

## Townsend's Warbler (*Dendroica townsend*)

*Paul Cotter*



**FIG 1** Male Townsend's warbler. (Steve Matsuoka)

The handsome Townsend's warbler is a common summer inhabitant of old-growth stands throughout Southeastern Alaska (Southeast) and the Tongass National Forest (Fig 1). The reliance of this species on mature forests is consistent across its breeding range, from the Pacific Northwest coast, east to Idaho and Saskatchewan, Canada, and north to central Alaska (American Ornithologists' Union [AOU] 1983, Matsuoka et al. 1997b, Wright et al. 1998). In winter, Townsend's warblers are distributed from coastal California, south along coastal Mexico, to Nicaragua and Panama (AOU 1983, Wright et al. 1998). Townsend's warblers arrive in Southeast as early as late April and may remain until late September (Johnson 2003). Male Townsend's warblers are most noticeable in spring, when their distinctive song and plumage make them difficult to confuse with any other forest songbird in Southeast.

### STATUS IN SOUTHEASTERN ALASKA

#### Distribution

The Townsend's warbler is a common, long-distance migrant found breeding throughout Southeast and the Tongass (Gabrielson and Lincoln 1959, Kessel and Gibson 1978, Stotts et al. 1999, Cotter and Andres 2000). The species regularly occurs on 92% of Southeast Breeding Bird Survey (BBS) routes (Cotter and Andres 2000), and Armstrong (1995) considered them common summer visitors (with casual and accidental visits in winter) in the region. Stotts et al. (1999) considered them to be breeding in all 11 Research Natural Areas (RNAs) surveyed from extreme southern Southeast to near Skagway in upper Lynn Canal. Breeding reports from Yakutat are scarce, but Johnson (2003) observed singing males near the Alsek River. Johnson (2003) confirmed breeding of the Townsend's warbler along 3 major Tongass river systems, and he considered it a probable breeder along the 7 other systems surveyed across the forest.

#### Abundance

Kissling (2003) measured densities of 0.5 bird/ac (1.2 birds/ha) for singing male Townsend warblers in Southeast old-growth forests. Willson and Comet (1996) measured relative abundance of Townsend's warblers in conifer stands in Haines from 0 to 1.7 birds per point and in Juneau from 0 to 2.0 birds per point. The highest relative abundance at both sites occurred in stands with the biggest trees. Stotts et al. (1999) detected 0.9 individuals per count on 187 point counts in Tongass RNAs. On systematic inventories, Stotts et al. (1999) considered Townsend's warblers to be fairly

common to common (average abundance = 2.43 – 3.67/day) in most RNAs.

Cotter and Andres (2000) reported an average density of 16.3 birds for the 50-stop Southeast BBS route (22.4 birds/route when the route without Townsend's warblers was removed from the analysis). On two Tongass BBS routes (Thorne Bay and Chichagof), an average of 50 singing males per route was observed.

Johnson (2003) found Townsend's warbler abundance varied considerably on point counts in major riparian habitats across the Tongass. On the Alsek River near Yakutat, no individuals were recorded during surveys, despite their known presence in the area. In southern regions of the forest, frequencies reached 0.76 individual per point and 0.48 individual per point along the Chickamin and Unuk rivers, respectively. Townsend's warblers were detected at much higher frequencies along coastal rivers (0.44 individual/count) compared to the large trans-mountain rivers (0.04 individual/count) connecting coastal areas with interior regions.

### **Taxonomic Considerations**

No subspecies of Townsend's warblers are currently recognized. Although the species is considered monotypic, some morphological differences have been noted across populations (Wright et al. 1998). Morrison (1983) found that the Townsend's warblers breeding on the Queen Charlotte Islands have shorter wings than those that breed and winter elsewhere in the species' range. Although birds from Alaska were included in the analysis, it is not clear whether birds from Prince of Wales Island were studied. Prince of Wales Island, like the Queen Charlotte Islands, appears to have been a forested refugium during the last ice age. The potential for morphological differences on Prince of Wales Island similar to those in the Queen Charlotte populations of Townsend's warblers merits further investigation.

