

= Carolina wren =

The Carolina wren (*Thryothorus ludovicianus*) is a common species of wren that is a resident in the eastern half of the United States of America , the extreme south of Ontario , Canada , and the extreme northeast of Mexico . Severe winters restrict the northern limits of their range while favorable weather conditions lead to a northward extension of their breeding range . Their preferred habitat is in dense cover in forests , farm edges and suburban areas . This wren is the state bird of South Carolina .

There are seven recognized subspecies across the range of these wrens and they differ slightly in song and appearance . The birds are generally inconspicuous , avoiding the open for extended periods of time . When out in the open , they investigate their surroundings and are rarely stationary . After finding a mate , pairs maintain a territory and stay together for several years . Both sexes give out alarm calls , but only males sing to advertize territory . Carolina wrens raise multiple broods during the summer breeding season , but can fall victim to brood parasitism by brown @-@ headed cowbirds , among other species . Some populations have been affected by mercury contamination .

= = Taxonomy = =

The Carolina wren was first described under the name of *Sylvia ludoviciana* by John Latham in 1790 . Louis Jean Pierre Vieillot considered all wrens under the genus *Troglodytes* and called the Carolina wren *Troglodytes arundinaceus* but placed it subsequently in a separate genus *Thryothorus* (initially misspelled *Thriothorus*) that he created in 1816 . *Thryothorus* is of Greek origin from the combination of *thryon* (rush , reed) and *thouros* (derivative of verb *throskein* to leap up , spring , jump at) which means ' reed jumper ' ; its specific name *ludovicianus* is a post @-@ classical Latin term for *Ludovicus* (derivative from Louis XIV) that means ' of Louisiana ' that identifies the locality of the specimen collected near New Orleans .

There are seven recognized subspecies of the Carolina wren :

T. l. ludovicianus (Latham , 1790) ? Southeast Canada (Southern Ontario , irregularly in Eastern and Southern Quebec) and the eastern United States (Southern Wisconsin and New England southward to Texas and northern Florida) .

T. l. miamensis Florida wren (Ridgway , 1875) ? Florida from approximately 30 degrees (Gainesville) region southward through the rest of the state .

T. l. nesophilus (Stevenson , 1973) ? Dog Island in Northwestern Florida .

T. l. burleighi ? Burleigh 's Carolina wren (Lowery , 1940) Offshore islands off of the Mississippi coast : Cat Island , Ship Island (Mississippi) , and Horn Island .

T. l. lomitensis ? Lomita wren (Sennett , 1890) southern Texas to the extreme northeast of Mexico (Tamaulipas) .

T. l. berlandieri ? Berlandier 's wren (S. F. Baird , 1858) Northeastern Mexico (eastern Coahuila , Nuevo Leon , and southwestern Tamaulipas)

T. l. tropicalis ? Northeastern Mexico (eastern San Luis Potosi and southern Tamaulipas) .

T. ludovicianus is traditionally placed within its own genus as its only representative of North America , but recent DNA work suggests it is closely allied with the Bewick 's wren . A distinct population in the Yucatan Peninsula of Mexico , Belize , Nicaragua , and in Guatemala is treated as a separate species , either known as Cabot 's wren or white @-@ browed wren (*Thryothorus albinucha*) . It is considered a subspecies of *T. ludovicianus* by some authors , however .

= = Description = =

At 12 @.@ 5 to 14 cm (4 @.@ 9 to 5 @.@ 5 in) long , with a 29 cm (11 in) wingspan and a weight of about 18 to 23 g (0 @.@ 63 to 0 @.@ 81 oz) , the Carolina wren is a fairly large wren ; the second largest in the United States species after the cactus wren . Among standard measurements , the wing chord is 5 @.@ 4 to 6 @.@ 4 cm (2 @.@ 1 to 2 @.@ 5 in) , the tail is 4 @.@ 5 to 5 @.@ 6 cm (1 @.@ 8 to 2 @.@ 2 in) , the culmen is 1 @.@ 4 to 1 @.@ 8 cm (0 @.@

55 to 0 @. @ 71 in) and the tarsus is 2 to 2 @. @ 3 cm (0 @. @ 79 to 0 @. @ 91 in) . Sexual dimorphism is slight with males being larger than their mates . A study indicated that out of 42 mated pairs , all but one of male was larger than the female of the pair . The males were on average 11 percent heavier along with having longer wing chords .

