

1-1-2012

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Publication Information

Carlisle, Jay D. (2012). "Irruptive Migration of Chestnut-Backed Chickadees to Southwestern Idaho". *Western Birds*, 42, 12-20.

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IRRUPTIVE MIGRATION OF CHESTNUT-BACKED CHICKADEES TO SOUTHWESTERN IDAHO

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ABSTRACT: I document irruptive movements of the Chestnut-backed Chickadee to Lucky Peak in southwestern Idaho, over 80 km from its regular range. Chestnut-backed Chickadees were captured and/or observed at Lucky Peak in 2000, 2004, and 2008. To evaluate the context for this phenomenon, I also examined data on capture of all chickadees and other irruptive species at Lucky Peak and numbers of irruptive species recorded on Idaho Christmas Bird Counts (CBC) from 1997 to 2011. Though CBCs in the winter of 2004–05 (following the largest movement of Chestnut-backed Chickadees at Lucky Peak in fall 2004) found high numbers of many irruptive species, relatively low numbers of Chestnut-backed Chickadees were detected on Idaho CBCs that winter. Overall, I observed little correspondence between capture totals at Lucky Peak and Idaho CBC data for potentially irruptive species in general, and little correspondence between years with Chestnut-backed Chickadees and patterns of any irruptive species in CBC data for the subsequent winter. The seasonal movement patterns of this species, their regularity, and their causes warrant greater attention.

Several North American chickadees including the Black-capped (*Poecile atricapillus*), Boreal (*P. hudsonicus*), and Mountain (*P. gambeli*) engage in some level of regular and/or irruptive migration (Ficken et al. 1996, McCallum et al. 1999, Foote et al. 2010), a trait also shared by numerous Old World relatives (van Balen and Hage 1989, Heldbjerg and Karlsson 1997). The Chestnut-backed Chickadee (*P. rufescens*) is a permanent resident of western North America, primarily in the states/provinces adjacent to the Pacific Ocean (from Alaska to California), but it also occurs in the interior, including southeastern British Columbia, northern Idaho, and western Montana (Dahlsten et al. 2002). It makes short-distance, especially elevational, movements within or close to its regular range in British Columbia, Montana, and Oregon, and irregular post-breeding dispersal has been documented to northern British Columbia, southwestern Alberta, and southern California (Grinnell and Miller 1944, Dahlsten et al. 2002, D. Casey and P. Hendricks, pers. comm.). Longer-distance movements are undocumented. Here I provide evidence for rare but regular movements in Idaho to at least 80 km (mostly well over 150 km) from the nearest point where the species is resident.

METHODS

Since 1997, the Idaho Bird Observatory has operated a banding station in fall migration at Lucky Peak (1845 m; 43.605° N, 116.061° W), along a forested ridgeline near the edge of the Snake River Plain in southwestern Idaho (details in Carlisle et al. 2004, 2005, 2006). Three distinct habitat types occur in a mosaic at Lucky Peak: dry coniferous forest dominated by Douglas-fir (*Pseudotsuga menziesii*), mountain deciduous shrubland dominated by bitter cherry (*Prunus emarginata*), and shrubsteppe dominated by sagebrush (*Artemisia tridentata*). The date on which operation of the station

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started advanced during the first few years from mid-August to late July but was standardized at mid-July in 2000; capture and banding have continued through October 15 in all years. Weather allowing, station's crew captured birds each day from sunrise for 5 hours by using ten 12-m nets placed in the deciduous shrubs adjacent to conifer forest and shrubsteppe. We identified all captured birds to species, age, and sex (Pyle 1997) and fitted each with individually numbered U.S. Geological Survey aluminum leg bands. We also recorded the date, time, and numerous measurements of each bird captured.

Each morning the crew recorded approximate numbers of all bird species observed at the study site. The combination of intensive capture and banding with careful observation on a daily basis has provided a thorough record of bird occurrence at the site.

