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

SCIENTIFIC NAME: *Tryonia circumstriata (=stocktonensis)*

COMMON NAME: Gonzales springsnail

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Endangered Species Act (Act) and, therefore, was not elevated to Candidate status
___ New candidate
X Continuing candidate
___ Non-petitioned
X Petitioned - Date petition received: May 11, 2004
_ 90-day positive - Federal Register (FR) date:
_ 12-month warranted but precluded - FR date:
_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? Yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current Candidate Notice of Review (CNOR) (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

___ Listing priority (LP) change
Former LP: ___
New LP: ___

Date when the species first became a Candidate (as currently defined): January 1989

___ Candidate removal: Former LP: ___

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

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

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails, Gastropoda, Hydrobiidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Pecos County, Texas

LAND OWNERSHIP: One hundred percent of the range of the Gonzales springsnail occurs on the Diamond Y Preserve which is owned and managed by The Nature Conservancy (TNC). The species occurs in two separate spring run segments, totaling about 1.5 miles (mi) (2.5 kilometers (km)) in length. General width of the stream is estimated to be 10 feet (ft) (3 meters (m)). The area of the stream habitat is estimated to encompass 1.9 ac (0.75 ha). The TNC Diamond Y Spring Preserve is 3,962 acres (ac) (1,603 hectares (ha)). The surrounding watershed and surface area over contributing aquifers are all privately owned.

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LEAD FIELD OFFICE CONTACT: Austin Ecological Service Field Office (ESFO), Nathan Allan, 512-490-0057, ext. 237, *Nathan_Allan@fws.gov*

BIOLOGICAL INFORMATION

Species Description & Taxonomy: The Gonzales springsnail is a very small snail, measuring only 0.11 to 0.14 inch (in) (3.0 to 3.7 millimeters (mm)) long. The shell is narrowly conical, with obtuse apex and a broadly rounded anterior end (Taylor 1987, p. 37). Shells of larger females contain 5-6 regularly convex whorls that are separated by a deeply incised suture (Taylor 1987, p. 37). Another endemic hydrobiid aquatic snail, Diamond Y Spring snail (*Pseudotryonia* (=*Tryonia*) *adamantine*), also occurs in the Diamond Y Spring system. Systematic studies (Hershler *et al*. 1999, p. 377; Hershler 2001, pp. 7, 16) of these snails have been conducted using mitochondrial DNA sequences and morphological characters. This analysis supported the unique taxonomic status of both snail species at Diamond Y Spring and reclassified the Diamond

Y Spring snail into a new genus, *Pseudotryonia* (Hershler 2001, p. 16). The Gonzales springsnail was assigned to a clade of "true *Tryonia*" made up of 16 species in southwestern North America (Hershler *et al*. 1999, p. 383). The Diamond Y Spring snail was assigned to a separate clade of four species. A closely related congener of Gonzales springsnail is the Phantom springsnail (*T. cheatumi*), which occurs in the San Solomon Spring System in Reeves and Jeff Davis counties. Gonzales springsnail is distinguished from Phantom springsnail by its narrower, more strongly sculptured shell and more numerous penial papillae (Hershler 2001, p. 7). These studies confirm that the two snails from the Diamond Y Spring system (*P. adamantina* and *T. circumstriata*) are indeed distinct, valid taxa. Thus, we have carefully reviewed the available taxonomic information to reach the conclusion that *T. circumstriata* is a valid taxon.

Life History/Biology: The Gonzales springsnail likely has a life span of 9-15 months and reproduces several times during the spring to fall breeding season (Pennak 1989, p. 552). Snails of the family Hydrobiidae are sexually dimorphic with females being characteristically larger and longer-lived than males. The snails are ovoviviparous, producing live young serially (as opposed to broods) (Taylor 1985, p. 16). Habitat of the species is mud substrates on the margins of small springs, seeps, and marshes in flowing water associated with sedges and cattails and they are fine-particle feeders presumably on detritus and periphyton associated with the substrates (mud and vegetation) (Taylor 1987, p. 38).

In the desert southwest, aquatic snails are distributed in isolated, geographically-separate wetland populations (Hershler *et al*. 1999, p. 377). They likely evolved into distinct species during recent dry periods (since the Late Pleistocene, ca. 100,000 years ago) from parent species that once enjoyed a wide distribution during wetter, cooler climates of the Pleistocene. Such divergence has been well-documented for aquatic and terrestrial macroinvertebrate groups within arid ecosystems of western North America (e.g., Taylor 1987, p. 6; Bowman 1981, p. 105; Brown *et al*. 2008, p. 486).