There are several differences among the subspecies . For T. l. ludovicianus , the crown is rich brown that appears more chestnut @-@ colored on its rump and uppertail @-@ coverts . Shoulders and greater coverts are a rich brown , with a series of small white dots on the lesser primary coverts . The secondary coverts are rich brown with a darker brown barring on both webs ; the bars on the primaries are on the outerwebs only , but darker and more noticeable . The retrices are brown with 18 to 20 bars that span across the tail . The white supercilious streak borders thinly with a black above and below , and extends above and beyond its shoulders . The ear coverts are speckled gray and grayish @-@ black . Its chin and throat are grey that becomes buff on its chest , flank and belly , though the latter two are of a warmer color . The underwing coverts sport a grayish buff color . Its iris is reddish @-@ brown , the upper mandible is lemon @-@ colored and paler at the base and lower mandible . The legs are flesh @-@ colored .

As for the other subspecies in contrast to T. l. ludovicianus , T. l. berlandieri is of a slightly smaller build , but possesses a larger bill , the upperparts are duller brown with deeper colored underparts , T. l. lomitensis is of a duller color (than either ludovicianus or berlandieri) with its underparts either pale or almost white , T. l. miamensis contains darker rusty chestnut upperparts and deeper colored below . T. l. burleighi is duller and sootier with less distinct tail markings , T. l. mesophilus has paler underparts and a whiter supercilium , and T. l. tropicalis is darker than all races , and contains heavier bars than T. l. berlandieri .

= = = Plumage = = =

The juvenile T.l. ludovicianus is similar in appearance , but the plumage is generally paler with a softer texture with buff @-@ tipped wing coverts , a supercilary streak is less white , a fluffy vent and crissum (flanks) without bars . In August and September , the partial plumage molt for the post @-@ juvenile wrens is darker in color and affects the contour plumage , wing coverts , tail and develops a whiter supercilary stripe . The post @-@ nuptial molt for adults in the same time period is more pronounced in color than the spring molt , with both sexes similar in appearance .

= = = Life span = = =

Survival rates differ by region . A male captured in Arkansas lived to be at least 73 months old , and in Alabama , the oldest female and male captured were six and ten years old , respectively . A mark @-@ and @-@ recapture analysis of the wrens analyzing survival probability within the Southeastern United States captured was monitored from 1992 to 2003 . Roughly 90 percent of the banded wrens died within 10 years .

= = = Similar species = = =

The easiest species to confuse with the Carolina wren is Bewick 's wren , which differs in being smaller but with a longer tail , grayer @-@ brown above and whiter below . The Carolina and white @-@ browed wrens differ from the house wren in being larger , with a decidedly longer bill and hind toe ; their culmen has a notch behind the tip .

= = Habitat and distribution = =

These birds are largely resident , and will only disperse beyond their range after mild winters . Carolina wrens sporadically breed as far north as Maine and Quebec after mild winters . In certain parts of their range , such as most of Iowa , prolonged periods of snow can curtail potential expansion . Permanent breeding locations range from eastern Nebraska , southern Michigan ,

southeast Ontario and the New England states to Mexican states such as Coahuila , Nuevo León , San Luis Potosí and Tamaulipas and the Gulf Coast of the United States . Local occurrences with infrequent and likely breeding locations include southeast South Dakota , central Kansas , eastern Colorado , western Oklahoma and Texas as far as Maine and New Brunswick . There have been occasional vagrants spotted in Colorado , New Mexico , and Arizona , Wyoming , South Dakota , Manitoba , Nova Scotia , and the Gulf of St. Lawrence .

The range of the wrens increased northward and westward in several regions over the past few centuries . In Massachusetts , the wrens had expanded westward and northeastward from its former southeastern location in approximately 35 years , in New York the population increased three @-@ fold in roughly 25 years , while in midwest states such as Ohio and Michigan have seen numbers of the birds increase since the mid @-@ 1800s and early 1900s , respectively . Expansion around Ontario occurred since early reports in 1890 and 1905 . Explanations given include infrequent winter storms in the 20th century , expanded forest habitats , and the wrens taking advantage of urban areas containing feeders , especially in winter .

Carolina wrens adapt to various habitats . Natural habitats include various types of woodland such as oak hardwoods and mixed oak @-@ pine woodlands , ash and elmwoods , hickory @-@ oak woodlands with a healthy amount of tangled undergrowth . The preferred habitats are riparian forests , brushy edges , swamps , overgrown farmlands , and suburban yards with abundant thick shrubs and trees , and parks . It has an affinity for dilapidated buildings and unkempt yards in man @-@ made areas . Subspecies *burleighi* and *neophilus* inhabit slash pine and palmettos .