I examined the patterns of observation and capture of the Chestnut-backed Chickadee at Lucky Peak from 1997 to 2010 in the context of closely related species and other irruptive species. Also, because fall migration of irruptive species might be reflected in Christmas Bird Count (CBC) data and CBC data provide an independent dataset for exploring such questions, I looked at Idaho CBC data for the corresponding winters to determine if similar patterns emerged. Thus datasets used for comparison included (1) patterns of capture of the Black-capped and Mountain chickadees, Red-breasted Nuthatch (*Sitta canadensis*), Brown Creeper (*Certhia americana*), and Pine Siskin (*Carduelis pinus*) at Lucky Peak and (2) CBC data for Idaho covering the winters from 1997–98 to 2010–11 for a suite of species that also show some irruptive tendencies (National Audubon Society 2011).



Figure 1. Chestnut-backed Chickadee captured at Lucky Peak, Ada County, Idaho, 7 October 2004.

Photo by Patrick Kolar

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Table 1 Specific Dates of Capture and Detection of the Chestnut-backed Chickadee at Lucky Peak, Idaho

Year and date	Captured	Observed	Total
2000			
25 Sep	1	0	1
2004			
30 Sep	0	3	3
1 Oct	0	1	1
3 Oct	0	1	1
5 Oct	0	3	3
6 Oct	0	3	3
7 Oct	2	4	6
8 Oct	1	0	1
early October ^a	0	7	7
11 Oct	0	2	2
12 Oct	0	1	1
13 Oct	0	1	1
2008			
29 Sep	0	1	1
Total	4	27	31

^aThis flock of seven individuals was observed by the hawk-migration team but the exact date was not recorded.

RESULTS

We captured and/or detected Chestnut-backed Chickadees only in 2000, 2004, and 2008 (Table 1). The first was captured 25 September 2000, the only Chestnut-backed detected at the site that year. We detected a flock of at least three Chestnut-backed Chickadees on 30 September 2004, beginning a 2-week period during which the species was detected and/or captured on 10 out of 14 days, including three individuals captured and banded (Figure 1) and 19 other observations (Table 1). In addition, the raptor-count team, who did not routinely record passerines, observed a flock of seven individuals calling and taking off from the tree tops and flying south in early October 2004 (G. Papp pers. comm.; Table 1). The next observation was of a bird heard and seen by multiple observers on 29 September 2008. Thus all Chestnut-backed Chickadees were captured or observed at four-year intervals (coincidentally, in leap years): 2000, 2004, and 2008 (Table 1). Three of four captured birds were aged with certainty as hatch-year birds, and the fourth (in 2004) was also suspected to be a hatch-year bird (skull pneumatized but mouth lining suggested an immature) but recorded as of unknown age.

Numbers of both the Black-capped (range 2–66 captured per season) and Mountain Chickadees (range 15–206) have varied substantially over the 14-year study period (Figure 2). Although the highest number of Black-capped Chickadees was recorded in 2000, when one Chestnut-backed was captured, the two other years in which Chestnut-backed Chickadees occurred at the site had among the lowest seasonal totals for both other chickadees

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(Figure 2), suggesting that whatever factor was responsible for Chestnut-backed Chickadee movements was not acting simultaneously on the other chickadee species captured at Lucky Peak. On the other hand, the total of Pine Siskins captured was highest in 2004, and we also captured more Red-breasted Nuthatches than normal in 2004 (Figure 2). Thus two other irruptive species dependent on coniferous forests moved to Lucky Peak in higher than normal numbers the same year that we saw the highest numbers of Chestnut-backed Chickadees.

During the 2000–01 CBC, following our first capture of a Chestnut-backed Chickadee in September 2000, several species were recorded in Idaho in above average numbers. These included the Black-capped Chickadee, Mountain Chickadee, Red-breasted Nuthatch, Pine Siskin, Red Crossbill (*Loxia curvirostra*), and Evening Grosbeak (*Coccothraustes vespertinus*), but only for the Evening Grosbeak was this the highest count of the study period (Figures 3 and 4). Interestingly, in the winter of 2004–05 (following the biggest movement of Chestnut-backed Chickadees at Lucky Peak in fall 2004) CBC numbers were high for many irruptive species, including the Black-capped and Mountain chickadees, Red-breasted Nuthatch, Brown Creeper, Bohemian Waxwing (*Bombycilla garrulus*), Pine Siskin, and Red