Historical and Current Range/Distribution: The Gonzales springsnail is an aquatic snail occurring only in the Diamond Y Spring system and associated outflows in Pecos County, Texas (Taylor 1987, pp. 37-38). No available information indicates that the historic distribution of this species was larger than the present distribution. Other area springs nearby may have contained the same species, but because these nearby springs have been dry for more than four decades, there is no opportunity to determine the potential historic distribution.

Habitat and Population Estimates/Status: The Diamond Y Spring system is a tributary drainage to the Pecos River and is composed of disjunct upper and lower watercourses, separated by about a 0.6 mi (1 km) stretch of dry stream channel. The upper watercourse starts with the Diamond Y Spring head pool and is augmented by numerous small seeps, some of which drain into the spring outflow channel. This outflow channel converges with the Leon Creek drainage and flows through a marsh-meadow, where it is then referred to as Diamond Y Draw. The total upper watercourse is about 0.93 mi (1.5 km) long. The lower watercourse has a smaller head pool spring (Euphrasia Spring) and outflow stream and also has several isolated pools, for example, Mansanto Pool. The total lower watercourse is about 0.6 mi (1 km) long and may extend below the State Highway 18 bridge during wetter seasons or years. With some variance

across microhabitats, the species is estimated to occupy all the wetted habitats in both the upper and lower watercourses.

Taylor (1985, pp. 18-19) documented the distribution and abundance of aquatic snails in the Diamond Y Spring system. In fall 1984, he found that in the lower watercourse the Gonzales springsnail was limited to only the first 98.4 ft (30 m) of outflow from Euphrasia Spring. Taylor (1985, p. 19) calculated densities in the range of 469 to 793 individuals per 0.1 ft^2 (0.01 m^2) for Gonzales springsnail in this short reach of habitat. Taylor (1985, p. 20) estimated the total population of over one million individuals would not be unreasonable. In contrast, he also reported the Diamond Y Spring snail distribution was limited to the upper watercourse. The Diamond Y Spring snail was found at 12 of the 14 sites sampled, with density estimates ranging from 0.5 to 108 individuals per 0.1 ft^2 (0.01 m^2), with very low densities in the upstream areas, near the headspring. Taylor (1985, pp. 14-15) indicates that the low density areas were in definite contrast to unpublished data he collected in 1968, where the upstream areas of the upper watercourse had a very high abundance of Diamond Y Spring snails. These findings on the snail distribution in the upper and lower watercourses were confirmed by Fullington (1991, p. 3).

Echelle (2001, pp. 24-26) found that Diamond Y Spring snail was in the isolated spring seeps near the Diamond Y Spring head pool, in side seeps at the downstream end of the upper watercourse, and at the immediate outflow of Euphrasia Spring in the lower watercourse, while the Gonzales springsnail was found only in the outflow stream of the Diamond Y head pool in the upper watercourse. This distribution is supported by observations of Dr. Robert Hershler (Echelle 2001, p. 25). The reason for the apparent reversal in distributional patterns of the two species within the Diamond Y Spring system (Brown *et al*. 2008, p. 489) since the surveys by Taylor (1985) is unknown. Surveys in late 2009 have confirmed that Gonzales springsnail distribution is limited to the first 200 to 400 m (600 to 1,200 feet) of the outflow of Diamond Y Spring, with densities reaching 350 individuals per m^2 (10 $feet^2$) (H. Ladd, Texas Tech University, pers. comm., 2010).

Although the two snail species both occur in the Diamond Y Spring system, they have not been taken together at any sample locations (Taylor 1985, p. 16; Echelle 2001, pp. 24-26), with one reported exception by Fullington (1991, p. 3) where both were collected from a small seep to the side of the Diamond Y Spring head pool. Taylor (1987, p. 38) reports the reason for this mutually exclusive distribution is likely a function of competition rather than habitat differences, because the two species appear to occupy the same microhabitats, but are spatially segregated.

THREATS

We have no new information as of April 2010 regarding threats to the species.

