

= Wood turtle =

The wood turtle ( *Glyptemys insculpta* ) is a turtle endemic to North America . It is in the genus *Glyptemys* , a designation given to only one other turtle : the bog turtle . The wood turtle reaches a carapace length of 14 to 20 centimeters ( 5 @. @ 5 to 7 @. @ 9 in ) , its defining characteristic being the pyramidal pattern on its upper shell . Morphologically , it is similar to the bog turtle , spotted turtle , and Blanding 's turtle . The wood turtle exists in a broad range extending from Nova Scotia in the north ( and east ) to Minnesota in the west and Virginia in the south . In the past , it was forced south by encroaching glaciers : skeletal remains have been found as far south as Georgia .

It spends a great deal of time in or near the water of wide rivers , preferring shallow , clear streams with compacted and sandy bottoms . The wood turtle can also be found in forests and grasslands , but will rarely be seen more than several hundred meters from flowing water . It is diurnal and is not overtly territorial . It spends the winter in hibernation and the hottest parts of the summer in estivation .

The wood turtle is omnivorous and is capable of eating on land or in water . On an average day , a wood turtle will move 108 meters ( 354 ft ) , a decidedly long distance . Many other animals that live in its habitat pose a threat to it . Raccoons are over @-@ abundant in many places and are a direct threat to all life stages of this species . Inadvertently , humans cause a large number of deaths through habitat destruction , road traffic , farming accidents , and illegal collection . When unharmed , it can live for up to 40 years in the wild and 58 years in captivity .

= = Taxonomy = =

Formerly in the genus *Clemmys* , the wood turtle is now a member of *Glyptemys* , a classification that wood turtles share with only the bog turtle . It and the bog turtle have a similar genetic makeup , which is marginally different from that of the spotted turtle , the only current member of the *Clemmys* genus . It has undergone extensive name changes by various scientists over the course of its history . Today , there are several prominent common names for the wood turtle , including sculptured tortoise , red @-@ legged tortoise , and redleg .

Although no subspecies are recognized , there are morphological differences in wood turtles between areas . Individuals found in the west of its range ( areas like the Great Lakes and the Midwest United States ) have a paler complexion on the inside of their legs and underside of their necks than ones found in the east ( places including the Appalachian Mountains , New York , and Pennsylvania ) . Genetic analysis has also revealed that southern populations have less genetic diversity than the northern ; however , both exhibit a fair amount of diversity considering the decline in numbers that have occurred during previous ice ages .

= = Description = =

Wood turtles grow to between 14 and 20 centimeters ( 5 @. @ 5 and 7 @. @ 9 in ) in length , and reach a maximum of 23 @. @ 4 centimeters ( 9 @. @ 2 in ) . They have a rough carapace that is a tan , grayish brown or brown color , with a central ridge ( called a keel ) made up of a pyramidal pattern of ridges and grooves . Older turtles typically display an abraded or worn carapace . Fully grown , they weigh 1 kilogram ( 35 oz ) . The wood turtle 's karyotype consists of 50 chromosomes .

The larger scutes display a pattern of black or yellow lines . The wood turtle 's plastron ( ventral shell ) is yellowish in color and has dark patches . The posterior margin of the plastron terminates in a V @-@ shaped notch . Although sometimes speckled with yellowish spots , the upper surface of the head is often a dark gray to solid black . The ventral surfaces of the neck , chin , and legs are orange to red with faint yellow stripes along the lower jaw of some individuals . Seasonal variation in color vibrancy have been known to occur .

At maturity , males , who reach a maximum length of 23 @. @ 4 centimeters ( 9 @. @ 2 in ) , are larger than females , who have been recorded to reach 20 @. @ 4 centimeters ( 8 @. @ 0 in ) . Males also have larger claws , a larger head , a concave plastron , a more dome @-@ like carapace

, and longer tails than females . The plastron of females and juveniles is flat while in males it gains concavity with age . The posterior marginal scutes of females and juveniles ( of either gender ) radiate outward more than in mature males . The coloration on the neck , chin , and inner legs is more vibrant in males than in females who display a pale yellowish color in those areas . Hatchlings range in size from 2 @. @ 8 to 3 @. @ 8 centimeters ( 1 @. @ 1 to 1 @. @ 5 in ) in length ( straight carapace measurement ) . The plastrons of hatchlings are dull gray to brown . Their tail usually equals the length of the carapace and their neck and legs lack the bright coloration found in adults . Hatchling 's carapaces also are as wide as they are long and lack the pyramidal pattern found in older turtles .

The eastern box turtle and Blanding 's turtle are similar in appearance to the wood turtle and all three live in overlapping habitats . However , unlike the wood turtle , both the Blanding 's turtle and members of the box turtle family have hinged plastrons that allow them to completely close their shells . The diamondback terrapin has a shell closely resembling the wood turtle 's ; however its skin is gray in color , and it inhabits coastal brackish and saltwater marshes . The bog turtle and spotted turtle are also similar , but neither of these have the specific sculptured pattern found on the carapaces of the wood turtle .

