

WHITE-CROWNED SPARROW

TAXONOMY

Scientific name: *Zonotrichia leucophrys* (Forster, 1772)

Common name: White-crowned Sparrow

Family: Emberizidae

Taxonomic comments:

Five subspecies recognized:

Zonotrichia leucophrys leucophrys, *Z. l. gambelii*, *Z. l. oriantha*, *Z. l. pugetensis* and *Z. l. nuttalli*. *Z. l. pugetensis* and *Z. l. nuttalli* are not as well differentiated genetically, with substantial gene flow between them (Corbin and Wilkie 1988).

See Corbin and Wilkie (1988) for evidence showing high levels of gene flow between subspecies *nuttalli* and *pugetensis*.

Mitochondrial DNA data indicate that relative to most congeneric avian comparisons, the five species of *Zonotrichia* are closely related; *leucophrys* is most closely related to the Golden-crowned Sparrow, *Z. atricapilla* (Zink et al. 1991).



© Larry Master

Photographer: Larry Master

Image ID#: 11637

Location: Mt. Auburn Cemetery, Cambridge, Massachusetts, USA

Date: May, 2004

Life Stage: adult

DESCRIPTION

Basic description: A medium-sized songbird.

General description:

A distinctive songbird with two broad black stripes separated by a broad median white stripe on top of head, white eyebrow stripes, and a narrow black line extending from eye to back of nape. The remainder of face, neck, and breast are gray fading to white on throat and abdomen; back and scapulars are light gray streaked with brown; rump and upper tail-coverts are pale brownish. Tail is dark brown and wings have two white wing bars (Chilton et al. 1995). Sexually monomorphic, although females are slightly smaller than males and as adults female head markings are usually not as bold (Morton 2002).

Length (cm): 18

Weight (g): 29

Reproduction:

At the northern end of the range in the Northwest Territories (N.W.T.), Canada, most nesting initiated in the second or third week of June, after breeding habitat was at least 60% snow free (Norment 1992). Female constructs cup shaped nest with sticks, grass, pine needles, moss and leaves; lined with soft grasses, sedges and hairs (Chilton et al. 1995). Egg laying begins the third week of May in Alaska (Chilton et al. 1995); May to mid-June in California and Oregon (Morton 1978, Chilton et al. 1995). Clutch size is three to seven, typically three to four, rarely seven. Incubation, by the female, lasts 9 to 15 days (range-wide average is 12 days). Young are tended by both parents, leave nest in 9 to 11 days, fed to some degree for additional 25 to 30 days. Generally one brood produced, double broods infrequent in some parts of the range (Petrinovich and Patterson 1983) although renesting may be attempted several times if clutches are lost (Morton 2002). Heavy snow conditions may delay the onset of breeding at high elevations in the Sierra Nevada, California (Morton 1978).

Ecology:

Highly productive when raised in captivity, as a result this species has become a well-studied songbird, contributing much to the current knowledge about song development and geographical variation in song (Chilton et al. 1995).

A large proportion of eggs and nestlings may be lost to predators (e.g., garter snakes, ground squirrels), even in a stable population (Petrinovich and Patterson 1983). In Tuolumne Meadows, California, 53% of *Z. l. oriantha* nests failed between 1968 and 1997. About 30% of nests were lost to predation, the remainder to investigator impacts and storms, yet reproductive output was maintained due to vigorous renesting efforts (Morton 2002). A relatively high lifetime reproductive output (7 to 8 fledglings) indicates that this passerine, in particular, is well suited for reproduction in montane environments (Morton 2002). Predators of adults and juveniles include Common Barn Owl (*Tyto alba*), Sharp-shinned Hawk (*Accipiter striatus*) and American Kestrel (*Falco sparverius*) (Chilton et al. 1995).

May form flocks in winter, up to about 10 to 20 in southeastern U.S., 30 to 50 in the west.

Permanent resident birds (*nuttalli*) on West Coast maintain year-round territories.

