. However, crayfish have created major problems in aquatic systems in Arizona, and there is no physiological reason why some species of crayfish could not survive in the habitats that now support the four invertebrates. Eradication of crayfish once they are established is extremely difficult (Hyatt 2004). Diamond Y Springs Complex has an undescribed native crayfish which we do not believe to be a concern for Pecos assiminea.

Non-native fish have had a major impact on native aquatic fauna in the Southwest (Minckley and Douglas 1991; Desert Fishes Team 2003). Communities of animals evolved together and developed adaptations to deal with competition and predation from other members of the community (Meffe *et al.* 1994). When a non-native species is introduced into this community the native members often do not have defenses against predation or they may be less successful competitors. As a result, the non-native species can have a major impact on native populations (Minckley and Douglas 1991; Meffe *et al.* 1994). One species of non-native fish, common carp (*Cyprinus carpio*), is known to co-occur with the three aquatic invertebrates at BLNWR. Native to Asia, common carp was introduced into the United States in 1831, has become widely distributed (Sublette *et al.* 1990), and is present at BLNWR in habitats occupied by the invertebrates. Through spawning and feeding behavior it uproots vegetation and increases turbidity (Sublette *et al.* 1990). It is an omnivore feeding on aquatic invertebrates, fish eggs, algae, plants, and organic matter (Sublette *et al.* 1990). Because of its non-discriminatory diet and habitat disturbance, it could have an impact on the three aquatic invertebrate species.

Mosquitofish (*Gambusia affinis*) is also present in some of the spring systems at BLNWR, but it is not known if it is native to the area or not. The species is native to portions of New Mexico but it has also been widely introduced to control mosquitoes (Sublette *et al.* 1990). However, it has negatively affected or extirpated many species of fish and invertebrates (*e.g.*, through predation) (Meffe *et al.* 1994). It is not known if mosquitofish are affecting the three species of aquatic invertebrates.

Non-native mollusks have affected the distribution and abundance of native mollusks in the United States. Of particular concern for three of the invertebrates (Noel's amphipod, Roswell springsnail, and Koster's springsnail) are *Melanoides tuberculata* (red-rim melania) and *Potamopyrgus antipodarum* (New Zealand mudsnail). Both of these snails are excellent colonizers that reach tremendous population sizes and have been found in isolated springs in the West. *Melanoides* has caused the decline and local extirpation of native snail species, and it is considered a threat to endemic aquatic snails that occupy springs and streams in the Bonneville Basin of Utah (Rader *et al.* 2003). It is easily transported on gear or aquatic plants, and because it reproduces asexually (individuals can develop from unfertilized eggs), a single individual is capable of founding a new population. It has become established in isolated desert spring ecosystems such as Ash Meadows, Nevada, and Cuatro Cinegas, Mexico, and within the last 10 years, *Melanoides* has become established in Diamond Y Springs Complex (Echelle 2001; McDermott 2000). It has become the most abundant snail in the upper watercourse of the Diamond Y Springs

Complex (Echelle 2001). In many locations, this exotic snail is so numerous that it essentially is the substrate in the small stream channel. The effect *Melanoides* is having on native snails is not known; however, because it is aquatic it probably has less effect on Pecos assiminea than on the other endemic aquatic snails present in the spring.

Potampyrgus is also a potential threat to the endemic aquatic snails at BLNWR and the spring systems in Texas. It was discovered in the Snake River, Idaho, in the mid-1980s and has quickly spread to every Western state except New Mexico (Montana State University *http://www.esg.montana.edu/aim/mollusca/nzms/status.html*, accessed on June 16, 2005). Like *Melanoides*, *Potamopyrgus* has an operculum (a lid to close off the shell opening), can withstand periods of drying up to 8 days (thereby facilitating transport) and can reproduce either sexually or asexually. Thus, new populations can be established with transport of a single individual. In addition, *Potampyrgus* is tiny (3 mm in height [0.12 in]), is easily overlooked on gear or shoes, and can be transported unknowingly by people visiting various recreational sites. Considering its current rate of expansion, and the availability of suitable habitat, it is highly likely that *Potampyrgus* will soon be discovered in New Mexico.

Potampyrgus tolerates a wide range of habitats, including brackish water. Densities are usually highest in systems with high primary productivity, constant temperatures, and constant flow (typical of spring systems). It has reached densities exceeding 500,000 m^2 (Richards *et al.* 2001) to the detriment of native invertebrates. Not only can it dominate the invertebrate assemblage (97 percent of invertebrate biomass), it can also eat nearly all of the algae and diatoms growing on the substrate, altering ecosystem function at the base of the food web (food is no longer available for native animals) (Hall *et al.* 2003). If *Potampyrgus* is introduced into the spring systems harboring the proposed invertebrates, control would most likely be impossible because the snails are so small and because any chemical treatment would also affect the native species. The impact could be devastating.

D. *The inadequacy of existing regulatory mechanisms.* One primary cause of decline of the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod is the loss, degradation, and fragmentation of habitat due to human activities. Federal and State laws have been insufficient to prevent past and ongoing losses of the limited habitat of the four invertebrates, and are unlikely to prevent further declines of the species.

Federal

Clean Water Act. Pursuant to section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344), the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged or fill material into all Waters of the United States, including wetlands. In general, the term ''wetland'' refers to areas meeting the Corps criteria of having hydric soils, hydrology (either a defined minimum duration of continuous inundation or saturation of soil during the growing season), and a plant community that is predominantly hydrophytic vegetation (plants specifically adapted for growing in a wetland environment). The spring complexes occupied by these four invertebrates qualify as wetlands.

Any discharge of dredged or fill material into waters of the United States, including wetlands, requires a permit from the Corps. These include individual permits which would be issued following a review of an individual application, and general permits that authorize a category or categories of activities in a specific geographical location or nationwide (33 CFR parts 320–330). General and special permit conditions may vary among individual Corps Districts and the various general permits. However, the use of any individual or general permit requires compliance with the Act.

While the CWA provides a means for the Corps to regulate the discharge of dredged or fill material into waters and wetlands of the United States, it does not provide complete protection. Many applicants are required to provide compensation for wetlands losses (*i.e.*, no net loss) and many smaller impact projects remain largely unmitigated unless specifically required by other environmental laws such as the Act. Moreover, we are not aware of any Corps permits that have been issued for the spring complexes where these species occur or historically occurred, indicating that there is little protection provided to these species through the CWA.

Recent court cases limit the Corps' ability to utilize the CWA to regulate the discharge of fill or dredged material into the aquatic environment within the current range of the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod (*Solid Waste Agency of Northern Cook County* v. *U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) (SWANCC)). There may be instances where seasonal wetlands used by California tiger salamander lack sufficient connection to waters of the United States for the Corps to assert jurisdiction under the authority of the Clean Water Act. For example, the Corps frequently cites the SWANCC decision as their reason for not taking jurisdiction over waterbodies that do not meet the definition of waters of the United States. For these reasons, we conclude that regulation of wetlands filling by the Corps under Section 404 of the CWA is inadequate to protect the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod from further decline.

Revisions to the Roswell Approved Resource Management Plan made by BLM in 1997 prompted a formal section 7 consultation with the Service regarding the endangered Pecos gambusia (*Gambusia nobilis*), which resides on BLNWR. The BLM designated an area for protection of habitat for Pecos gambusia from potential groundwater contamination by oil and gas well drilling operations (BLM 2002). This area, referred to as the Habitat Protection Zone (HPZ), includes a portion of the source-water capture area for the springs in the northern part of the Middle Tract of BLNWR, where Pecos gambusia co-occurs with the four invertebrate species. The HPZ includes 12,585 ac (5,093 ha) of the Federal mineral estate and 9,945 ac (4,025 ha) of the Federal surface estate that are within the water source area for the BLNWR. The HPZ was established in October of 2002 and special requirements for oil and gas well development managed to protect the ground and surface water resources (BLM 2002). For example, stipulations for oil and gas wells in the HPZ include storage of drilling muds in steel tanks and use of cement to seal the entire length of the well casing. These requirements reduce the probability of contamination from oil and gas development but do not reduce the likelihood of groundwater contamination attributable to oil and gas storage or transportation activities (*e.g.* leaking pipelines, storage tanks, or other equipment failures). Therefore, the HPZ does not eliminate the threat of oil and gas activities on these species, nor does it address the other threats identified under Factor A (*e.g.*, drought, septic tank leaching, etc).

State

Existing New Mexico State regulatory mechanisms are inadequate to protect the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod. All four species are listed as New Mexico State endangered species, Group 1, which are those species ''whose prospects of survival or

recruitment within the State are in jeopardy.'' This designation provides the protection of the New Mexico Wildlife Conservation Act, but only prohibits direct take of these species, except under issuance of a scientific collecting permit. New Mexico State statutes do not address habitat protection, indirect effects, or other threats to these species. New Mexico State status as an endangered species only conveys protection from collection or intentional harm. However, there is no formal consultation process to address the habitat requirements of the species or how a proposed action may affect the needs of the species. Because most of the threats to these species are from effects to habitat, protecting individuals will not ensure their long-term protection.