#### = = Distribution and habitat = =

The wood turtle is found in most New England states , Nova Scotia , west to Michigan , northern Indiana and Minnesota , and south to Virginia . Overall , the distribution is disjunct with populations often being small and isolated . Roughly 30 % of its total population is in Canada . It prefers slow @-@ moving streams containing a sandy bottom and heavily vegetated banks . The soft bottoms and muddy shores of these streams are ideal for overwintering . Also , the areas bordering the streams ( usually with open canopies ) are used for nesting . Spring to summer is spent in open areas including forests , fields , bogs , wet meadows , and beaver ponds . The rest of the year is spent in the aforementioned waterways .

The densities of wood turtle populations have also been studied . In the northern portion of its range ( Quebec and other areas of Canada ) , populations are fairly dilute , containing an average of 0 @. @ 44 individuals per 1 hectare ( 2 @. @ 5 acres ) , while in the south , over the same area , the densities varied largely from 6 to 90 turtles . In addition to this , it has been found that colonies often have more females than males .

In the western portion of its range , wood turtles are more aquatic . In the east , wood turtles are decidedly more terrestrial , especially during the summer . During this time , they can be found in wooded areas with wide open canopies . However , even here , they are never far from water and will enter it every few days .

#### = = Evolutionary history = =

In the past , wood turtle populations were forced south by extending glaciers . Remains from the Rancholabrean period ( 300 @, @ 000 to 11 @, @ 000 years ago ) have been found in states such as Georgia and Tennessee , both of which are well south of their current range . After the receding of the ice , wood turtle colonies were able to re @-@ inhabit their customary northern range ( areas like New Brunswick and Nova Scotia ) .

#### = = Ecology and behavior = =

During the spring , the wood turtle is active during the daytime ( usually from about 7 : 00 a.m. and 7 : 00 p.m. ) and will almost always be found within several hundred metres of a stream . The early morning and late afternoon are preferred foraging periods . Throughout this season , the wood turtle use logs , sandy shores , or banks to bask in sunlight . In order to maintain its body temperatures through thermoregulation , it spends a considerable amount of time basking , most of which takes place in the late morning and late afternoon . The wood turtle reaches a peak body temperature of

37 ° C ( 99 ° F ) after basking . During times of extreme heat , it has been known to estivate . Several reports mention individuals resting under vegetation , fallen debris and in shallow puddles . During the summer , the wood turtle is considered a largely terrestrial animal . At night , its average body temperature drops to between 15 and 20 ° C ( 59 and 68 ° F ) and it will rest in small creeks or nearby land ( usually in areas containing some sort of underbrush or grass ) .

During warmer weather , the wood turtle stays in the water for a larger percentage of the time . For this reason , during the winter months ( and the late fall and early spring ) it is considered an aquatic turtle . November through February or March is spent in hibernation at the bottom of a small , flowing river . The wood turtle may hibernate alone or in large groups . During this period , individuals bury themselves in the thick mud at the bottom of the river and rarely move . During hibernation , it is vulnerable to flash floods . Emergence does not occur until March or sometimes April , months that mark the beginning of its activation period ( males are typically more active than females at this time ) .

Males are known to be aggressive , with larger and older turtles being more dominant . Larger males rank higher on the social hierarchy often created by wood turtle colonies . In the wild , the submissive turtle is either forced to flee , or is bombarded with physical abuses , which include biting , shoving , and ramming . Larger and more dominant males will sometimes try to remove a subordinate male while he is mating with a female . The defender will , if he does not successfully fight for his position , lose the female to the larger male . Therefore , among males , there is a direct relationship between copulation opportunities and social rank . However , the outcome of encounters between two turtles is more aggression @-@ dependent than size @-@ dependent . The wood turtle that is more protective of his or her area is the victor . Physical bouts between wood turtles ( regardless of gender ) increases marginally during the fall and spring ( times of mating ) .

The wood turtle is omnivorous , feeding mainly on plant matter and animals both on land and in water . It eats prey such as beetles , millipedes , and slugs . Also , wood turtles consume specific fungi ( *Amanita muscaria* and *Leccinum arcolatum* ) , mosses , grasses , various insects , and also carrion . On occasion , it can be seen stomping the ground with alternating hits of the left and right front feet . This behavior is thought to imitate the sound of falling rain , sometimes causing earthworms to rise to the surface where they quickly become easy prey . When hunting , the wood turtle pokes its head into such areas as dead and decaying logs , the bottoms of bushes , and in other vegetation . In the water , it exhibits similar behavior , searching algae beds and cavities along the sides of the stream or river .

Many different animals are predators of or otherwise pose a threat to the wood turtle . They include snapping turtles , porcupines , raccoons , otters , foxes , and cats . All of these species destroy unhatched eggs and prey upon hatchlings and juveniles . Several animals that often target wood turtle eggs are the common raven and coyote , which may completely destroy the nests they encounter . Evidence of predatory attacks ( wounds to the skin and such ) are common on individuals , but the northern populations tend to display more scarring than the southern ones . In addition to these threats , wood turtles also suffer from leech infestations .