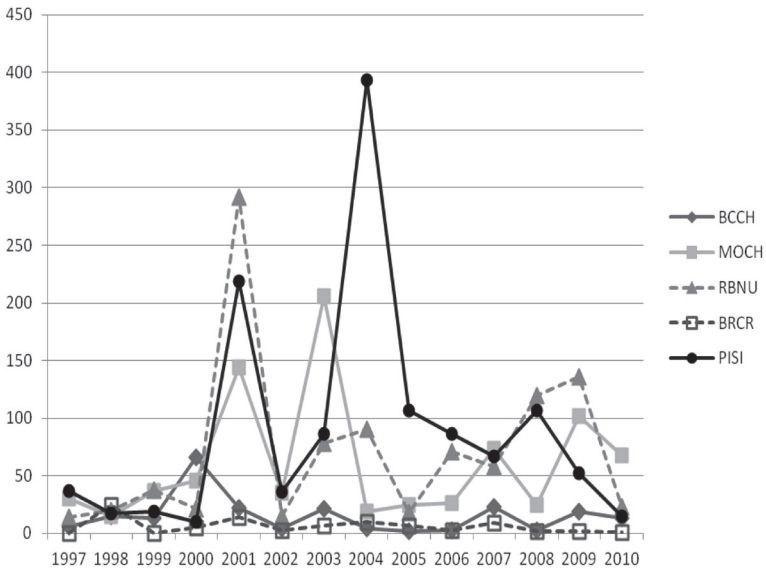


Figure 2. Patterns of capture from 1997 to 2010 of potentially irruptive species during fall migration at Lucky Peak, southwestern Idaho (Chestnut-backed Chickadee not shown because of difference in scale, see Table 1). Species codes: BCCH, Black-capped Chickadee; MOCH, Mountain Chickadee; RBNU, Red-breasted Nuthatch; BRCR, Brown Creeper; PISI, Pine Siskin. Dates of study: 1997, 13 Aug–21 Oct; 1998, 5 Aug–15 Oct; 1999, 31 July–15 Oct; 2000, 18 July–16 Oct; 2001–2010, 16 July–15 Oct.

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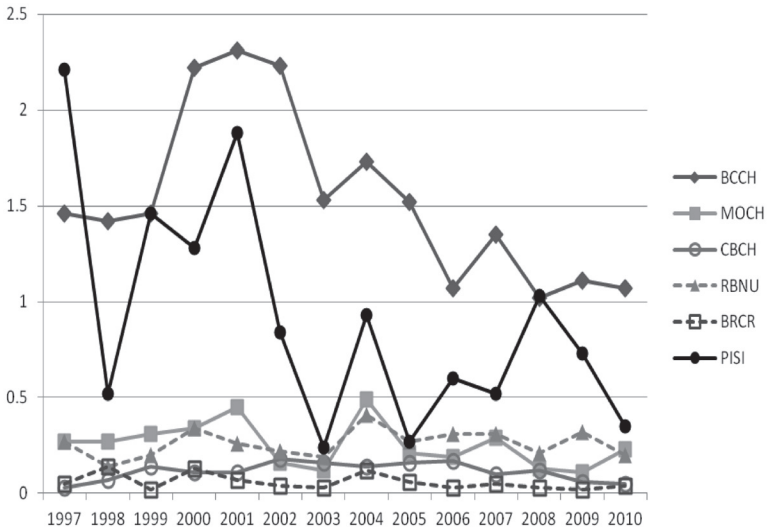


Figure 3. Christmas Bird Counts (birds counted per party-hour of effort) for winters of 1997–98 to 2010–11 for potentially irruptive species that are also captured at Lucky Peak. Species codes: BCCH, Black-capped Chickadee; MOCH, Mountain Chickadee; CBCH, Chestnut-backed Chickadee; RBNU, Red-breasted Nuthatch; BRCC, Brown Creeper; PISI, Pine Siskin.

Crossbill, but relatively low for the Chestnut-backed Chickadee! In the winter of 2008–09 CBC totals were relatively high for the Pine Siskin but relatively low for other irruptive species.

