

**Current Distribution of the Blotched Watersnake (*Nerodia erythrogaster transversa*) and
the Rio Grande Cooter (*Pseudemys gorzugi*) in the Lower Pecos River System Eddy
County, New Mexico 2006.**

Final Report to:

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Introduction

Objectives

The primary objective of this project was to investigate the current distribution and status of the Blotched Watersnake and Rio Grande Cooter in southeastern New Mexico. A secondary goal was to document other riparian obligate amphibians and reptiles in the lower Pecos River drainage in southeastern New Mexico.

Blotched Watersnake (*Nerodia erythrogaster transversa*)

Nerodia erythrogaster is a wide ranging species ranging from southern Michigan and southern Delaware in the north and the coastal states to Coahuila, and Nuevo Leon, in the south with isolated localities in Durango, and Zacatecas Mexico. From east to west it is known from the Atlantic coast to western Oklahoma, and southeastern New Mexico in the west (Conant 1991, Degenhardt et al. 1996). There are currently six recognized subspecies of Plain-bellied Watersnake (*N. erythrogaster*) across their range with only *N. erythrogaster transversa* found in New Mexico. The range of *N. erythrogaster transversa* includes western Missouri, Kansas, northwestern Arkansas, central Texas, southeastern New Mexico and northern Coahuila, Nuevo Leon and Tamaulipas, Mexico (Conant 1991, Gibbons and Dorcas 2004). In New Mexico *N. erythrogaster transversa* is known from the Lower Pecos River drainage including, Black River, Delaware River, and Rocky Arroyo in Eddy County (Degenhardt et al 1996). Currently *N. erythrogaster* is state listed as endangered by New Mexico Department of Game and Fish (NMDGF, 2000). Investigations conducted on *N. erythrogaster* in NM has been limited to work conducted by C. W. Painter (NMDGF) in 1991 and 1992 (1993) during which six specimens were observed on the Delaware River.

Rio Grande River Cooter (*Pseudemys gorzugi*)

Pseudemys gorzugi has a limited distribution in the Rio Grande from Brownsville to the Big Bend region and in the Pecos River drainage in western Texas, and in the Pecos River and its tributaries in southeastern New Mexico. Isolated populations also occur in northeastern Coahuila, central Nuevo Leon, and northeastern Tamaulipas, Mexico (Ernst et al. 1994, Degenhardt et al. 1996). There is an unconfirmed record from Bitter Lakes National Wildlife Refuge in Chaves County, but is otherwise currently known from Brantley Lake downstream on the Pecos River, throughout the Black and the Delaware rivers in Eddy County, New Mexico (Degenhardt et al 1996). An individual (C. Newsom) reported seeing *P. gorzugi* in Rocky Arroyo in 2005; however no museum records currently exist for this locality. *Pseudemys gorzugi* is currently listed as threatened by New Mexico Department of Game and Fish (NMDGF, 2000). Investigations conducted on this species have been limited to work during the field seasons of 1991–1993 conducted by C. W. Painter (NMDGF), during which time mark-recapture and radio telemetry studies were conducted at the headwaters of the Black River (*unpub. data*).

Methods

Nerodia erythrogaster and other semi-aquatic snake species were captured using double-ended funnel traps set along shorelines of riverine systems with 10–20 cm of depth at localities of historic occurrence. Traps were generally set for 15–48 hrs at a given site. Traps were checked and any snake found was transferred to a cloth snake bag for transport to a processing location. In addition, active diurnal and nocturnal searches were conducted at selected sites to hand capture any snakes observed. Data collected for snakes included weight to the nearest 0.5 gram using Pesola spring scales, and snout-vent and tail lengths to the nearest millimeter. Mensural data included scale counts (ventrals, sub-caudals, mid-dorsals, and labials). All watersnakes were palpated for stomach contents and a blood or tissue sample collected for future genetic analysis should that avenue of research be warranted. All watersnakes were tagged using PIT tags (passive integrated transponders) for future positive identification and released at the point of capture. Complete data for each snake can be found in Appendix 1.