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>.
Water Withdrawal, Groundwater Pumping, and Drought

The primary threat to this species is the potential failure of spring flow due to groundwater pumping and/or drought which would result in total habitat loss for the species. Diamond Y

Spring is the last major spring still flowing in Pecos County, Texas. Pumping of the regional aquifer system for agricultural production of crops has resulted in the drying of most other springs in this region (Brune 1981, p. 356). Other springs that have already failed include Comanche Springs, which was once a large surface spring in Fort Stockton, Texas, about 8 mi (12.9 km) from Diamond Y Spring. This spring flowed at more than 42 cubic feet per second (cfs) [1200 liters per second (lps)] (Brune 1981, p. 358) and undoubtedly provided habitat for rare species of fishes and invertebrates, including aquatic snails. The spring ceased flowing by 1962 (Brune 1981, p. 358). Leon Springs, located upstream of Diamond Y in the Leon Creek watershed, was measured at 500 lps (18 cfs) in the 1930s and was also known to contain rare fish, but ceased flowing in the 1950s following significant irrigation pumping (Brune 1981, pp. 358-359). There have been no continuous records of spring flow discharge at Diamond Y Spring to confirm any trends in spring flow. While spring flows are low, the information on geohydrology and groundwater pumping is not available to determine the exact relationships of groundwater withdrawals and spring flow.

Studies by Veni (1991, p. 77) and Boghici (1997, p. *v*) indicate that the spring flow at Diamond Y Spring comes from the local aquifers west of the spring outlets. One significant factor that influences flows at the spring is the large groundwater withdrawals for agricultural irrigation of farms to the southwest in the Belding-Fort Stockton areas. Although TNC owns and manages the property surrounding the Diamond Y Spring system, it has no control over groundwater use that affects spring flow. The spring flow is very small, 1 to 2 cfs (27 to 54 lps), so any decreases would be substantial.

Climate Change

Future climate change may also impact water quantity and habitat maintenance for this aquatic species. According to the Intergovernmental Panel on Climate Change (IPCC 2007, p. 1), "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Localized projections suggest the southwest U.S. may experience the greatest temperature increase of any area in the lower 48 states (IPCC 2007, p. 8), with warming increases in southwestern states greatest in the summer. The IPCC also predicts hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007, p. 8). Karl *et al*. (2009, p. 12) suggest that warming of the United States climate is already happening and is increasing.

There is also high confidence that many semi-arid areas like the western United States will suffer a decrease in water resources due to climate change (IPCC 2007, p. 7; Karl *et al*. 2009, pp. 129-131), as a result of less annual mean precipitation and reduced length of snow season and snow depth. Milly *et al*. (2005, p. 347) also project a 10 to 30 percent decrease in precipitation in mid-latitude western North America by the year 2050 based on an ensemble of 12 climate models. Even under lower emission scenarios, recent projections forecast a 4 to 6 ºF (2 to 3 ºC) increase in temperature and a 10 percent decline in precipitation in western Texas by 2080-2099 (Karl *et al*. 2009, pp. 129-130). Assessments of climate change in west Texas suggest that the area is likely to become warmer and possibly slightly drier (TWDB 2008, pp. 22-25).

The potential effects of future climate change could reduce overall water availability in this region of western Texas and compound the threat of declining flows from the Diamond Y Spring system. If this were to occur, spring flows could decline directly because of decreases in recharge from declining precipitation or indirectly as a result of increased pumping of groundwater to accommodate human needs for additional water supplies (Mace and Wade 2008, p. 664). Other potential effects of climate change on the physical and biological environment of Diamond Y Spring are possible, but difficult to predict as no formal vulnerability assessment has been completed. The species may be highly sensitive to the effects of climate change because its habitat is closely dependent on stable flows (from precipitation) and water temperatures. Other indirect effects of climate change include alteration of water quality, invasion of nonnative species, increased disease susceptibility, or other factors are also possible. We lack sufficient certainty to know how climate change may specifically affect this species. However, because of the extremely small range and dependence on specific environmental conditions, any potential changes to its environment could result in the extinction of the species.

The species also has no opportunity to migrate and it is unlikely it could be successfully relocated to alternate environments. As a consequence, its capability to adapt to environmental changes from climate change is presumed low. Therefore, although the imminence of the threats related to climate change can be considered low, the magnitude of effects of those changes on the species is considered high.

Oil and Gas Development

Oil and gas activities threaten the Gonzales springsnail because of the potential groundwater or surface water contamination from pollutants (Veni 1991, p. 83; Fullington 1991, p. 6). The Diamond Y Spring system is within an active oil and gas extraction field. At this time there are still many active wells located about 300 feet (about 100 m) of surface waters. In addition, a natural gas refinery is located within 0.8 km (0.5 mi) upslope of Diamond Y Spring. Oil and gas activities have been occurring for many decades, since at least the 1960s. Oil and gas pipelines cross the habitat, and many oil extraction wells are located near the occupied habitat. The potential for a catastrophic event is possible at any time. There is also old brine pits associated with previous drilling within feet of surface waters. If these pits were to leak into the habitat of the species, the effects of the contamination could result in death to individuals or reductions in food availability or other ecological impacts. However, there is currently no regular monitoring occurring for these species, so it is unlikely that the effects would be detected. Oil and gas pipelines cross the spring outflow channels and marshes where the species occurs, creating a constant potential for contamination from pollutants from leaks or spills. These activities pose a threat to the habitat of the Gonzales springsnail by creating the potential for pollutants to enter underground aquifers that contribute to spring flow or by point sources from spills and leaks of petroleum products on the surface. Presently, there is no evidence of habitat destruction/modification due to groundwater or surface water contamination from leaks or spills; however, the potential for future adverse effects is an ongoing threat.

