

WHITE-CROWNED SPARROW - ZONOTRICHIA LEUCOPHRYS

Unihemispheric slow-wave sleep (USWS) is sleep where one half of the brain rests while the other half remains alert. This is in contrast to normal sleep where both eyes are shut and both halves of the brain show unconsciousness. In USWS, also known as asymmetric slow-wave sleep, one half of the brain is in deep sleep, a form of non-rapid eye movement sleep and the eye corresponding to this half is closed while the other eye remains open. When examined by low-voltage electroencephalography (EEG), the characteristic slow-wave sleep tracings are seen from one side while the other side shows a characteristic tracing of wakefulness. The phenomenon has been observed in a number of terrestrial, aquatic and avian species.

Taxonomy: Kingdom: Animalia Phylum: Chordata Class: Aves Order: Passeriformes Family: Passerellidae Genus: Zonotrichia Species: Z. leucophrys

Habitat:

Biomes: White-crowned Sparrows breed in open or shrubby habitats, including tundra, high alpine meadows, and forest edges. Patches of bare ground and grasses are important characteristics. During winter and on migration these birds frequent thickets, weedy fields, agricultural fields, roadsides, and backyards.

Distribution:

In US: It breeds in brushy areas in the taiga and tundra of the northernmost parts of the continent and in the Rocky Mountains and Pacific coast. While southerly populations in the Rocky Mountains and coast are largely resident, the breeding populations of the northerly part of its range are migratory and can be found as wintering or passage visitors through most of North America south to central Mexico.

In Other Countries: ^^^^^^^

Holistic Description: White-crowned Sparrows appear each winter over much of North America to grace our gardens and favorite trails (they live in parts of the West year-round). The smart black-and-white head, pale beak, and crisp gray breast combine for a dashing look – and make it one of the surest sparrow identifications in North America. Watch for flocks of these sparrows scurrying through brushy borders and overgrown fields, or coax them into the open with backyard feeders. As spring approaches, listen out for this bird's thin, sweet whistle.

Species Richness: FIVE SUBSPECIES

Population Dynamic: CHECK THREATS

Evolution and Systematics:

Evolution: Identified from Pleistocene deposits in California.

Systematics: Among populations, dichotomous variation in loreal color (black in East and in western mountains, white in north and on Pacific coast) and polytomous variation in bill color (yellow on Pacific coast, orange in north, pink in East and in western mountains). Coloration of mantle feathers varies in concert with above combinations, with feather fringes ranging from gray to brown and centers ranging from black to purplish. Across Canada, size increases from west to east. Sex for sex, populations on Pacific coast markedly smaller (wing length) than populations in North or East.

Number of Species: FIVE SUBSPECIES

Number of Genera: FIVE SUBSPECIES

Physical Characteristics:

Size and Length: Length: 5.9-6.3 in (15-16 cm) Weight: 0.9-1.0 oz (25-28 g)

Wingspan: 8.3-9.4 in (21-24 cm)

Coloration: First impressions of White-crowned Sparrows tend to be of a plain, pale-gray bird; next your eye is drawn to the very bold black-and-white stripes on the head and the pale pink or yellow bill. Learn this bird's size and shape so you're ready to identify young birds that have brown, not black, markings on the head.

General Body Features: The White-crowned Sparrow is a large sparrow with a small bill and a long tail. The head can look distinctly peaked or smooth and flat, depending on the bird's attitude.

Special Features of the Body: The white-crowned sparrow is known for its natural alertness mechanism, which allows it to stay awake for up to two weeks during migration. This effect has been studied for possible human applications, such as shift-work drowsiness or truck driving.

Special Features of the Head and Sensory Organs: Sparrows are physically similar to other seed-eating birds, such as finches, but have a vestigial dorsal outer primary feather and an extra bone in the tongue. This bone, the preglossale, helps stiffen the tongue when holding seeds.

Dentition: BEAK/LAMELLAE/GIZZARD

Special Features of the Limbs and Digits: Other adaptations towards eating seeds are specialised bills and elongated and specialised alimentary canals.

Any Special Internal Anatomy: NONE

Sexual Dimorphisms: Small oscine, sexually monomorphic in plumage but geographically variable. Definitive Basic and Alternate plumages essentially the same.

Differences Between Juvenile Stage and Adult: Juvenile plumage similar to Definitive plumage, but more brown, less gray, brown head-stripes rather than black, buffy median head-stripe rather than white, streaks on back and scapulars black rather than brown.

