

The Birds of Winter on Nuttby Mountain

John Kearney, John F. Kearney & Associates, 2012

The winter season in this study roughly corresponds to the astronomical definition of the season, beginning December 15 and ending March 15, thus shortly before the winter solstice and spring equinox. Nonetheless, due to its higher elevations (around 300 meters) than most of mainland Nova Scotia, winter comes early and the spring late on Nuttby Mountain, with mean temperatures below 0° by the end of November and lasting until April. The snowfall exceeds 300 cm per winter, with 140 days of snow cover and accumulations of 40 cm by midwinter (Davis and Browne 1996). The nearest Environment Canada weather station is at Debert, about 23 kilometers southwest of Nuttby Mountain at a much lower elevation of approximately 40 meters. Here the mean daily temperature between 1971 and 2000 was -6.6° in January and -6.1° in February. The mean amount of snow on the ground at the end of January was 12 cm and at the end of February 18 cm, considerably less than would be expected on Nuttby Mountain (Environment Canada).

During the first winter of post-construction winter surveys, the mean temperature at Debert in January 2011 was -6.2° and in February, it was -7.3°. This is close to the long-term mean for January and somewhat colder for February. The snow on the ground at the end of January was 13.45 cm and 52.54 at the end of February, again reflecting normal depths for January and greater than normal depths for February (Environment Canada).

In contrast, the second winter of post-construction winter survey was characterized by a very mild month of January. The mean temperature at Debert in January 2012 was -5.06° and -6.27° in February. Snow on the ground was 5 cm at the end of January and 44 cm at the end of February. Thus January was very mild compared to the historical trend while February was close to normal (Environment Canada).

Bird survey effort on the Nuttby Mountain Wind Farm site was similar during the two winters. There were 5 surveys in 2010-2011, and 6 surveys in 2011-2012. The surveys were begun about one hour after sunrise and continued for 3 to 4 hours. They consisted of two components;

- 1) A general area search which recorded any bird seen while driving through or standing in the wind farm site, and
- 2) A standardized area search which recorded all birds within 50 meters on each side of a walked transect.

The transects were of varying length and specific to a particular habitat type. In 2010-2011, 15 transects with an average length of 333 meters and 23 minutes were completed. In 2011-2012, 13 transects with an average length of 210 meters and 13 minutes were completed. The mean temperature at the beginning of each transect was -2.27°C in 2010-2011 and -0.54°C in 2011-2012.

On Nuttby Mountain, the difference in January weather in 2011 compared to 2012 was reflected in the number of birds present on the wind farm site during the entire winter. Figure 1 shows the locations of all the birds seen during the winter of 2010-2011 while conducting both the general and standardized area searches. The aerial photograph from Google earth shows the current Nuttby Mountain Wind Farm road and turbine layout superimposed on forest conditions in 2005. Winter birds were seen on only 5 occasions throughout the winter of 2010-2011. These included only four species; 30 Snow Buntings, 4 Common Ravens, 2 American Crows, and 1 Blue Jay.

