

## Turtles at the Bosque

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The turtles at the Bosque del Apache NWR have recently become more visible, thanks to some new logs placed in the ponds and the new observation blind at the Ducks Unlimited pond. It's often amusing to find some of them hauled up on the logs to bask in the morning sunshine, with their legs stretched out "Superman style" to catch the sun's rays.

There are three species of turtles most commonly found on the Bosque Refuge: painted turtles, spiny soft-shell turtles, and Big Bend sliders. Painted turtles are small, dark turtles with a hard, shiny shell. Their heads and legs have brightly colored stripes, and they also have a bright red plastron (the bottom shell). They are frequently seen basking in the display pond across from the Visitor Center and on the logs near the new duck blind. Soft-shell turtles are brown and flat, and look like large pancakes when basking near the edge of the canals. Soft-shell turtles, as their name implies, have flexible leather shells. They have particularly long necks that allow them to lay on the bottom of shallow ponds while extending the elongated snout like a snorkel to breathe at the surface. Big Bend sliders have a similar profile to painted turtles when viewed basking, but are much larger. Their most popular hangout this summer is basking on the logs in the display pond directly across from the Visitor Center. Females have a very high, domed shell, whereas males have a more streamlined profile.

June is the nesting season for all three species of turtles. Female painted turtles emerge from the water in late afternoon, dig a flask-shaped cavity about 10 centimeters deep, and lay 7 to 11 eggs inside. The eggs are 2-3 centimeters long, elongated, and translucent pinkish-white in color, with a flexible shell. Then she covers the nest with a muddy plug

and returns to the water, completing the extent of her maternal care. She will lay two to three clutches per season. Brightly colored hatchlings, only about the size of a quarter, hatch near the end of August, but often remain in the nest throughout the winter and emerge in early spring. Soft-shell turtles lay 20 to 30 eggs, the size and shape of ping-pong balls, in shallow nests along the sandy banks of the canals, whereas Big Bend sliders typically lay about 20 oblong eggs.

Many turtles exhibit an intriguing form of sex determination, called temperature-dependent sex determination. The temperature at which eggs are incubated, rather than sex chromosomes, permanently determine the sex of the hatchlings. In painted turtles, eggs incubated at warm temperatures produce females, and cooler temperatures produce males. A tiny difference in temperatures, about one degree Celsius, can determine whether the eggs become males or females. On the other hand, soft-shell turtles exhibit chromosomal sex determination rather than temperature-dependent sex determination. It is not known which sex determination mechanism Big Bend sliders exhibit.

Western painted turtles are found as far north as Manitoba, and the extreme southern extent of their range happens to be near the Bosque del Apache NWR, as well as the Pecos River in southern New Mexico. Summer climatic conditions greatly influence what the sex ratio will be for the hatchlings born in the summer, in fact, a small increase in July temperatures for an extended period of time could potentially eliminate the production of males in an entire population. So why aren't all males born in Manitoba and all females born in New Mexico?

I'm a graduate student at Iowa State University, and I'm addressing this question by studying whether timing of nesting, nesting behavior, or response of the eggs to temperatures vary in New Mexico painted turtles from other populations in the United States, which could help keep sex ratios balanced across such varying climates. The information I have gathered so far can be useful for answering this question as well as learning about potential consequences of

global warming, prime nesting habitat for turtle conservation in New Mexico, and potential dangers of introducing non-native members of the same species that may not exhibit the same reproductive traits as local population. The Bosque Refuge has been a perfect location to research painted turtles in the southwest because of the extensive aquatic habitat available to them.