### == Movement ==

The wood turtle can travel at a relatively fast speed ( upwards of 0 @.@ 32 kilometers per hour ( 0 @.@ 20 mph ) ) ; it also travels long distances during the months that it is active . In one instance , of nine turtles studied , the average distance covered in a 24 @-@ hour period was 108 meters ( 354 ft ) , with a net displacement of 60 meters ( 197 ft ) .

The wood turtle , an intelligent animal , has homing capabilities . Its mental capacity for directional movement was discovered after the completion of an experiment that involved an individual finding food in a maze . The results proved that these turtles have locating abilities similar to that of a rat . This was also proved by another , separate experiment . One male wood turtle was displaced 2 @.@ 4 kilometers ( 1 @.@ 5 mi ) after being captured , and within five weeks , it returned to the original location . The homing ability of the wood turtle does not vary among genders , age groups , or directions of travel .

## == Life cycle ==

The wood turtle takes a long time to reach sexual maturity , has a low fecundity ( ability to reproduce ) , but has a high adult survival rate . However , the high survival rates are not true of juveniles or hatchlings . Although males establish hierarchies , they are not territorial . The wood turtle becomes sexually mature between 14 and 18 years of age . Mating activity among wood turtles peaks in the spring and again in the fall , although it is known to mate throughout the portion of the year they are active . However , it has been observed mating in December . In one rare instance , a female wood turtle hybridized with a male Blanding 's turtle .

The courtship ritual consists of several hours of ' dancing , ' which usually occurs on the edge of a small stream . Males often initiate this behavior : starting by nudging the females shell , head , tail , and legs . Because of this behavior , the female may flee from the area , in which case the male will follow . After the chase ( if it occurs ) , the male and female approach and back away from each other as they continually raise and extend their heads . After some time , they lower their heads and swing them from left to right . Once it is certain that the two individuals will mate , the male will gently bite the female 's head and mount her . Intercourse lasts between 22 and 33 minutes . Actual copulation takes place in the water , between depths between 0 @. @ 1 and 1 @. @ 2 meters ( 0 and 4 ft ) . Although unusual , copulation does occur on land . During the two prominent times of mating ( spring and fall ) , females are mounted anywhere from one to eight times , with several of these causing impregnation . For this reason , a number of wood turtle clutches have been found to have hatchlings from more than one male .

Nesting occurs from May until July . Nesting areas receive ample sunlight , contain soft soil , are free from flooding , and are devoid of rocks and disruptively large vegetation . These sites however , can be limited among wood turtle colonies , forcing females to travel long distances in search of a suitable site , sometimes a 250 meters ( 820 ft ) trip . Before laying her eggs , the female may prepare several false nests . After a proper area is found , she will dig out a small cavity , lay about seven eggs ( but anywhere from three to 20 is common ) , and fill in the area with earth . Oval and white , the eggs average 3 @. @ 7 centimeters ( 1 @. @ 5 in ) in length and 2 @. @ 36 centimeters ( 0 @. @ 93 in ) in width , and weigh about 12 @. @ 7 grams ( 0 @. @ 45 oz ) . The nests themselves are 5 to 10 centimeters ( 2 @. @ 0 to 3 @. @ 9 in ) deep , and digging and filling it may take a total of four hours . Hatchlings emerge from the nest between August and October with overwintering being rare although entirely possible . An average length of 3 @. @ 65 centimeters ( 1 @. @ 44 in ) , the hatchlings lack the vibrant coloration of the adults . Female wood turtles in general lay one clutch per year and tend to congregate around optimum nesting areas .

The wood turtle , throughout the first years of its life , is a rapid grower . Five years after hatching , it already measures 11 @. @ 5 centimeters ( 4 @. @ 5 in ) , at age 16 , it is a full 16 @. @ 5 to 17 centimeters ( 6 @. @ 5 to 6 @. @ 7 in ) , depending on gender . The wood turtle can be expected to live for 40 years in the wild , with captives living up to 58 years .

## == Conservation ==

Despite many sightings and a seemingly large and diverse distribution , wood turtle numbers are in decline . A large number of deaths caused by humans result from : habitat destruction , farming accidents , and road traffic . Also , it is commonly collected illegally for the international pet trade . These combined threats have caused many areas where they live to enact laws protecting it . Despite legislation , enforcement of the laws and education of the public regarding the species are minimal .

For proper protection of the wood turtle , in @-@ depth land surveys of its habitat to establish population numbers are needed . One emerging solution to the highway mortality problem , which primarily affects nesting females , is the construction of under @-@ road channels . These tunnels allow the wood turtle to pass under the road , a solution that helps prevent accidental deaths . Brochures and other media that warn people to avoid keeping the wood turtle as a pet are currently

being distributed . Next , leaving nests undisturbed , especially common nesting sites and populations , is the best solution to enable the wood turtle 's survival .