



## Scientists Undertake Comprehensive Study of Birds

*By Jill Riddell*

At four thirty AM, Ryan Buron and Harrison Jones wake up in the Ives Lake field station, make coffee, and drive off into the woods. It's June of 2021, and they're attempting to compile a quantitative record of bird populations found in the Huron Mountains, recreating a survey first executed by Michael Kielb and associates in a 1997-1998 HMWF-sponsored study.

"We're returning to precisely the same data points visited in that earlier study," says Jones. "We want to learn whether the species list has changed since then, and also, of species that are still here, are populations the same? Have they increased? Decreased?"

Jones is an avian ecologist at the Institute for Bird Populations and is an affiliated researcher at Florida Museum of Natural History. Buron completed a master's degree in Florida, and is currently a PhD student at the University of Wisconsin. Both studied with Scott Robinson, a professor at the University of Florida, and this is their second season of working on the survey.

After arriving at the target territory for that day's work, the two go separate ways to cover more ground. Sampling points are established every 200 meters along transects matching those established by Kielb, and the protocol for the study is for a researcher to stand in each location for five minutes and tabulate any bird they see or hear.

"We also take notes on the vegetation at each transect," Harry says. "Ornithologists have to know something about plants to understand the habitat birds live in. So, Ryan and I've been learning the trees up here."

Their work begins before sunrise because that's the brief period when birds do most of their vocalizing. Males sing to establish territory, and, if they haven't already done so, to find a mate. Particular species start to sing at a specific time relative to the light. The timing of song for each species is correlated with the height at which they typically forage and with the size of the bird's eye, according to biologist Karl Berg, a biologist who studies acoustic communication. Birds with different eye sizes perceive light levels differently at the same height, because larger eyes gather more light than smaller ones. Berg found that species who forage higher in the canopy or have larger eyes sing earlier than others.

The advantage of singing in the pre-dawn hours is twofold: one, there's sufficient light to perceive predators that may be lurking—so the bird can tell when it's a good idea to shut up and hide. Two, this

is time that would otherwise be wasted. The most time-consuming task of staying alive is finding and consuming food, and at that time of day, it's not yet bright enough to hunt and forage.

### *Value of Utilizing Former Surveys*

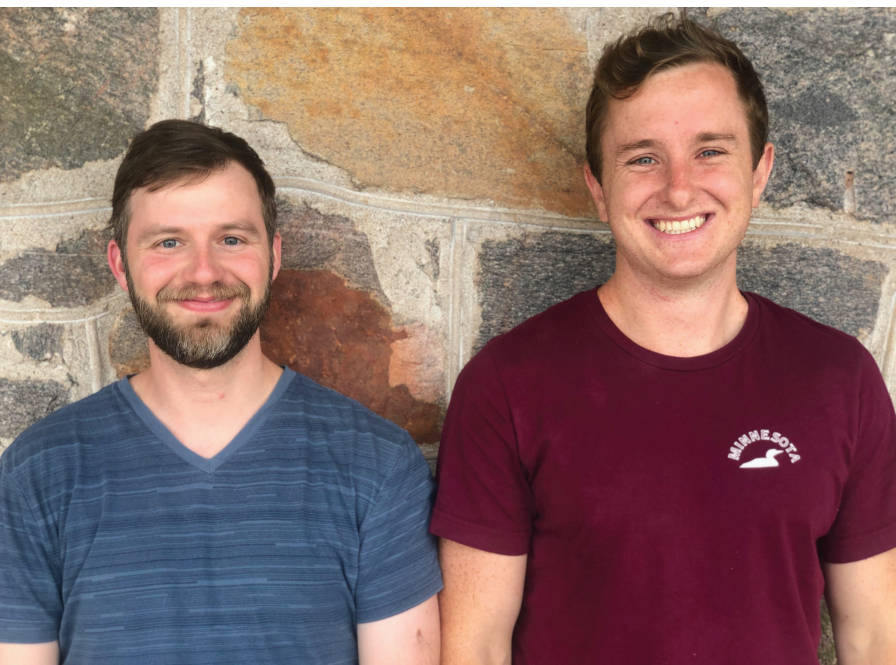
"When reviewing new research proposals, high priority goes to projects that must be done in the Huron Mountains with the Foundation—ones that couldn't be carried out the same way anywhere else," says Kerry Woods, director of science. "A new proposal that's scientifically strong can go to the top of the list if it builds on earlier studies and datasets. ~~A new applicant who intends to make current use of earlier datasets go to the top of the list.~~"

"We'd like to know if there are invasions of species that used to be limited to temperate forests," says Buron. "And though we hope this isn't the case, are there extirpations of birds limited to northern forests?"

**"There's no point anywhere on the property that you can be out of earshot of a red eyed vireo. They're the second-most common bird here," says Harrison Jones.**

*Illustration by Lynda Wallis*





**Left:** Ryan Buron and Harrison Jones conduct the field surveys for the bird study of the Huron Mountains. “It’s great place to work. No car sounds, no planes. We can hear which birds are singing all the way on the other side of the lake.”

**Right:** “I think birds are smart and adaptable. There are plenty of reasons to be concerned about them because of climate change and habitat loss. I wouldn’t want to be studying reptiles and amphibians—they’re a lot less mobile. Birds are fun—they always surprise me.” Scott Robinson, Katherine Ordway Professor of Ecosystem Conservation at Florida Natural History Museum.

At 11:00, after several hours of work, the two are finished with the field work. It’s time for lunch back at the Stone House, and a swim in Ives Lake. In the afternoon, they reconvene to input data from the morning.

“We record the information we gathered but we can’t analyze it yet. We don’t do quantification and statistical analysis until we’re back in Florida,” Jones says. “It takes a lot of computing power to do that. Running the programs takes hours.”

### ***Factors that Alter Bird Populations***

“Boreal forests are changing because of the warming climate,” Jones says. “But other changes affect them, too. For example, the forestry industry hates outbreaks of spruce budworm. It’s a pest that cycles through every thirty or forty years. When budworms arrive, they decimate a lot of trees, so foresters spray insecticide from planes to control them. But some birds species really like budworms, they depend on that cycle. Bay-breasted warbler, Tennessee warbler, Cape May—those have seven eggs each in outbreak years, very large clutches for songbirds. In between budworm outbreaks, their populations get reduced or extirpated. If budworms come through, the warbler populations bounce back up but that doesn’t happen very often anymore, it isn’t allowed to.”

Another factor that affects population numbers is what happens to winter habitat in Central and South America. “Certain birds tend

to overwinter in certain areas,” says Jones. “Like Canada warblers and some other species that live in eastern Canada, for example, prefer this one eastern-most mountain in a certain mountain chain within the Andes. If there’s a loss of habitat there, that particular species is hit hard.”

In the original survey, the Canada warbler was present in 20 percent of the transect points. “Redoing the survey gives us a way to find what the Canada warbler is occupying now – is it more than 20 percent? Less than 20 percent?” Jones says.

For the Canada warbler, the Upper Peninsula of Michigan has always been at the cusp of its range, the southern-most region of acceptable habitat. This means it’s likely to be one of the species first impacted by climate change. The new study will tell whether this is already happening.

### ***Observations Made So Far***

**Species of temperate birds are moving in**, especially in the second-growth forests around the Salmon Trout River. Indigo bunting used to be a rare species in the Huron Mountains, but now is common along the river and at Ives Lake. Yellow-billed cuckoo and white breasted nuthatch are also now quite common along the river. “We even saw a red-bellied woodpecker at the Salmon Trout,” Buron says. “Those are common elsewhere in the eastern United States but extremely rare for up here.”





**Above:** Hawkweed blooms in June at the meadow by Ives Lake. Open grasslands don't occur naturally in the Huron Mountains; this one is present because the land was cleared for a farm that operated many years ago. Because the meadow is atypical, it attracts birds not found anywhere else in the Huron Mountains, like bobolinks and lark sparrows. Photo by Jill Riddell

**Thrushes and vireos are doing well.** The American robin—a type of thrush that's the most abundant bird in North America—is also the most abundant species in the Huron Mountains. Analysis of new data will tell if it is more common now than in the 1990s. The second-most abundant bird in the Hurons is the red-eyed vireo. Ninety-six percent of the spots where Buron and Jones stopped to count had red-eyed vireos; 52 percent had Swainson's thrush, which requires conifers for nesting; and 64 percent had hermit thrush, a species willing to tolerate a mix of conifers and hardwoods.

**The black throated blue warbler is fairly common** in the Huron Mountains. Though it prefers mature forests, it's doing well not just here but throughout its range.

Resources: Information on Karl Berg's work comes from an article on *All About Birds*, website of the Cornell Laboratory of Ornithology. It was first published in 2006, in an article in *Proceedings of the Royal Society*, and appeared as a research highlight in *Nature*.