### **Significance to the Region and Tongass National Forest**

The Tongass provides breeding habitat for thousands of Townsend's warblers each summer. Although specific habitat requirements of the Townsend's warbler in Southeast have yet to be fully understood, this species is closely affiliated with old-growth forest habitats during the breeding season. As the nation's largest forest containing the most significant tracts of undisturbed old-growth forest, the

Tongass is likely an important breeding refuge for migrating Townsend's warblers.

### **Special Management or Conservation Designations**

The Alaska Department of Fish and Game (ADF&G) lists the Townsend's warbler as a species of special concern in Alaska (ADF&G 2005). Boreal Partners In Flight (BPIF) (1999), a cooperative effort between government agencies, and non-governmental organizations, considered the Townsend's warbler to be a conservation priority in Southeast because of the relatively high percentage of breeding birds in Southeast relative to the global and continental Townsend's warbler population. Warblers were also considered a conservation priority because of negative population trend data and habitat loss on breeding and nonbreeding ranges. BPIF noted loss of forest cover from large-scale logging as the primary reason for concern in Southeast. The organization recommended the development of a Tongass habitat model for Townsend's warblers and a mechanism to monitor the trends in forest cover across the forest. These measures are necessary to assess potential impacts on warbler populations in the region. As specified in the BPIF Landbird Conservation Plan (1999), a population monitoring effort for Townsend's warblers should focus on undisturbed old-growth stands throughout the Tongass.

### **HABITAT RELATIONSHIPS**

Detailed habitat requirements of Townsend's warblers in the Tongass remain unknown. Most available habitat data are derived from multispecies studies aimed at determining relative patterns of habitat association, rather than specific habitat requirements (Noble 1977, Kessler 1979, Kessler and Kogut 1985, DellaSala et al. 1996, Stotts et al. 1999). These studies suggest a relationship with the presence of large coniferous trees in or near Townsend's warbler territories across the Tongass.

Kessler and Kogut (1985) found Townsend's warblers in old-growth habitats, but nearly absent in younger forest stands and clearcuts. Townsend's warblers occurred in higher abundance categories in old-growth forests (highest in nonriparian old growth), compared to other habitats, and were common or very common in all old-growth forest habitats sampled, except muskeg. These findings were supported by Stotts et al. (1999), who reported relatively low densities of Townsend's warblers in shore pine and

muskeg habitats compared with other old-growth habitats. Noble (1977) recorded fairly high Townsend's warbler densities in muskeg habitats, but he noted that the muskeg sampled bordered a large, contiguous stand of spruce-hemlock old-growth forest and its proximity may have influenced observed warbler densities in the muskeg.

Kessler (1979) showed a relative increase in the proportion of Townsend's warbler observations with forest age. In that study, the greatest proportion of total Townsend's warbler observations occurred in older stands (150-year-old trees). Further, successively higher concentrations of Townsend's warblers were noted as stand age increased from 30 and 80 years to >150 years. These data suggest old-growth forest may be preferred by Townsend's warblers.

On Prince of Wales Island, DellaSala et al. (1996) found Townsend's warblers in high densities in old-growth forests. However, densities were not statistically greater in old-growth forest than for either nonmodified or gapped 20-year forests. The greatest difference in Townsend's warbler densities occurred between old-growth and thinned second-growth habitats. These habitats also exhibited the greatest difference in canopy cover between any 2 habitat types. The suggestion that canopy cover limitations result in low Townsend's warbler densities is supported by the species' preference for dense canopy cover elsewhere in its range (Wright et al. 1998).

Kissling (2003) measured breeding densities of Townsend's warblers to be more than 2 times higher in forested beach buffers than in adjacent clearcuts. That study also determined that breeding densities were 1.5 times higher in uncut blocks of shoreline forest than in beach buffers of variable widths.