Pseudemys gorzugi and other aquatic turtle species were captured using hoop traps with one funnel opening, baited with sardines, and set along the shorelines of riverine habitats with ca. ≥ 1 meter of water depth. Those habitats with sufficient water clarity were actively searched using mask and snorkel in an effort to hand capture any turtles encountered. Trapping sites for both species were determined from gray literature (NMDGF files), personal communications with C. W. Painter, and museum records from the Museum of Southwestern Biology (MSB) at the University of New Mexico (UNM) in Albuquerque. Complete turtle data can be found in Appendix 2.

Results

Thirteen historic sites were surveyed for *N. erythrogaster* and *P. gorzugi* between April 10 and June 15, 2006. A total of 18,643 and 3,533 trap hours were spent attempting to document *N. erythrogaster* and *P. gorzugi*, respectively. This equates to 666 trap hours/snake and 101 trap hours/turtle. Additionally, 31 man hours were spent actively searching for *N. erythrogaster* (n=5) equating to 6.2 man hours required for finding one snake. A total of 29 man hours were spent actively searching for *P. gorzugi* (n=6) equating to 4.8 man hours required to find one turtle.

Nerodia erythrogaster

Nerodia erythrogaster were trapped at 4 of 13 sites surveyed (Appendix 1, Maps 1 and 2 [Appendix 3], and Appendix 7) with a total of 28 captures including one recapture. The dots on the map represent individual snakes, and where dots are clustered represents a trapping locality. However a single dot on Map 1 south of NM Hwy 31 and west of the Pecos River is mis-mapped and incorrect. The single recaptured female occurred at the old diversion dam on the Delaware River 24 days later and within 1 meter of the initial capture suggesting some site fidelity. The recaptured snake increased in SVL from 580 mm to 620 mm (40 mm) and increased in mass from 127.5 g. to 152.5 g. (25 g.). Fourteen of the 27 snake captures occurred in the Pecos River between NM Hwy

31 and “10 Mile Dam”. Of the 27 captures, 16 were males (13 adult, 3 juvenile); and 11 were females (7 adults, 4 juveniles). Lengths of *N. erythrogaster* captured are summarized in Appendix 4. Figure 1 shows the length to mass relationship for all snakes captured. In addition to *N. erythrogaster*; two other snake species were encountered, *Thamnophis proximus* and *T. marcianus*. *Thamnophis proximus* were captured on the Pecos River at NM Hwy 31 and observed on the Delaware River at US Hwy 285, and *T. marcianus* were found on the Delaware River at the old diversion dam. Scutellation data of *N. erythrogaster* were also collected and compared to those reported by Degenhardt et al. (1996) and Gibbons and Dorcas (2004) (Appendix 4).