NMDGF recognizes the importance of Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod conservation at the local population level and has the authority to consider and recommend actions to mitigate potential adverse effects to these species during its review of development proposals. As noted, NMDGF's primary regulatory venue is under the New Mexico Wildlife Conservation Act. There are no statutory requirements under NMDGF's jurisdiction that serve as an effective regulatory mechanism for reducing or eliminating the threats (see Factors A and C above) that may adversely affect Roswell springsnail, Koster's springsnail, Pecos assiminea and their habitat.

Still, New Mexico State statutes require the NMDGF to develop a recovery plan that will restore and maintain species' habitat. A recovery and conservation plan for the four invertebrates was finalized by the State of New Mexico in January 2005 (NMDGF 2005b). The plan provides details about the natural history of the invertebrates, a historical perspective of habitat and population trends, and habitat assessment. The goal of the plan is to ensure that the invertebrates occur in sufficient numbers within populations and in a sufficient number of discrete and independent populations, that downlisting and eventual delisting under the Wildlife Conservation Act is warranted (NMDGF 2005b). The plan outlines three parameters to meet the goal: (1) Maintenance or expansion of the existing distribution and abundance of the invertebrates at BLNWR; (2) repatriation of the invertebrates to restored suitable habitat at two or more sites within their known historic range; and (3) establishment and stocking of an artificial and secure refugium to protect against catastrophic loss in the wild (NMDGF 2005b). As noted above, the State's recovery plan does not ensure any long-term protection for these species because there are no mandatory elements to ensure proposed projects do not adversely affect these species or their habitat.

The Oil Conservation Division of the New Mexico Energy, Minerals, and Natural Resources Department regulates oil and gas well drilling and casing in part to prevent contamination of groundwater (19 NMAC 15.3). Although there are no known instances of groundwater contamination by leaking oil or gas wells in the source-water capture zone for the Middle Unit of BLNWR, there is a well documented history of oil and gas industry operations on and adjacent to BLNWR, which have resulted in the spillage of oil and brine onto the BLNWR (Service 1994b, 1996, 1997a, 1998b). Therefore, we find that these regulations provide some protection to the four invertebrates, but do not eliminate the threat of oil spills through accidents or equipment malfunctions.

The environmental assessment found that spring flows within the proposed critical habitat on BLNWR are already protected by existing water rights afforded by the New Mexico Office of the State Engineer's administration of the Roswell Basin. In 1967, water rights were adjudicated in the Roswell Basin, wells were metered, and pumping rates administered by the Office of the State Engineer (OSE). Currently, any proposed change in use of water (underground or surface depletion) in the Roswell Basin will undergo analysis by OSE to determine if there would be impairment to existing water rights (McCord *et al.* 2005). The OSE will not allow such change if it impairs the Federal water right in any respect (NMISC 2005). Thus the spring flows on BLNWR should be protected from any changes in groundwater pumping near the refuge in the future. This provides a regulatory benefit to the four invertebrates.

However, we believe that there was a lag between the time of the drought and recovery in the artesian groundwater in this area. Because New Mexico has been in a drought since 1999, there may be a lag time before the effect of the current drought is observed. We believe that the springs on BLNWR will flow in spite of relatively intense drought (McCord *et al.* 2005). However, it is not known how the springs in Texas would respond to extended drought and the current level of groundwater pumping. Moreover, the habitat occupied by the four invertebrates does not have to dry out completely to have an effect on populations. Lower spring flows may cause a decrease in habitat availability, increased water temperatures, lower dissolved oxygen levels, and an increase in salinity (MacRae *et al.* 2001). Any of these factors, alone or in combination, could lead either to the reduction or extirpation of a population. Additionally, the primary threat to Pecos assiminea in Texas is the potential failure of spring flow due to excessive groundwater pumping and/or drought, which would result in total habitat loss for the species.

In Texas, Pecos assiminea currently has no State or other regulatory protection. Some protection for the habitat of this species is provided with the ownership of the springs by TNC (Karges 2003). However, this land ownership provides no protection from one of the main threats to this species—the loss of necessary groundwater levels to ensure adequate spring flows. Groundwater pumping that could affect spring flows is subject to limited regulation in Texas. State agencies do not control groundwater pumping, and Texas courts have held that, with few exceptions, landowners have the right to take all the water that can be captured under their land (rule of capture), regardless of impacts to neighbors or natural resources. Individual groundwater conservation districts have varying amounts of authority and capacity to limit pumping. Diamond Y Spring is within the jurisdiction of the Middle Pecos Groundwater Conservation District, but generally groundwater districts will not limit groundwater use to allow for conservation of surface water flows (Booth and Richard-Crow 2004; Caroom and Maxwell 2004). Thus, we find no existing regulatory mechanisms in place to protect the Pecos assiminea.

Members of the four invertebrate species that co-exist in springs with the federally endangered Pecos gambusia (*Gambusia nobilis*) at BLNWR and Diamond Y Spring and the federally endangered Leon Springs pupfish at Diamond Y Spring may receive incidental habitat protection from the Act. However, possible habitat protection provided by the federally listed Pecos gambusia and the Leon Springs pupfish offers only partial protection for the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod because the federally listed fish are not found in all the springs the snails or amphipod inhabit. For example, Pecos assiminea does not normally occur directly within submerged habitats. It is most

commonly found in moist soil or vegetation along the periphery of standing water. As a result, this habitat may not be afforded protection under current management actions or consultations which address conservation for listed fish species in the same area.

Federal water-rights for the BLNWR were secured in 1996 (Service 2005b). This acquisition should ensure minimum surface water discharge of Bitter Creek. However, if this water is contaminated, the Federal water right alone does not provide adequate protection for these species.

E. *Other natural or manmade factors affecting its continued existence.* BLNWR was established in 1937 as wintering and breeding grounds for migratory birds. At the time the four invertebrates were unknown to science. Consequently, management was directed primarily at creating dikes so that ponds could be created and their water levels controlled for the benefit of waterfowl. Some of the ponds created would seasonally flood springs that flowed into these ponds naturally. Because the Roswell springsnail and Noel's amphipod, in particular, prefer flowing over pooled water, this had a negative impact on the habitat available to them. In 2003, a dike rehabilitation project was begun on BLNWR. Two dikes running the length of Areas 6 and 7 were constructed. This isolated the spring systems from the main body of the impoundments, allowing the areas to be flooded in the winter without inundating the springs occupied by the invertebrates. In addition, potential habitat for the invertebrates was created in a new ditch designed to carry water to Area 7. Current management of BLNWR recognizes and includes the invertebrates in its maintenance and operations, and is no longer a threat to the invertebrates.

Fire

BLNWR is characterized by sinkhole/karst terrain. This terrain poses safety threats to fire crews and suppression equipment. As a result, fire suppression efforts are largely restricted to established roads. This severely limits management ability to quickly suppress fires that threaten fragile aquatic habitats on the BLNWR. On March 5, 2000, the Sandhill fire burned 405 ha (1,000 ac) of the western portion of the BLNWR, including portions of Bitter Creek. The fire burned through Dragonfly Spring, eliminated vegetation shading the spring, and generated a substantial amount of ash in the spring system (Lang 2000, NMDGF 2005b, 2005c). Subsequently, dense algal mats formed, water temperature fluctuations and maximum temperatures increased, while dissolved oxygen levels decreased (Lang 2002). The pre-fire dominant vegetation of submerged aquatic plants and mixed native grasses within the burned area has also been replaced by the invasive common reed (NMDGF 2005b, 2005c). Following the fire, a dramatic reduction in Noel's amphipod was observed, and Koster's springsnail occurs at lower densities than were observed prior to the fire (Lang 2002, NMDGF 2005c).

Currently, dense stands of common reed are found throughout most reaches of Bitter Creek, including in habitat occupied by the four invertebrates (NMDGF 2005c) (see also ''Factor C'' section above). Prior to the Sandhill Fire, common reed occurred only sporadically along Bitter Creek (NMDGF 2005c). These dense stands of common reed have increased the fuel load and threat of wildfire on BLNWR. Standing dead canes of common reed and associated litter often constitute twice as much biomass as living shoots (Uchytil 1992). This abundant dead fuel carries fire well, allowing stands to burn even when the current year's shoots are green (Uchytil 1992). Because of the increase in common reed on BLNWR within habitat occupied by the four invertebrates, we now find that wildfire is a threat to the four invertebrates.

Removal of vegetative cover by burning in habitats occupied by Pecos assiminea may be an important factor in decline or loss of populations (Taylor 1987). Alternatively, Pecos assiminea has been found to persist in areas following fires (Lang 2000). Pecos assiminea was also discovered at Dragonfly Spring following burning of habitat there during the Sandhill Fire (NMDGF 2005a). Season of burning, intensity of the fire, and frequency of fire are likely important determinants of effects on population persistence and abundance of Pecos assiminea (NMDGF 1998). Pecos assiminea is potentially more vulnerable to fires than the springsnails because they reside at or near the surface of the water. However, it is thought that Pecos assiminea may survive fire or other vegetation reduction if sufficient litter and ground cover remain to sustain appropriate soil moisture and humidity at a microhabitat scale (NMDGF 2005a; Service 2004).

Controlled burns have been implemented on BLNWR to burn grass, sedge, cattail, and non-native vegetation (*e.g.*, Russian thistle) in an attempt to reduce the risk of large uncontrolled wildfires or to remove excessive amounts of Russian thistle from a spring run (Service 2004). We have found that controlled burns with appropriate conservation measures do not adversely affect the Koster's springsnail, Pecos assiminea, or Roswell springsnail (Service 2004). On the other hand, prescribed burns to remove Russian thistle may have indirectly affected Noel's amphipod through the release of common reeds, which can reduce water flow and result in decreased dissolved oxygen levels (Service 2005c). Surveys conducted immediately post-fire indicate that Noel's amphipod is still found throughout the burned area, with little to no direct effects (Service 2005c). Still, the Service is continuing to monitor post-fire effects from these activities to determine if Noel's amphipod has been adversely affected.

Fire, particularly during the winter months, will allow ash, sediment, salts, and nutrients to more readily enter the aquatic habitat via precipitation and wind. Ash consists of carbon, soots, and other organic compounds that, upon entering the water column, provide a food source for bacteria and algae. With the addition of associated nutrients, and water temperature increases from the loss of streamside vegetation, populations of bacteria and algae will expand, causing oxygen depletions. As a result, some invertebrates may perish in these situations, where they cannot escape the oxygen deficit. Additionally, denuded areas will allow erosion and sedimentation of the streamside habitat. Sedimentation could have the direct effect on the Roswell springsnail, which is typically found on rocks.

Finding

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining that these species are in danger of extinction throughout all or a significant portion of their respective ranges. The habitat and range of Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod are threatened with destruction, modification, and curtailment. Existing regulatory mechanisms do not provide adequate protection for these species, and other natural and manmade factors affect their continued existence. Because each of these four species has a very limited range, their populations are disjunct and isolated from each other, and potential habitat areas are isolated and separated by large areas of unsuitable habitat, these invertebrates are particularly vulnerable to localized extinction should their habitat be degraded or destroyed. Because their mobility is limited, populations will have little opportunity to leave

degraded habitat areas in search of suitable habitat. As a result, one contamination event, or a short period of drawdown in the aquatic habitat where they are found could result in the loss of an entire population, of which there are few. Because of the limited distribution of these endemic species, any impact from increasing threats (*e.g.*, loss of springflow, contaminants, nonnative species) is likely to result in their extinction because the magnitude of threat is high. These species occur in an arid region plagued by drought and ongoing aquifer withdrawals (*e.g.*, in Texas), making the loss of springflows an imminent threat in the foreseeable future. We also found that their habitat faces a constant threat from water quality contamination. Therefore, we have determined that the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod meet the definition of an endangered species pursuant to section 3 of the Act. A threatened species designation as defined in section 3 of the Act would not accurately reflect the population status, restricted distribution, vulnerability, and imminent threats. As such, we are listing these four invertebrate species as endangered under the Act.

Critical Habitat

Designation of Critical Habitat Provides Little Additional Protection to Species

In 30 years of implementing the Act, the Service has found that the designation of statutory critical habitat provides little additional protection to most listed species, while consuming significant amounts of conservation resources. The Service's present system for designating critical habitat is driven by litigation rather than biology, limits our ability to fully evaluate the science involved, consumes enormous agency resources, and imposes huge social and economic costs. The Service believes that additional agency discretion would allow our focus to return to those actions that provide the greatest benefit to the species most in need of protection.

Role of Critical Habitat in Actual Practice of Administering and Implementing the Act

While attention to and protection of habitat is paramount to successful conservation actions, we have consistently found that, in most circumstances, the designation of critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources. Sidle (1987) stated, ''Because the Act can protect species with and without critical habitat designation, critical habitat designation may be redundant to the other consultation requirements of section 7.''

Currently, only 445 species, or 36 percent, of the 1,244 listed species in the United States under the jurisdiction of the Service have designated critical habitat. We address the habitat needs of all 1,244 listed species through conservation mechanisms such as listing, section 7 consultations, the Section 4 recovery planning process, the section 9 protective prohibitions of unauthorized take, section 6 funding to the States, and the section 10 incidental take permit process. The Service believes that it is these measures that may make the difference between extinction and survival for many species.

We note, however, that a recent 9th Circuit judicial opinion, *Gifford Pinchot Task Force* v. *United States Fish and Wildlife Service*, has invalidated the Service's regulation defining destruction or adverse modification of critical habitat. We are currently reviewing the decision to determine what effect it may have on the outcome of consultations pursuant to section 7 of the Act.

Procedural and Resource Difficulties in Designating Critical Habitat

We have been inundated with lawsuits regarding critical habitat designation, and we face a growing number of lawsuits challenging critical habitat determinations once they are made. These lawsuits have subjected the Service to an ever-increasing series of court orders and court-approved settlement agreements, compliance with which now consumes nearly the entire listing program budget. This leaves the Service with little ability to prioritize its activities to direct scarce listing resources to the listing program actions with the most biologically urgent species conservation needs.

The consequence of the critical habitat litigation activity is that limited listing funds are used to defend active lawsuits and to comply with the growing number of adverse court orders. As a result, the Service's own proposals to undertake conservation actions based on biological priorities are significantly delayed.

The accelerated schedules of court ordered designations have left the Service with almost no ability to provide for meaningful additional public participation beyond those minimally required by the Administrative Procedure Act (APA), the Act, and the Service's implementing regulations, or to take additional time for review of comments and information to ensure the rule has addressed all the pertinent issues before making decisions on listing and critical habitat proposals, due to the risks associated with noncompliance with judicially imposed deadlines. This in turn fosters a second round of litigation in which those who will suffer adverse impacts from these decisions challenge them. The cycle of litigation appears endless, is very expensive, and in the final analysis provides little additional protection to listed species.

The costs resulting from the designation include legal costs, the cost of preparation and publication of the designation, the analysis of the economic effects and the cost of requesting and responding to public comment, and in some cases the costs of compliance with the NEPA; all are part of the cost of critical habitat designation. These costs result in minimal benefits to the species that are not already afforded by the protections of the Act enumerated earlier, and they directly reduce the funds available for direct and tangible conservation actions.

Section 3(5)(A) of the Act defines critical habitat as the specific areas within the geographical area occupied by the species on which are found those physical and biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection and that the designation of critical habitat for a given species is prudent and determinable. ''Conservation'' means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary. Because we proposed critical habitat for the four invertebrates, we already determined that critical habitat pursuant to the Act and implementing regulations was both prudent and determinable (67 FR 6459).

Section 3(5)(c) of the Act states that not all areas that can be occupied by a species should be designated as critical habitat unless the Secretary determines that all such areas are essential to the conservation of the species. Our regulations (50 CFR 424.12(e)) also state that ''The Secretary shall designate as critical habitat areas outside the geographical area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species.''

Areas within the geographical area occupied by the species that do not contain the features essential for the conservation of the species are not, by

definition, critical habitat. Similarly, within the geographical area occupied by the species, if the features essential for the conservation of the species will not require special management considerations or protection, the area is not, by definition, critical habitat. To determine whether the essential features within an area may require special management, we first determine if the essential features located there generally require special management to address applicable threats. If those features do not require special management, or if they do in general but not for the particular area in question because of the existence of an adequate management plan or for some other reason, then the essential features within the area do not require special management.

Further, section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data after taking into consideration the economic impact, impact on national security, and any other relevant impact of specifying a particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species.

The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. It does not allow government or public access to private lands. Under section 7 of the Act, Federal agencies must consult with the Service on activities they undertake, fund, or permit that may affect critical habitat and lead to its destruction or adverse modification. However, the Act prohibits unauthorized take of listed species and requires consultation for activities that may affect them, including habitat alterations, regardless of whether critical habitat has been designated.

When a Federal nexus exists, we work with the appropriate Federal agency, and in some cases the applicant to the consultation, to ensure that the project can be completed without jeopardizing the species or adversely modifying critical habitat. We intend to continue working with our Federal partners to provide technical assistance, coordination, and, in some instances, section 7 consultation. We do not anticipate that the listing of these species or the designation of critical habitat for the Pecos assiminea will preclude projects such as riparian restoration, fire prevention/management, or oil and gas development activities.

