
South Hills Crossbill

Loxia sp. [undescribed]

Aves — Passeriformes — Fringillidae

CONSERVATION STATUS / CLASSIFICATION

Rangewide:	Unranked (GNR)
Statewide:	Critically imperiled (S1)
ESA:	No status
USFS:	Region 1: No status; Region 4: No status
BLM:	No status
IDFG:	Protected nongame

BASIS FOR INCLUSION

Restricted distribution, habitat threats, and endemic to Idaho.

TAXONOMY

As many as 9 distinct red crossbill types have been identified based on genetic, morphologic, and vocal variation, and 3 of these types (call types 2, 5, and 9) can be found in the South Hills and Albion Mountains of south-central Idaho (C. Benkman, pers. comm.). However, call type 9 is the most common type occurring in the South Hills and Albion Mountains and a variety of evidence indicates that it is speciating from other red crossbills (*L. curvirostra* complex) (C. Benkman, pers. comm.). Based on genetic evidence and paleobotanical data, T. Parchman and C. Benkman believe that the South Hills crossbill evolved from the call type 5 crossbill (Rocky Mountain Lodgepole Pine Crossbill) within the last approximately 5,000 years (C. Benkman, pers. comm.). Although there is considerable genetic overlap between call type 5 and call type 9 red crossbills, L. Snowberg found that 99% of 417 crossbill breeding pairs in the South Hills and Albion Mountains were composed of males and females of like types (C. Benkman, pers. comm.). In addition, in laboratory experiments, Snowberg found that South Hills female crossbills demonstrated statistically significant preference for courting males of their own call type (C. Benkman, pers. comm.). Despite the genetic overlap between call types, the above is evidence of reproductive isolation between crossbill populations. Given this information, it seems likely that the South Hills crossbill (and others within the *L. curvirostra* complex) will eventually be formally described as a distinct species.

DISTRIBUTION AND ABUNDANCE

Red crossbills are a medium-sized finch found primarily in conifer forests. Like other crossbills, they have crossed mandibles that allow the bird to pry open conifer cone scales to access the seeds within. They are found in parts of North America, Europe, Asia and northern Africa (Adkisson 1996). In North America, they inhabit conifer forests from Alaska to Newfoundland south through much of the western United States, portions of the eastern United States, and portions of Mexico and Central America (Adkisson 1996).

North American red crossbills exhibit considerable genetic, morphologic, and vocal variation (more below), and as many as 9 distinct types have been identified based on this variation (Adkisson 1996, Sibley 2000). Because of this variability and its associated reproductive isolation, some researchers have suggested that the call types may represent discrete species (Adkisson 1996, Sibley 2000). The remainder of this account focuses on the South Hills form of red crossbill (call type 9; Sibley 2000), hereafter referred to as the South Hills crossbill, call type 9, or the species.

The South Hills crossbill is consistently found only in the South Hills and Albion Mountains of south-central Idaho (C. Benkman, pers. comm.). Although other red crossbill call types (call types 2 and 5) also breed in the South Hills and Albion Mountains, the South Hills crossbill (call type 9) is far more common (C. Benkman, pers. comm.). Within these 2 mountain ranges, the South Hills crossbill is rarely found outside of areas where lodgepole pine occurs. There is an estimated 8,094 ha (20,000 acres) of lodgepole pine in the South Hills and approximately 2,023 ha (5,000 acres) in the Albion Mountains (C. Benkman, pers. comm.). The South Hills crossbill is common in areas with lodgepole pine in the South Hills and Albion Mountains, but data needed to estimate population size for this species are lacking (C. Benkman, pers. comm.). However, because potentially suitable habitat for the species is limited, it is suspected that the total population of South Hills crossbills is <10,000 individuals (C. Benkman, pers. comm.).

POPULATION TREND

The North American Breeding Bird Survey (BBS; Sauer et al. 2005) has not calculated population trends for each of the distinct red crossbill call types. Instead, red crossbill records are grouped to include all types within the *L. curvirostra* complex. In addition, there are deficiencies in the data set for Idaho that preclude statistically rigorous trend estimates. However, C. Benkman (pers. comm.) reports that South Hills crossbill population density has been fairly constant during the period 1998–2004.