= = Behavior = =

= = = Song and calls = = =

Carolina wrens sing year round and at any point during the daytime , with the exception of performing during the most harsh weather conditions . The birds are also the only species in the Certhiidae family that neither sings in duet nor has their song control regions affect repertoire size . Males alone sing , and have a repertoire of at least twenty different phrase patterns and on average , thirty two . One of these patterns is repeated for several minutes , and although the male 's song can be repeated up to twelve times , the general amount of songs range from three to five times in repetition . While singing , the tail of the birds is pointed downward . Some general vocalizations have been transcribed as teakettle @-@ teakettle @-@ teakettle and cheery @-@ cheery @-@ cheery . Various descriptions of the teakettle song include whee @-@ udel , whee @-@ udel , whee @-@ udel , che @-@ wortel , che @-@ wortel and túrtee @-@ túrtee @-@ túrtee and familiar names and phrases such as sweet heart , sweet heart , come to me , come to me , sweet William , and Richelieu , Richelieu .

Males are capable of increasing their repertoire through song learning , but due to their sedentary nature and territorial defense habits , the song learning must occur within the first three months of life . Geographic barriers affect song repertoire size from male wrens , as one study indicated that distances separated as close as 3 kilometres (1 @.@ 9 mi) by water barriers can have the same effect as that of a distance of 145 kilometres (90 mi) in the mainland with no barriers .

Female Carolina wrens possess song control regions that would appear to make them capable of singing with repertoires like the male . Due to vocalizations that they occasionally make with the male , it has been suggested that song perception plays a role and is of behavioral relevance .

Different subspecies have variations in songs and calls , such as *miamensis* having a more rapid song that contains more notes than the races that are further north .

Their songs can be confused with the Kentucky warbler . The song patterns are similar , but is of a different quality , as the warbler 's songs is described as richer , with more ringing and a hurried pace . Other bird species that have their songs described as akin to the wrens are the flicker , Baltimore oriole , gray catbird , and more specifically the peto , peto , peto calls of the tufted titmouse , and whistles of the northern cardinal . Occasionally , the wrens mimic other species , and

in Pennsylvania it has led for it to be also known as the ' mocking wren ' .

== Sexual selection ==

A 2006 study suggested that the correlation of tail length and body size in males , wing length in females , and lifespan for both sexes were signs of individual quality , and the wrens of high quality tend to mate with like individuals . The courting and antagonistic encounters that involve the tail fanning and wing drooping was suggested to be a possible signaling use . Age and life experience are not thought of as significant for potential mates due to their relatively short lifespan and sedentary lifestyle . Due to the large size of male wrens and the male 's vigor in defending its territory , intrasexual selection was given as a possible explanation for the sexual dimorphism .

== Territorial and predator defense ==

Both sexes are involved in defending the territory . One aspect of territorial defense involves identifying the proximity of the threat based on the loudness of bird song as well as the level of degradation of the calls . In experiments involving playback , the wrens are capable of discriminating between degraded and undegraded songs , as well as degraded songs in the same acoustic conditions , and can detect changes of acoustic properties within their territories , such as songs under foliage . Song degradation can also be used to determine the proximity of potential intruders . If the song of a bird appears to be degraded , the wrens will assume that the threat is distant not respond ; if the song is not degraded , they respond by attacking . Not all birds within their territory are potential enemies . Some species of birds that are neighbors are designated as ' dear @-@ enemies ' by the wrens , and the responses to neighbors and intruders in their territories differ by the season . In spring , the wrens respond more aggressively toward neighbors , though in the fall , no major discrepancy in responses is shown . When protecting their nest , alarm calls are the general response . The wrens judge the size of the potential threat , such as a blue jay and avoid the risk of injury when attacking . Countersinging produced by intruder birds is more likely to be taken as an aggressive threat to male Carolina wrens .

Both males and females utilize calls in alarm situations , especially in territorial disputes and encounters with predators . Males alone produce the cheer call , which can sound indistinct . In southern regions of their range , the sound males use in alarm disputes is a ringing pink or p 'dink sound . Females are the only ones that can perform the paired dit @-@ dit or chatter sounds . The former can be used in territorial disputes with predators , and with at least northern populations the songs are used in alternation with the males cheer chant . The chatter is used exclusively with territorial encounters with male song , and the song can either follow or overlap her mate 's song .

== Feeding ==

Carolina wrens spend the majority of their time on or near the ground searching for food , or in tangles of vegetation and vines . They also probe bark crevices on lower tree levels , or pick up leaf @-@ litter in order to search for prey . Their diet consists of invertebrates , such as beetles , true bugs , grasshoppers , katydids , spiders , ants , bees , and wasps . Small lizards and tree frogs also make up the carnivorous portion of their diet . Vegetable matter makes up a small percentage of their diets , such as fruit pulp and various seeds . In the northern portion of their range , they frequent bird feeders .