Migration:

Mostly a long-distance migrant, but migrations are more localized in the western U.S., and a sedentary subspecies (*nuttalli*) occurs along the coast of California. Migrations occur mainly in April and May and from August to October. The subspecies *gambelii* migrates the farthest, from western Texas and Oklahoma to breeding areas in northern Alaska and N.W.T. (Dunn et al. 1995). See Dunn et al. (1995) for information on the timing of migrations of the various subspecies.

Northward migration occurs mainly in April to May, southward migration between August and October. Birds do not migrate as cohesive flocks (Chilton et al. 1995). Breeding population arrived in May and June in the Sierra Nevada (California), departed

in September and October (Morton and Pereyra 1994); juveniles departed on migration in late September after most had traveled some distance from their birth site (Morton 1992). In the N.W.T., adults began arriving on breeding grounds during the last week in May and remained until early September (Norment 1992).

Food:

Granivore, invertivore. Feeds primarily on seeds of grasses and weeds (ragweed, pigweed, goosefoot, panicum, etc.). Also feeds on terrestrial invertebrates, especially in the summer (ants, caterpillars, true bugs, beetles, spiders and snails). Usually forages on ground close to cover, also gleans from low foliage and hawks insects from a perch (Dobkin 1994, Chilton et al. 1995).

Phenology:

Crepuscular, diurnal. Typically inactive for several hours per day when in continuous daylight at high latitudes.

Habitat:

Breeding habitat remarkably variable, from boreal forest and tundra to alpine meadows and also to margins of urban areas. Generally associated with open woodlands, shrub thickets, riparian stands of willow (*Salix* spp.), birch (*Betula* spp.) and aspen (*Populus* spp.), brushy subalpine meadows, sedge meadows and shrubby spruce (*Picea* spp.) forests (Semenchuk 1992, Dobkin 1994, Chilton et al. 1995). Necessary habitat features of breeding territories include grass and bare ground for foraging, dense shrub or small conifers for nest concealment and roosting, standing or running water nearby, and taller conifers, usually on the periphery (Chilton et al. 1995).

Nests on ground under cover of shrubs and ground vegetation, or in shrub or tree up to a few feet above ground. Nests are more likely to be located on the ground at higher latitudes or altitudes. Ground nests are usually constructed in dense vegetation mats and concealed by nearby branches (Chilton et al. 1995). In N.W.T., Canada, ground nests were in thick, moist vegetation, of predominantly dwarf birch (*Betula pumila*) and spruce (Chilton et al. 1995).

Human disturbance such as road construction, logging, fires, and farming often create new habitat by providing bare ground or grassland in previously wooded areas; sparrows are often abundant in avalanche slopes, burnt-over areas, active flood plains, and timber cut forests (Semenchuk 1992, Chilton et al. 1995). In eastern Oregon, abundance increased in response to high-intensity timber harvest (Chambers et al. 1999) and was a dominant species recorded in clearcuts where it used low shrubs and open areas near shrub thickets (Morrison and Meslow 1983).

While tolerant of some types of habitat disturbance, this species avoids areas where summer cattle grazing has caused changes to vegetation structure. In Colorado, species was present on winter-grazed pasture, but not on summer-grazed pasture (Knopf et al. 1988). In California, nest success was significantly lower in grazed coastal scrub communities (13% success) than in ungrazed areas (35% success; Favis 2000).

STATUS

Global rank: G5 (04Dec1996)

Global rank reasons:

Secure – widespread and abundant.

State rank: S5B (7June2006)

State rank reasons:

Highly abundant and widely distributed throughout the state. Statewide breeding population estimated at 22,000,000 individuals. BBS data indicate a nonsignificant population decline of 1.3%/year from 1980 to 2005; reasons are unknown. Few threats, usually related to early spring storms.

DISTRIBUTION AND ABUNDANCE

Range:

Global range:

Breeding: Northern Alaska to Labrador, south to southern California, Nevada, central Arizona, northern New Mexico, central Manitoba, southeastern Quebec, and Newfoundland.