HABITAT AND ECOLOGY

The South Hills and Albion Mountains are isolated mountain ranges where red squirrels, often a primary predispersal predator of lodgepole pine seeds, are absent. Lodgepole pines in these mountains have, therefore, evolved in the absence of red squirrels for 10,000–12,000 years and crossbills are the primary predispersal predator of their seeds (Benkman et al. 2001). Thus, lodgepole pines and crossbills in the South Hills and Albion Mountains have coevolved in the absence of red squirrels. As a result, cone structure of lodgepole pines and bill morphology (and other traits) of red crossbills in these populations differ from that of other populations of lodgepoles and red crossbills (Benkman et al. 2001). This coevolution and the resultant specialized diet and morphology of the South Hills crossbill intimately links the South Hills crossbill to lodgepole pine dominated stands within the South Hills and Albion Mountains. In fact, because their bills are specialized for foraging on the seeds of lodgepole pines in these ranges, South Hills crossbills are year-round residents (non-migratory) of these mountain ranges and would be at a competitive disadvantage in most other lodgepole populations (and in stands of other types of conifers) (Adkisson 1996; C. Benkman,

pers. comm.). C. Benkman (pers. comm.) reports that South Hills crossbills are rarely observed outside of lodgepole pine stands in the South Hills and Albion Mountains.

Breeding in red crossbill populations is apparently regulated by photoperiod, with opportunistic responses to food supply and social factors also influencing the cycle (Adkisson 1996). These birds have responded to the extreme variability in conifer seed crops (their preferred food) in a number of ways including variable age of first breeding (breeding activity has been documented for individuals with immature plumage), rapid succession of breeding, and multiple broods per year (Adkisson 1996). Red crossbills as a whole are apparently monogamous (pair bonds often are maintained outside of breeding periods) and there is little evidence of territoriality within populations (Adkisson 1996). Red crossbill females construct bulky, loosely-built cup nests of twigs, grasses, and other materials, typically within conifers and built on horizontal branches away from the trunk (Ehrlich et al. 1988). Only females incubate eggs and brood chicks, while both parents feed nestlings.

In response to crossbill predation, lodgepole pine trees in the South Hills and Albion Mountains have rapidly evolved larger cones with thicker scales than lodgepole pines in areas where red squirrels are the primary predispersal predator of lodgepole pine seeds (Benkman 1999). Crossbills with large, stout bills are more efficient at foraging on cones with such traits (Benkman 1999). As expected, South Hills crossbills have large bills that allow them to efficiently extract seeds from the cones of the lodgepole pine trees of the South Hills and Albion Mountains and, as a result, they feed almost exclusively on this seed source. As noted above and due primarily to their exclusive diet, the South Hills crossbill is non-migratory whereas other Red Crossbill populations often migrate between conifer populations as their seeds become available.

ISSUES

Primary immediate threats to the South Hills crossbill include activities or events that adversely affect lodgepole pine (or their seeds) in the South Hills and Albion Mountains such as catastrophic wildfire or introduction of red squirrels (C. Benkman, pers. comm.). A massive wildfire could reduce the already limited amount of lodgepole pine in these mountain ranges, which would likely result in a massive and rapid decline in crossbill numbers. The introduction of red squirrels into the South Hills and Albion Mountains would almost certainly result in the extinction of the South Hills crossbill (C. Benkman, pers. comm.). Because lodgepole pine in the South Hills and Albion Mountains have lost defenses against squirrel predation, squirrels introduced into these ranges would reach very high densities and outcompete crossbills for lodgepole seeds (as has happened in 2 other distinct crossbill populations, 1 on Newfoundland and another in southern Alberta/Saskatchewan; C. Benkman, pers. comm.). The greatest long-term threat to the South Hills crossbill is global warming (C. Benkman, pers. comm.). Global warming projections suggest that there will be little recruitment in lodgepole pine populations within 100 miles (160 km) of the South Hills and Albion Mountains (C. Benkman, pers. comm.). Given the close relationship between South Hills crossbill and the form of lodgepole pine in the South Hills and Albion Mountains (see above), a lack of lodgepole recruitment could adversely affect the South Hills crossbill population.

RECOMMENDED ACTIONS

Conservation actions for the South Hills crossbill should focus on maintaining the health and size of the lodgepole pine forests they depend on (through appropriate management of fire [wild and prescribed], grazing, timber and fuelwood harvest, etc.) and keeping the South Hills and Albion Mountains free of red squirrels (C. Benkman, pers. comm.). Red squirrels should never be purposefully introduced into the South Hills and/or Albion Mountains and resource managers should pay careful attention to nearby squirrel populations and to reports of squirrels in these ranges.

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Map created on September 22, 2005
and prepared by Idaho Conservation Data Center.
Sources: Predicted distribution is from the Wildlife Habitat
Relationships Models (WHR), A Gap Analysis of Idaho:
Final Report. Idaho Cooperative Fish and Wildlife Research
Unit, Moscow, ID (Scott et al. 2002). Predicted distribution
is approximate (for more information, go to
http://www.wildlife.uidaho.edu/idgap/idgap_report.asp).