Stotts et al. (1999) compared data from point counts with habitat cover based on U.S. Forest Service (USFS) designations for plant communities in RNAs across the Tongass. Highest densities were observed in low-, mid-, and high-elevation hemlock-spruce forests. Fewer observations occurred in mixed conifer and shore pine habitats. Because that study was restricted to RNAs, no data were obtained in unnaturally disturbed forests.

Salmon streams may also be important for Townsend's warblers. Gende and Willson (2001) found Townsend's warblers in higher densities near salmon-rearing streams than near non-salmon streams. They suggest that presence of salmon carcasses in and near streams increases both aquatic and terrestrial

invertebrate prey concentrations, which provide an abundant food source for passerines in fall and spring. This assertion strongly supports the maintenance of large, riparian buffers near salmon streams.

Townsend's warbler habitat is not restricted to upland forest habitats. Johnson (2003) recorded them in mixed river-bottom forests and shrub lands (associated with scattered large spruce) along large Southeast rivers. The requirement for large coniferous trees during the breeding season appears to be consistent across the entire breeding range of the Townsend's warbler in Alaska and elsewhere (Wright et al. 1998). Large trees have been found to be important as nest sites in Southcentral Alaska, with predation rates higher among nests in small trees than in large trees (Matsuoka et al. 1997a, 1997b).

## IMPLICATIONS FOR CONSERVATION

The most important conservation issue in the Tongass is likely the harvest of large conifer trees. In Southeast, although large-tree old growth represents a small (<4%) proportion of the land area, these stands have been disproportionately harvested throughout the region (USFS 2003). The loss of this scarce, but important, habitat may have a disproportionate effect on species that select this type of and similar habitats. This issue is further complicated by the large-scale harvest of high-quality timber lands on nonfederally managed lands in the region.

The association of Townsend's warblers and large coniferous trees should be considered in land-use decisions. Because of their close association with large-tree forests, Townsend's warbler populations in the Tongass could be affected by large-scale forest modifications such as clearcut logging. Preliminary analyses suggest that a 2% annual reduction in old-growth habitats in the Tongass could reduce the proportion of point count stops where Townsend's Warblers are observed from current levels of 0.63 to 0.47 (a 25% reduction) within 15 years (BPIF 1999).

Conversion of old-growth forests stands to young, even-aged forests could significantly affect Townsend's warbler populations throughout Southeast and the Tongass. Further, increased timber harvest results in a more fragmented forest, which is associated with lower productivity in other passerine birds (Delasalla et al. 1996), but its impact on Townsend's warblers in the Tongass is unknown. If Townsend's warblers occur in higher densities along salmon-rearing streams (Gende and Willson 2001), increased

sedimentation of streams from road construction may also pose an additional indirect risk to Townsend's warblers and other species that benefit from highly productive stream habitats.

The Alaska BBS and the Monitoring Avian Productivity and Survivorship (MAPS) study (USFS 2002) currently track Townsend's warbler populations and demographics in the Tongass. Although helpful, these studies fail to adequately monitor Townsend's warblers in less accessible regions of the forest. The inadequacy of monitoring protocols for land bird species in roadless areas in the Tongass, like most of Alaska, has long been recognized. The BPIF has developed, and is currently testing, the Alaska Off-road Breeding Bird Survey (ORBBS). This project builds on the national BBS by focusing on areas not served by roads. Eighteen randomly-selected plots, each containing 25 point counts, have been established in the Tongass. The plan calls for a biennial rotation for sampling each plot, in which 9 plots would be surveyed each year. This plan was developed to detect a 50% population change in a given species during a 25-year period (Gwen Baluss, USFS, Juneau, AK, personal communication 2004). The effectiveness of this plan for monitoring Townsend's warblers, and other species, is being evaluated (C. Handel, U.S. Geological Survey, Anchorage, AK, personal communication 2004).

Studies to further understand the complex habitat requirements of Townsend's warblers, coupled with precautionary forest management practices, including protection of large-tree old-growth habitat, could ensure the future health of the Southeast breeding population of Townsend's warblers.