The five recognized subspecies are fairly distinct in their distributions, with very little overlap of breeding areas (Morton 2002). Subspecies *nuttalli* is a nonmigratory resident of coastal California, *pugetensis* breeds along the Pacific coast from northern California to southern British Columbia, *oriantha* breeds in the central western U.S. and the Sierra Nevada, *leucophrys* breeds across northern Quebec, Labrador and Newfoundland, and *gambelii* breeds throughout Alaska east to northwestern Ontario and south to southcentral British Columbia (Dunn et al. 1995).

Non-breeding: Casually to central and southcentral Alaska, regularly from southern British Columbia, southeastern Washington, southern Idaho, Wyoming, Kansas, Missouri, Kentucky to western North Carolina, south to southern Baja California and southern mainland of Mexico, Gulf coast, and Cuba.

Subspecies *pugetensis* winters along the Pacific coast from Washington to southern California, *oriantha* winters from southern U.S. border to Baja California and southern Mexico, *leucophrys* winters in the eastern U.S. north to the Great Lakes and rarely in New England north to Massachusetts, and *gambelii* winters throughout the western U.S. and sparsely in eastern U.S. (Dunn et al. 1995).

State range:

Breeding: Widely distributed to the northwestern limits of knee-high shrubbery in the state; from the Kobuk and Colville Rivers and the Brooks Range south to the Alaska Peninsula, Kodiak Island, Kenai Peninsula and the Copper River valley (Gabrielson and Lincoln 1959, Dunn et al. 1995).

Non-breeding: Rare reports of wintering birds from central Alaska, Kodiak Island and the Kenai Peninsula (Chilton et al. 1995).

Abundance:

Global abundance:

Global population estimate 72,000,000 individuals (Rich et al. 2004). Breeding Bird Survey (BBS) data estimate relative abundance in the U.S. at 2.53 birds/route (n = 239) for the period 1966 to 2005 and 1.24 birds/route (n = 84) in Canada for the same time period (Sauer et al. 2005).

State abundance:

Statewide population estimated at 21,900,000 (about 31% of global population), although estimate is likely inaccurate (Rosenberg 2004). BBS data estimate a relative abundance in Alaska of 28.04 birds/route (n = 78) for the period 1966 to 2005 (Sauer et al. 2005).

Trends:

Global trend:

BBS data indicate a significant population decrease of -1.2%/year ($P < 0.01$, n = 227) in the U.S. between 1966 and 2005 (Sauer et al. 2005). BBS trend data for Canada indicate a nonsignificant increase of 2.3%/year for the same time period. However, the Canadian BBS only samples the southern edge of this species range; BBS trend data for Alaska (which may reflect northern populations better) indicate a nonsignificant decline of -1.3%/year ($P < 0.09$, n = 76; Sauer et al. 2005).

Migration counts from southern Ontario indicate stability over 40 years; populations apparently stable in Alberta (Semenchuk 1992). Populations in Idaho and Montana appear to be declining, but numbers have fluctuated greatly (Dobkin 1994). BBS data indicate long-term declines (1966-2005) in California, Colorado, and Oregon (Sauer et al. 2005). Small isolated populations are thought to experience cycles of extinction and recolonization (Morton 2002). Subspecies *nutalli* in the San Francisco Bay area, California, has experienced a large increase in the rate of brood parasitism by the Brown-headed Cowbird (*Molothrus ater*); long-term population persistence may be threatened (Trail and Baptista 1993).

State trend:

BBS data for Alaska indicate a nonsignificant decline of -1.3%/year ($P < 0.09$, n = 76) for the period 1980 to 2005 (Sauer et al. 2005).

EXISTING PROTECTION

Global protection:

Protected under the Neotropical Migratory Bird Conservation Act and the Migratory Bird Treaty Act; habitat is protected in state and national parks and national wildlife refuges.

State protection:

See Global protection comments.

CHALLENGES

Global challenges:

Few threats overall. Concern related to brood parasitism by the Brown-headed Cowbird (Trail and Baptista 1993), habitat alteration due to cattle grazing (Favis 2000), and natural mortality caused by predation (Morton et al. 1993, Chilton et al. 1995) and inclement weather (Morton 2002).

