



DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2016–0077; 4500030113]

RIN 1018–BB34

Endangered and Threatened Wildlife and Plants; Endangered Species Status for Texas

Hornshell

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine endangered species status under the Endangered Species Act of 1973 (Act), as amended, for the Texas hornshell (*Popenaias popeii*), a freshwater mussel species from New Mexico, Texas, and Mexico. The effect of this regulation will be to add this species to the List of Endangered and Threatened Wildlife.

DATES: This rule becomes effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: This final rule is available on the internet at <http://www.regulations.gov> in Docket No. FWS–R2–ES–2016–0077 and in <https://www.fws.gov/southwest/es/TexasCoastal/>. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <http://www.regulations.gov>. Comments, materials, and documentation that we considered in this rulemaking will be available by appointment, during normal business hours at the address shown in **FOR FURTHER INFORMATION CONTACT**.

FOR FURTHER INFORMATION CONTACT: Charles Ardizzone, U.S. Fish and Wildlife Service, Texas Coastal Ecological Services Field Office, 17629 El Camino Real #211, Houston, TX 77058; or by telephone 281–286–8282. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339. Website: <https://www.fws.gov/southwest/es/TexasCoastal/>

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Endangered Species Act, a species is added to the Federal List of Endangered and Threatened Wildlife if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule. The Lists of Endangered and Threatened Wildlife and Plants are located in title 50 of the Code of Federal Regulations (CFR) in part 17.

What this rule does. This rule finalizes the listing of the Texas hornshell (*Popenaias popeii*) as an endangered species. The species will be added to the List of Endangered and Threatened Wildlife at 50 CFR 17.11(h).

The basis for our action. Under the Endangered Species Act, we can determine that a species is an endangered or threatened species based on any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

The Texas hornshell is an endangered species based on impairment of water quality, loss of flowing water, and accumulation of fine sediment (Factor A), predation (Factor C), and barriers to host fish movement and the effects of climate change (Factor E).

Peer review and public comment. We prepared a species status assessment report (SSA report) for the Texas hornshell. The SSA report documents the results of the comprehensive biological status review for the Texas hornshell and provides an account of the species' overall viability through forecasting of the species' condition in the future (Service 2018, entire). We sought comments on the SSA report from independent specialists to ensure that our analysis was based on scientifically sound data, assumptions, and analyses. We received feedback from four scientists with expertise in freshwater mussel biology, ecology, and genetics. During the comment period for the proposed rule, we reached out to an additional five peer reviewers, and we received responses from three. We incorporated peer review suggestions and comments into the SSA report and the final listing rule. The SSA report and other materials relating to this proposal can be found at <http://www.regulations.gov> under Docket No. FWS-R2-ES-2016-0077.

Previous Federal Actions

On August 10, 2016, we published a proposed rule (81 FR 52796) to list the Texas hornshell as an endangered species under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 et seq.). The publication of this proposed rule complied with a deadline established in a court-approved settlement agreement (Endangered Species Act Section 4 Deadline Litigation, No. 10–377 (EGS), MDL Docket No. 2165 (D.D.C. May 10, 2011)). That proposal had a 60-day comment period, ending October 11, 2016. We reopened the comment period for 30 days on May 30, 2017 (82 FR 24654), in order to hold two public hearings on the proposed rule. We then extended the final listing determination for 6 months due to substantial scientific disagreement about the species' status in Mexico and reopened the comment period for an additional 30 days (82 FR 37397). For a description of previous Federal actions concerning the Texas hornshell, please refer to the August 10, 2016, proposed listing rule (81 FR 52796).

Background

A thorough review of the taxonomy, life history, and ecology of Texas hornshell (*Popenaias popeii*) is presented in the SSA report (Service 2018, entire).

Species Description

The Texas hornshell is a medium-sized (3 to 4 inches long) freshwater mussel with a dark brown to green, elongate, laterally compressed shell (Howells *et al.* 1996, p. 93; Carman 2007, p. 2). The Texas hornshell was described by Lea (1857, p. 102) from the Devils River in Texas and Rio Salado in Mexico. Currently, the Texas hornshell is classified in the unionid subfamily Ambleminae (Campbell *et al.* 2005, pp. 140, 144) and is considered a valid taxon by the scientific community (Williams *et al.* 2017, p. 42).

Freshwater mussels, including the Texas hornshell, have a complex life history. Males

release sperm into the water column, which are taken in by the female through the incurrent siphon (the tubular structure used to draw water into the body of the mussel). The sperm fertilize the eggs, which are held during maturation in an area of the gills called the marsupial chamber. The developing larvae remain in the gill chamber until they mature and are ready for release. These mature larvae, called glochidia, are obligate parasites (cannot live independently of their hosts) on the gills, head, or fins of fishes (Vaughn and Taylor 1999, p. 913). Glochidia die if they fail to find a host fish, attach to a fish that has developed immunity from prior infestations, or attach to the wrong location on a host fish (Neves 1991, p. 254; Bogan 1993, p. 599). Glochidia encyst (enclose in a cyst-like structure) on the host's tissue, draw nutrients from the fish, and develop into juvenile mussels weeks or months after attachment (Arey 1932, pp. 214–215).

For the Texas hornshell, spawning generally occurs from March through August (Smith *et al.* 2003, p. 335), and fertilized eggs are held in the marsupial chambers of females for 4 to 6 weeks (Smith *et al.* 2003, p. 337). Glochidia are released in a sticky mucous net or string (Carman 2007, p. 9); the host fish likely swim into the nets, and the glochidia generally attach to the face or gills of the fish and become encysted in its tissue (Levine *et al.* 2012, p. 1858). The glochidia will remain encysted for about a month through transformation to the juvenile stage. Once transformed, the juveniles will excyst from the fish and drop to the substrate. The known primary host fishes for the Texas hornshell are river carpsucker (*Carpionodes carpio*), grey redbreast (*Moxostoma congestum*), and red shiner (*Cyprinella lutrensis*) (Levine *et al.* 2012, pp. 1857–1858).

Mussels are generally immobile but experience their primary opportunity for dispersal and movement within the stream as glochidia attached to a mobile host fish (Smith 1985, p. 105).

Upon release from the host, newly transformed juveniles drop to the substrate on the bottom of the stream. Those juveniles that drop in unsuitable substrates die because their immobility prevents them from relocating to more favorable habitat. Juvenile freshwater mussels burrow into interstitial substrates and grow to a larger size that is less susceptible to predation and displacement from high-flow events (Yeager *et al.* 1994, p. 220). Throughout the rest of their life cycle, mussels generally remain within the same small area where they excysted from the host fish.

The actual lifespan is not known for the Texas hornshell, although two adult individuals were captured and marked in the Black River in New Mexico in 1997 and were recaptured 15 years later (Inoue *et al.* 2014, p. 5). Species in the subfamily Ambleminae, which includes Texas hornshell, commonly live more than 20 years (Carman 2007, p. 9), so we believe the Texas hornshell can live at least 20 years.

Little is known about the specific feeding habits of Texas hornshell. Like all adult freshwater mussels, Texas hornshell are filter feeders, siphoning suspended phytoplankton and detritus from the water column (Yeager *et al.* 1994, p. 221; Carman 2007, p. 8).