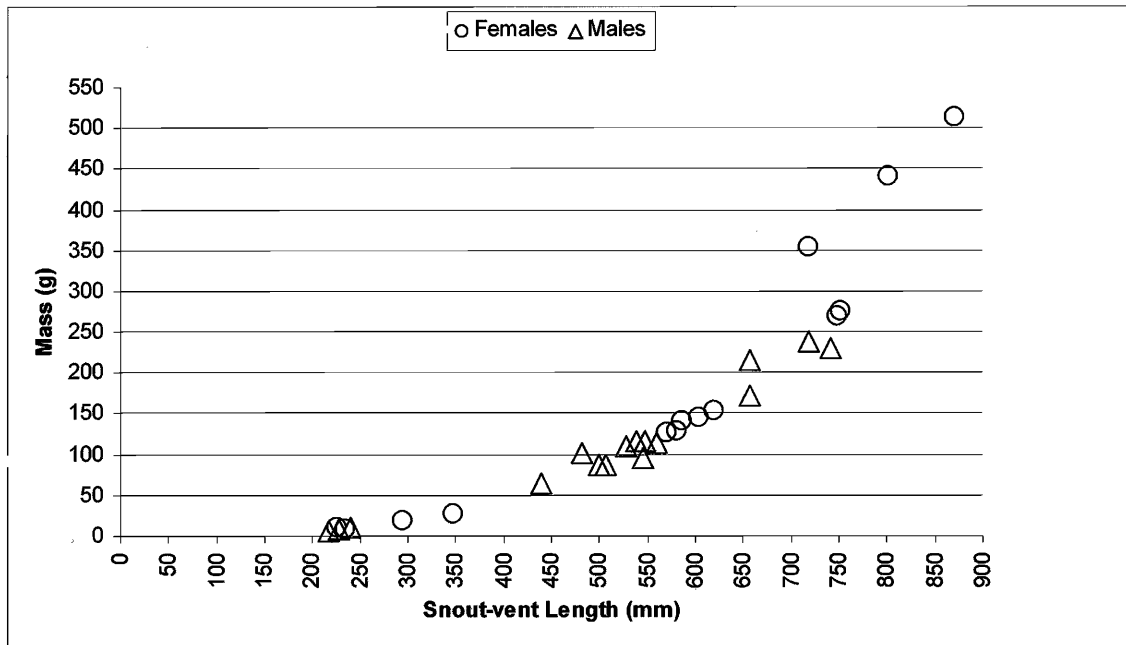


Figure 1. *Nerodia erythrogaster* length-weight relationship for Eddy County, 2006.

Food habits were investigated and 8 food items were palped from 28 total *N. erythrogaster* captured. Fish were the dominant item recovered from 7 watersnakes (2 Green Sunfish [*Lepomis cyanellus*], 4 Red Shiners [*Cyprinella lutrensis*], and 3 unidentified fish parts), and one amphibian was recovered from 1 watersnake (Northern Cricket Frog [*Acris crepitans*]). Furthermore, upon checking a trap a watersnake was observed with a *Lepomis cyanellus* in its mouth.

Pseudemys gorzugi

Pseudemys gorzugi were found at 8 of 13 historic sites surveyed (Appendix 2 and Maps 1–3 [Appendix 3], and Appendix 7), with a total of 39 captures. Triangles on Maps 1–3 represent individual captures, and where triangles are clustered represent a single trapping locality. It should also be noted that scales differ between maps and for example Map 3 triangles all represent one general trapping locality (Black River headwaters). Of the 8 sites where *P. gorzugi* were encountered, they were most abundant on the Black River, particularly in the upper reaches (Appendix 3 and Appendix 7), where *P. gorzugi*

were the dominant species encountered. *Pseudemys gorzugi* were only trapped at one site on the Delaware River (old diversion dam) where three adults were trapped and a shell was recovered with an obvious bullet hole through the shell. Sites surveyed on the Pecos River had relatively few individuals encountered per trapping effort. At the Pecos River at NM Hwy 31 a single juvenile was hand captured, at 10 Mile Dam a single large adult female was trapped, and at the Pecos River at the Black River confluence a single adult female was trapped. The site below Avalon Dam was not actively trapped however *P. gorzugi* were observed to be common with various size classes observed through binoculars. An observation (with photos) of two basking *P. gorzugi* was made by D. Reily at Carlsbad Municipal Lake June 2006, verifying their continued presence at that site. Another observation was made at Rattlesnake Springs of a single adult *P. gorzugi* on 5 May 2006 (BLC pers. obs.). The observations were not included in data tables or maps. Other turtle species encountered during this investigation included; Western Painted Turtle (*Chrysemys picta*), Red-eared Slider (*Trachemys scripta*), Common Snapping Turtle (*Chelydra serpentina*), Spiny Softshell Turtle (*Apalone spinifera*), and Yellow Mud Turtle (*Kinosternon flavescens*).