Brood parasitism by Brown-headed Cowbird occurs infrequently, but may be of concern to certain populations. In the San Francisco Bay area, *Z. l. nuttalli* experienced a large increase in the rate of brood parasitism which could threaten long-term population persistence (Trail and Baptista 1993). Although this species utilizes disturbed areas during the breeding season, disturbance as a result of cattle grazing has been shown to have a negative effect on sparrow populations. Reduced nest success in California coastal scrub communities (compared to undisturbed habitat) was attributed to habitat alteration as a result of grazing (Favis 2000). Predation contributes substantially to egg and nestling mortality in some populations (Chilton et al. 1995). Predation by Belding's ground squirrels (*Spermophilus beldingi*) was the largest cause of nest failure during a 19-year study in the Sierra Nevada, California (Morton et al. 1993). Activities of human investigators may also increase the likelihood of nest predation and desertion (Morton et al. 1993; Chilton et al. 1995). Nest loss and desertion have been attributed to weather effects such as late spring snowfall (Morton 2002).

State challenges:

Statewide threats are minimal. May desert nest or terminate migration at high latitudes as a result of late spring snowfall (Morton 2002).

RESEARCH AND INVENTORY NEEDS

Global research needs:

Identify source(s) contributing to population decline. Research needed on habitat use and the effects of habitat alteration as a result of grazing on species distribution. Identify the degree of threat posed by brood parasitism. A better understanding of the natural history and distribution of the species during the non-breeding season is needed.

State research needs:

Alaska population may be declining; determine severity of and causes of the decline and determine if negative trend is associated with threats during the breeding season. Breeding habitat associations need study (ADFG 2005).

Global inventory needs:

Where possible, conduct surveys to help determine population size for each subspecies; identify areas where population changes may be occurring. Migratory habits need study.

State inventory needs:

Field surveys and analysis of existing data are needed to determine habitat specifications and geographic locations that support high densities of this species during the breeding season as well as during migration. Information is also needed on distribution and abundance off the road system to better assess status statewide. Considered casual in central and southcentral Alaska during winter; better information needed on winter distribution in the state (ADFG 2005).

CONSERVATION AND MANAGEMENT NEEDS

Global conservation and management needs:

Identify causes of decline using monitoring information from throughout breeding and non-breeding range.

State conservation and management needs:

Maintain current participation in the BBS and encourage participation in the Alaska Landbird Monitoring Survey (ALMS) to better assess population status in roadless areas of the state (ADFG 2005).

LITERATURE CITED

- Alaska Department of Fish and Game (ADFG). 2005. Our wealth maintained: a strategy for conserving Alaska's diverse wildlife and fish resources, a comprehensive Wildlife Conservation Strategy emphasizing Alaska's nongame species. Anchorage, AK. Submitted to USFWS. Anchorage, Alaska.
- Chambers, C.L., W.C. McComb, and J.C. Tappeiner, II. 1999. Breeding bird responses to three silvicultural treatments in the Oregon Coast Range. *Ecological Applications* 9:171-185.
- Chilton, G., M.C. Baker, C.D. Barrentine, and M.A. Cunningham. 1995. White-crowned Sparrow (*Zonotrichia leucophrys*). In: The birds of North America, No. 183 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.
- Corbin, K.W. and P.J. Wilkie. 1988. Genetic similarities between subspecies of the White-crowned Sparrow. *Condor* 90:637-647.
- Dobkin, D.S. 1994. Conservation and management of neotropical migrant landbirds in the northern Rockies and Great Plains. High Desert Ecological Research Institute. University of Idaho Press, Moscow, ID.
- Dunn, J.L., K.L. Garrett, and J.K. Alderfer. 1995. White-crowned Sparrow subspecies: identification and distribution. *Birding* 27:182-200.
- Favis, A. 2000. The effects of cattle grazing on nesting success of Nuttall's White-crowned Sparrow (*Zonotrichia leucophrys nuttalli*). *New Mexico Ornithological Society Bulletin* 28(2):45. Las Cruces, NM.
- Gabrielson, I.N. and F.C. Lincoln. 1959. The birds of Alaska. The Stackpole Company, Harrisburg, PA and the Wildlife Management Institute, Washington, D.C.
- Knopf, F.L., J.A. Sedgwick, and R.W. Cannon. 1988. Guild structure of a riparian avifauna relative to seasonal cattle grazing. *Journal of Wildlife Management* 52:280-290.
- Morrison, M.L. and E.C. Meslow. 1983. Bird community structure on early-growth clearcuts in western Oregon. *American Midland Naturalist* 110:129-137.
- Morton, M.L. 1978. Snow conditions and the onset of breeding in the Mountain White-crowned Sparrow. *Condor* 80:285-289.
- Morton, M.L. 1992. Effects of sex and birth date on premigration biology, migration schedules, return rates and natal dispersal in the Mountain White-crowned Sparrow. *Condor* 94:117-133.