One such spill occurred in 1992 when approximately 10,600 barrels of crude oil were released from a 6 in (15 centimeter (cm)) pipeline that traverses Leon Creek upstream of its confluence with Diamond Y Draw. The oil was from a ruptured pipeline at a point several hundred feet away from the Leon Creek channel. The site itself is about 1 mi (1.6 km) overland from Diamond Y Spring. The distance that surface runoff of oil residues must travel is about two miles down Leon Creek to reach Diamond Y Draw. The pipeline was operated at the time of the spill by the Texas-New Mexico Pipeline Company, but ownership has since been transferred to several other companies. Texas Railroad Commission has been responsible for overseeing cleanup of the spill site. Remediation of the site initially involved above ground land farming of contaminated soil and rock strata to allow microbial degradation. Further remediation efforts focused on vacuuming oil residues from the surface of groundwater exposed by trenches dug at the spill site. No obvious impacts on the rare fauna of Diamond Y Spring were observed, but no specific monitoring of the effects of the spill was undertaken.

Based on our evaluation of ongoing groundwater pumping and oil and gas activities, we conclude that the Gonzales springsnail is threatened by the present and threatened destruction, modification, or curtailment of its habitat and range.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
Overutilization is not known to be a factor threatening the Gonzales springsnail.

C. Disease or predation.
Disease and predation are not known to be factors threatening the Gonzales springsnail. The presence of the introduced species (*Melanoides* snail) increases the potential for diseases to affect the species (See Factor E). However, there is not sufficient information to conclude that disease is currently a threat to the species.

D. The inadequacy of existing regulatory mechanisms.
Texas State law provides no protection for this invertebrate species. There are no existing Federal, State, or local regulatory mechanisms providing protection for the species. However, the Gonzales springsnail is afforded some protection indirectly due to the presence of two endangered fishes (Leon Springs pupfish (*Cyprinodon bovinus*) and Pecos gambusia (*Gambusia nobilis*)), a semi-aquatic endangered snail (Pecos assiminea (*Assiminea pecos*)), and the threatened Pecos sunflower (*Helianthus paradoxus*) that occupy the same or similar habitats. However, aquatic mollusks, such as the Gonzales springsnail, are acutely sensitive to ground and surface water contaminants (see references in Lang 2002, p. 17) and may be more sensitive to changes in water quality than other species. The springsnails may also be more directly threatened by the presence of the exotic *Melanoides* snail than the endangered fish (see Factor E below).

Some protection for the habitat of the Gonzales spingsnail is provided with the ownership of the springs by TNC (Karges 2003, p. 143). However, land ownership provides no protection from the main threats to this species—the loss of necessary groundwater levels to ensure adequate spring flows or contamination of groundwater from oil and gas activities. Texas groundwater resources were historically under the "Rule of Capture," which provides limited opportunity for

regulation of pumping or management of groundwater resources (Potter 2004, p. 1). Local groundwater districts are now the method for groundwater management in Texas. Diamond Y Spring is within the jurisdiction of the Middle Pecos Groundwater Conservation District, however it is uncertain if the district would limit groundwater use to provide for conservation of surface water flows for natural resource benefits (Booth and Richard-Crow 2004, p. 38; Caroom and Maxwell 2004, p. 53).

Based on our evaluation, we conclude that the protections from the existing regulatory mechanisms are not adequate to limit or alleviate the threats to the Gonzales springsnail, even considering the protections resulting from the co-occurrence of the two federally endangered fishes and the federally endangered Pecos assiminea.

E. Other natural or manmade factors affecting its continued existence.

Exotic Species

An exotic snail, *Melanoides* sp., has become established in Diamond Y Spring (Echelle 2001, p. 15; McDermott 2000, p. 15). The exotic snail is the most abundant snail in the upper watercourse of the Diamond Y Spring system. Currently, it has not been detected in the lower water course (Echelle 2001, p. 26). In many locations, the exotic snail is so numerous that it essentially is the substrate in the small stream channel. The effects of this introduction are not yet known. However, the exotic snail is likely competing with native snails for space and resources. Other changes to the ecosystem from the dominance of this species are likely to occur and could have detrimental effects to the native invertebrate community.