Similarly, actions on private lands that have the potential to result in take of any of the four invertebrate species would be subject to section 10 of the Act, which requires development of a Habitat Conservation Plan as part of an application to the Service for an incidental take permit. These incidental take permits are issued pursuant to section 10(a)(1)(B) of the Act. Critical habitat has possible effects on activities conducted by non-Federal entities only if they are conducting activities on Federal lands or that involves Federal funding, a Federal permit, or other Federal action (*e.g.*, grazing permits).

Regulations at 50 CFR 424.02(j) define special management considerations or protection to mean any methods or procedures useful in protecting the physical and biological features of the environment for the conservation of listed species. When we designate critical habitat, we may not have the information necessary to identify all areas that are essential for the conservation of the species. Nevertheless, we are required to designate those areas we consider to be essential, using the best information available to us. Accordingly, we do not designate critical habitat in areas outside the geographical area occupied by the species unless the best available scientific and commercial data demonstrate that unoccupied areas are essential for the conservation needs of the species.

The Service's Policy on Information Standards Under the Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), and Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554; H.R. 5658) and the associated Information Quality Guidelines issued by the Service, provide criteria, establish procedures, and provide guidance to ensure that decisions we make represent the best scientific and commercial data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, information may be obtained from the listing package, recovery plans, articles in peer-reviewed journals, conservation plans developed by States and counties or other entities that develop HCPs, scientific status surveys and studies, and biological assessments. In the absence of published data, unpublished materials and expert opinion or personal knowledge are used.

Areas that support populations, but are outside the critical habitat designation, are still important to the species. Because of that they will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available information at the time of the action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. 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, or other species conservation planning efforts if new information available to these planning efforts calls for different approaches.

In our critical habitat designation we use the provisions outlined in section 3(5)(A) of the Act to evaluate those specific areas defined by the features essential to the conservation of the species that may require special management considerations or protections. On the basis of our evaluation, we have determined that BLNWR does not require special management considerations or protections, and have excluded this area from the designation of critical habitat for these four invertebrates pursuant to section 3(5)(A) of the Act as discussed below (see ''Exclusions Under Section 3(5)(A) of the Act'' section below). Because the Roswell springsnail, Koster's springsnail, and Noel's amphipod are only found within or adjacent to the BLNWR, we are not designating critical habitat for these three species. The critical habitat discussion below only concerns habitat for the Pecos assiminea.

Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we consider those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection. These features include but are not limited to: space for individual and population growth and for normal behavior; food, water, air, light,

minerals or other nutritional or physiological requirements; cover or shelter; sites for germination or seed dispersal; and habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

This critical habitat designation does not include lands on BLNWR, New Mexico (see Exclusions Under Section 3(5)(A)'' and ''Summary of Changes to Proposed Rule'' sections). We determined the primary constituent elements for the Pecos assiminea (the only species which occurs off of BLNWR) from data and studies on its general habitat and life history requirements including, but not limited to: Taylor 1987; and NMDGF 1996, 1998, 1999, 2005b, and 2005c. A description of the essential environment as it relates to the specific primary constituent elements required of the Pecos assiminea is described below.

Space for Individual and Population Growth and Normal Behavior

The Pecos assiminea requires saturated, moist soil at stream or spring run margins. Spring complexes that contain flowing water create saturated soils that provide the specific habitat needed for population growth, sheltering, and normal behavior of the species. This snail typically occurs near the soil surface or beneath leaf litter or vegetation in these areas (NMDGF 2005b). Consequently, wetland plant species are required to provide the leaf litter, shade, and appropriate microhabitat. Plant species such as American three-square (*Scirpus americanus*), spike rush (*Eleocharis* spp), inland saltgrass (*Distichlis spicata*) and rushes (*Juncus* spp.) provide the appropriate cover and shelter required Pecos assiminea (NMDGF 2005b).

Water

The Pecos assiminea is found in wet mud or beneath mats of vegetation, usually within a few centimeters (inches) of flowing water. The moist soil environment provides foraging and sheltering habitat, as well as habitat structure necessary for reproduction and successful recruitment of offspring. These areas provide the algae, bacteria, and decaying organic matter on which this species depends as a food resource. The Pecos assiminea is rarely found immersed in water or in standing water. Therefore, impoundment of springbrooks or streams is seen as detrimental to the survival of the species. It also does not appear to persist in areas with fluctuating water levels or in wetlands that freeze (Lang 2000). However, water is essential to the conservation of the Pecos assiminea because the species cannot withstand permanent drying (loss of surface flow) of springs or spring complexes. When water quality conditions degrade (*e.g.*, water temperatures are too high, and dissolved oxygen concentrations are too low), Pecos assiminea will likely be injured or die.

Reproduction and Rearing of Offspring

Little is known about the reproductive requirements for the Pecos assiminea. The native wetland plant community was included in this designation because the Pecos assiminea is found within the moist environment directly adjacent to the aquatic habitat. Substrates found in these margin areas provide for temperatures within the environmental tolerance for this species, and the habitat for reproduction that the Pecos assiminea requires.

Food

The Pecos assiminea has a file-like radula (a ribbon of teeth) situated behind the mouth that is used to graze or scrape food from the foraging surface. Saturated soils and wetland vegetation adjacent to spring complexes contribute to the necessary components to support the algae, detritus, and bacteria on which this species forages.

The discussion above describes the physical and biological features essential to the Pecos assiminea and presents our rationale as to why the features identified below were selected. The primary constituent elements described below include the essential features of spring complexes that develop, maintain, and regenerate the habitat components required for the Pecos assiminea to forage, reproduce, and shelter. The specific biological and physical features, otherwise referred to as the primary constituent elements, essential to the conservation of the Pecos assiminea are:

(1) Permanent, flowing, unpolluted, fresh to moderately saline water;

(2) Moist or saturated soil at stream or spring run margins with native vegetation growing in or adapted to aquatic or very wet environment, such as salt grass or sedges; and

(3) Stable water levels with natural diurnal and seasonal variation.

Criteria for Defining Critical Habitat

Restoring an endangered or threatened species to the point where it is recovered is a primary goal of our Endangered Species Program. To help guide the recovery effort, we are required to prepare and implement recovery plans for all of the listed species native to the United States unless such plan will not promote the conservation of the species and the species is therefore exempt from having a plan developed for it. Recovery plans describe actions considered necessary for conservation of the species, establish criteria for downlisting or delisting them, and estimate time and cost for implementing the recovery measures needed. A final recovery plan formalizes the recovery strategy for a species, but is not a regulatory document (*i.e.*, recovery plans are advisory documents because there are no specific protections, prohibitions, or requirements afforded to a species based solely on a recovery plan). Critical habitat contributes to the overall recovery strategy for listed species, but does not by itself achieve recovery plan goals.

We do not currently have a recovery plan for Pecos assiminea. Nevertheless, we have reviewed the recovery plan developed by the State of New Mexico (NMDGF 2005b). In designating critical habitat for the Pecos assiminea, we also reviewed information within our files and recommendations contained in State wildlife resource reports (Balleau *et al.* 1999; NMDGF 2005a, 2005b, 1999, 1998, Boghici 1997; Jones and Balleau 1996; and Cole 1985). We also reviewed the available literature pertaining to habitat requirements, historic localities, and current localities for this species.

We are not aware of any reliable information that is currently available to us that was not considered in this designation process. This final determination constitutes our best assessment of areas needed for the conservation of the species. Much remains to be learned about this species; should credible new information become available which contradicts this designation, we will reevaluate our analysis and, if appropriate, propose to modify this critical habitat designation, depending on available funding and staffing. We must make this determination on the basis of the information available at this time, and we may not delay our decision until more information about the species and its habitat are available (*Southwest Center for Biological Diversity* v. *Babbitt*, 215 F.3d 58 (D.C. Cir. 2000)).

The designated critical habitat constitutes our best assessment of the specific areas that contain the primary constituent elements for Pecos assiminea and that may require special management or protection. The designated areas are within the geographical area occupied by Pecos assiminea populations and currently have one or more constituent elements

(see description of primary constituent elements, above).

Critical Habitat Designation

We designate two units as critical habitat for the Pecos assiminea (see the ''Regulation Promulgation'' section of this final rule for exact boundary descriptions). These critical habitat units include primary constituent elements that provide for the physiological, behavioral, and ecological requirements essential for the conservation of Pecos assiminea. The designation includes one complex at Diamond Y Spring and a segment of the drainage and East Sandia Spring. Critical habitat units are designated in portions of Pecos and Reeves Counties, Texas. Detailed digital files of each unit can be obtained by contacting the New Mexico Ecological Services Field Office (see **ADDRESSES** section).