== Movement ==

Carolina wrens are wary , and are more often heard than seen . When on the ground , they move in jerky hops pillaging through various objects , whether man @-@ made or natural . While moving abruptly , they pause momentarily for chattering or singing . When stationary , they move in twitched motions , jerking their breast around . They also sun- or sand @-@ bathe . The wrens also displays

a skittish behavior when encountered by humans , as they can be seen thrusting off into cover slowly if approaching is detected . However , they occasionally seek out humans that are near , so long as there is no movement from them . Other movements involve being capable of crawling like a creeper and hanging upside @-@ down like a nuthatch .

Flights are generally of short duration , rapid , low @-@ leveled , and wavelike . The wings during flight are flapped rapidly , and are frequently used during foraging . They are also capable of flying vertically from the base of a tree to the top in a single wing assisted bound .

= = = Breeding = = =

Carolina wrens are both genetically and socially monogamous and will usually mate for life . Mate changing is rare , and there has been one possible instance of polygamy . During the winter season , males are more responsible for guarding the territory . Females vary in succeeding to maintain winter territories without a mate . It has been suggested that the possibility of desertion and decline in care @-@ taking from males along with the need for security in resources year @-@ round prevent extra pair copulations from females , as the mortality rate for Carolina wrens peaks during the winter . Along with thermoregulatory benefits , roosting is thought to reinforce pair @-@ bonding and prevent divorce between mates .

The nests are arch @-@ shaped structures with a side entrance and built of dried plants or strips of bark , as well as horsetail , string , wool and snake sloughs . Males obtain nesting materials while the females remains at the site to construct the nest . Nests are located in fragmented or complete cavities in trees , or in man @-@ made structures such as bird @-@ boxes , buildings , tin cans , mailboxes or unorthodox places such as pockets of hanging jackets in sheds or in a tractor in everyday use . Nests are from 1 ? 3 m (3 @.@ 3 ? 9 @.@ 8 ft) from the ground and are rarely higher . They occasionally can be built in sloping locations or at ground level .

Egg laying dates and clutch size vary by region ; in Texas the time period is from late February to late August , in Iowa it ranges from late April to June . The clutch size is generally 3 to 6 eggs , but can reach as high as seven in Texas . The eggs are creamy white with brown or reddish @-@ brown spots , and are more heavily marked at the broad end . The eggs are incubated by the female for 12 ? 16 days . After the young hatch , they are fed exclusively on invertebrates and they fledge in 12 ? 14 days . As many as three broods may be raised by a pair in a single breeding season . In one study , three of the 70 fledglings remained or defended territory adjacent to the natal area .

Male and females are involved in the process of provisioning at similar rates throughout most nest stages , with the males providing slightly more in the nestling stages . Both sexes increase their provision rates as the nestlings grow in age .

= = Predation and threats = =

Brood parasitism by brown @-@ headed cowbirds is common , with up to 25 % of Carolina wren nests being affected in certain regions such as Oklahoma and Alabama . Cowbird parasitism peaks in April at 41 % , and is as low as 8 % and 0 % in July and August , respectively . Female cowbirds sometimes eject Carolina wren eggs before laying their own , and even if host eggs are retained , the size of cowbird eggs negatively affect the hatching success of wren eggs . As a result , cowbirds may have a significant impact on the reproductive success of wrens . The feeding rate for cowbird nestlings is higher than wren feeding rates , and some have been raised to independence . This also can be detrimental to the survival of wren nestlings . A rare instance of brood @-@ parasitism by a house finch has been recorded . The rate of brood parasitism is thought to be lower in more natural and concealed nesting locations . Body parasites such as the larvae of blowflies feed on nestlings and the blood loss weakens nestlings . Fellow species of wren such as Bewick 's wren and the winter wren compete for nesting locations and food , respectively .

In Virginia , some Carolina wrens populations show high levels of mercury in their blood and this is acquired from feeding all @-@ year @-@ round on spiders . Spiders being at a higher trophic levels contain a higher concentrations of mercury (through biomagnification) than herbivorous

invertebrates . As these wrens are year @-@ round residents , they are at a higher risk than other species to acquire mercury in its blood . Nest abandonment and failure to raise young were more common with higher mercury content . Exposure , and prolonged periods of cold , ice , and snow is thought to affect the wren nestling and adult populations , respectively . Wrens that outlast those winters reside in sheltered areas during the season .

Among the top predators of adult Carolina wrens are domestic cats , and snakes such as the canebrake rattlesnake . Raccoons and black rat snakes also feed on wren eggs and nestlings .

= = In culture = =

In 1930 , the South Carolina Federated Women 's club adopted the Carolina wren as the unofficial state bird over the eastern mourning dove and pushed for its official state adoption until 1939 , when the South Carolina Legislature named the northern mockingbird as the state bird . In 1948 , the legislature repealed their previous decision , and the wren became the official state bird .

In 2000 , the Carolina wren was featured on the back of the South Carolina edition of the 50 State Quarters .