In addition to other species of turtles and snakes encountered, three amphibian species (*Acris crepitans*, *Rana berlandieri*, and *Rana blairi*) were encountered. *Acris crepitans* was found at all sites surveyed except the headwaters of the Black River and Chalk Bluff Draw. *Rana berlandieri* was only observed on the Pecos River at NM Hwy 31, and *R. blairi* only at Chalk Bluff Draw.

Turtle sizes were plotted (carapace length vs. mass) in Figure 2 for those turtles with complete data.

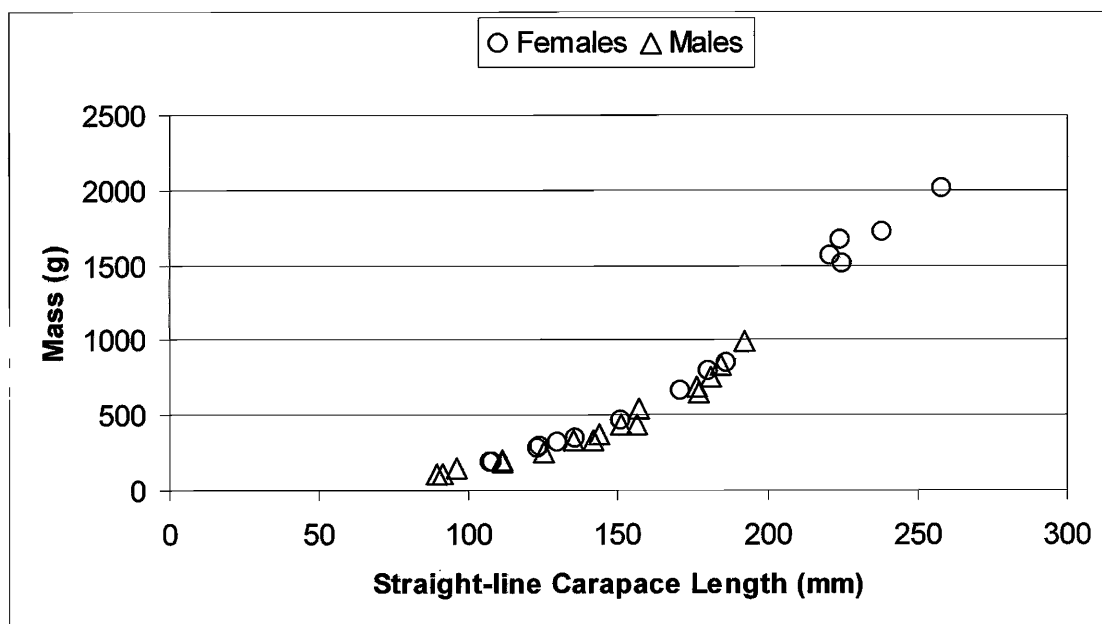


Figure 2. *Pseudemys gorzugi* length-weight relationship for Eddy County, 2006.

Discussion

Nerodia erythrogaster

Data gathered to date are incomplete due to delays in funding. A final three trips (July, August, and September) are scheduled pending funding, as is an investigation into food habits of *N. e. transversa* in NM and the greater Chihuahuan Desert from museum specimens. Museum specimens are being acquired at the time of this writing. While the single recaptured female showed measurable signs of growth during the 24 days between captures; the change in SVL may be in part due to measuring differences (as snakes are hard to measure accurately) but the change in weight is self evident.

Regarding food habits Degenhardt et al. (1996) reported a *Lepomis cyanellus* from one trapped specimen and that snakes likely preyed on *Acris crepitans*, both of which were confirmed during this investigation. Gibbons and Dorcas reported a number of prey items for *N. erythrogaster* including; *Lepomis humilis* and various anurans, but not *L. cyanellus*, *C. lutrensis* or *A. crepitans*. These two fish species and one anuran were found to be quite common at sites surveyed during this investigation.