White-crowned Sparrow

- Morton, M.L. 2002. The Mountain White-crowned Sparrow: migration and reproduction at high altitude. Studies in avian biology No. 24. The Cooper Ornithological Society, Allen Press, Inc., Lawrence, KS.
- Morton, M.L. and M.E. Pereyra. 1994. Autumnal migration departure schedules in Mountain White-crowned Sparrows. *Condor* 96:1020-1029.
- Morton, M.L., K.W. Sockman, and L.E. Peterson. 1993. Nest predation in the Mountain White-crowned Sparrow. *Condor* 95:72-82.
- Norment, C.J. 1992. Comparative breeding biology of Harris' Sparrows and Gambel's White-crowned Sparrows in the Northwest Territories, Canada. *Condor* 94:955-975.
- Petrinovich, L. and T. L. Patterson. 1983. The White-crowned Sparrow: reproductive success (1975-1980). *Auk* 100:811-825.
- Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Inigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and T.C. Will. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology, Ithaca, NY.
- Rosenberg, K.V. 2004. Partners In Flight continental priorities and objectives defined at the state and bird conservation region levels, Parts I and II. Cornell Lab of Ornithology, Ithaca, NY.
- Sauer, J.R., J.E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966-2005. Version 6.2.2006. USGS Patuxent Wildlife Research Center, Laurel, MD. Available online at: <http://www.mbr-pwrc.usgs.gov>. Accessed 7Jun2006.
- Semenchuk, G.P. (Ed.). 1992. The atlas of breeding birds of Alberta. Federation of Alberta Naturalists, Edmonton, Alberta.
- Trail, P.W. and L.F. Baptista. 1993. The impact of Brown-headed Cowbird parasitism on populations of the Nuttall's White-crowned Sparrow. *Conservation Biology* 7(2):309-315.
- Zink, R.M., D.L. Dittman, and W.L. Rootes. 1991. Mitochondrial DNA variation and the phylogeny of *Zonotrichia*. *Auk* 108:578-584.

Acknowledgements

State Conservation Status, Element Ecology & Life History Author(s): Gotthardt, T.A. and J.G. McClory, Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, Anchorage, AK, <http://aknhp.uaa.alaska.edu>.

State Conservation Status, Element Ecology & Life History Edition Date: 7June2006

Life history and Global level information were obtained from the on-line database, NatureServe Explorer (www.natureserve.org/explorer). In many cases, life history and Global information were updated for this species account by Alaska Natural Heritage Program zoologist, Tracey Gotthardt. All Global level modifications will be sent to NatureServe to update the on-line version.

Copyright Notice: Copyright © 2005 NatureServe, 1101 Wilson Boulevard, 15th Floor, Arlington Virginia 22209, U.S.A. All Rights Reserved. Each document delivered from this server or web site may contain other proprietary notices and copyright information relating to that document.

Global Element Ecology & Life History Edition Date: 31Aug1995

Global Element Ecology & Life History Author(s): Hammerson, G.

Photo credit: © Larry Master, image ID#: 11637, location: Mt. Auburn Cemetery, Cambridge, Massachusetts, USA, date: May, 2004, life stage: adult.