Behavior:

Diurnal, Nocturnal, or Crepuscular: Diurnal

Activity: White-crowned Sparrows hop across the ground and through low foliage in brushy habitats. You may see them "double-scratching," a move they share with towhees involving a quick hop backwards to turn over leaves followed by a forward hop and pounce. When these birds arrive on their breeding grounds males and females quickly pair, then wait until snow has melted enough to begin nest building. At the end of summer the pairs break up and winter separately, but when both members of the pair return the next summer, about two-thirds of the pairs re-form. Young birds move very little for the first few days after they leave the nest, and don't typically learn to fly until a week or so later. Siblings can stay with each other for more than two months after fledging.

Locomotion: Hops along ground while foraging; performs "double-scratch" movement. Captives maintain treadmill velocity of 0.46 km/h; free-living birds hop about 1.6 km/h. Young begin to fly 7-10 d after leaving nest.

Communication and Perception: The song of the White-crowned Sparrow is one of the most-studied sounds in all of animal behavior. Different subspecies across the country sing clearly different songs, but they're all recognizable by the sweet, whistling introduction, a succession of jumbled whistles, and a buzz or trill near the end. Songs last 2-3 seconds. Females sing only rarely.

Home Range: All-purpose breeding territories, non-overlapping, often contiguous, but some with suitable undefended area between them. In some cases, bare ground is not included within the breeding territory, and adults must leave to forage. In the nonmigratory Z. l. nuttalli, territorial encounters are most common in Sep, Oct, and Jan, when intruder pressure is greatest. In territorial encounters, females do not fight and rarely chase intruders; their usual response is to trill and posture.

Degree of Sociality: Young are extremely sedentary in the first few days after fledging, but follow parents more actively after 1-2 wk, begging and receiving food. Ranging distance increases with age, and family units dissolve about 35-40 d after fledging. Some siblings stay together through at least 70 d of age.

Level of Aggression: Territorial male flies toward conspecific intruder, erects crown feathers, puffs chest, and sings loudly. Aggressor may then adopt a threatening posture, sleeking its body feathers, orienting its body to the horizontal, and pointing its open bill toward the intruder. This may be accompanied by a Wing-flutter Display in which male crouches, lowers and flutters its wings, and raises its head and tail slightly, reminiscent of female's Copulation-solicitation Display. Fighting is most common early in territory establishment. Birds in a territorial dispute fly at each other with feet pointed toward opponent. In prolonged combat, they fall to the ground, grappling with their feet.

Migration: Resident or medium-distance migrant. White-crowned Sparrows that breed in Alaska and arctic Canada spend the winter over much of the continental U.S. and Mexico. Birds along the Pacific Coast and in parts of the interior West don't migrate.

Predators:

Predators: Garter Snake, Gopher Snake, Squirrel, Bran Owls, Sharp-shinned Hawk, Crows, Scrub Jays, American Kestrels.

Anti-Predator Defenses: When returning to nest from foraging, both sexes fly to vicinity of nests but travel last few meters on foot, making location of the nest less obvious to potential predators. Incubating females slip quietly and inconspicuously off nest when approached. Often perform an apparent distraction display in which they wag their tail while running from nest. Behaviors directed at nest predators include alarm calls (chink, pink), distraction displays, and physical contact. These are probably ineffective if nest has been discovered.

Diet and Nutrition:

Adult Diet: White-crowned Sparrows eat mainly seeds of weeds and grasses, plus considerable numbers of caterpillars, wasps, beetles, and other insects during the summer. They also eat grains such as oats, wheat, barley, and corn, and fruit including elderberries and blackberries.

Juvenile Diet: ^^^^^^^

Special Adaptations for Getting Prey: Adaptable species with broad foraging niche. Takes seeds and arthropods from soil surface and from plants, and hawks insects from perch. Lacks a functional crop. Opportunistic feeder; decreases consumption of seeds and increases consumption of insects from Feb to onset of spring migration. Eats seeds and green grass blades, and avidly forages for arthropods among vegetation, rocks, and on bark of low tree limbs.

Reproduction:

Mode of Reproduction: Monogamous

Mating System: Socially monogamous; rarely polygynous. Territories of polygynous males not exceptional, and reproductive success of polygynous-mated females not lower than of monogamously-mated females.