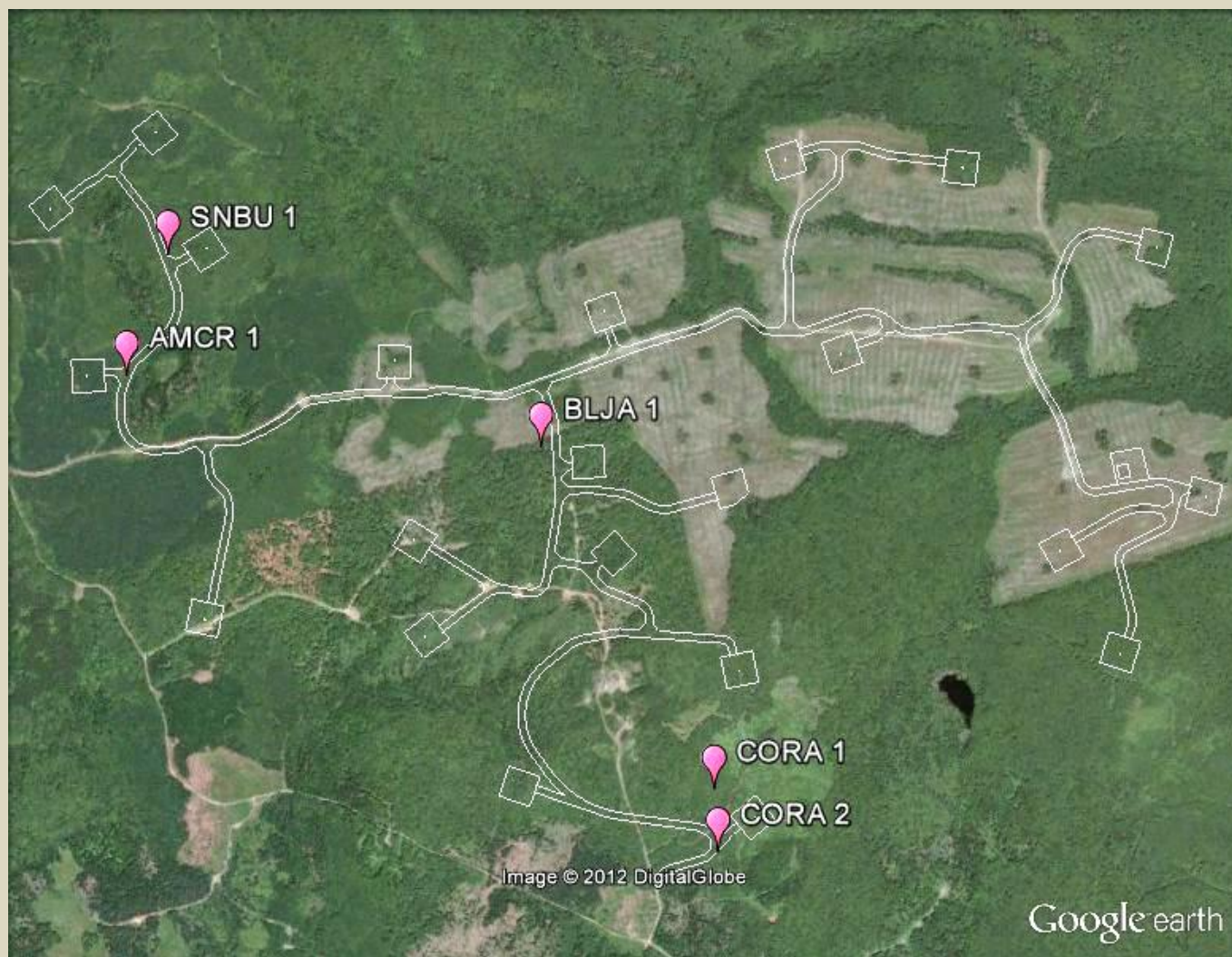
The situation during the winter of 2011 to 2012 was quite different. The ground was bare or had minimal snow cover on the wind farm site during all of the month of January. Thus it seems possible that many birds remained at these higher elevations, not only in January, but throughout the winter. As seen in Figure 2, there were many more sightings of birds during the winter of 2011-12 while conducting the general and standardized area searches. Birds were seen on 21 different occasions and included 9

species; 3 Downy Woodpeckers, 3 Hairy Woodpeckers, 1 American Crow, 4 Common Ravens, 6 Black-capped Chickadees, 1 White-breasted Nuthatch, 2 Golden-crowned Kinglets, 2 Pine Grosbeaks, and 1 unidentified songbird.

Standardized area searches (transects) were conducted in five different habitat types:

- 1) Disturbed forest and early successional forest
- 2) Disturbed forest next to mature deciduous forest
- 3) Mixed composition and age forest (mid-to-late succession)
- 4) Coniferous forest, and
- 5) Mature deciduous forest