I observed little correspondence between capture totals at Lucky Peak and Idaho CBC data for potentially irruptive species in general, and little correspondence between years with Chestnut-backed Chickadees and patterns of any irruptive species in the subsequent year's CBC data for Idaho. Indeed, the patterns of Chestnut-backed Chickadee capture at Lucky Peak did not match with CBC data for that species.

DISCUSSION

Though more common in wet forests farther north in Idaho, Chestnut-backed Chickadees are known to be resident as far south as the McCall/Cascade/Smith's Ferry area of Valley and Adams counties of west-central Idaho (Svingen and Dumroese 1997, Sturts and Sturts 2011, D. Trochlll pers. comm.). Thus Lucky Peak sits approximately 80 km south of the nearest documented range of the species and well over 150 km from higher-density populations farther north. The records at Lucky Peak are the southernmost for the species in the state and in the interior West, as there are no records farther south in Idaho nor from Utah or Nevada (Nevada Bird Records Committee 2011, Utah Bird Records Committee 2011). The

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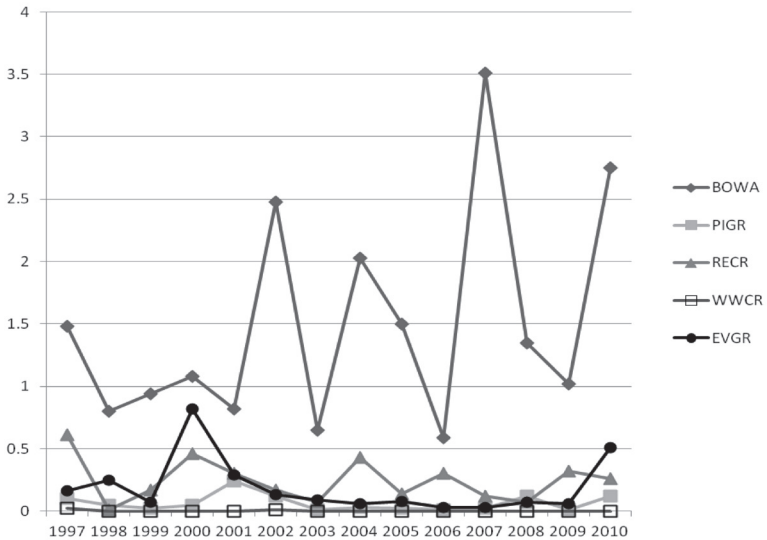


Figure 4. Christmas Bird Counts (birds counted per party-hour of effort) for winters of 1997–98 to 2010–11 for potentially irruptive species that are rarely or never captured at Lucky Peak. Species codes: BOWA, Bohemian Waxwing; PIGR, Pine Grosbeak; RECR, Red Crossbill; WWCR, White-winged Crossbill (*Loxia leucoptera*); EVGR, Evening Grosbeak.

only other out-of-range report for Idaho comes from the town of Salmon in December 1984 (also a leap year) (Sturts and Sturts 2011).

The Chestnut-backed Chickadee’s pattern of occurrence at Lucky Peak raises several important questions: (1) Why were these chickadees moving so far from their permanent range? (2) Why have we only documented this every four years? (3) Why were Chestnut-backed Chickadee movements not strongly related to movements of other species? (4) Why was there so little apparent correlation between migration data and CBC data?

The Chestnut-backed Chickadee’s pattern of regular movement every four years was not seen for any irruptive species at Lucky Peak or in Idaho CBC data for corresponding years. There are several plausible reasons why its fall movements detected at Lucky Peak were apparently not correlated with CBC data or movements of other irruptive species; these include diet differences by species, the distance from the study site to the source of dispersing chickadees, and habitat differences between CBC locations and ideal habitat for Chestnut-backed Chickadees.

Patterns of irruption can vary dramatically by species, from irregular and unpredictable to regular with reasonably consistent intervals (e.g., Bock and Lepthien 1976, Koenig and Knops 2001). With CBC data, Koenig and Knops (2001) showed that irruptions of many species are correlated with large crops of conifer seeds in the year prior to irruption (likely leading to high winter survivorship and increased population size) followed by a

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substantially lower seed crop during the irruption year. They also found that weather variables had no significant relationship with irruptive movements. Among the chickadees and tits, most evidence suggests that a combination of population density and food scarcity drives irruptions (van Balen and Hage 1989, Ficken et al. 1996, Heldbjerg and Karlsson 1997, McCallum et al. 1999, Koenig and Knops 2001, Foote et al. 2010).