A general description of land ownership in both areas follows:

1. Diamond Y Springs Complex, Pecos County, Texas. This area comprises a major population of Pecos assiminea. The designation includes the Diamond Y Spring and approximately 6.8 km (4.2 mi) of its outflow, ending at approximately 0.8 km (0.5 mi) downstream of the State Highway 18 bridge crossing. Also included is approximately 0.8 km (0.5 mi) of Leon Creek upstream of the confluence with Diamond Y Draw. All surrounding riparian vegetation and mesic soil environments within the spring, outflow, and portion of Leon Creek are also designated as these areas are considered habitat for the Pecos assiminea. This designation is approximately 153.8 ha (380 ac) of aquatic and neighboring mesic habitat. This complex occurs entirely on private lands. Private land in the immediate vicinity of the Diamond Y Springs Complex is managed as a nature preserve by TNC.

2. East Sandia Spring, Reeves County, Texas. This spring contains a population of Pecos assiminea. The designation includes the springhead itself, surrounding seeps, and all submergent vegetation and moist soil habitat found at the margins of these areas. These areas are considered habitat for the Pecos assiminea. This designation is approximately 6.7 ha (16.5 ac) of aquatic and neighboring upland habitat. The site is private land managed as a nature preserve by TNC.

Exclusions Under Section 3(5)(A) of the Act

As we undertake the process of designating critical habitat for a species, we first evaluate lands defined by those physical and biological features essential to the conservation of the species for inclusion in the designation pursuant to section 3(5)(A) of the Act. We then evaluate lands defined by those features to assess whether they may require special management considerations or protection. As discussed in the five factor analysis above, the Pecos assiminea is imperiled by a multitude of threats such as oil and gas operations, introduced species, groundwater contamination and depletion, drought, risk of wildfire, and inadequate regulatory mechanisms.

Below we first provide some general background information on the BLNWR and the Comprehensive Conservation Plan (CCP), followed by an analysis pursuant to section 3(5)(A) of the Act of the current management provisions on BLNWR, and an analysis of why we believe special management is not required. Pursuant to section 3(5)(A)(i) of the Act, we consider the areas that we are excluding on the BLNWR to be within the geographical range occupied by the four invertebrate species. As noted in the environmental assessment, one of the areas on the BLNWR, the impoundment complex, contains an area that could allow for future expansion of existing populations. While this area is not known to be currently occupied, we consider it to be within the geographical range occupied by the four invertebrate species because it is in close proximity to known occupied areas (*i.e.,* ranging from approximately 164 to 656 feet (50 to 200 m)), and it would be an area where section 7 consultations would occur because of the potential presence of the four invertebrate species and known proximity to occupied areas.

The BLNWR was established on October 8, 1937, by Executive Order 7724 ''as a refuge and breeding ground for migratory birds and other wildlife.'' The Refuge Recreation Act (16 U.S.C. 460–1) identifies the refuge as being ''suitable for incidental fish and wildlife-oriented recreational development, the protection of natural resources, and the conservation of endangered species or threatened species.'' The Wilderness Act of 1964 (Pub. L. 88–577) directs the Service to ''maintain wilderness as a naturally functioning ecosystem'' on portions of the Refuge. While the BLNWR was originally established to save wetlands vital to the perpetuation of migratory birds, the isolated gypsum springs, seeps, and associated wetlands protected by the Refuge have been recognized as providing the last known habitats in the world for several unique species. Management emphasis of the BLNWR is placed on the protection and enhancement of habitat for endangered species and Federal candidate species, maintenance and improvement of wintering crane and waterfowl habitat, and monitoring and maintenance of natural ecosystem values.

The BLNWR sits at a juncture between the Roswell Artesian Groundwater Basin and the Pecos River. These two systems and their interactions account for the diversity of water resources on the Refuge, including sinkholes, springs, wetlands, oxbow lakes, and riverine habitats. The BLNWR has a federally reserved water right that essentially protects groundwater levels of the Roswell Basin in the Refuge vicinity. The Refuge has undergone adjudication of its federally reserved water rights by the State of New Mexico (order signed May 1997). The BLNWR is currently in negotiations with the New Mexico Interstate Stream Commission, a State agency responsible for administering New Mexico's water resources, to quantify these reserved rights (Service 2005).

The National Wildlife Refuge System Improvement Act of 1997 establishes a conservation mission for refuges, gives policy direction to the Secretary of the Interior and refuge managers, and contains other provisions such as the requirement to integrate scientific principals into the management of the Refuges. According to Section 7(e)(1)(E) of the Refuge Improvement Act, all lands of the Refuge System are to be managed in accordance with an approved CCP that will guide management decisions and set forth strategies for achieving refuge purposes. In general, the purpose of the CCP is to provide long-range guidance for the management of National Wildlife Refuges. The Refuge Improvement Act requires all refuges to have a CCP and provides the following legislative mandates to guide the development of the CCP: (1) Wildlife has first priority in the management of refuges; (2) wildlife-dependent recreation including hunting, fishing, wildlife observation, wildlife photography, environmental education and environmental interpretation are the priority public uses of the refuge system, and shall be allowed when compatible with the refuge purpose; and (3) other uses have lower priority in the refuge system and are only allowed if not in conflict with any of the priority uses and determined appropriate and compatible with the refuge purpose.

The CCP must also be revised if the Secretary determines that conditions that affect the refuge or planning unit have changed significantly. In other words, a CCP must be followed once it

is approved, and regularly updated in response to environmental changes or new scientific information.

The BLNWR has a Final CCP that was approved in September 1998. The CCP serves as a management tool to be used by the Refuge staff and its partners in the preservation and restoration of the ecosystem's natural resources. The plan is intended to guide management decisions over the next 5 to 10 years and sets forth strategies for achieving Refuge goals and objectives within that timeframe. Key goals of the CCP related to these four invertebrates include the following: (1) To restore, enhance and protect the natural diversity on the BLNWR including threatened and endangered species by (a) appropriate management of habitat and wildlife resources on refuge lands and (b) by strengthening existing and establishing new cooperative efforts with public and private stakeholders and partners, and (2) To restore and maintain selected portions of a hydrological system that more closely mimics the natural processes along the reach of the Pecos River adjacent to the BLNWR by: (a) restoration of the river channel, as well as restoration of threatened, endangered, and special concern species; and (b) control of exotic species and manage trust responsibilities for maintenance of plant and animal communities and to satisfy traditional recreational demands. Specific objectives related to these goals include: (1) The restoration of populations of aquatic species designated as endangered, threatened, or of special concern to a sustainable level (aquatic species in these categories include the four invertebrates), and (2) the monitoring of wildlife populations, including endemic snails.

As explained in detail above, we believe that BLNWR lands are already managed for the conservation of wildlife and special management considerations or protections are not required. Therefore, these lands do not meet the definition of critical habitat, and we are not designating critical habitat for the four invertebrate species within BLNWR.

Critical habitat receives protection from destruction or adverse modification through required consultation under section 7 of the Act. The section 7 consultation process is triggered when a Federal agency determines that its proposed Federal action (*i.e.*, an action that it funds, carries out, or authorizes) may affect a listed species or its critical habitat. Thus, the principal benefit of any designated critical habitat is that Federal activities that may affect critical habitat require consultation under section 7 of the Act.

Once consultation under section 7 of the Act is triggered, the process may conclude informally when the Service concurs in writing that the proposed Federal action is not likely to adversely affect the listed species or its critical habitat. However, if the Service determines through informal consultation that adverse impacts are likely to occur, then formal consultation is initiated. Formal consultation concludes with a biological opinion issued by the Service on whether the proposed Federal action is likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat, with separate analyses being made under both the jeopardy and the adverse modification standards. For critical habitat, a biological opinion that concludes in a determination of no destruction or adverse modification may contain discretionary conservation recommendations to minimize adverse effects to primary constituent elements, but it would not contain any mandatory reasonable and prudent measures or terms and conditions. Mandatory reasonable and prudent alternatives to the proposed Federal action would only be issued when the biological opinion results in a jeopardy or adverse modification conclusion.

The designation of critical habitat does not imply that lands outside of critical habitat do not play an important role in the conservation of these four invertebrate species. Federal activities that may affect those unprotected areas (such as groundwater pumping, oil and gas activities, and livestock grazing, etc.) outside of critical habitat are still subject to review under section 7 of the Act if they may affect these species. The prohibitions of section 9 of the Act (*e.g.*, harm, harass, capture) also continue to apply both inside and outside of designated critical habitat.

Effect of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including us, to insure that their actions are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This requirement is met through section 7 consultation under the Act. Our regulations define ''jeopardize the continued existence of'' as to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). ''Destruction or adverse modification of designated critical habitat'' for this species would include habitat alterations that appreciably diminish the value of critical habitat by significantly affecting any of those physical or biological features that were the basis for determining the habitat to be critical. We are currently reviewing the regulatory definition of adverse modification in relation to the conservation of the species.

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide ''reasonable and prudent alternatives'' to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Service's Regional Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Activities on Federal lands that may affect the four invertebrates or their habitat will require consultation pursuant to section 7 of the Act. Activities on State or private lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers, or some other Federal action, including funding, will continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat, and actions on non-Federal lands that are not federally funded, authorized, or permitted, do not require section 7 consultations.

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

include those that alter the primary constituent elements to an extent that the value of critical habitat for both the survival and recovery of the Pecos assiminea is appreciably reduced. We note that such activities may also jeopardize the continued existence of the species. Activities that, when carried out, funded, or authorized by a Federal agency that may affect the Pecos assiminea and may require consultation under section 7 of the Act to determine if they adversely modify critical habitat include, but are not limited to:

(1) Any activity that would significantly alter the source-water capture zone, subterranean flows, or water level of the supporting aquifers (groundwater pumping), including any activity that would significantly alter the water chemistry, water quality, or physical parameters (*e.g.*, temperature, pH, contaminants), or wastewater or point-source discharge permits in the wetland habitats and systems that could appreciably diminish the primary constituent elements where this species occurs;

(2) Any activity that would introduce, spread, or augment non-native aquatic predators or competitors, or non-native species that negatively alter Pecos assiminea habitat or primary constituent elements: this would include the introduction of non-native species through contaminated sampling gear, bait-bucket introductions of non-native fishes, or the release of aquarium species (fish, aquatic snails, and aquatic plants) from uninformed members of the public; or

(3) Any activity that would detrimentally alter the habitat for Pecos assiminea. This would include water diversion, drainage alteration projects, road construction, construction of public and private facilities, or ponding of spring runs.

Specific examples of Federal activities include, but are not limited to, EPA authorization of discharges under the National Pollutant Discharge Elimination System and registration of pesticides; Federal Highway Administration approval or funding of road or highway infrastructure and maintenance; BLM issuance of oil and gas leases or permits; U.S. Army Corps of Engineers authorization of discharges of dredged or fill material into waters of the United States under section 404 of the Clean Water Act; USDA-Natural Resources Conservation Service technical assistance and other programs; USDA-Rural Utilities Service infrastructure or development; Federal Energy Regulatory Commission permitting activities; and the Department of Housing and Urban Development's Small Cities Community Development Block Grant and home loan programs.

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 encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Act provides for possible land acquisition and cooperation with the States and authorizes recovery plans for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed animals are discussed in the ''Effect of Critical Habitat Designation'' section above.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed to be listed or is listed as endangered or threatened, and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Federal agencies are required to confer with us informally on any action that is likely to jeopardize the continued existence of a proposed species, or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, 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 such a species or to destroy or adversely modify its critical habitat. If a Federal agency action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with us. Federal agency actions that may affect the four invertebrates throughout their range and may require consultation with us include, but are not limited to, oil and gas development, irrigated agricultural and livestock activities, residential and commercial development, non-native vegetation control, fire suppression, controlled burns, water control structures, and habitat enhancement projects.

Listing the four invertebrates provides for the development and implementation of a rangewide recovery plan. This plan will bring together Federal, State, and local agency efforts for the conservation of these species. A recovery plan will establish a framework for agencies to coordinate their recovery efforts. The plan will set recovery priorities and estimate the costs of the tasks necessary to accomplish the priorities. It also will describe the site-specific actions necessary to achieve conservation and survival of the species.

Listing also will require us to review any actions that may affect the four invertebrates for lands and activities under Federal jurisdiction, State plans developed pursuant to section 6 of the Act, scientific investigations of efforts to enhance the propagation or survival of the animal pursuant to section 10(a)(1)(A) of the Act, and habitat conservation plans prepared for non-Federal lands and activities pursuant to section 10(a)(1)(B) of the Act.

Federal agencies with management responsibility for the four invertebrates include the Service, in relation to the issuance of section 10(a)(1)(A) and (B) permits for scientific research, habitat conservation plans, BLNWR management and maintenance, and other programs.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, 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, or collect, or to attempt any of these), import or 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 also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the U.S. Fish and Wildlife Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, or for incidental take in the course of otherwise lawful activities.

Pursuant to the Interagency Cooperative Policy for Endangered Species Act Section 9 Prohibitions, published in the **Federal Register** on July 1, 1994 (59 FR 34272), we identify to the maximum extent practicable 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 as to the effects of this listing on future and

ongoing activities within the species' range. We believe, based on the best available information that the following actions will not result in a violation of the provisions of section 9 of the Act, provided these actions are carried out in accordance with existing regulations and permit requirements:

(1) Possession, delivery, or movement, including interstate transport that does not involve commercial activity, of specimens of these species that were legally acquired prior to the publication in the **Federal Register** of the Federal List of Endangered and Threatened Wildlife and Plants;

(2) Oil and gas exploration and drilling in areas where surface or groundwater is not connected to habitats occupied by the Roswell springsnail, Koster's springsnail, Pecos assiminea, and Noel's amphipod; and

(3) Any actions that may affect the Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea that are authorized, funded, or carried out by a Federal agency (*e.g.*, prescribed burns, pesticide/herbicide application, pipeline construction crossing suitable habitat, oil and gas development or extraction activities), when the action is conducted in accordance with the consultation requirements for listed species pursuant to section 7 of the Act.

Potential activities involving these species that we believe will likely be considered a violation of section 9 include, but are not limited to, the following:

(1) Unauthorized possession, collecting, trapping, capturing, killing, harassing, sale, delivery, or movement, including interstate, and foreign commerce, or harming, or attempting any of these actions, of the Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea. Research activities where these species are trapped or captured will require a permit under section 10(a)(1)(A) of the Act;

(2) The use of chemical insecticides or herbicides that results in killing or injuring these species;

(3) Intentional release of exotic species (including, but not limited to, mosquitofish, crayfish, or non-native snails) into habitat currently occupied by the Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea;

(4) Within the 12,585 ac (5,093 ha) of the Federal mineral estate and 9,945 ac (4,025 ha) habitat protection zone in New Mexico (*e.g.*, BLM 2002, Balleau *et al.* 1999), subsurface drilling or similar activities that contaminate or cause significant degradation of surface drainage water or aquifer water quality that supports the habitat occupied by these species;

(5) Septic tank placement and use where the groundwater is connected to sinkhole or other aquatic habitats occupied by these species;

(6) Unauthorized discharges or dumping of toxic chemicals, silt, or other pollutants into, or other illegal alteration of the areas supporting Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea that results in death or injury of the species or that results in degradation of their occupied habitat to an extent that individuals are killed or injured or essential behaviors such as breeding, feeding, and sheltering are impaired; and

(7) Destruction or alteration of the Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea occupied habitat through discharge of fill materials into occupied sites; draining, ditching, tilling, channelization, drilling, pumping, or other activities that interrupt surface or ground water flow into or out of the spring complexes, and occupied habitats of these species that results in killing or injuring these species by significantly impairing essential life-sustaining requirements such as breeding, feeding, and shelter.

If you have questions regarding whether specific activities will likely violate the provisions of section 9 of the Act, contact the New Mexico Ecological Services Field Office (see **ADDRESSES** section). For Pecos assiminea in Texas, contact the Austin Ecological Services Field Office, 10711 Burnet Road, Suite 200, Austin, Texas 78758 (512/490–0057). Requests for copies of the regulations on listed wildlife and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Division of Endangered Species, P.O. Box 1306, Albuquerque, New Mexico 87103 (telephone 505/248–6920; facsimile 505/248–6788).

Economic Analysis

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific and commercial data available and to consider the economic impact, impact to national security, and other relevant impacts of designating a particular area as critical habitat. We based this designation on the best available scientific information. We utilized the economic analysis, and took into consideration comments and information submitted during the public hearing and comment periods to make this final listing and critical habitat determination. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species.

A draft analysis of the economic effects of the proposed critical habitat designation was prepared and made available for public review (70 FR 23083; May 4, 2005). The economic analysis considers the economic impacts of conservation measures taken prior to and subsequent to the final listing and designation of critical habitat for the four invertebrates. Pre-designation impacts are typically defined as all management efforts that have occurred since the time of listing. The four invertebrates have not been listed, but were proposed for listing in February 2002 (67 FR 6459). Total post-designation costs associated with proposed critical habitat Units 3 and 4 for the Pecos assiminea on TNC lands in Texas are estimated to be $707,000 over the next 20 years (Service 2005a). Estimated costs include creating a conservation plan to formally assess conservation elements and future management actions within proposed critical habitat Units 3 and 4. Additionally, future costs to oil and gas activities within proposed Unit 3 are anticipated to be related to continued partnership projects between TNC and regional oil and gas companies.

Based upon these estimates, we conclude in the final analysis, which reviewed and incorporated public comments, that no significant economic impacts (*i.e.*, will not have annual effect on the economy of $100 million or more or affect the economy in a material way discussed further in the ''Required Determinations'' section below) are expected from the designation of critical habitat for Pecos assiminea. A copy of the economic analysis is included in our supporting record and may be obtained by contacting the New Mexico Ecological Services Field Office (see **ADDRESSES** section) or from our Web site *http://ifw2es.fws.gov/*.

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is a significant rule because it may raise novel legal and policy issues. However, based on our final economic analysis, it is not anticipated that the designation of critical habitat for the four invertebrate species will result in an annual effect on

the economy of $100 million or more or affect the economy in a material way. Due to the timeline for publication in the **Federal Register**, the Office of Management and Budget (OMB) has not formally reviewed the final rule or accompanying economic analysis.

Further, Executive Order 12866 directs Federal Agencies promulgating regulations to evaluate regulatory alternatives (Office of Management and Budget, Circular A–4, September 17, 2003). Pursuant to Circular A–4, once it has been determined that the Federal regulatory action is appropriate, then the agency will need to consider alternative regulatory approaches. Since the determination of critical habitat is a statutory requirement pursuant to the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), we must then evaluate alternative regulatory approaches, where feasible, when promulgating a designation of critical habitat.

In developing our designations of critical habitat, we consider economic impacts, impacts to national security, and other relevant impacts pursuant to section 4(b)(2) of the Act. Based on the discretion allowable under this provision, we may exclude any particular area from the designation of critical habitat providing that the benefits of such exclusion outweighs the benefits of specifying the area as critical habitat and that such exclusion would not result in the extinction of the species. As such, we believe that the evaluation of the inclusion or exclusion of particular areas, or combination thereof, in a designation constitutes our regulatory alternative analysis.

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

Under the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Act, (SBREFA) 5 U.S.C. 802 (2), whenever an agency is required to 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 effect 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 an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. Our economic analysis of the proposed designation provides the factual basis for our determination.

According to the Small Business Administration (SBA), small entities include small organizations, such as independent nonprofit organizations and small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents, as well as small businesses (13 CFR 121.201). 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 considered the types of activities that might trigger regulatory impacts under this designation as well as 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.

Activities anticipated to occur within the next 20 years within or adjacent to critical habitat for the Pecos assiminea that potentially effect small businesses include: oil and gas production, irrigated agricultural production, and livestock operations.

With regard to livestock operations the economic analysis finds that confined animal feeding facilities do not occur in Pecos or Reeves Counties, Texas, within 60 miles of the critical habitat designation. As such, the analysis does not anticipate impacts to small entities within the livestock industry in these counties.

Agricultural production dependent on groundwater irrigation occurs within Pecos and Reeves Counties, Texas. The analysis assumes that all farms operating within the regions are small entities. Within Texas, further hydrological studies are necessary to determine the impact of groundwater pumping on surface and groundwater levels to designated critical habitat. As a result, groundwater withdrawal activities for agricultural production are unlikely to change as a result of the presence of the Pecos assiminea. Thus, no impacts to small entities within the irrigated agricultural industry are expected.

Oil and gas drilling occurs on private lands outside of critical habitat Unit 3 (Diamond Y Springs Complex) in Texas. The economic analysis finds that while oil and gas activities may present water quality issues, they are not considered a threat to groundwater levels in the region. The analysis does not forecast modifications to oil and gas production in Texas and therefore no impacts to small businesses are quantified. This is due to the fact that Unit 3 is owned and managed by TNC. TNC manages this area as a preserve for long term habitat conservation and protection of the functional integrity of surface water systems to benefit rare aquatic species and communities within the preserves. TNC does not own the mineral rights at Unit 3. However, the companies that own or lease these rights have generally worked voluntarily with TNC to protect these lands. The economic analysis finds that future costs to oil and gas activities within Unit 3 are anticipated to be related to continued partnership projects between TNC and regional oil and gas companies. There may also be a potential for costs associated with an incidental take permit and Habitat Conservation Plan under section 10 of the Act. However, the economic analysis finds that the potential for that occurrence is unknown.

There has been one section 7 consultation on an oil and gas project with Federal involvement in the vicinity of habitats occupied by the four invertebrates. This was an informal consultation in 2004 regarding proposed abandonment of 58 miles of pipeline in Winkler, Ward, Reeves, and Pecos counties, Texas (Service 2004b). The proposed project involved permitting by the Federal Energy Regulatory Commission. It was determined that the proposed action would not have any affect on any of the four invertebrate species or any co-occurring, listed, aquatic taxa such as Leon Springs pupfish. There were no conservation recommendations made by the Service regarding protection of aquatic habitats in this consultation. Based upon this and other information presented in the draft economic analysis and draft environmental assessment, we do not anticipate economic costs to small businesses in this industry. Therefore, we have considered whether this rule would result in a significant economic effect on a substantial number of small entities. We have concluded that this final designation of critical habitat for the Pecos assiminea would not affect a substantial number of small entities. Therefore, we are certifying that the designation of critical habitat for the Pecos assiminea will not have a significant economic impact on a substantial number of small entities, and a final regulatory flexibility analysis is not required.

Executive Order 13211

On May 18, 2001, the President issued Executive Order (E.O.) 13211 on

regulations that significantly affect energy supply, distribution, and use. E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This final rule is considered a significant regulatory action under E.O. 12866 due to it potentially raising novel legal and policy issues, but the economic analysis finds that the oil and gas industry is not likely to experience ''a significant adverse effect'' as a result of conservation efforts for the four invertebrates. Appendix A of the draft economic analysis provides a detailed discussion and analysis of this determination. Specifically, two criteria were determined to be relevant to this analysis: (1) Reductions in natural gas production in excess of 25 million mcf per year, and (2) increases in the cost of energy production in excess of one percent. Impacts to ongoing oil and gas production in Pecos County, Texas, are not forecast as it is unclear whether these activities will require conservation efforts for the Pecos assiminea. As described in Section 4.2.1 of the economic analysis and above, while oil and gas activities in this region may affect groundwater quality, they are not anticipated to affect groundwater levels.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501), the Service makes the following findings:

(a) This 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 Tribal 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 Tribal 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 Tribal 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 who receive Federal funding, assistance, permits or 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 on to State governments.

(b) We do not believe that this rule will significantly or uniquely affect small governments. This determination is based on information from the economic analysis conducted for this designation of critical habitat for the Pecos assiminea and the fact that critical habitat is only being designated on TNC lands. As such, a Small Government Agency Plan is not required.

Takings

In accordance with Executive Order 12630 (''Government Actions and Interference with Constitutionally Protected Private Property Rights''), we have analyzed the potential takings implications of proposing critical habitat for the Pecos assiminea in a takings implications assessment. The takings implications assessment concludes that the designation of critical habitat for the Pecos assiminea does not pose significant takings implications.

Federalism

In accordance with Executive Order 13132, this rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior policy, the Service requested information from, and coordinated development of this critical habitat designation with, appropriate State resource agencies in New Mexico and Texas. The impact of the designation on State and local governments and their activities was fully considered in the economic analysis. As discussed above, the designation of critical habitat for the Pecos assiminea would have little incremental impact on State and local governments and their activities. In fact, the designation of critical habitat may have some benefit to the State and local resource agencies in that the areas essential to the conservation of this species are more clearly defined, and the primary constituent elements of the habitat necessary to the conservation of this species are specifically identified.

Civil Justice Reform

In accordance with Executive Order 12988, 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, as amended. This rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs that are essential for the conservation of the Pecos assiminea.

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

This rule does not contain new or revised information collection for which Office of Management and Budget approval is required under the Paperwork Reduction Act. 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

It is our position that, outside the Tenth Circuit, we do not need to prepare environmental analyses as defined by the NEPA in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This assertion was upheld in the courts of the Ninth Circuit

[(*Douglas County* v. *Babbitt*, 48 F.3d 1495 (9th Cir. Ore. 1995), cert. denied 116 S. Ct. 698 (1996).] However, when the range of the species includes States within the Tenth Circuit, such as that of the four invertebrates, pursuant to the Tenth Circuit ruling in *Catron County Board of Commissioners* v. *U.S. Fish and Wildlife Service*, 75 F.3d 1429 (10th Cir. 1996), we undertake a NEPA analysis for critical habitat designation. We completed an environmental assessment and finding of no significant impact on the designation of critical habitat for the Pecos assiminea.

Secretarial Order 3206: American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act

The purpose of Secretarial Order 3206 (Secretarial Order) is to ''clarif(y) the responsibilities of the component agencies, bureaus, and offices of the Department of the Interior and the Department of Commerce, when actions taken under authority of the Act and associated implementing regulations affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights.'' If there is potential that a tribal activity could cause either direct or incidental take of a species proposed for listing under the Act, then meaningful government-to-government consultation will occur to try to harmonize the Federal trust responsibility to tribes and tribal sovereignty with our statutory responsibilities under the Act. The Secretarial Order also requires us to consult with tribes if the designation of an area as critical habitat might impact tribal trust resources, tribally owned fee lands, or the exercise of tribal rights. However, no known tribal activities could cause either direct or incidental take of the four species in this final rule, and no tribal lands or tribal trust resources are anticipated to be affected by the designation of critical habitat.

References Cited

A complete list of all references cited in this rulemaking is available upon request from the New Mexico Ecological Services Field Office (see **ADDRESSES** section).