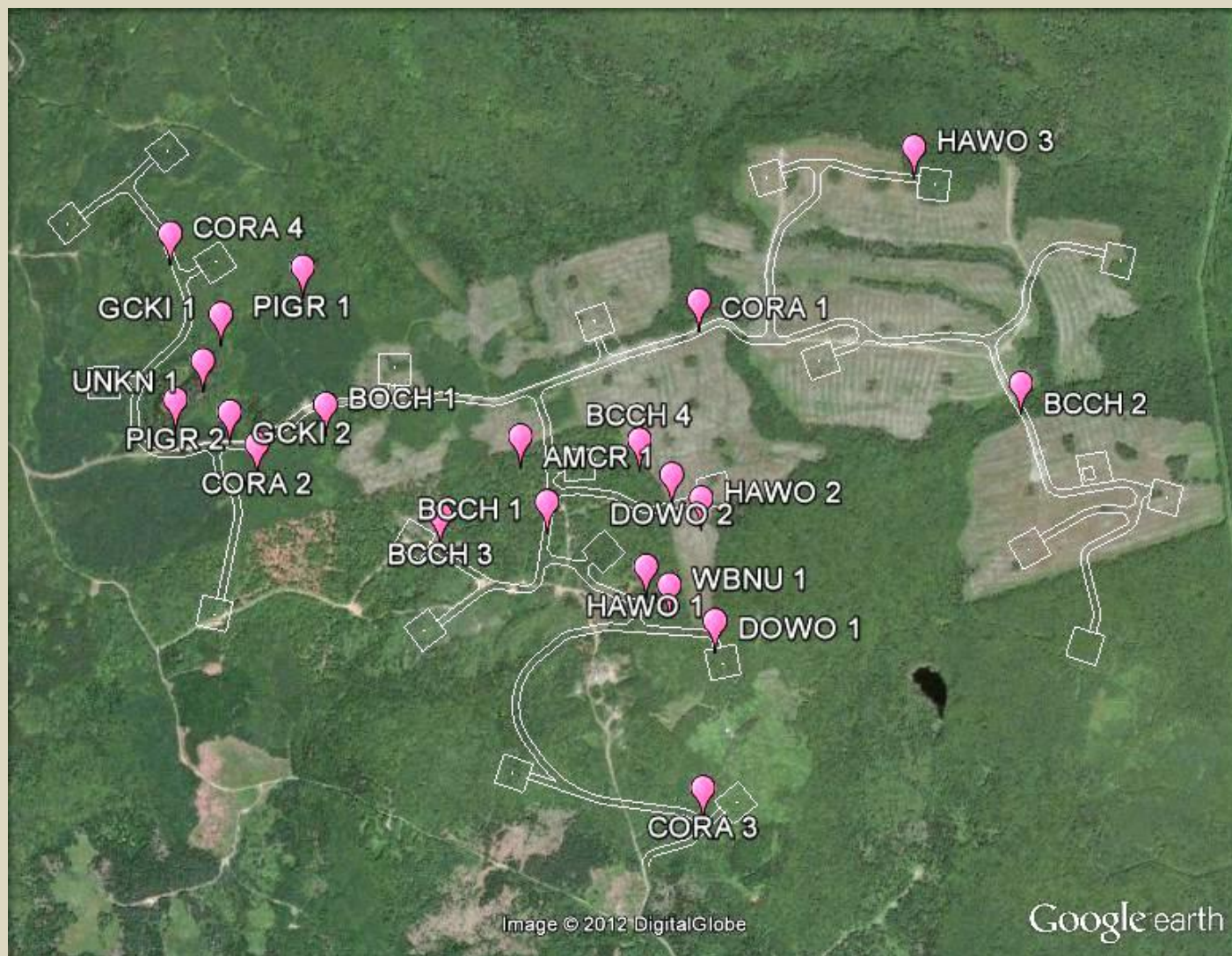
Figure 1: Map of Bird Sighting Locations during the Winter of 2010-2011



AMCR=American Crow; BLJA=Blue Jay; CORA=Common Raven; SNBU=Snow Bunting

During the standardized area searches conducted during the winter of 2010-2011, not a single bird was detected within 50 meters of the transect in any of the five habitat types. During the winter of 2011 to 2012, five species were detected within the 50-meter band in two different habitat types. A single Golden-crowned Kinglet was found in the mixed forest habitat (Type #3). In the mature deciduous habitat (Type #5), four species were found; Black-capped Chickadee, Hairy Woodpecker, Downy Woodpecker, and White-breasted Nuthatch.