## REFERENCES CITED

Alaska Department of Fish and Game. 2005. <http://www.wildlife.alaska.gov/index.cfm?adfg=endangere.d.concern>. Accessed December 14, 2005.

American Ornithologists' Union. 1983. Check-list of North American Birds. 6th edition. Washington, DC.

Armstrong, R. 1995. A guide to the birds of Alaska. Fourth edition. Alaska Northwest Books.

Boreal Partners In Flight Working Group. 1999. Landbird conservation plan for Alaska biogeographic regions, Version 1.0. Unpublished report. U.S. Fish and Wildlife Service, Anchorage, Alaska. 45 pp.

Cotter, P.A., and B.A. Andres. 2000. Breeding bird habitat associations on the Alaska Breeding Bird Survey. Information and Technology Report USGS/BRD/ITR-

2000-0010. U.S. Biological Survey, Biological Resources Division. 53 pp.

DellaSala, D.A., J.C. Hagar, K.A. Engel, W.C. McComb, R.L. Fairbanks, and E.G. Campbell. 1996. Effects of silvicultural modifications of temperate rainforest on breeding and wintering bird communities, Prince of Wales Island, Southeast Alaska. *Condor* 98:706-721.

Gabrielson, I.N., and F.C. Lincoln. 1959. Birds of Alaska. Wildlife Management Institute, Stackpole Co., Harrisburg, PA. 922 pp.

Gende, S.M., and Willson, M.F. 2001. Passerine densities in riparian forests of Southeast: potential effects of anadromous spawning salmon. *Condor* 103:624-629.

Johnson, J.A. 2003. Breeding bird communities of major mainland rivers of Southeastern Alaska. Thesis, Utah State University, Logan, UT.

Kessel, W.B., and D.D. Gibson. 1978. Status and distribution of Alaska birds. *Studies in Avian Biology*. No. 1.

Kessler, W.B. 1979. Bird population responses to clearcutting in the Tongass National Forest of Southeast Alaska. Report No. 17. U.S. Forest Service, Ketchikan, AK. 22 pp.

Kessler, W. and T. Kogut. 1985. Habitat orientations of forest birds in Southeastern Alaska. *Northwest Science* 59:58-65.

Kissling, M. 2003. Effects of forested buffer width on breeding bird communities in coastal forests of Southeast Alaska with a comparison of avian sampling techniques. Thesis, University of Idaho.

Matsuoka, S., C. Handel, and D. Roby. 1997a. Nesting ecology of Townsend's warblers in relation to habitat characteristics in a mature boreal forest. *Condor* 99:271-281.

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and D.L. Thomas. 1997b. The relative importance of nesting and foraging sites in selection of breeding territories by Townsend's Warblers. *Auk* 114(4):657-667.

Morrison, M.L. 1983. Analysis of geographic variation in Townsend's Warbler. *Condor* 85:385-391.

Noble, R.E. 1977. Breeding bird populations in hemlock-spruce old growth and clearcuts, Prince of Wales Island, Alaska. Unpublished report. U.S. Forest Service, Ketchikan, AK.

Stotts, M.J., B.A. Andres, and J.M. Melton. 1999. Breeding bird and vegetation community surveys of Research Natural Areas in the Tongass National Forest. Unpublished report. U.S. Fish and Wildlife Service, Anchorage, AK. 36 pp.

U.S. Forest Service. 2002. Tongass monitoring and evaluation, 2001 report. U.S. Department of Agriculture, Ketchikan, AK.

\_\_\_\_\_. 2003. Tongass land management plan revision: final supplemental environmental impact statement. R10-MB-48a.

Willson, M.F. and T. and Comet. 1996. Bird communities of northern forests: patterns of diversity and abundance. *Condor* 98:337-349.

Wright, A.L., G.D. Hayward, S.M. Matsuoka, and P.H. Hayward. 1998. Townsend's warbler (*Dendroica Townsendi*). In A. Poole and F. Gill, editors. The birds of North America. No. 333. Philadelphia, PA: The Birds of North America, Inc.