Mating Season: April to May

Courtship: For oriantha breeding at high altitude, adults form pair bonds soon after arrival of females, but do not engage in chases and other sexual activity until territory is sufficiently free of snow to permit nesting. Courtship feeding rarely observed.

Territoriality: HOME RANGE

Mating: Copulation is most common in the half-hour before dark and is performed an average of 5 times/evening. Female initiates copulatory sequence with a Copulation-solicitation Display: slight crouch, tail held nearly vertical, bill pointed upward, wings held out at sides with slight quiver while trilling. Feathers parted to expose cloaca. Low-intensity displays by female begin early in breeding season, generally given only in response to male song. Male approaches soliciting female with crown raised and tail lowered and spread; stands on female's back, flutters wings, and maintains cloacal contact for about 3 s before flying away.

Nest Placement: White-crowned Sparrow nests are typically fairly low, placed 1.5 to 10 feet high in shrubs, particularly for Pacific Coast birds. Across the arctic and subarctic portions of the species' range, White-crowned Sparrows nest on the tundra and have little choice but to put their nests on the ground, hidden among mats of mosses, lichens, and ground-hugging shrubs.

Nest Description: Females build nests out of twigs, coarse grasses, pine needles, moss, bark, and dead leaves. They line the nest cup with fine grasses and hairs. The finished product is about 5 inches across and 2 inches deep, and takes the female 2-9 days to complete.

Egg-Laying: Clutch Size: 3-7 eggs Number of Broods: 1-3 broods Egg Length: 0.8-0.9 in (1.9-2.4 cm) Egg Width: 0.6-0.7 in (1.4-1.8 cm) Incubation Period: 10-14 days Nestling Period: 8-10 days Egg Description: Greenish, greenish-blue, or bluish spotted with reddish brown.

Hatching and Incubation/Gestation: Born with only sparse down feathers, eyes closed, weighing about 0.1 ounce.

Development: New nestlings are naked except for down on some feather tracts; transparent pink skin turns yellowish, mouth lining turns from pink to bright red; eyes closed. ALTRICIAL

Parental Care: Only females brood young. Male begins to bring food on day of hatching, soon after feeding has been initiated by female. On day of hatching, female performs about 80% of feedings, but male's efforts steadily increase until both parents contribute 50% of feedings from day 3 through day 8. Proportion of feedings by male decreases steadily to 35% by day 10.

Lifespan: Up to 13 years.

Conservation:

Official Federal Status: Least Concern

Special Statuses in Individual States: NONE

Threats: White-crowned Sparrows are numerous and widespread but populations declined by about 29% between 1966 and 2012, according to the North American Breeding Bird Survey. Partners in Flight estimates a global breeding population of 60 million with 80% spending some part of the year in the U.S., 59% in Canada, and 18% wintering in Mexico. They rate a 7 out of 20 on the Continental Concern Score and are not on the 2014 State of the Birds Watch List.

Conservation Efforts: ^^^^^^^

Extra Facts:

1. A young male White-crowned Sparrow learns the basics of the song it will sing as an adult during the first two or three months of its life. It does not learn directly from its father, but rather from the generalized song environment of its natal neighborhood.
2. A migrating White-crowned Sparrow was once tracked moving 300 miles in a single night. Alaskan White-crowned Sparrows migrate about 2,600 miles to winter in Southern California.
3. Scientists interested in movement and energetics have discovered that White-crowned Sparrows can run on a treadmill at a pace of about one-third of a mile an hour without tiring out.
4. White-crowned Sparrows will share their territories with Fox Sparrows, but chase Chipping Sparrows and Dark-eyed Juncos until they leave.
5. Male White-crowned Sparrows do most of the singing, but sometimes females also sing. They usually do this while contesting breeding territories or a winter food source. Their songs are quieter and more variable than male's songs.
6. Because male White-crowned Sparrows learn the songs they grow up with and typically breed close to where they were raised, song dialects frequently form. Males on the edge of two dialects may be bilingual and able to sing both dialects.
7. The oldest recorded White-crowned Sparrow lived in California and was at least 13 years, 4 months old.

Notable Species: There are five currently recognized subspecies of white-crowned sparrow (*pugetensis*, *gambelii*, *nuttalli*, *oriantha*, and *leucophrys*), varying in breeding distribution migratory route. Birds of the subspecies *nuttalli* are permanent residents in California, while birds of the subspecies *gambelii* may migrate as far as the Arctic Circle during the summer breeding season. Northern birds migrate to the southern United States and northern Mexico.