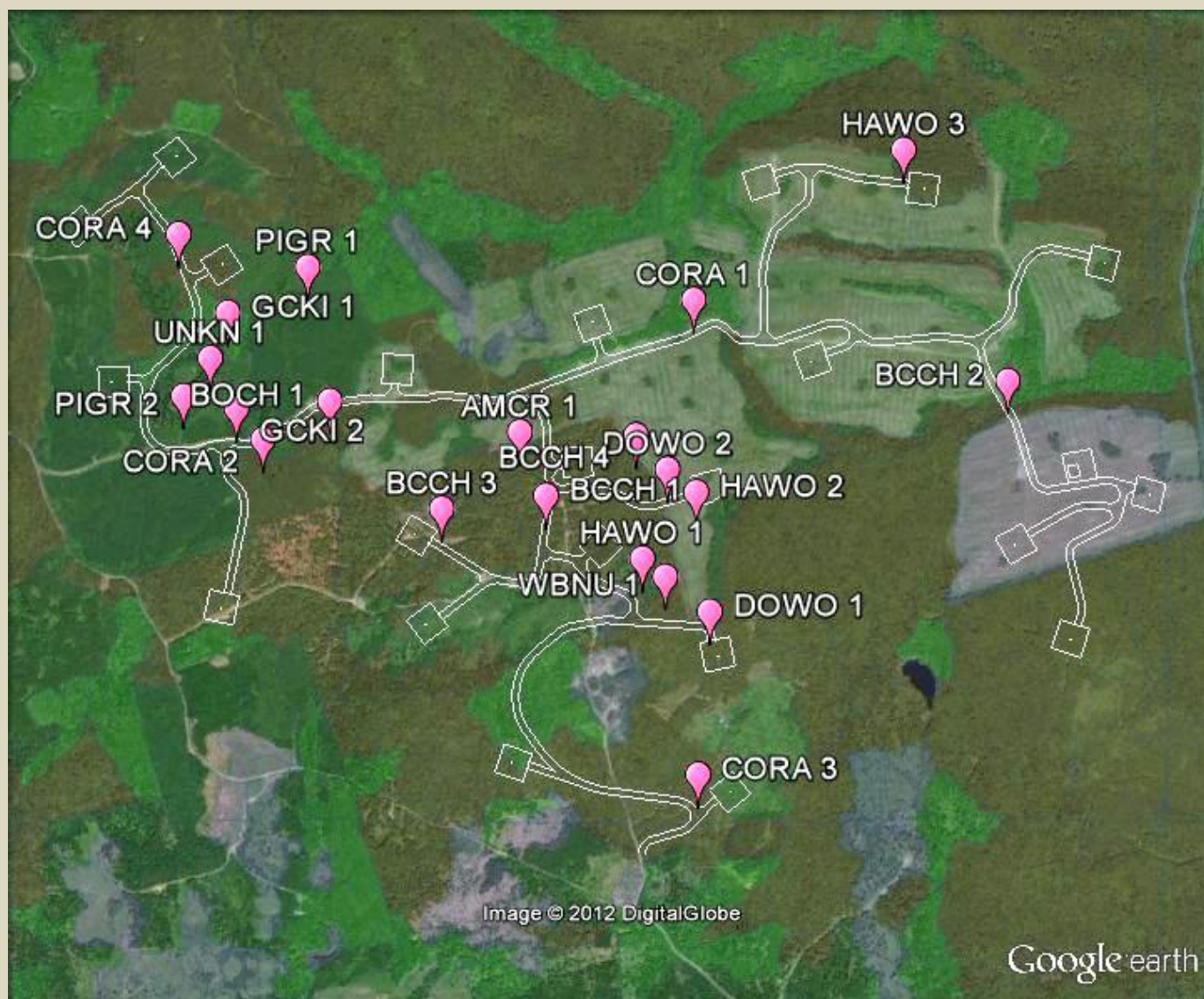
Figure 2: Map of Bird Sighting Locations during the Winter of 2011-2012



AMCR=American Crow; BCCH=Black-capped Chickadee; BOCH=Boreal Chickadee; CORA=Common Raven; DOWO=Downy Woodpecker; GCKI=Golden-crowned Kinglet; HAWO=Hairy Woodpecker; PIGR=Pine Grosbeak; UNKN=Unidentified songbird; WBNU=White-breasted Nuthatch

The calculated densities of these four species in the mature deciduous forest was 1 Black-capped Chickadee per 1.35 hectares, 1 Downy Woodpecker per 1.82 hectares, 1 Hairy Woodpecker per 2.70 hectares, and 1 White-breasted Nuthatch per 5.56 hectares. If the two winters are combined, the densities are 1 Black-capped Chickadee per 7.69 hectares, 1 Downy Woodpecker per 10.00 hectares, 1 Hairy Woodpecker per 14.29 hectares, and 1 White-breasted Nuthatch per 33.33 hectares of mature deciduous forest.

Figure 3: Forest Cover at the Nuttby Mountain Wind Farm Site and Bird Sightings during the Winter of 2011-2012



Blue-grey shading is disturbed forest; dark green shading is coniferous forest; light green shading is mixed forest; brown shading is mature deciduous forest

Calculating the combined densities over two years is an alternative way of understanding the distribution of birds on the higher elevations of Nuttby Mountain during the winter. This assumes that these four species are present each winter but spread over very large tracts of mature deciduous forest. Figure 3 shows the extent of the mature deciduous forest adjacent to the Nuttby Mountain Wind Farm site. The map

adds an additional layer to the previous Google earth maps showing forest cover from the forest inventory of Nova Scotia, using data primarily collected in the years 2003-2005 (Nova Scotia 2012). It demonstrates that there is extensive deciduous forest in the area, and that it is the dominant forest cover apart from the disturbed, cut-over areas. The map also shows how species such as the Golden-crowned Kinglet, Boreal Chickadee, and Pine Grosbeak, associated with coniferous habitats, are located near the coniferous forest cover type.

Thus, the number of winter birds found on the Nuttby Mountain may be the result of a number of factors including variations in weather conditions from one winter to the next, the detectability of birds in low densities over large hardwood tracts, natural fluctuations in resident bird populations, and the winter movements of non-local birds such as the Snow Bunting and Pine Grosbeak.

References

- Davis, Derek S., and Sue Browne, eds. 1996. *Natural history of Nova Scotia*. Halifax, N.S.: Nova Scotia Museum.
- Environment Canada. *Canadian Climate Data and Information Archive*, 29 May 2012. Available from www.climate.weatheroffice.gc.ca.
- Nova Scotia, Department of Natural Resources. 2012. Forest Inventory Data.