The Pecos River site upstream of NM highway 31 to "10 Mile Dam" (Appendix 7) appears to have the most robust population despite being heavily used by fishermen, weekend campers and partiers. The habitat is more diverse here than immediately up or down stream, with a divided channel over bedrock that increases water flow rate and likely oxygen content. Water depths are relatively shallow (≤ 1.5 m) and riparian obligate plant species such as sedges, cattail, and rushes are abundant creating a thick maze of potential cover and foraging habitat for *N. e. transversa* and potential anuran prey as well as other reptile species like *Thamnophis proximus*. This reach of river more than any other surveyed appears to have greater biotic diversity than was observed else where on the Pecos or its tributaries. The lack of recaptured *N. e. transversa* from this site on the Pecos River suggests a relatively robust population. This site would provide an excellent study site for a radio telemetry study to investigate the habitat use of *N. e. transversa* in a habitat with heavy public use.

Preliminary observations suggest that *N. e. transversa* are less likely to be encountered in habitats with deep water (> 2 m) or at least those lacking shallows, and there seems to be some preference to moving water with rocky retreats or foraging areas. A preference for shallower water over rocky substrates may provide better foraging habitat as more fish species of appropriate size may be present in greater numbers and water clarity may be better for visual hunting.

Sexual dimorphism in *Nerodia* in general is based on size differentiation, with females larger than males. Figure 1 shows that female *N. e. transversa* weights become proportionately heavier somewhere between 650–750 mm SVL than that of males. Up to 650–750 mm SVL males and females are of a similar size.

Habitat loss or degradation through human activities has been proposed as reasons to declines in the species further downstream on the Pecos River in Texas (Scudday, 1974). Currently the Pecos River in NM appears to be sufficiently "healthy" to support a variety of aquatic amphibians and reptiles and their prey.

Pseudemys gorzugi

Further investigation at historic sites is needed to complete this project. Sites in need of investigation are Rocky Arroyo, Brantley Lake, Carlsbad Municipal Lake, Avalon Lake, Willow Lake, and the Pecos River at Six Mile Dam. Our finding of an individual *P. gorzugi* shell with a bullet hole indicates that turtle shooting remains a **problem in this region**. Charles W. Painter (*pers. comm.*) found numerous turtle shells at a drying pool along the Delaware River with bullet holes, some of which could be identified as *P. gorzugi*. This type of behavior can have serious impacts on populations of such long lived animals. Recent investigations conducted on *P. gorzugi* in Texas suggest that some populations may be reduced through commercial collecting, and that NM populations may be some of the most robust currently known in the wild (B. Stearns *pers. comm.*).

Recommendations

Current state listings should remain as is. Further investigations should include radio telemetry studies into habitat use by *N. erythrogaster* at sites with heavy public use. Increase education and law enforcement to protect turtles and snakes from persecution.

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Appendix 4: Scutellation and morphometric data for *N. erythrogaster*.

Scutellation *Nerodia erythrogaster*.

	Eddy Co. 2006	Degenhardt	Gibbons and Dorcas
Subcaudals			
Females	66–78 (69)	61–79	64–74
Males	69–81 (77)	75–87	71–84
Ventrals			
Females	134–146 (144)	n/a	141–157
Male	138–155 (144)	n/a	141–156
Combined		132–159	138–158
Middorsals			
Females	23–25 (24)		21–25
Males	23		23
Combined		23–27 (25)	19–25
Supralabials			
	7–11 (8)	7–10	8
Infralabials			
	9–13 (10)	n/a	10–11

Morphometrics *Nerodia erythrogaster*, Eddy Co. 2006.

	n	Adults		n	Juveniles	
		SVL	Total Length		SVL	Total Length
Females	10	225-870 (568)	743-1109 (887)	4	225-347 (276)	293-458 (359)
Males	13	217-741 (506)	581-971 (763.7)	3	217-240 (228)	297-321 (307)

Appendix 5: Photos of juvenile and adult *Nerodia erythrogaster* and *Pseudemys gorzugi*
Eddy Co. NM.