Author

The primary authors of this rule are the New Mexico Ecological Services Field Office staff (see **ADDRESSES** section) (telephone 505/346–2525).

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. Amend § 17.11(h) as follows:
■ a. Add Pecos assiminea, Koster's springsnail, and Roswell springsnail in alphabetical order under ''SNAILS;'' and
■ b. Add Noel's amphipod in alphabetical order under ''CRUSTACEANS,'' to the List of Endangered and Threatened Wildlife 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							
*	*	*	*	*	*		*
Pecos assiminea	*Assiminea pecos*	U.S.A. (NM, TX)	NA	E	17.95(f)	NA	
*	*	*	*	*	*		*
Springsnail, Koster's ...	*Juturnia kosteria*	U.S.A. (NM)	NA	E	NA	NA	
Springsnail, Roswell ...	*Pyrgulopsis roswellensis.*	U.S.A. (NM)	NA	E	NA	NA	
CRUSTACEANS							
*	*	*	*	*	*		*
Amphipod, Noel's	*Gammarus desperatus*	U.S.A. (NM)	NA	E	NA	NA	
*	*	*	*	*	*		*

■ 3. Amend § 17.95 (f) by adding critical habitat for Pecos assiminea in the same order as this species occurs in § 17.11(h).

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(f) Clams and snails.

* * * * *

Pecos assiminea (*Assiminea pecos*)

1. Within the areas designated below as critical habitat, the primary constituent elements for Pecos assiminea include:

(i) Permanent, flowing, unpolluted, fresh to moderately saline water;

(ii) Moist or saturated soil at stream or spring run margins with native vegetation growing in or adapted to aquatic or very wet environment, such as salt grass or sedges; and

(iii) Stable water levels with natural diurnal and seasonal variation.

2. Critical habitat is depicted for the Pecos assiminea in Pecos County, Texas, at the Diamond Y Springs Complex. The designation includes the Diamond Y Spring, which is located at UTM 13–698261 E, 3431372 N, and 6.8 km (4.2

mi) of its outflow, ending at UTM 13–701832 E, 3436112 N, about 0.8 km (0.5 mi) downstream of the State Highway 18 bridge crossing. Also included is 0.8 km (0.5 mi) of Leon Creek upstream of the confluence with Diamond Y Draw. All surrounding riparian vegetation and mesic soil environments within the spring outflow and portion of Leon Creek are also designated as these areas are considered habitat for the Pecos assiminea. Critical habitat is also depicted for the Pecos assiminea in Reeves County, Texas, at the East Sandia Spring complex. East Sandia Spring is located at UTM 13–621366 E, 342929 N. Critical habitat includes the springhead itself, surrounding seeps, and all submergent vegetation and moist soil habitat found at the margins of these areas. These areas are considered habitat for the Pecos assiminea.

(i) Pecos County, Texas, including the Diamond Y Springs Complex, located at longitude –102.923461 and latitude 30.999271, and approximately 6.8 km (4.2 mi) of the spring outflow ending at about 0.8 km (0.5 mi) downstream of the State Highway 18 bridge crossing (approximately longitude –102.885137 and latitude 31.041405). Also included is approximately 0.8 km (0.5 mi) of Leon Creek upstream of the confluence with Diamond Y Draw. All surrounding riparian vegetation and mesic soil environments within the spring, outflow, and portion of Leon Creek are also proposed for designation as these areas are considered habitat for the Pecos assiminea. Legal description (geographic projection, North American Datum 83): Longitude (decimal degrees), Latitude (decimal degrees):

−102.905319869746634, 31.022089444891570;
−102.887036917654868, 31.043947412173729;
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31.043947412173729.

(ii) Reeves County, Texas, at the East Sandia Spring complex. East Sandia Spring is located at longitude –103.728918, latitude 30.991012. The designation includes the springhead itself, surrounding seeps, and all submergent vegetation and moist soil habitat found at the margins of these areas. These areas are considered habitat for the Pecos assiminea. Legal description (geographic projection, North American Datum 83): Longitude (decimal degrees), Latitude (decimal degrees): –103.729296238487009, 30.990656960487129;
–103.731179077171333, 30.989695620405591;
–103.730160658036496, 30.991850361242875;
–103.727182653076312, 30.992477028891606;
–103.729159475230986, 30.988608062418542;
–103.731179077171333, 30.989695620405591.

3. A map of the Diamond Y Springs Complex and East Sandia Spring Complex follows:

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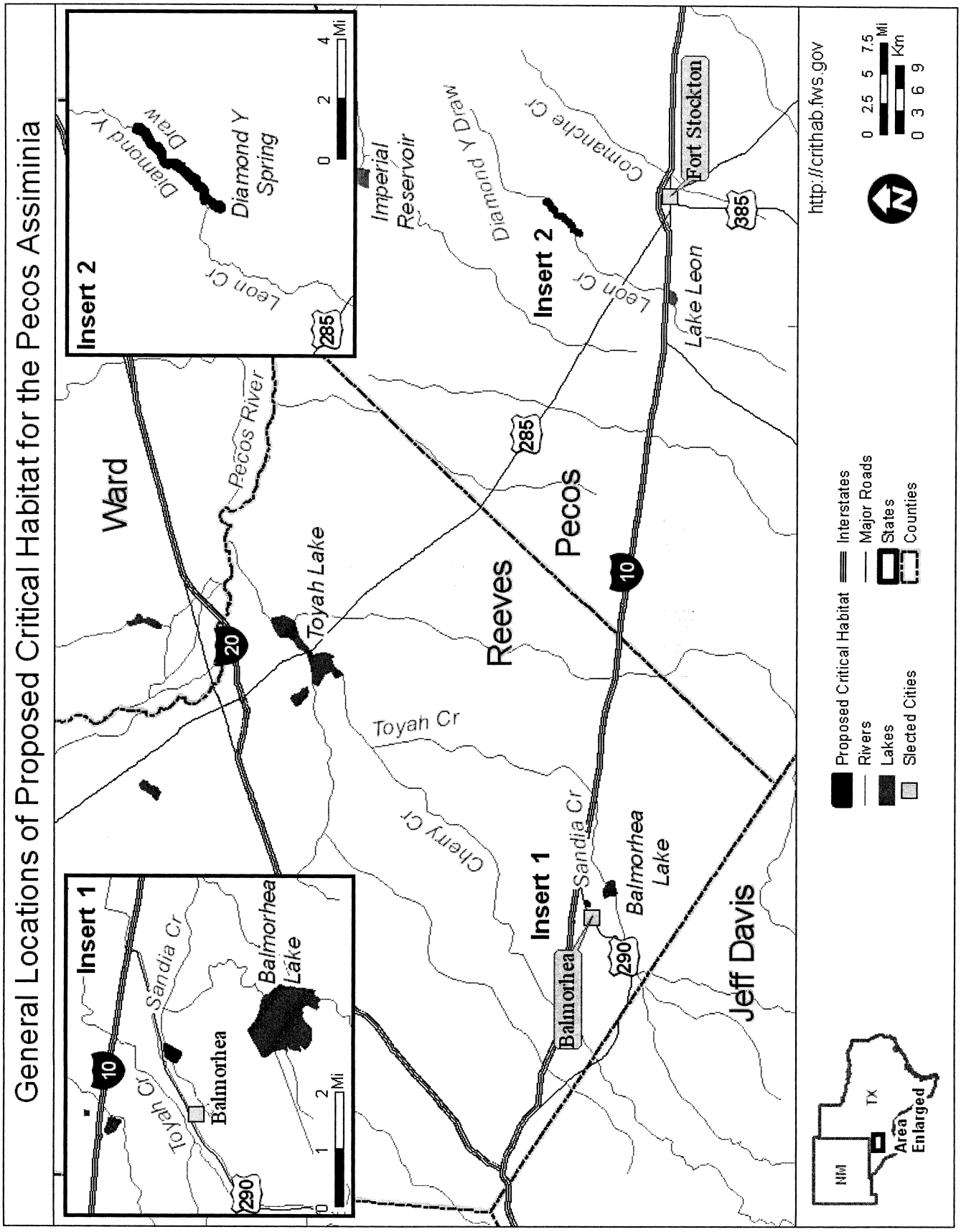
General Locations of Proposed Critical Habitat for the Pecos Assiminia
Insert 1
Insert 2
Ward
Reeves
Pecos
Jeff Davis
Pecos River
Toyah Lake
Toyah Cr
Cherry Cr
Sandia Cr
Balmorhea Lake
Balmorhea
Imperial Reservoir
Diamond Y Spring
Diamond Y Draw
Leon Cr
Comanche Cr
Lake Leon
Fort Stockton
10
20
285
290
385
http://crithab.fws.gov
Proposed Critical Habitat
Rivers
Lakes
Slected Cities
Interstates
Major Roads
States
Counties
NM
TX
Area Enlarged

Dated: August 1, 2005.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

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