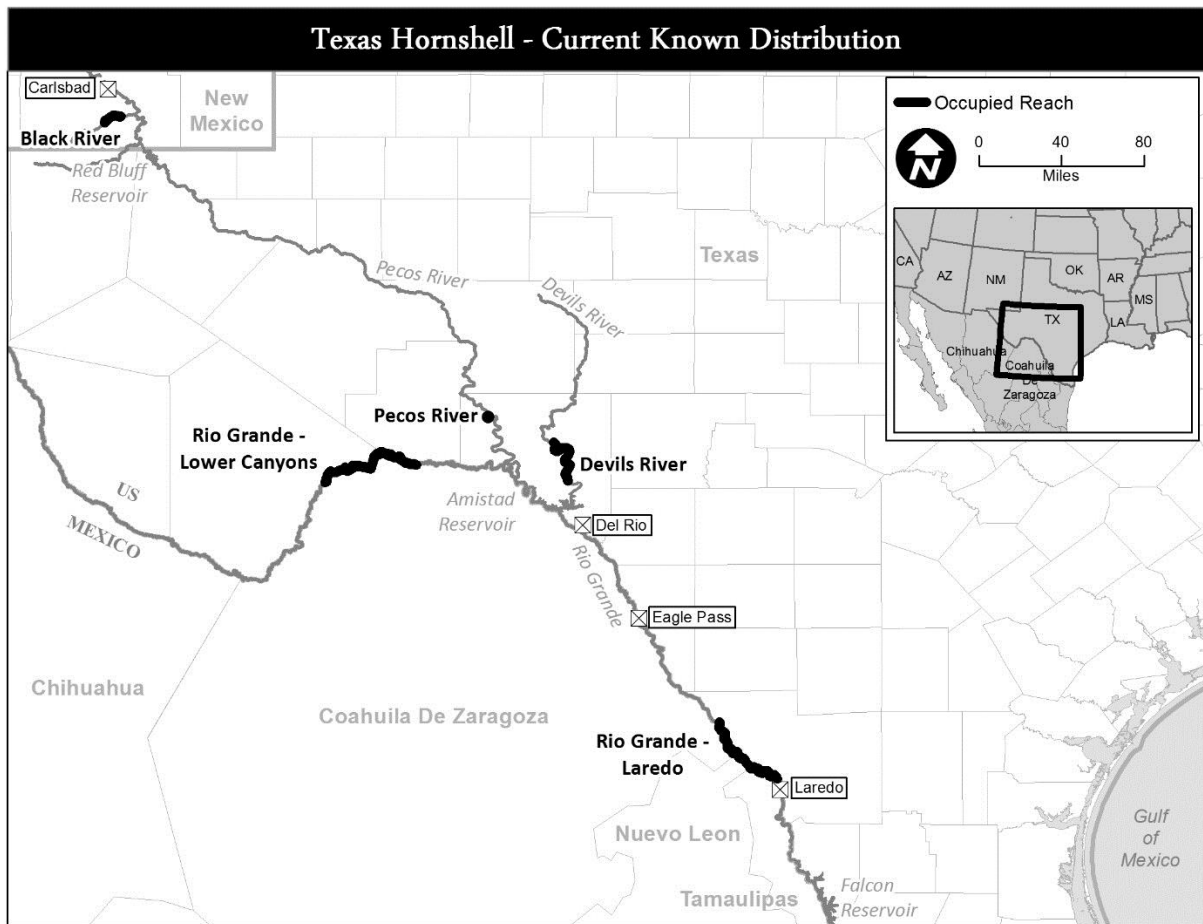
Habitat and Range

Adult Texas hornshell occur in medium to large rivers, in habitat not typical for most mussel species: in crevices, undercut riverbanks, travertine shelves, and under large boulders adjacent to runs (Carman 2007, p. 6; Randklev *et al.* 2015, p. 8), although in the Devils River, the species is found in gravel beds at the heads of riffles and rapids (Randklev *et al.* 2015, p. 8). Small-grained material, such as clay, silt, or sand, gathers in these crevices and provides suitable anchoring substrate. These crevices are considered to be flow refuges from the large flood events that occur regularly in the rivers this species occupies. Texas hornshell are able to use

these flow refuges to avoid being swept away as large volumes of water move through the system, as there is relatively little particle movement in the flow refuges, even during flooding (Strayer 1999, p. 472). Texas hornshell are not known to occur in lakes, ponds, or reservoirs.

The Texas hornshell historically ranged throughout the Rio Grande drainage in the United States (New Mexico and Texas) and Mexico. Individuals that had previously been identified as Texas hornshell in Mexican Gulf Coastal streams (Johnson 1999, p. 23), including in our proposed rule to list the species, have recently been determined to belong to a different, undescribed species (Inoue 2017, p. 1). Currently, five known populations of Texas hornshell remain in the United States: Black River (Eddy County, New Mexico), Pecos River (Val Verde County, Texas), Devils River (Val Verde County, Texas), Lower Canyons of the Rio Grande (Brewster and Terrell Counties, Texas), and Lower Rio Grande near Laredo (Webb County, Texas) (Map 1). They are described briefly below.

Map 1. Known Current Distribution of Texas Hornshell



Black River: The Black River, in Eddy County, New Mexico, originates from several groundwater-fed springs and flows approximately 30 miles (mi) (48 kilometers (km)) through the Chihuahuan Desert until its confluence with the Pecos River (Inoue *et al.* 2014, p. 3) near Malaga, New Mexico. Extensive population monitoring (Lang 2001, entire; 2006, entire; 2010, entire; 2011, entire) and a long-term mark-recapture study (Inoue *et al.* 2014, entire) have yielded significant information about the population size and extent. Texas hornshell occur in approximately 8.7 mi (14.0 km) of the middle Black River, between two low-head (small) dams (Lang 2001, p. 20). The total population size has been estimated at approximately 48,000

individuals (95 percent confidence interval: 28,849–74,127) (Inoue *et al.* 2014, p. 7), with a diversity of size classes, primarily aggregated in flow refuges within narrow riffles. The population remained relatively stable over the 15-year study period from 1997 to 2012 (Inoue *et al.* 2014, p. 6).

Pecos River: In the Pecos River, inundation from Amistad Reservoir has resulted in the extirpation of Texas hornshell from the lower reaches of the river. Additionally, salinity levels are too high for freshwater mussel habitation in much of the Pecos River from the confluence with the Black River in New Mexico, downstream to the confluence with Independence Creek. However, in 2016, researchers collected three old, live Texas hornshell and 37 shells from a small section of the Pecos River downstream of the confluence with Independence Creek and upstream of Amistad Reservoir near Pandale in Val Verde County, Texas (Bosman *et al.* 2016, p. 6; Randklev *et al.* 2016, p. 9). Numerous dead shells were found farther downstream in the Pecos River in 2016 (Bosman *et al.* 2016, p. 6; Randklev *et al.* 2016, p. 9). Prior to this collection, live individuals had not been collected in the Pecos River since 1973 (Randklev *et al.* 2016, p. 4).

Because the number of live individuals detected is so small (three live individuals found in 2016), it is difficult to draw many conclusions about the overall abundance and health of the population. The population appears to be extremely small, the live individuals were old, and no evidence of reproduction such as young individuals or gravid females (females with mature larvae within the gills) was noted.

Devils River: Texas hornshell were historically found in the Devils River and were known to occupy only the lower reaches of the river, which are currently inundated by Amistad Reservoir (Neck 1984, p. 11; Johnson 1999, p. 23; Burlakova and Karatayev 2014, p. 19).

Between 2008 and 2014, researchers collected 11 individuals from upstream in the Devils River (Burlakova and Karatayev 2014, p. 16; Karatayev *et al.* 2015, p. 4). More intensive surveys conducted in 2014, 2015, and 2017, including 20 sites, have yielded more than 150 individuals in approximately 29 mi (47 km) of the river— all from The Nature Conservancy’s Dolan Falls Preserve and the Devils River State Natural Area’s Dan A. Hughes Unit (formerly known as the Big Satan Unit) (Randklev *et al.* 2015, pp. 6–7; Diaz 2017, p. 1). Because of the increased number of individuals collected since 2014, it is likely that the Devils River population is more numerous than previously thought, although we do not expect that this population is particularly large based on the limited number of collections to date. Interestingly, Texas hornshell in the Devils River occupy different habitats than those in the rest of the range; instead of being found under rock slabs and in travertine shelves, they occupy gravel beds at the heads of riffles or in clean-swept pools with bedrock (Randklev *et al.* 2015, p. 8). Even though the number of collected individuals is small, several young individuals were found, as well as gravid females (Randklev *et al.* 2015, p. 8), indicating reproduction and recruitment (offspring survive to join the reproducing population) are occurring in the Devils River population.

Rio Grande–Lower Canyons: One of two remaining populations of Texas hornshell in the Rio Grande is found in the Lower Canyons, just downstream of Big Bend National Park, in Terrell County, Texas. The species is found in low density (approximately 40 individuals per km) in this region of the Rio Grande (Burlakova and Karatayev 2014, p. 16). Subsequent surveys confirmed the presence of Texas hornshell in approximately 18.5 mi (30 km) of the Lower Canyons in two sections, finding that the species occupies approximately 63 percent of sites with suitable (rocky) habitat (Randklev *et al.* 2015, entire). For purposes of this analysis, we believe the species is present in the entire section between these collections, approximately

62 mi (100 km). Sites in the Rio Grande–Lower Canyons reach vary in density, with the densest sites near Sanderson Canyon, Terrell County, Texas, and decreasing downstream (Randklev *et al.* 2015, p. 13); the average density of Texas hornshell at each site is lower compared to the Black River and Rio Grande–Laredo (5 ± 14 individuals per site). We expect Texas hornshell to occur between the known occupied sections where we have documented presence of the species, near the confluence with San Francisco Creek (Howells 2001a, p. 6), but limited access has prevented recent surveys for the species. Young individuals and gravid females have been found throughout the Lower Canyons reach, indicating recruitment is occurring (Randklev *et al.* 2015, p. 8). Scientific modeling reveals that Texas hornshell are found in areas near spring inflows in rocky habitats in the Lower Canyons reach (Randklev *et al.* 2017, pp. 5–6).

Rio Grande–Laredo: The largest Texas hornshell population occurs from Laredo, Texas (near La Bota Ranch just northwest of Laredo), upstream approximately 56 mi (90 km) (Randklev *et al.* 2015, p. 7). The density in this reach is high, with some habitat patches containing more than 8,000 individuals (Karatayev *et al.* 2015, p. 4) and 100 percent of surveyed patches of suitable habitat containing Texas hornshell (Randklev *et al.* 2015, p. 7). Throughout this reach, the density of Texas hornshell was estimated 170 ± 131 individuals per suitable (rocky) habitat site (Randklev *et al.* 2015, p. 7). Young individuals and gravid females have been found throughout the Laredo reach, indicating reproduction and recruitment are occurring (Randklev *et al.* 2015, p. 8). Within this reach, Texas hornshell are found in rocky habitats in areas with appropriate water quality (Randklev *et al.* 2017, pp. 5–6). No live Texas hornshell have been found downstream of the city of Laredo in recent years.

Mexico: The species historically occurred in the Rio Salado basin, which is a tributary to the Rio Grande in Mexico. Rio Salado and several tributaries were surveyed in the early 2000s,

with several recently dead shells collected in 2001 and 2002 in a tributary to Rio Salado, the Rio Sabinas (Strenth *et al.* 2004, p. 225). The surveyed portions of riverbed were reported to be dry with no evidence of recent water flow, so it is unlikely these shells represent an abundant Texas hornshell population.

In the mainstem Rio Salado, several old shells and one recently dead shell were collected at two sites in 2002 (Strenth *et al.* 2004, p. 227). As with the Rio Sabinas, the river exhibited no flow; at one site, household waste was reported. These rivers, and many others in this region of Mexico, have been noted as losing flow and becoming dry or intermittent since the mid-1990s (Contreras-B. and Lozano-V. 1994, p. 381).

In 2017, eight sites in four rivers in the Rio Salado basin were surveyed for Texas hornshell. No live individuals were found at any site, and three long dead shells were found at one site in the Rio Nadadores (Hein *et al.* 2017, p. 3), further indicating that the species may be extirpated from the Rio Salado basin.

Separately, Texas hornshell were thought to occur in approximately 15 rivers that flow into the Gulf of Mexico and are not tributaries to the Rio Grande. Recent genetic analysis of museum samples indicates that individuals that had previously been identified as Texas hornshell in these Mexican Gulf Coastal streams belong to a different, undescribed species (Inoue 2017, p. 1). Therefore, we conclude that the Texas hornshell was never native to Gulf Coastal rivers outside of the Rio Grande basin, and it is endemic to the Rio Grande basin in the United States and Mexico.

Species Needs

Texas hornshell need seams of fine sediment in crevices, undercut riverbanks, travertine shelves, and large boulders in riverine ecosystems with flowing water and periodic cleansing

flows to keep the substrate free of excess fine sediment accumulation. They need water quality parameters to be within a suitable range (Randklev *et al.* 2017, p. 5) (*i.e.*, dissolved oxygen above 3 milligrams/liter (mg/L), salinity below 0.9 parts per thousand, and ammonia below 0.7 mg/L (Sparks and Strayer 1998, p. 132; Augspurger *et al.* 2003, p. 2574; Augspurger *et al.* 2007, p. 2025; Carman 2007, p. 6)), and phytoplankton and bacteria as food. Finally, Texas hornshell need host fish to be present during times of spawning.

We describe the Texas hornshell's viability by characterizing the status of the species in terms of its resiliency (ability of the populations to withstand stochastic events), redundancy (ability of the species to withstand large-scale, catastrophic events), and representation (the ability of the species to adapt to changing environmental conditions). Using various timeframes and the current and projected resiliency, redundancy, and representation, we describe the species' level of viability over time. For the Texas hornshell to maintain viability, its populations or some portion thereof must be resilient. A number of factors influence the resiliency of Texas hornshell populations, including occupied stream length, abundance, and recruitment. Elements of Texas hornshell habitat that determine whether Texas hornshell populations can grow to maximize habitat occupancy influence those factors, thereby increasing the resiliency of populations. These resiliency factors and habitat elements are discussed here.

Occupied Stream Length: Most freshwater mussels, including Texas hornshell, are found in aggregations, called mussel beds, that vary in size from about 50 to greater than 5,000 square meters (m²) (540 to greater than 53,800 square feet (ft²)), separated by stream reaches in which mussels are absent or rare (Vaughn 2012, p. 983). Resilient Texas hornshell populations must occupy stream reaches sufficient in length such that stochastic events that affect individual mussel beds do not eliminate the entire population. Repopulation by fish infested with Texas

hornshell glochidia from other mussel beds within the reach, if present and hydrologically connected, can allow the population to recover from these events.

Abundance: Mussel abundance in a given stream reach is a product of the number of mussel beds and the density of mussels within those beds. For populations of Texas hornshell to be resilient, there must be many mussel beds of sufficient density (~200 individuals per 150 m² (1,614 ft²); see SSA report for more discussion) such that local stochastic events do not necessarily eliminate the bed(s), allowing the mussel bed and the overall population in the stream reach to recover from any single event. We measure Texas hornshell abundance by the number of beds within the population, and the estimated density of Texas hornshell within each.

Reproduction: Resilient Texas hornshell populations must also be reproducing and successfully recruiting young individuals into the reproducing population. Population size and abundance reflects previous influences on the population and habitat, while reproduction and recruitment indicate population trends that may be stable, increasing, or decreasing. Detection of very young juvenile mussels during routine abundance and distribution surveys happens extremely rarely due to sampling bias; sampling for this species involves tactile searches, and mussels below about 35 millimeters (mm) (1.4 inches (in)) are very hard to detect. Therefore, reproduction is verified by repeatedly capturing small-sized individuals near the low end of the detectable size range (about 35 mm (1.4 in)) over time and by capturing gravid females during the reproductively active time of year (generally, March through August (Smith *et al.* 2003, p. 335)).

Substrate: Texas hornshell occur in flow refuges such as crevices, undercut riverbanks, travertine shelves, and large boulders. These refuges must have seams of clay or other fine sediments within which the mussels may anchor, but not so much excess sediment that the

mussels are smothered. Those areas with clean-swept substrate with seams of fine sediments are considered to have suitable substrate, and those with copious fine sediment both in crevices and on the stream bottom are considered less suitable.

Flowing Water: Texas hornshell need flowing water for survival. They are not found in lakes or in pools without flow, or in areas that are regularly dewatered. River reaches with continuous flow are considered suitable habitat, while those with little or no flow are considered not suitable.

Water Quality: Freshwater mussels, as a taxonomic group, are sensitive to changes in water quality parameters such as dissolved oxygen, salinity, ammonia, and pollutants (*i.e.*, dissolved oxygen above 3 mg/L, salinity below 0.9 parts per thousand, and ammonia below 0.7 mg/L (Sparks and Strayer 1998, p. 132; Augspurger *et al.* 2003, p. 2574; Augspurger *et al.* 2007, p. 2025; Carman 2007, p. 6)). Habitats with appropriate levels of these parameters are considered suitable, while those habitats with levels outside of the appropriate ranges are considered less suitable.

Maintaining representation in the form of genetic or ecological diversity is important to maintain Texas hornshell's capacity to adapt to future environmental changes. Texas hornshell populations in the Rio Grande and Devils River (and, presumably, the Pecos River, due to its proximity to Rio Grande populations) have distinct variation in allele frequencies from those in the Black River (Inoue *et al.* 2015, p. 1916). Mussels, like Texas hornshell, need to retain populations throughout their range to maintain the overall potential genetic and life-history attributes that can buffer the species' response to environmental changes over time (Jones *et al.* 2006, p. 531). The Texas hornshell has likely lost genetic diversity as populations have been extirpated. As such, maintaining the remaining representation in the form of genetic diversity

may be important for the capacity of the Texas hornshell to adapt to future environmental change.

Finally, the Texas hornshell needs to have multiple resilient populations distributed throughout its range to provide for redundancy, the ability of the species to withstand catastrophic events. The more populations, and the wider the distribution of those populations, the more redundancy the species will exhibit. Redundancy reduces the risk that a large portion of the species' range will be negatively affected by a catastrophic natural or anthropogenic event at a given point in time. Species that are well-distributed across their historical range are considered less susceptible to extinction and have higher viability than species confined to a small portion of their range (Carroll *et al.* 2010, entire; Redford *et al.* 2011, entire).

Summary of Biological Status and Threats

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an “endangered species” or a “threatened species.” The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act directs us to determine whether any species is an endangered species or a threatened species because of one or more of the following factors affecting its continued existence: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

We completed a comprehensive assessment of the biological status of the Texas hornshell

and prepared a report, which provides a thorough account of the species' overall viability. We define viability as the ability of the Texas hornshell to sustain populations in natural river systems over time. In this section, we summarize the conclusions of that assessment, which can be accessed at Docket No. FWS-R2-ES-2016-0077 on <http://www.regulations.gov>. Please refer to Chapter 4 of the SSA report for a more detailed discussion of the factors affecting the Texas hornshell.

Risk Factors

We reviewed the potential risk factors (i.e., threats, stressors) that could be affecting the Texas hornshell now and in the future. In this final rule, we will discuss only those factors in detail that could meaningfully impact the status of the species. Those risks that are not known to have effects on Texas hornshell populations, such as collection and disease, are not discussed here. The primary risk factors affecting the status of the Texas hornshell are: (1) Increased fine sediment (Factor A), (2) water quality impairment (Factor A), (3) loss of flowing water (Factor A), (4) barriers to fish movement (Factor E), and (5) increased predation (Factor C). These factors are all exacerbated by the effects of climate change (Factor E). We also factored into our analysis the degree to which existing regulatory mechanisms either ameliorate or exacerbate these risk factors (Factor D). We also reviewed the conservation efforts being undertaken for the species.

Increased Fine Sediment

Texas hornshell require seams of fine sediment under boulders and bedrock and in streambanks in order to anchor themselves into place on the stream bottom; however, too much fine sediment can fill in these crevices and smother any mussels inhabiting those spaces. Under natural conditions, fine sediments collect on the streambed and in crevices during low flow

events, and they are washed downstream during high flow events (also known as cleansing flows). However, the increased frequency of low flow events (from groundwater extraction, instream surface flow diversions, and drought), combined with a decrease in cleansing flows (from reservoir management and drought), has caused sediment to accumulate to some degree at all populations. When water velocity decreases, which can occur from reduced streamflow or inundation, water loses its ability to carry sediment in suspension, and sediment falls to the substrate, eventually smothering mussels that cannot adapt to soft substrates (Watters 2000, p. 263). Sediment accumulation can be exacerbated when there is a concurrent increase in the sources of fine sediments in a watershed. In the range of Texas hornshell, these sources include streambank erosion from agricultural activities, livestock grazing, and roads, among others.

Interstitial spaces (small openings between rocks and gravels) in the substrate provide essential habitat for juvenile mussels. Juvenile freshwater mussels burrow into interstitial substrates, making them particularly susceptible to degradation of this habitat feature. When clogged with sand or silt, interstitial flow rates and spaces may become reduced (Brim Box and Mossa 1999, p. 100), thus reducing juvenile habitat availability.

All populations of Texas hornshell face the risk of fine sediment accumulation to varying degrees. Elimination of Texas hornshell from mussel beds due to large amounts of sediment deposition has been documented on the Black River in two locations in recent years. In the future, we expect this deposition may continue to occur sporadically. Fine sediments are also accumulating at the Rio Grande–Laredo population. Low water levels in the Devils River will likely lead to additional sediment accumulation at this population, as well. In the future, we expect lower flows to occur more often at all populations and for longer periods due to the effects of climate change (Nohara et al. 2006, p. 1087; Bren School of Environmental

Management 2014, p. 91; Miyazono et al. 2015, p. A-3).

Water Quality Impairment

Water quality can be impaired through contamination or alteration of water chemistry. Chemical contaminants are ubiquitous throughout the environment and are a major reason for the current declining status of freshwater mussel species nationwide (Augsburger *et al.* 2007, p. 2025). Chemicals enter the environment through both point and nonpoint discharges, including spills, industrial sources, municipal effluents, and agricultural runoff. These sources contribute organic compounds, nutrients, heavy metals, pesticides, herbicides, and a wide variety of newly emerging contaminants to the aquatic environment. Ammonia is of particular concern below wastewater treatment plants because freshwater mussels have been shown to be particularly sensitive to increased ammonia levels (Augsburger *et al.* 2003, p. 2569). It is likely for this reason that Texas hornshell are not found for many miles downstream of two wastewater treatment plants that discharge into the Rio Grande at Nuevo Laredo, Mexico, and at Eagle Pass, Texas (Karatayev *et al.* 2015, p. 14; Randklev *et al.* 2017, p. 5).

An additional type of water quality impairment is alteration of water quality parameters such as dissolved oxygen, temperature, and salinity levels. Dissolved oxygen levels may be reduced from increased nutrients in the water column from runoff or wastewater effluent, and juveniles seem to be particularly sensitive to low dissolved oxygen (Sparks and Strayer 1998, pp. 132–133). Increased water temperature from climate change and from low flows during drought can exacerbate low dissolved oxygen levels as well as change the timing of spawning and glochidial release. Finally, salinity appears to be particularly limiting to Texas hornshell. The aquifer near Malaga, New Mexico, contains saline water. As the saline water emerges from the ground, it is diluted by surface flow. As surface flow decreases, however, the concentration of

salinity in the river increases. Additionally, aquifers have become increasingly saline due to salinized water recharge (Hoagstrom 2009, p. 35). Irrigation return flows exacerbate salinity levels as salts accumulate on irrigated lands and then are washed into the riverway. The Pecos River from the confluence with the Black River to the confluence with Independence Creek has become particularly saline in the past few decades, with levels at 7 parts per million (ppm) or higher, which is too high for freshwater mussel habitation. Additionally, the Black River downstream of the Texas hornshell population has had salinity levels in the range of 6 ppm, which may be one reason the population has been extirpated from the downstream reach.

Contaminant spills are also a concern. In particular, the Black River population is vulnerable to spills from the high volume of truck traffic crossing the river at low water access points (Bren School of Environmental Management 2014, p. 26). Due to the topography and steep slopes of these areas, spilled contaminants and contaminated soils could directly enter the surface water of the river and negatively impact the species (Boyer 1986, p. 300) and downstream habitat. For the smaller populations (Black, Devils, and Pecos Rivers), a single spill could eliminate the entire population.

In August of 2017, 18,000 barrels of wastewater from oil and gas production and 11 barrels of oil were spilled from a ruptured pipeline into the Delaware River, upstream of the Texas hornshell reintroduction site (Eaton 2017, p. 1), demonstrating a risk of contaminant spills in this area. A boom was deployed to collect some of the oil, but wastewater mixes with river water and cannot be collected (Onsurez 2017, p. 1). An Administrative Order was issued by the Environmental Protection Agency (EPA) on October 16, 2017 (EPA 2017), directing that a pollution prevention plan be created to prevent such spills in the future, but no other regulatory action was taken. Safety concerns due to poor water quality from the spill have prevented

surveys to determine if the reintroduced individuals survived the event.

Any reduction in surface flow from drought, instream diversion, or groundwater extraction results in concentrated contaminant and salinity levels, increased water temperatures in streams, and exacerbated effects to Texas hornshell individuals and populations.

Poor water quality currently affects most Texas hornshell populations to some degree, and future water quality is expected to decrease due to decreasing river flow and increasing temperatures. The Pecos River experiences very high salinity levels upstream of the existing population, and we expect that the observed high mortality of the Pecos River population is due to salinity pulses. Rangelwide, as water flow is expected to decrease due to climate change, water quality will decline.

Loss of Flowing Water

Texas hornshell populations need flowing water in order to survive. Low flow events (including stream drying) and inundation can eliminate appropriate habitat for Texas hornshell, and while the species can survive these events if they last for only a short time (days or weeks, depending on the time of year), populations that experience these events regularly will not persist.

Inundation has primarily occurred upstream of dams, both large (such as Amistad, Falcon, and Red Bluff Dams) and small (low water crossings and diversion dams, such as those on the Black River). Inundation causes an increase in sediment deposition, eliminating the crevices this species inhabits. In large reservoirs, deep water is very cold and often devoid of oxygen and necessary nutrients. Cold water (less than 11 degrees Celsius (°C) (52 degrees Fahrenheit (°F))) has been shown to stunt mussel growth (Hanson *et al.* 1988, p. 352). Because glochidial release may be temperature dependent, it is likely that relict individuals living in the

constantly cold hypolimnion (deepest portion of the reservoir) in these reservoirs may never reproduce, or reproduce less frequently. Additionally, the effects of these reservoirs extend beyond inundation and fragmentation of populations; the reservoirs are managed for flood control and water delivery, and the resultant downstream releases rarely mimic natural flow regimes, tempering the natural fluctuations in flow that flush fine sediments from the substrate.

At the Rio Grande–Laredo population, a low-water weir has been proposed for construction (Rio Grande Regional Water Planning Group 2016, p. 8-8). The dam would be located just downstream of the La Bota area, which contains the largest known and most dense Texas hornshell bed within the Rio Grande–Laredo population and rangewide. The impounded area would extend approximately 14 mi (22.5 km) upstream, effectively eliminating habitat for Texas hornshell from 25 percent of the currently occupied area and likely leading to extirpation of the densest sites within this population.

Very low water levels are also detrimental to Texas hornshell populations. Effects of climate change have already begun to affect the regions of Texas and New Mexico where the Texas hornshell occurs, resulting in higher air temperatures, increased evaporation, and changing precipitation patterns such that water levels rangewide have already reached historic lows (Dean and Schmidt 2011, p. 336; Bren School of Environmental Management 2014, p. 50). These changes are exacerbated by increased groundwater pumping resulting from increased water demand in response to changes in water availability. The rivers inhabited by Texas hornshell have some resiliency to drought because they are spring-fed (Black and Devils Rivers) or very large (Rio Grande), but drought in combination with increased groundwater pumping and regulated reservoir releases may lead to lower river flows of longer duration than have been recorded in the past.

Streamflow in the Rio Grande downstream of the confluence with the Rio Conchos (near the Rio Grande–Lower Canyons population) has been declining since the 1980s (Miyazono *et al.* 2015, p. A-3), and overall river discharge for the Rio Grande is projected to continue to decline due to increased drought as a result of climate change (Nohara *et al.* 2006, p. 1087). The Rio Conchos contributes more than 90 percent of the flow of the lower Rio Grande (Dean and Schmidt 2011, p. 4). However, during times of drought (such as between 1994 and 2003), the contribution of the Rio Conchos has fallen to as low as 40 percent (Carter *et al.* 2015, p. 15). The Rio Grande–Lower Canyons population is downstream of the confluence with the Rio Conchos and is at risk from these reduced flows. The Rio Grande–Lower Canyons is very incised (in other words, has vertical banks), and the population occurs in crevices along the steep banks. Due to the habitat characteristics of this population, reductions in discharge in this area may lead to a higher proportion of the Texas hornshell population being exposed to desiccation than would be found in other populations experiencing similar flow decreases.

In the Black River, surface water is removed from the river for irrigation, including the Carlsbad Irrigation District's Black River Canal at the diversion dam. Studies have shown that flows in the river are affected by groundwater withdrawals, particularly those from the Black River Valley. Groundwater in the Black River watershed is also being used for hydraulic fracturing for oil and gas activities. Between 4.3 acre-feet (187,308 ft³ (5,304 m³)) and 10.7 acre-feet (466,091 ft³ (13,198 m³)) of water is used for each hydraulic fracturing job (Bren School of Environmental Management 2014, p. 91). Overall, mean monthly discharge has already declined since the mid-1990s, and mean monthly temperatures have increased over the past 100 years (Inoue *et al.* 2014, p. 7). In the Black River, Texas hornshell survivorship is positively correlated with discharge (Inoue *et al.* 2014, p. 9); as mean monthly discharge

decreases, we expect Texas hornshell survivorship to decrease, as well. The Black River is expected to lose streamflow in the future due to air temperature increases, groundwater extraction, and reduced precipitation.

In the Devils River, future water withdrawals from aquifers that support spring flows in the range of the Texas hornshell could result in reduction of critical spring flows and river drying (Toll *et al.* 2017, pp. 46-47). In particular, there have been multiple proposals to withdraw water from the nearby aquifer and deliver the water to municipalities (e.g., Val Verde Water Company 2013, pp. 1–2). To date, however, none have been approved.

As spring flows decline due to drought or groundwater lowering from pumping, habitat for the Texas hornshell is reduced and could eventually cease to exist. While Texas hornshell may survive short periods of low flow, as low flows persist, mussels face oxygen deprivation, increased water temperature, and, ultimately, stranding and death.

Barriers to Fish Movement

Two of the Texas hornshell's primary host fish species (river carpsucker and red shiner) are common, widespread species. We do not expect the distribution of host fish to be a limiting factor in Texas hornshell distribution. However, the barriers that prevent fish movement upstream and downstream affect the viability of Texas hornshell as described below.

Texas hornshell were likely historically distributed throughout the Rio Grande, Pecos River, Devils River, and Black River basins in Texas, New Mexico, and Mexico when few natural barriers existed to prevent migration (via host species) among suitable habitats. The species colonized new areas through movement of infested host fish, and newly metamorphosed juveniles would excyst from host fish in new locations. The loss of historical range has resulted in remaining populations that are significantly isolated from one another such that recolonization

of areas previously extirpated is extremely unlikely if not impossible due to existing contemporary barriers to host fish movement. The primary reason for this isolation is reservoir construction and unsuitable water quality. The Black River is isolated from the rest of the populations by high salinity reaches of the Pecos River, as well as by Red Bluff Reservoir, and is hundreds of river miles from the nearest extant population. Amistad Reservoir separates the three Texas populations from each other, isolating the Rio Grande–Lower Canyons, Devils River, and Rio Grande–Laredo populations. No opportunity for natural interaction currently exists among any of the five extant U.S. populations.

The overall distribution of mussels is, in part, a function of the dispersal of their host fish. Small populations are more affected by this limited immigration potential because they are susceptible to genetic drift (random loss of genetic diversity) and inbreeding depression. At the species level, populations that are eliminated due to stochastic events cannot be recolonized naturally, leading to reduced overall redundancy and representation.

Increased Predation

Predation on freshwater mussels is a natural ecological interaction. Raccoons, snapping turtles, and fish all prey upon Texas hornshell. Under natural conditions, the level of predation occurring within Texas hornshell populations is not likely to pose a significant risk to any given population. However, during periods of low flow, terrestrial predators have increased access to portions of the river that are otherwise too deep under normal flow conditions. High levels of predation during drought have been observed on the Devils River, and muskrat predation has also been reported on the Black River (Lang 2001, p. 26; Robertson 2016, p. 1). As drought and low flow conditions are projected to occur more often and for longer periods due to the effects of climate change, the Devils River in particular is expected to experience additional predation

pressure into the future. Predation is expected to be less of a concern for the Rio Grande populations, as the river is significantly larger than the Black and Devils Rivers, and Texas hornshell are less likely to be found in exposed or very shallow portions of the stream.

Effects of Climate Change

Climate change in the form of the change in timing and amount of precipitation and air temperature increase is occurring, and continued greenhouse gas emissions at or above current rates will cause further warming (Intergovernmental Panel on Climate Change (IPCC) 2013, pp. 11–12). Warming in the Southwest is expected to be greatest in the summer (IPCC 2013, pp. 11–12), and annual mean precipitation is very likely to decrease in the Southwest (Ray *et al.* 2008, p. 1; IPCC 2013, pp. 11–12). In Texas, the number of extreme hot days (high temperatures exceeding 95 °F (35 °C) are expected to double by around 2050 (Kinniburgh *et al.* 2015, p. 83), and Texas is projected to be one of the areas most affected by climate change in North America. West Texas is an area expected to show greater responsiveness to the effects of climate change (Diffenbaugh *et al.* 2008, p. 3). Even if precipitation and groundwater recharge remain at current levels, increased groundwater pumping and resultant aquifer shortages due to increased temperatures are nearly certain (Loaiciga *et al.* 2000, p. 193; Mace and Wade 2008, pp. 662, 664–665; Taylor *et al.* 2012, p. 3). Increased water temperature can cause stress to individuals, decrease dissolved oxygen levels, and increase toxicity of contaminants and ammonia. Effects of climate change, such as air temperature increases and an increase in drought frequency and intensity, have been shown to be occurring throughout the range of Texas hornshell (Kinniburgh *et al.* 2015, p. 88), and these effects are expected to exacerbate several of the stressors discussed above, such as increased water temperature and flow loss (Wuebbles *et al.* 2013, p. 16). As we projected the future condition of the Texas hornshell and which stressors are

likely to occur, we considered climate change to be an exacerbating factor in the increase of fine sediments, declines in water quality, and loss of flowing water.

Due to the effects of ongoing climate change, we expect the frequency and duration of cleansing flows to decrease, leading to the increase in fine sediments and reduced water levels at all populations. More extreme climate change projections lead to further increases in fine sediment within the populations. Similarly, as lower water levels concentrate contaminants and cause unsuitable temperature and dissolved oxygen levels, we expect water quality to decline to some degree in the future as a result of the effects of climate change.

Conservation Actions and Regulatory Mechanisms

About 7 percent of known occupied habitat for the Texas hornshell is in New Mexico, and the Service collaborated with water users, oil and gas developers, landowners, and other partners to develop candidate conservation agreements (CCAs) and candidate conservation agreements with assurances (CCAAs) for the species on State, Federal, and private lands (Regulations pertaining to these types of agreements are at 50 CFR 17.22 and 17.32.). These agreements provide voluntary conservation that will, if executed properly, reduce threats to the species while improving physical habitat and water quality. The key conservation measures in the agreements are designed to limit oil and gas development to areas outside of the Black and Delaware River floodplains, minimize erosion, and maintain minimum water flows in the rivers. Along with these measures, the partners to the agreement are evaluating alternatives to the multiple low water crossings on the Black River. Partners are considering alternate crossing locations, which could include bridges designed to allow host fishes to pass through in addition to decreasing potential contamination events. These agreements were approved by the Service in October 2017. Enrollment in the agreements is available until this rule becomes effective.

Because enrollment under these agreements is just beginning, the conservation measures have not yet become effective at reducing or eliminating threats to the species. As discussed elsewhere in this decision, we do not expect these agreements to modify the overall conservation status of the species because of the relatively small amount of habitat subject to these agreements; however, they will provide good conservation benefits to the hornshell populations within the covered area.

In 2013, the New Mexico Department of Game and Fish (NMDGF) began Texas hornshell reintroduction efforts into the Delaware River, which is within the historical range of the species. Adults and infested host fish were released in suitable habitat in the Delaware River in 2013 and 2015. Many of the released adults have been subsequently located, and success of the reintroduction will be determined in the coming years, as well as the effect of the produced water and oil spill in 2017 on these individuals. Mussel reintroductions take many years to show success, because the size of the juvenile mussel prevents detecting natural reintroduction for at least 3 years or more. As a positive sign, NMDGF biologists captured two gray redhorse from the Delaware River that appeared to be infested with Texas hornshell glochidia (NMDGF 2017, p. 1). We expect the reintroduction effort to continue over the next several years, but we are not considering the population to have been successfully reestablished until progeny from the reintroduced adults have been found in the river.

In Texas, The Nature Conservancy and Texas Parks and Wildlife Department manage lands under their purview in the Devils River watershed for native fish, wildlife, and plant communities, including Texas hornshell. The large amount (over 200,000 acres) of land in conservation management in the Devils River watershed reduces the risks to Texas hornshell from sediment inputs and contaminants.

In the Rio Grande, we are not aware of any management actions for Texas hornshell. The Texas Comptroller of Public Accounts has established an Endangered Species Task Force and has funded much of the recent research in Texas on Texas hornshell, which has led to greater understanding of the species' distribution in the State.

Summary of Risks to Texas Hornshell

Our analysis of the past, current, and future influences on what the Texas hornshell needs for long-term viability revealed that five influences pose the largest risk to future viability of the species. These risks are primarily related to habitat changes: The accumulation of fine sediments, the loss of flowing water, and impairment of water quality; these are all exacerbated by the effects of climate change. Additionally, predation and barriers to fish movement exacerbate the effects of these risks. We did not assess overutilization for scientific and commercial purposes or disease in detail, because these risks do not appear to be occurring at a level that affects Texas hornshell populations. The accumulation of fine sediments, the loss of flowing water, impairment of water quality, predation, and barriers to fish movement, as well as conservation and management efforts, are acting individually and cumulatively to affect the current and future viability of the Texas hornshell.

Current Condition

Overall, five known populations of Texas hornshell remain, comprising approximately 15 percent of the species' historical range in the United States (see Map 1, above). Historically, most Texas hornshell populations were likely connected by fish migration throughout the Rio Grande, upstream through the Pecos River, and throughout the tributaries, but due to impoundments and river reaches with unsuitable water quality (for example, high salinity) they are currently isolated from one another, and repopulation of extirpated locations is unlikely to

occur without human assistance. Here we discuss the current condition of each known population, taking into account the risks to those populations that are currently occurring, as well as management actions that are currently occurring to address those risks. We consider low levels of climate change to be currently occurring, resulting in reduced timing and amount of streamflow, increased stream temperatures, and increased accumulation of fine sediments.

Black River: The Black River population is quite dense and recruitment appears to be high, but the short length (8.7 mi (14.0 km)) of the occupied reach limits this population's resiliency. Accumulation of fine sediment in the substrate has already occurred due to increased sediment input into the river from road crossings, culverts, and cattle grazing, combined with a decreased frequency of cleansing river flows. The current level of climate impacts will continue to reduce flow in the river from groundwater extraction and drought, resulting in fewer cleansing flows and increased fine sediments. The distribution of Texas hornshell in the Black River will remain small, and the risk of a contaminant spill will remain high, resulting in a high likelihood that water quality will become unsuitable and reduce abundance of Texas hornshell significantly. The CCA/CCAA being implemented for the Black River will help reduce the likelihood of a spill and help maintain water flows, but extended droughts are nevertheless likely, resulting in low water flows. Therefore, taking into account the current threats to the population and its distribution within the river, the Texas hornshell population in the Black River has low to moderate resiliency.