Photo 1 and 2. *Nerodia erythrogaster* juvenile and adult, Pecos River.

Appendix 5: cont.

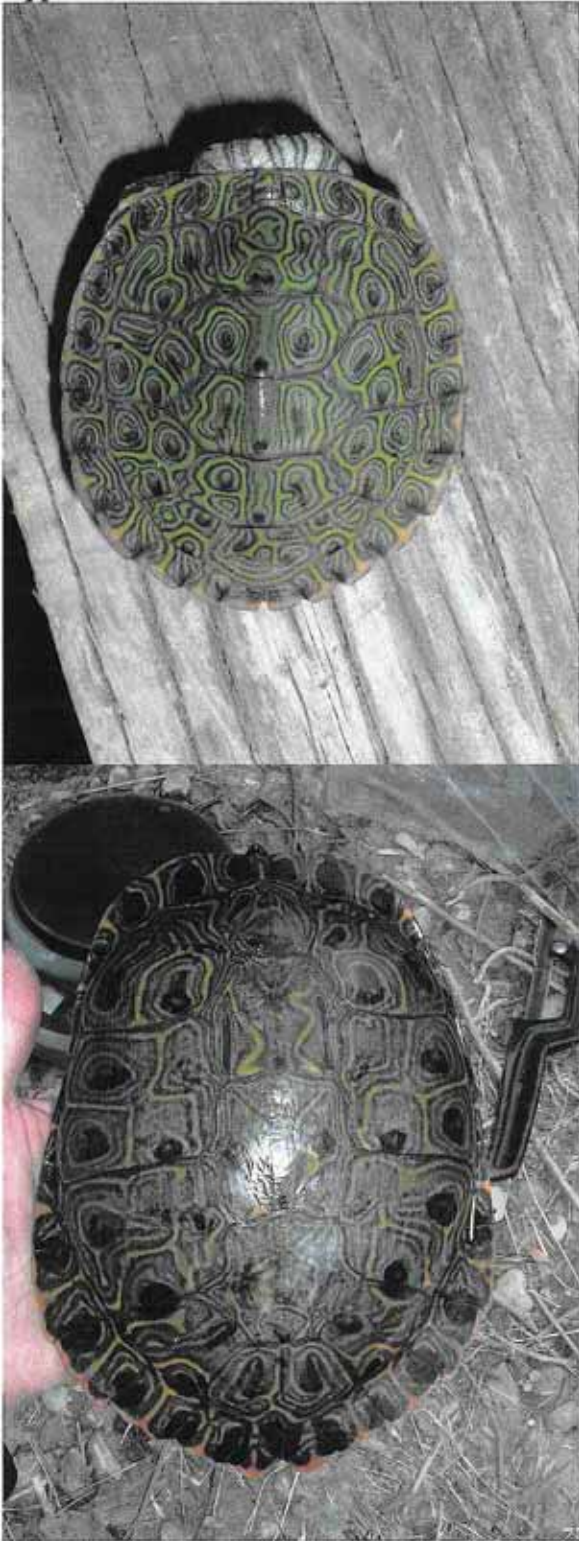


Photo 3 and 4. *Pseudemys gorzugi*, juvenile Pecos River, adult Black River.

Appendix 6: Photos of habitats where *Nerodia erythrogaster* and *Pseudemys gorzugi* were found, Eddy Co. NM, 2006.

Habitat Photos: *Nerodia erythrogaster*



Pecos River above NM Hwy 31 (top) and at “10 Mile Dam” (bottom)



Delaware River vicinity of old diversion dam, top, (20 m above dam) pool and bottom, (100 m below dam) showing ledge habitat favored by *N. erythrogaster*.



Delaware River at old diversion dam, *N. erythrogaster* and *P. gorzugi* pool habitat.



Black River, headwaters, *P. gorzugi* pool habitat.