Limited Distribution and Stochastic Events

The Gonzales springsnail may be susceptible to threats associated with limited distribution and impacts from stochastic events. Stochastic events from either environmental factors (random events such as severe weather) or demographic factors (random causes of births and deaths of individuals) are also heightened threats to the species because of the limited range (Melbourne and Hastings 2008, p. 100). Finally, the small range of only one population of this snail does not provide any opportunity for natural recolonization if any of these factors resulted in a local extirpation event.

Based on our evaluation, we conclude that Gonzales springsnail is threatened by the impacts of other natural and manmade factors, including exotic species, climate change, and limited distribution.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: This species is designated as a high priority species in the Wildlife Action Plan of Texas (TPWD 2005, p. 757). TNC has managed cattle on the Diamond Y Spring Preserve in the past, however, grazing is not currently occurring on the Preserve which may lessen impacts from cows trampling stream habitat. A study of the distribution and ecology of this species and the potential effects of the *Melanoides* was initiated in 2009 by Dr. Dave Rogowski of Texas Tech University. The project is funded

through a section 6 grant. Preliminary results from 2009 confirm that Gonzales springsnail continues to persist in relatively high abundance in the upstream watercourse at the Diamond Y Spring outflow (H. Ladd, Texas Tech University, pers. comm., 2010).

SUMMARY OF THREATS: The Gonzales springsnail is primarily threatened with habitat loss due to springflow declines from ongoing drought, groundwater pumping, and potentially climate change. Additional threats include potential water contamination from future accidental releases of petroleum products, as the species' habitat is in an active oil and gas field. Limited distribution of this narrow endemic species makes any impact from increasing threats (e.g., loss of springflow and contaminants) likely to result in its extinction.

We find that the Gonzales springsnail is warranted for listing throughout all of its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES: Needed conservation measures for the near-term include: maintaining spring flows at Diamond Y Spring through groundwater management and conservation; monitoring the distribution, abundance, and habitat use of the snails in comparison to the *Melanoides* snail to determine potential effects of this exotic species; and establishing a captive propagation program for the species.

LISTING PRIORITY:

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	**2***
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: HIGH. Limited distribution of this narrow endemic (two small interconnected springs) makes any impact from increasing threats (e.g., loss of spring flow and contaminants) likely to result in the extinction of the species.

Imminence: IMMINENT. This species occurs in an arid region plagued by ongoing drought and aquifer withdrawals, making the likelihood of the total loss of spring flows very high. The species' habitat is in an active oil and gas field with constant threats from contamination. There are numerous oil and gas pipelines that currently transect the species' habitat. If one of these pipelines were to leak or spill, the species could go extinct, with no detection until after the fact. Therefore, we regard these threats as imminent.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. Due to the current status of the species and its habitat, emergency listing of the Gonzales springsnail is not warranted at this time. Also, because the Gonzales springsnail is sympatric with two federally endangered fishes, the endangered Pecos assiminea , , and the threatened Pecos sunflower , it benefits from any conservation actions that have been and are being undertaken to recover these species. In addition, the nature of the main threat of spring flow loss is not a straightforward enforcement action under the Endangered Species Act, and, therefore, emergency listing is not likely to provide immediate protection that would either alleviate the threats or prevent extinction.

DESCRIPTION OF MONITORING: Qualitative monitoring of the Gonzales springsnail occurs sporadically by U.S. Fish and Wildlife Service (Service) personnel, university researchers, and State agency personnel. Spring habitats are generally monitored by TNC. Currently, there is no regular monitoring of the population status or trends of the Gonzales springsnail. A new project by researchers from Texas Tech University began in late 2009 to monitor the status of the species and determine habitat associates. Preliminary results from 2009 confirm that Gonzales springsnail continues to persist in relatively high abundance in the upstream watercourse at the Diamond Y Spring outflow (H. Ladd, Texas Tech University, pers. comm., 2010).

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:
On March 4, 2010, the Service contacted TPWD by email requesting information on the status of this and other candidate species. They provided no new information in their March 30, 2010, email response (Wendy Gordon, TPWD, pers. comm, 2010).

Indicate which State(s) did not provide any information or comments: NA

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

Approve: _____ May 21, 2010

Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ Date: October 22, 2010

ACTING
Director, Fish and Wildlife Service

Do not concur: _____ _____

Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010
Conducted by: Nathan Allan

Comments: