Flight Directions of Boreal Finches in the Irruption of 2020 - by Bill Evans

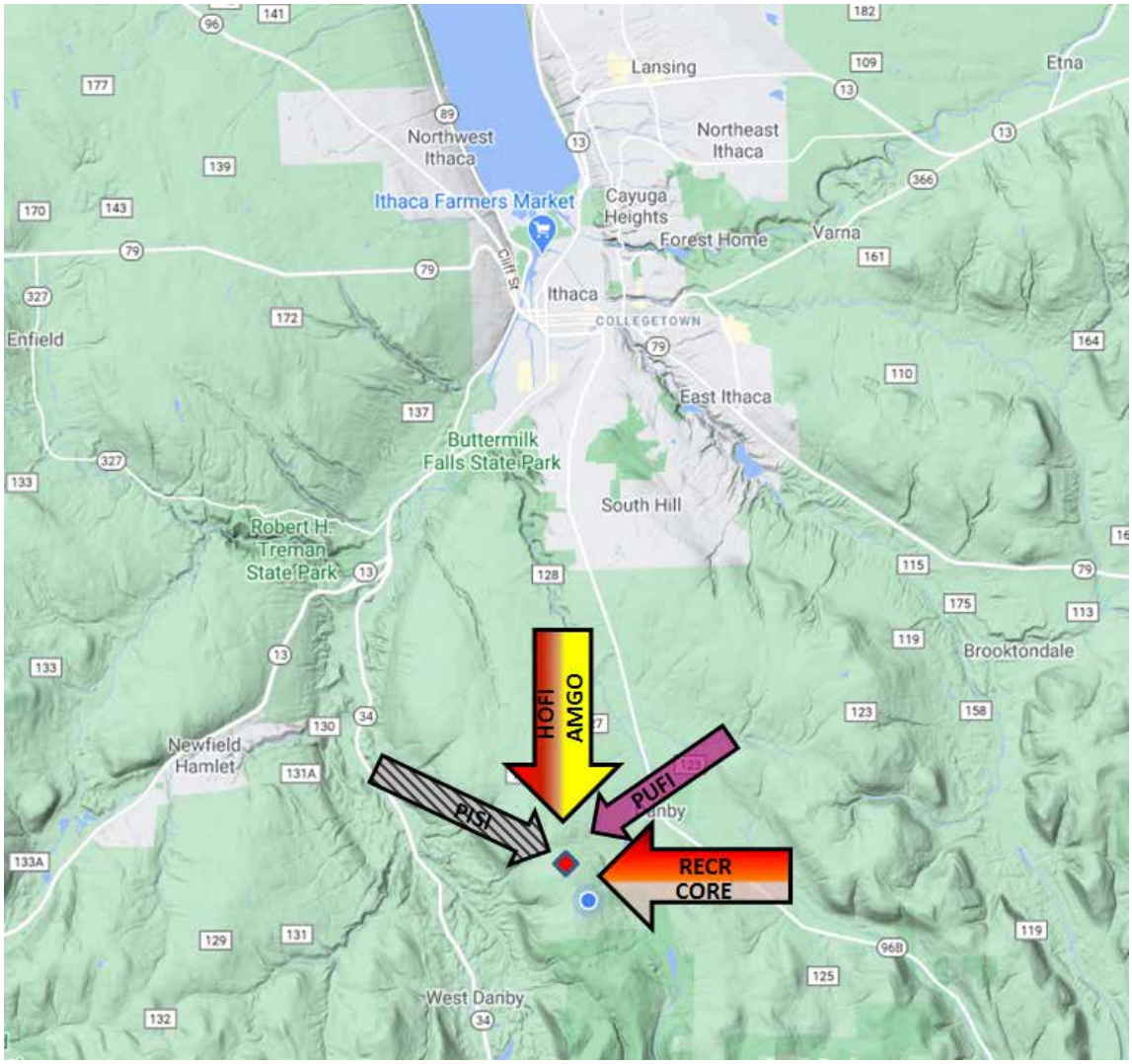
As this year's broad-spectrum finch irruption expanded, I happened to be taking a daily core sample of morning flight activity from a vista walking distance from my home, ~8 miles south of Ithaca NY (see picture of count site below). This morning watch had been evolving since fall 2017, when I first utilized the site to study southbound loon migration off Cayuga Lake and Lake Ontario. This year, because of the pandemic, I had no out-of-town work travel, did not have to drive kids to school, and everything seemed to line up to do daily counts for an hour or two each morning. I started August 4 with the intention of logging early-season American Robin movements and only have missed one morning as of this writing. I'm so thankful for the opportunity - for the peace of mind that's resulted, for the deeper connection with birds, and the front-center seat for this fall's eye-opening departure of finches and other species out of the Boreal.

View from the "Cayuga South" count site looking NNW on October 8, 2020.

After 4 months on the watch, there is much to say. Every morning has been unique, but species patterns connect the days and weeks – pulses in numbers have come and gone.

One of the big take-aways so far has been the intriguing differences in species' flight directions. Renown coastal morning count sites like that sponsored by New Jersey Audubon at Cape May's Higbee Beach Dike and that sponsored by Explos-Nature at the Dunes of Tadoussac (L'Observatoire d'oiseaux de Tadoussac) in Quebec each have two primary directions of flight paralleling shore. Whereas flight direction at my inland site is not a response to a barrier, there is a 360-degree option, and the flight that ensues theoretically reflects the way the birds *want* to go, for reasons we can speculate.

The picture below shows the primary flight directions of six species of winter finches I documented through November. By primary, I mean > 85% of the flocks or migrant individuals that were logged passed approximately in the directions indicated by the arrows.



Migrant American Goldfinch (AMGO) and House Finch (HOFI) invariably passed by heading directly south. Flocks of Pine Siskin (PISI) largely passed to the east-southeast. Purple Finches (PUFI) moved toward a swath of southwesterly directions (SSW to WSW). Red Crossbills (RECR) and redpolls (CORE) surprisingly arrived from the east and passed directly westward. Only 39 Evening Grosbeaks were documented. Some were on a westward trajectory like the crossbills and redpolls, with others moving northwesterly. No White-winged Crossbills or Pine Grosbeaks have been noted through November.

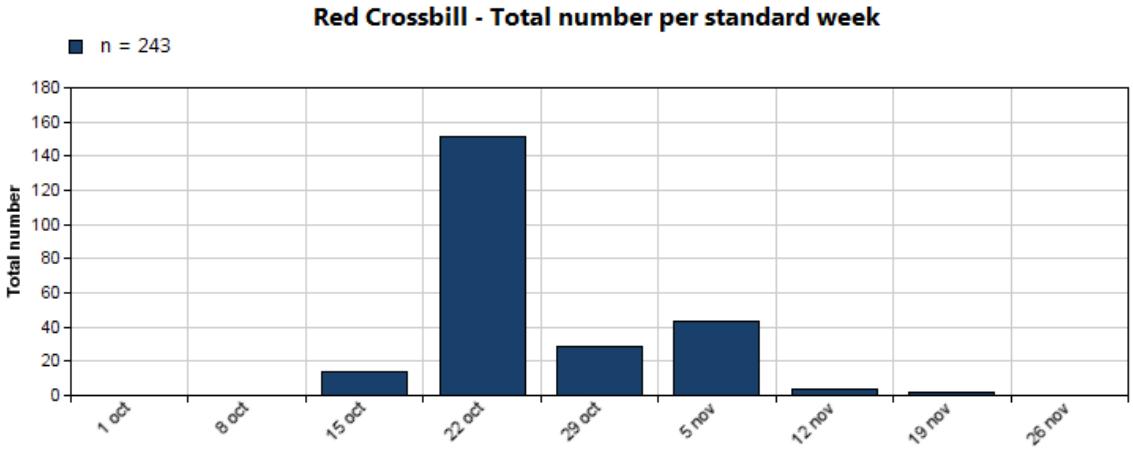
The Table below includes the estimated primary flight direction(s) for each species as well as numbers of birds and largest flock sizes detected. Numbers are underestimates because unseen flocks with vocal individuals were counted as either one or two birds depending on vocal activity, even though they in some cases likely involved additional silent birds. Flight direction from unseen flocks could often be gleaned by following vocal activity. For most species, single birds often wandered around first thing in the morning in what may be a search for association. This flight behavior seemingly occurred in all directions and these individuals were included in the ~15% for each species that did not move in the apparent primary flight direction. Some double counting of these birds may have occurred as they milled around. American Goldfinch and House Finch presented a counting challenge due to local, not actively migrating individuals that occasionally moved about the vicinity of the watch site. In this study, the level of uncertainty contributed by individuals in such local movements or those apparently looking for flock association was small relative to the strength of clear migratory flights. The exception is with Evening Grosbeak for which numbers were too low to confidently resolve flight direction.

Species	n	Primary Flight Direction	~Largest Flock Size
American Goldfinch	1094	~South	18
Purple Finch	915	SSW-WSW	14
Pine Siskin	871	E-SE	40
House Finch	271	~South	16
Red Crossbill	243	~West	45
Redpoll	242	~West	20
Evening Grosbeak	39	W-NW?	6

It makes sense to me, and I have some evidence, that there would be variations in flight directions from year to year, for example due to what region a species irrupts from. Of course, flight directions could be steered by elders within a flock or perhaps through innate wiring distilled over time. Or it may be as simple as flight radiating out in all directions from a region of food scarcity, or at least in directions that are more likely to have an abundant food source.

While there is little historical data from my watch site to compare, I also carried out contiguous daily counts throughout November 2019. In that month only one of the seven finch species noted in November 2020 was documented. During 16-23 Nov 2019, about 250 American Goldfinch were observed passing the watch site with a rate of passage averaging ~30/hour. Interestingly, the flock direction was nearly 100% toward the east. I have not seen any easterly passage of American Goldfinch flocks in 2020 and what little migratory passage occurred in the latter half of November this year was nearly 100% toward the south.

One of the most fascinating observations I had this fall was what appeared to be a wave of active migration of mostly Type 10 Red Crossbills out of northeastern North America. In other words, I observed a uniform directional movement of Red Crossbill flocks in the interior of the continent that appeared not to be transit between local feeding sites. After daily morning flight counts for 11 weeks with no Red Crossbill sightings, they seemed to arrive en masse. The flight began October 20 with a flock of 14, then on the 22nd & 23rd eight independent flocks passed over totaling 123 individuals, all headed directly west, seemingly pinged with urgency. I had never seen such high-flying crossbill flocks before – one of them I estimated passing at 300 feet above the watch site. The next two weeks the flight continued in lower numbers, nearly all headed straight west and since mid-November only a few additional individual flyovers have been logged - see table below for fall 2020 weekly detections. Even though crossbills are still being reported in the region, apparently as temporary residents, the initial migratory pulse seems to have passed. A big question for me is why they were flying west and not south?



So, what has become clear to me this season is that the phenomenon of fall irruptions of Boreal finches through central New York State (at least) is not simply a north to south movement. Indeed, there appears to be unique invisible vectors each species travels. Teasing these vectors apart from local movements requires special attention but can add a new dimension to one's observations of finches in flight, weaving them into a larger picture across space & time – seeing the forest for the trees so to speak, potentially enabling one to tune to the ebb & flow of a broad-front wave across the continent.

Continuous daily morning flight counts help resolve and build confidence in determined seasonal flight directions. Confidence would increase further if multiple sites in a region are monitored simultaneously. And, while I'm writing this article to encourage more attention to the dimension of winter finch flight direction in the interior of North America, I also utter a warning that one needs discipline and planning to maintain work, family, etc. while the first hour or so after sunrise each day is allocated to counting birds in morning flight. Otherwise the special gravity of a major Boreal finch irruption may have disruptive consequences and hurdle one away.

All data from my watch site named "Cayuga South" is available at Trektellen.org, the Netherlands-based site for daily counts of birds in active migration. I look forward to connecting with others who have monitored active diurnal morning flight of finches and other species in the past, and with those who aim to do so in the future.