Though one might expect migration data and CBC data to match up within a given year and across years, the relationship might not be so straightforward for all species. In the case of conifer-reliant species, it could be that a site like Lucky Peak (with conifer forest dominated by Douglas-fir) provides more habitat for Chestnut-backed Chickadees than do CBCs centered at lower elevations more accessible to surveyors in winter. Also, irruptive migrants occurring during fall migration might not necessarily remain until the CBC season in December and January. In the case of the Chestnut-backed Chickadee, one could imagine a bird undertaking long-range dispersal in September and/or October, only to perish or return to an area closer to the breeding range before mid-December. Another possibility is that survey effort during a CBC, especially in a state with relatively few birders like Idaho, is not of the same intensity as the daily coverage at a site of focused study of migration like Lucky Peak.

It is possible that various species' differences in diet might result in each species responding independently to different environmental cues. Importantly, we have very little information on what tree species' seeds the Chestnut-backed Chickadee relies upon (Dahlsten et al. 2002). Also, the U.S. Forest Service's Northern Region, which includes most of the Chestnut-backed Chickadee's range in Idaho, does not track cone crops on an annual basis; instead, it tracks years with especially good crops and for commercial species only (G. Scott pers. comm.). Thus I was unable to assess whether or not cone crops in the region were correlated with movements of chickadees.

Another important difference between the Chestnut-backed Chickadee and other irruptive species is the extent of its range. Because other irruptive species like the nuthatches, creeper, and other chickadees all have more extensive ranges, irruptions or dispersal could originate from multiple populations across the range at different times (e.g., LeBaron 1999). But, because Chestnut-backed Chickadees observed at Lucky Peak almost certainly originate from northern Idaho or western Montana, a more restricted range with more similarity in environmental variables at any given time, we might expect a lower potential for irruption, and therefore fewer incursions, in this species than in others.

Finally, we cannot be certain that the pattern we observed in our somewhat limited data set accurately reflects a pattern of periodic movement. One possibility is that Lucky Peak is too far from the permanent range for us to detect shorter-distance or more frequent movements. There may be annual or biennial shorter-distance movements to areas within a few kilometers of the permanent range that go unobserved because of a lack of observers and/or long-term research sites. For example, D. Trochlell (pers. comm.) has observed the Chestnut-backed Chickadee during fall and winter for three consecutive years at a site near La Grande, Oregon, at least several kilometers from the known breeding range. Also, periodic downslope move-

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ments into western valleys of Montana have been observed (D. Casey and P. Hendricks pers. comm.), consistent with evidence in Grinnell and Miller (1944) and Dahlsten et al. (2002) for regular short-distance movements. Such movements might relate to changes within the permanent range, maybe especially breeding areas, but whether fire, mast crops, or other unknown causes are involved is unclear.

While the cause(s) of the longer-distance movements to a site like Lucky Peak remain(s) uncertain, our data provide evidence for a regular, if irruptive, pattern of Chestnut-backed Chickadees moving in Idaho to over 80 km from their permanent range. The species' seasonal movement patterns, their regularity, and their causes warrant greater attention.

ACKNOWLEDGMENTS

I thank all the supporters of the Idaho Bird Observatory, including Boise State University (BSU), Golden Eagle Audubon Society, Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, Southwestern Idaho Birders Association, U.S. Forest Service, U.S. Bureau of Land Management, U.S. Geological Survey, BSU's Raptor Research Center, and generous individuals, local groups, and businesses. I'm also very appreciative of the efforts of countless field assistants, Boise State University students, and community volunteers that have made our migration research possible, especially including Dave Wike, Carol Wike, and Gary Robinson. Thanks also to Kenneth Able, Dan Casey, Paul Hendricks, Jack Stenger, Charles Swift, Scott Terrill, David Trochlell, and Heidi Ware for helpful comments on a prior version of the manuscript.

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Accepted 29 December 2011