Pecos River: The Pecos River population is extremely small and exhibits no evidence of reproduction. The age, poor condition, and small number of live individuals found among the very high number of dead shells indicates a population in severe decline; this situation is likely due to high salinity levels in the river upstream of the population. There is a high likelihood this

population will be extirpated in the near future due to water quality alone. Therefore, the Pecos River population of Texas hornshell has very low resiliency.

Devils River: The Devils River population has low abundance and has exhibited some evidence of reproduction. The current level of climate change impacts will continue to reduce flow in the Devils River due to groundwater extraction and drought. The low flows this population experiences during dry times will continue to become more frequent and prolonged. Because Texas hornshell in the Devils River occur at the heads of riffles, they are vulnerable to complete flow loss when water levels drop. The reduction in cleansing flows will also result in the accumulation of fine sediments, reducing substrate quality. Low flows will also affect water quality parameters such as temperature and dissolved oxygen, causing them to become unsuitable for Texas hornshell. Additionally, the species is already vulnerable to predation from terrestrial predators during times of low flow; predation will occur more frequently as periods of low flow become more common. Overall, because the population is currently small and would be unlikely to grow, the Devils River population has low resiliency.

Rio Grande–Lower Canyons: The Lower Canyons population has relatively high abundance and evidence of recruitment. Drought and groundwater extraction resulting from currently observed levels of climate change will continue to lower water levels in the Rio Grande–Lower Canyons population of Texas hornshell. We expect that the Rio Conchos will continue to be an unreliable source of water. This section of the Rio Grande is relatively deep and incised, and the population of Texas hornshell primarily occurs in crevices along the banks. Water flow reductions would expose a high proportion of the existing population; therefore, this reduction in flow will likely have a larger effect on the population size than in other populations, although at a small to moderate decrease in water flow we still expect abundance to be

maintained at moderate levels. Overall, the Rio Grande–Lower Canyons population exhibits moderate resiliency.

Rio Grande–Laredo: Similar to the Lower Canyons population, the Laredo population has numerous mussel beds with high Texas hornshell abundance and evidence of reproduction. However, drought and upstream water management will continue to reduce flows in the Rio Grande. Water quality will continue to decrease due to lower flows, and fine sediments will accumulate. Declining water flow will cause fine sediments to accumulate and water quality to decline, leading to a decline in population abundance. Overall, the Rio Grande–Laredo population has moderate resiliency.

Mexico: The Rio Salado basin has not yielded any evidence of an existing population despite several surveys since 2000. Texas hornshell is presumed to be extirpated from this basin. There are no other historical locations of Texas hornshell in Mexico.

Future Condition

As part of the SSA, we also developed multiple future condition scenarios to capture the range of uncertainties regarding future threats and the projected responses by the Texas hornshell. Our scenarios included a status quo scenario, which incorporated the current risk factors continuing on the same trajectory that they are on now. We also evaluated four additional future scenarios that incorporated varying levels of increasing risk factors with elevated negative effects on hornshell populations. The additional future scenarios project conditions that are worse for the Texas hornshell than the current condition or status quo projection. Because we determined that the current condition of the Texas hornshell and the associated status quo projections were consistent with an endangered species (see **Determination of Species Status**, below), we are not presenting the results of the other future

scenarios in this final rule. Since the status quo scenario was determined to be endangered, other projected scenarios would also be endangered, as they forecast conditions that are more at risk of extinction than the status quo. Please refer to the SSA report (Service 2018) for the full analysis of future scenarios.

Summary of Changes from the Proposed Rule

We made no changes from the proposed rule to the text of the rule itself. Since the publication of the August 10, 2016, proposed rule to list the Texas hornshell as endangered (81 FR 52796), we have made the following substantive changes in our supporting materials:

(1) Genetic analysis of individuals from the Rio Panuco basin in Mexico (representing the Mexican Gulf Coastal streams) indicates that they are not Texas hornshell; instead, they are a different, as yet undescribed species. The Rio Panuco basin contained the majority of historical records of Texas hornshell in the Mexican Gulf Coastal area. In light of this information, it is unlikely Texas hornshell occurred in the remainder of the Mexican Gulf Coastal streams. We have incorporated this information into the historical, current, and future conditions of the species in our SSA analysis and report.

(2) The Office of the Texas Comptroller of Public Accounts provided additional survey information regarding the Delaware River, which we have incorporated into our SSA report.

Summary of Comments and Recommendations

In the proposed rule published on August 10, 2016 (81 FR 52796), we requested that all interested parties submit written comments on the proposal by October 11, 2016. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in the San Antonio Express News and the Carlsbad

Current-Argus. We received requests for public hearings, and we held two public hearings: in Laredo, Texas, on June 13, 2017, and in Carlsbad, New Mexico, on June 15, 2017. The comment period was reopened for 30 days on May 30, 2017 (82 FR 24654), until June 29, 2017, and for another 30 days on August 10, 2017 (82 FR 37397), until September 11, 2017.

During the first comment period, we received 24 comment letters directly addressing the proposal. During the second comment period and at the public hearings, we received 16 comment letters and statements directly addressing the proposal. During the third comment period, we received 697 comment letters — including 685 form letters— directly addressing the proposal. All substantive information provided during the comment periods has either been incorporated directly into this final determination, into the SSA report, or addressed below. We received several comments that clarified various topics within the SSA report or this rule, and we incorporated them as appropriate. Comments received were grouped into 10 general issues specifically relating to the proposed listing status for the Texas hornshell and are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Reviewer Comments

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from five knowledgeable individuals with scientific expertise that included familiarity with Texas hornshell and its habitat, biological needs, and threats. During development of the SSA report, we reached out to five peer reviewers and received responses from four; all comments were incorporated into the SSA report prior to the proposed rule. During the comment period for the proposed rule, we reached out to an additional five peer reviewers, and we received responses from three. We reviewed all comments received from the peer reviewers for substantive issues and new information regarding the listing of the Texas

hornshell. The reviewers were generally supportive of our approach and made suggestions and comments that strengthened our analysis. Peer reviewer comments are addressed in the following summary and incorporated into the SSA report and this final rule as appropriate.

(1) Comment: One peer reviewer, NMDGF, the New Mexico State Lands Office (NMSLO), and five commenters stated that we should not presume the species has been extirpated from all locations in Mexico, given the lack of surveys particularly from the Gulf Coastal region.

Our Response: We recently learned that the populations in the Gulf Coastal region in Mexico previously identified as Texas hornshell are a different species, and we have updated our analysis accordingly. The remaining historical Texas hornshell populations in Mexico are in the Rio Salado basin in Nuevo Leon. This population was originally reported in 1891 (Mussel Project 2015). When this area was revisited in 2004 (Strenth *et al.* 2004, p. 227), household waste was found throughout the river and no live individuals were found. This basin was visited again in 2017, with surveys at eight sites in four rivers, and no live individuals were found (Hein *et al.* 2017, p. 3). Therefore, we have no evidence that any populations of Texas hornshell persist in Mexico. We have updated the SSA report to reflect the new genetic information and survey findings.

(2) Comment: One peer reviewer suggested we incorporate the effects of population fragmentation and isolation on the species.

Our Response: We discussed population isolation in our analysis of barriers to fish movement. Because the host fish may no longer move between populations of Texas hornshell, there is no immigration of individuals to increase genetic diversity and recolonize after stochastic

events. The effect of this isolation is incorporated into our analysis of the current and future condition of populations.

Comments from States

(3) *Comment:* We received one comment from the Texas Commission on Environmental Quality (TCEQ) clarifying the surface water rights and treaty obligations in the rivers inhabited by Texas hornshell.

Our Response: In the SSA report, we have clarified water management responsibilities of inland rivers occupied by Texas hornshell, as well as obligations under the 1944 Treaty between the United States and Mexico, which governs water management in the mainstem Rio Grande.

(4) *Comment:* We received comments from NMDGF, NMSLO, and one commenter expressing concern that listing may affect relationships with landowners along the Black River and that we have not adequately considered the conservation being implemented in the Black and Delaware River watersheds. In particular, NMSLO suggested that the Policy for Evaluation of Conservation Efforts when Making Listing Decisions (PECE) (68 FR 15100, March 28, 2003) requires “the Service to evaluate the conservation efforts of state and foreign governments or federal agencies, among others.”

Our Response: We share the commenters’ desire to maintain relationships with landowners along the Black River. NMDGF has spent considerable time and effort developing relationships with the private landowners on the Black River in order to access the river, survey for Texas hornshell, and implement conservation measures for the species. In the Black and Delaware River watersheds, the Service, NMDGF, NMSLO, Bureau of Land Management (BLM), and private landowners have developed CCAs/CCAAs for Texas hornshell, which will

provide voluntary conservation that will reduce threats to the species while improving physical habitat and water quality. A notice of availability on the permit application packages, including the draft CCA, draft CCAAs, and draft environmental assessment was published in the *Federal Register* on July 7, 2017, and was available for public comment for 30 days (82 FR 31625, July 7, 2017). The final agreements were signed by the Service, BLM, the New Mexico Land Commissioner, and the Center of Excellence on October 19, 2017. For private landowners who choose to enroll in these agreements, the agreements support the conservation of Texas hornshell while providing the landowner with a permit for incidental take of the species during the course of otherwise lawful activities. It is our intent that these agreements will help maintain landowner relationships in the Black and Delaware River watersheds.

We have addressed all relevant conservation efforts, as required by the Act, in this decision. Consistent with the PECE we find that the potential reduction in threats resulting from the CCAs/CCAAs in the Black and Delaware River watersheds limited to these watersheds and is not widespread enough to preclude listing the Texas hornshell as an endangered species. The PECE does not set standards for how much conservation is needed to make listing unnecessary. The PECE explains that we evaluate the significance of plans that address only a portion of a species' range in the context of the species' overall status. While a formalized conservation effort may be effective in reducing or removing threats in a portion of the species' range, that effort may or may not be sufficient to remove the need to list the species as threatened or endangered. Although the CCAs/CCAAs are expected to improve the status of the Texas hornshell in the Black and Delaware Rivers, four populations of Texas hornshell will not be affected by the agreements. Therefore, the agreements, even if fully implemented and effective, will not improve the status of Texas hornshell such that it does not meet the Act's definition of a

threatened or endangered species. Because of the limited scope of the agreements, it was unnecessary to conduct a PECE analysis.

(5) Comment: TCEQ and four commenters stated that our population survey information is limited and that we need to delay a final determination until more surveys are conducted and more data are collected.

Our Response: The Act requires the Service to publish a final rule within 1 year from the date we propose to list a species. This 1-year timeframe can be extended only if there is substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the determination or revision concerned, but only for 6 months and only for purposes of soliciting additional data. In such a case, under section 4(b)(6)(B)(i) of the Act, the Secretary may extend the 1-year period to make a final determination by up to 6 months for the purposes of soliciting additional data. In light of this comment, due to disagreements about the species' status in the Gulf Coastal region of Mexico, we extended the final determination by 6 months (82 FR 37397, August 10, 2017).

In accordance with section 4 of the Act, we are required to determine whether a species warrants listing on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards under the Act (published in the *Federal Register* on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines (www.fws.gov/informationquality/), provide criteria and guidance, and establish procedures to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of

information as the basis for determining whether a species warrants listing as an endangered or threatened species.

Science is a cumulative process, and the body of knowledge is ever-growing. In light of this fact, the Service will always take new research into consideration. If plausible new research supports amendment or revision of this rule in the future, the Service will modify the rule consistent with the Act and our established work priorities at that time.

(6) Comment: We received two comments from NMDGF regarding our analysis of the current and future influences on Texas hornshell viability. They cautioned us not to presume all sedimentation is detrimental to Texas hornshell; some sedimentation is part of the natural state of the watershed. Additionally, they did not agree that predation is a significant risk to the species, stating that low water levels would cause mortality before predation levels increase.

Our Response: Texas hornshell require seams of fine sediment under boulders and bedrock and in streambanks in order to anchor themselves into place. However, too much sedimentation, which can cause smothering, is a significant risk to the species rangewide. Chapter 4.1 and Appendix B of the SSA report contain more discussion of the risks of sedimentation.

In most of the streams occupied by Texas hornshell, we agree that low water levels would affect populations before predation is a significant factor. This scenario is because the species occupies crevices in streambanks and under boulders, which provide protection from predators. However, in the Devils River, Texas hornshell are found in gravel and cobble substrate in riffles. These habitats become easily accessible to terrestrial predators, such as raccoons (*Procyon lotor*), when water levels drop, and significant levels of predation on Texas hornshell have been

observed during times of low water levels. We have clarified in the SSA report and above in this preamble that this situation is primarily a concern for the population in the Devils River.

Public Comments

(7) *Comment:* Three commenters stated that existing laws and policies related to oil and gas production and surface water rights, such as the Clean Water Act, Oil Pollution Act, Resource Conservation and Recovery Act, and Pollution Prevention Act, will provide sufficient protection to Texas hornshell populations. According to the commenters, these laws and subsequent regulations provide many protections for freshwater systems including spill prevention measures, stormwater measures, and hazardous waste management, among others, which prevent the Texas hornshell in the Black River from being affected by oil and gas exploration. Further, the commenters state that groundwater use in Texas is governed by the Texas Groundwater Act, and ground and surface water rights in New Mexico are permitted by the Office of the State Engineer, and that these laws and policies provide at least as much protection as listing under the Act.

Our Response: While the laws and regulations related to water quality have reduced the risk of contamination of the Black River in New Mexico from oil and gas production, the risk from the high volume of truck traffic crossing the river at low-water access points remains high. In particular, one highly used crossing occurs at the upper end of the range of Texas hornshell in the Black River; a spill of water that has been collected as a byproduct of oil and gas production at this location could eliminate the entire population. For example, an overturned truck at a road crossing on the Clinch River in Virginia in 1998 resulted in the extirpation of three endangered species of mussels for 6 miles downstream (Jones *et al.* 2001, p. 28). While not from a road crossing, a spill of 18,000 barrels of produced water and 11 barrels of oil from a ruptured

pipeline occurred on the Delaware River, which is adjacent to the Black River, in August 2017, demonstrating the high risk of a spill in this area. Produced water mixes with river water and cannot be absorbed by boom lines, and so once a spill has happened, there is little clean up that can occur. In this case, the only regulatory response was the issuance of an Administrative Order by EPA (EPA 2017) directing the development of a pollution prevention plan.

Regarding water law, while extraction of water is regulated by the States of New Mexico and Texas, instream flow is affected by many factors, including local precipitation, high-altitude groundwater recharge, surface water–groundwater interactions, local groundwater table elevation, evapotranspiration, and anthropogenic water use. The Black River is expected to lose streamflow due to increased air temperature and reduced precipitation alone (Bren School of Environmental Management 2014, p. 91). Appropriate water management can help ensure sufficient streamflow, but if the amount of water entering the system decreases and anthropogenic water use remains at the same rate, streamflow levels will decrease. Therefore, although existing water law may mitigate water flow reductions, it is not sufficient to protect Texas hornshell from the effects of reduced streamflow.

(8) Comment: One commenter requested we provide data on water flow, water quality, the risk of spills, and on the Pecos River population of Texas hornshell.

Our Response: This information is provided in the SSA report in the following locations: water flow (Chapter 4.3 and Appendix B); water quality and spill risk (Chapter 4.2 and Appendix B); and Pecos River population data (Chapter 3.2.2). References cited are available at www.regulations.gov in Docket No. FWS–R2–ES–2016–0077.

(9) Comment: Two commenters stated that climate change does not exacerbate the risk factors in our analysis, and that our analysis is based on opinion rather than fact.

Our Response: We recognize that there are scientific differences of opinion on many aspects of climate change, including the role of natural variability in climate and the uncertainties involved with climate change projections and how local ecosystems may respond. We relied on synthesis documents (e.g., IPCC 2013) that present the consensus view of a very large number of experts on climate change from around the world. Additionally, we relied on downscaled climate change projections (e.g., Nohara 2006, CH2MHILL 2008, Mace and Wade 2008, Bren School of Environmental Management 2014) that forecast what is expected to occur to landscapes in New Mexico and Texas. We have found that these reports, as well as the scientific papers used in those reports or resulting from those reports, represent the best available scientific information we can use to inform our decision and have relied upon them and provided citations within our analysis. Climate change impacts are expected to result in lower stream flows, poorer water quality, increased accumulation of fine sediments, and, in the Devils River, increased predation.

(10) Comment: Two commenters expressed that the risks to the Black River from low flows and contamination are high.

Our Response: The Texas hornshell population in the Black River is at risk of reduction or extirpation from low flows or contamination. The CCA/CCAA for the Black and Delaware Rivers with water users, oil and gas developers, landowners, and other partners will be critical to reduce threats to the species in this area while improving physical habitat and water quality.

Determination of Species Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of “endangered species” or “threatened species.” The Act defines an “endangered species” as a

species that is “in danger of extinction throughout all or a significant portion of its range,” and a “threatened species” as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Texas Hornshell Determination of Status Throughout All of its Range

Our analysis of the past, current, and future influences on what the Texas hornshell needs for long-term viability revealed that there are five influences that pose a meaningful risk to the viability of the species. These are primarily related to habitat changes (Factor A from the Act): The accumulation of fine sediments, the loss of flowing water, and impairment of water quality, all of which are exacerbated by the effects of climate change (Factor E). Predation (Factor C) is also affecting those populations already experiencing low stream flow, and barriers to host fish movement (Factor E) prevent gene flow and recolonization after stochastic events. The regulatory mechanisms we considered include the Clean Water Act, Oil Pollution Act, Texas Endangered Species Act, and New Mexico Wildlife Conservation Act (Factor D) and were not enough to remove these influences on the viability of Texas hornshell.

The Texas hornshell has declined significantly in overall distribution and abundance, with the species currently occupying approximately 15 percent of its historical range in the United States. The resulting remnant populations occupy shorter reaches compared to likely historical populations, and they are all isolated from one another.

The primary historical reason for this reduction in range was reservoir construction and unsuitable water quality. Large reservoirs have been constructed on the Rio Grande and Pecos River, and much of the Pecos River upstream of the confluence with Independence Creek now has salinity levels too high for mussel habitation (Hoagstrom 2009, p. 28). The effects of these reservoirs extend beyond fragmentation of populations; the resultant downstream water releases do not mimic natural flow regimes, and the change in timing and frequency of cleansing flows results in increases in fine sediments, increases in predation, and decreases in water quality. The effects of climate change—increased temperature and decreased stream flow—exacerbate these impacts. Because of these threats acting in combination, the remaining Texas hornshell populations currently face moderate to high levels of risk of extirpation. For the populations occupying the smaller reaches (such as the Black River, Devils River, and Pecos River populations), a single stochastic event such as a contaminant spill or drought could eliminate an entire population of Texas hornshell. These effects are heightened at the species level because the isolation of the populations prohibits natural recolonization from host fish carrying Texas hornshell glochidia, which likely happened in the past and allowed for the species to ebb and flow from suitable areas.

Populations in both large and small reaches face risks from natural and anthropogenic sources. Climate change has already begun to affect the regions of Texas and New Mexico where Texas hornshell occurs, resulting in higher air temperatures, increased evaporation, increased groundwater pumping, and changing precipitation patterns such that water levels rangewide have already reached historic lows (Wuebbles et al. 2013, p. 16; Bren School of Environmental Management 2014, p. 91; Kinniburgh et al. 2015, p. 88; Miyazono *et al.* 2015,

appendix A; Toll *et al.* 2017, pp. 46-47). These low water levels put the populations at risk of habitat loss from increased fine sediments, poor water quality, and increased predation risk. These risks, alone or in combination, are expected to result in the extirpation of additional populations, further reducing the overall redundancy and representation of the species.

Historically, the species, with a large range of interconnected populations, would have been resilient to stochastic events such as drought and sedimentation because even if some populations were extirpated by such events, they could be recolonized over time by dispersal from nearby surviving populations. This connectivity would have made for a highly resilient species overall. However, under current conditions, connectivity is prevented due to large reservoirs and unsuitably high salinity levels between populations. As a consequence of these current conditions, the viability of the Texas hornshell now primarily depends on maintaining the remaining isolated populations.

Of the five known remaining isolated populations in the United States, three are small in abundance and occupied stream length and have low to no resiliency. The remaining two are larger, with increased abundance and occupied stream length; however, flow reduction, water quality decline, and habitat loss from sedimentation reduce the abundance and distribution of those populations. Therefore, the Texas hornshell has no populations that are currently considered highly resilient. The high risk of extirpation of these populations leads to low levels of redundancy (few populations will persist to withstand catastrophic events) and representation (little to no ecological or genetic diversity will persist to respond to changing environmental conditions). Overall, these low levels of resiliency, redundancy, and representation result in the Texas hornshell having low viability, and the species currently faces a high risk of extinction.

Thus, after assessing the best available information, we conclude that the Texas hornshell is in danger of extinction throughout all of its range. We find that the Texas hornshell is presently in danger of extinction throughout its entire range based on the severity and immediacy of threats currently impacting the species. The overall current range has been significantly reduced from the historical range of the species, and the remaining habitat and populations face a multitude of threats acting in combination to reduce the overall viability of the species. The risk of extinction is high because the remaining populations have a high risk of extirpation, are isolated, and have limited potential for recolonization. Therefore, on the basis of the best available scientific and commercial information, we list the Texas hornshell as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act. We find that a threatened species status is not appropriate for the Texas hornshell because of the currently contracted range (loss of 85 percent of its historic range), because the threats are occurring across the entire range of the species, and because the threats are ongoing currently and are expected to continue or worsen into the future. Because the species is already in danger of extinction throughout its range, a threatened status is not appropriate.

Because we found that the species is an endangered species because of its status throughout all of its range, we do not need to conduct an analysis of its status in any portions of its range. This is consistent with the Act because the species is currently in danger of extinction throughout all of its range due to high-magnitude threats across its range, or threats that are so high in particular areas that they severely affect the species across its range. Therefore, the species is in danger of extinction throughout every portion of its range, and an analysis of whether the species is in danger of extinction or likely to become so throughout any significant portion of its range would be redundant and unnecessary. See the Final Policy on Interpretation

of the Phrase “Significant Portion of Its Range” in the Endangered Species Act’s Definitions of “Endangered Species” and “Threatened Species” (79 FR 37577).

Texas Hornshell Determination of Status

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Texas hornshell. Because the species is in danger of extinction throughout all of its range, the species meets the definition of an endangered species.

Available Conservation Measures

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

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

species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan identifies site-specific management actions that set a trigger for review of the five factors that control whether a species remains endangered or may be downlisted (reclassified from endangered to threatened) or delisted (removed from the Lists of Endangered and Threatened Wildlife and Plants), and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan will be available on our website (<http://www.fws.gov/endangered>) or from our Texas Coastal Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on

Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

Following publication of this final listing rule, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the States of New Mexico and Texas will be eligible for Federal funds to implement management actions that promote the protection or recovery of the Texas hornshell. Information on our grant programs that are available to aid species recovery can be found at: <http://www.fws.gov/grants>.

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

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the National Park Service (Big Bend National Park and Rio Grande Wild and Scenic River); issuance of section 404 Clean Water Act permits by the Army Corps of Engineers; and construction and maintenance of roads or highways by the Federal Highway Administration.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered wildlife. The prohibitions of section 9(a)(1) of the Act, codified at 50 CFR 17.21, make it illegal for any person subject to the jurisdiction of the United States to take (which includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these) endangered wildlife within the United States or on the high seas. In addition, it is unlawful to import; export; deliver, receive, carry, transport, or ship in interstate or foreign commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any listed species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to employees of the Service, the National Marine Fisheries Service, other Federal land management agencies, and State conservation agencies.

We may issue permits to carry out otherwise prohibited activities involving endangered wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: for scientific purposes, to enhance the propagation or survival of the species, and for incidental take in connection with otherwise lawful activities. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a final listing on proposed and ongoing activities within the range of a listed species. Based on the best available information, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations and permit requirements; this list is not comprehensive:

(1) Normal agricultural and silvicultural practices, including herbicide and pesticide use, which are carried out in accordance with any existing regulations, permit and label requirements, and best management practices; and

(2) Normal residential landscape activities.

Based on the best available information, the following activities may potentially result in a violation of section 9 of the Act; this list is not comprehensive:

(1) Unauthorized handling or collecting of the species;

(2) Modification of the channel or water flow of any stream in which the Texas hornshell is known to occur;

(3) Livestock grazing that results in direct or indirect destruction of stream habitat; and

(4) Discharge of chemicals or fill material into any waters in which the Texas hornshell is known to occur.

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

Critical Habitat for the Texas Hornshell

Background

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

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

- (a) Essential to the conservation of the species, and
- (b) Which may require special management considerations or protection; and

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

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

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

species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

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

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time the species is determined to be endangered or threatened. Our regulations (50 CFR 424.12(a)(1)) state that the designation of critical habitat is not prudent when one or both of the following situations exist: (1) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species, or (2) such designation of critical habitat would not be beneficial to the species.

There is currently no imminent threat of take attributed to collection or vandalism under Factor B for the Texas hornshell, and identification and mapping of critical habitat is not likely to increase any such threat. In the absence of finding that the designation of critical habitat would increase threats to a species, if there are any benefits to a critical habitat designation, then a prudent finding is warranted. The potential benefits of designation include: (1) Triggering consultation under section 7 of the Act for actions in which there may be a Federal nexus where it would not otherwise occur because, for example, it is or has become unoccupied or the occupancy is in question; (2) focusing conservation activities on the most essential features and areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to the species. Therefore, because we have determined that the designation of critical habitat will not likely increase the degree of threat to these species and may provide some measure of benefit, we find that designation of critical habitat is prudent for the Texas hornshell.

Critical Habitat Determinability

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the species is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist: (i) Information sufficient to perform required analyses of the impacts of the designation is lacking, or (ii) The biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat.

As discussed above, we have reviewed the available information pertaining to the biological needs of this species and habitat characteristics where this species is located. We are completing the required analyses of the impacts related to possible exclusions to the designation

of critical habitat and anticipate publishing a proposed critical habitat rule in the near future. Therefore, we conclude that critical habitat is not determinable for the Texas hornshell at this time.

Required Determinations

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

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

Government-to-Government Relationship with Tribes

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

The Kickapoo Indian Reservation of Texas owns 1.3 km (0.8 mi) adjacent to the Rio Grande, downstream of Eagle Pass, Texas. We sent notification letters to the tribe on August 10,

2016, and June 1, 2017, inviting their review and comment on the proposed rule. We did not receive a response. We also sent notification letters on August 10, 2016, to the following tribes with interests in the Black and Delaware River watersheds: Comanche, Hopi, Isleta, Mescalero Apache, Oklahoma Apache, Tesuque, and Ysleta del Sur tribes, and we did not receive a response.

References Cited

A complete list of references cited is available in Appendix A of the SSA report (U.S. Fish and Wildlife Service. 2018. Species status assessment report for the Texas hornshell (*Popenaias popeii*), Version 1.2. Albuquerque, NM), available online at <http://www.regulations.gov> under Docket Number FWS–R2–ES–2016–0077.

Authors

The primary authors of this final rule are the staff members of the Texas Coastal Ecological Services Field Office.

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 follows:

PART 17— ENDANGERED AND THREATENED WILDLIFE AND PLANTS

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

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245; unless otherwise noted.

2. Amend §17.11(h) by adding an entry for “Hornshell, Texas” to the List of Endangered and Threatened Wildlife in alphabetical order under CLAMS to read as follows:

§ 17.11 Endangered and threatened wildlife.

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(h) * * *

| Common name | Scientific name | Where Listed | Status | Listing Citations and Applicable Rules |
|------------------|-------------------------|----------------|--------|--|
| * * * * * | | | | |
| CLAMS | | | | |
| * * * * * | | | | |
| Hornshell, Texas | <i>Popenaias popeii</i> | Wherever found | E | 83 FR [insert <i>Federal Register</i> page where the document begins], [Insert date of publication in the <i>Federal Register</i>]. |
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Dated: December 19, 2017

James W. Kurth,
Deputy Director, U.S. Fish and Wildlife Service,
Exercising the Authority of the Director
for the U.S. Fish and Wildlife Service.

Billing Code 4333–15

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