## HOW TO FIND COOL BIRDS

### *Pro Tips from Harrison Jones & Ryan Buron*

#### BEST TIME OF YEAR

"Visit the Huron Mountains from June 15 through July 10. That's when the area experiences a big pulse of mosquitoes and other insects. By the end of July, there are still bugs around but fewer. Birds like the Blackburnian warbler and green throated warbler are still present, but you're unlikely to see or hear them. Their young have hatched out and fledged. They have no reason to sing loud songs."

#### WHERE TO GO, AND WHERE IT'S NOT WORTH TRYING

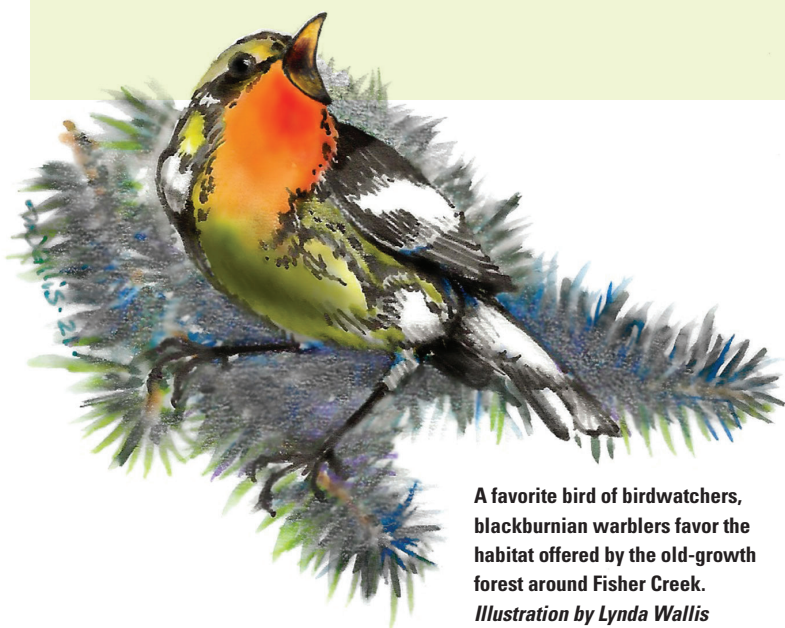
**Flat Rock:** "Avoid this whole general area. It's one of the poorest in terms of diversity of species. You won't see the songbirds present on most of the rest of the property. It's missing black throated blue warblers, golden crowned kinglet, brown creepers, Swainson's thrush, the Blackburnian warbler. Instead, it's dominated mostly by the generalists, the kind of birds that occur everywhere."

**Fisher Creek:** "Blackburnian warbler is a common bird there. It requires conifers – it can't make it with maples, ashes, birches alone." The old-growth forest around Fisher Creek has a good mix of hemlock and white pine with the hardwoods.

**Beaver swamp on the road around Ives Lake:** "Rich area for birds. Yellow warblers, alder flycatchers. This year, a pair of black-billed cuckoo were nesting. A breeding Wilson's snipe was also present."

**Meadows by the Stone House:** "We see birds here that aren't anywhere else on the property. A bobolink was breeding this year, and we saw a lark sparrow last summer. A dickcissel also showed up."

**Canyon Lake trail:** "The trail and the cedar swamp at the trailhead are amazing. This is one of the few (perhaps only) places on the property with Canada warbler and yellow-bellied flycatcher, two rare birds in the U.P."



A favorite bird of birdwatchers, Blackburnian warblers favor the habitat offered by the old-growth forest around Fisher Creek. Illustration by Lynda Wallis

# The Product: Research Publication and Impact

It's difficult to assess the yield of investment in primary research; research products typically emerge over extended periods, and there is no simple way of measuring their overall contribution in the vast, interconnected body of scientific understanding. But we have long seen that HMWF's research program has an impact far out of proportion to its relatively modest budget, and the past year has been particularly productive. The list below includes peer-reviewed publications and several conference presentations I've learned about since last winter's newsletter, all reporting HMWF-sponsored research. I believe the fourteen papers listed is a record for a single year. (These, along with earlier publications, are all listed at [www.hmwf.org](http://www.hmwf.org) under the "research reports" menu.)

Publication rate is only one index of the significance of the program. I'll note two other indicators that we are doing something right. First, a number of the papers listed here involve integrative and comparative analyses; data-sets from the Huron Mountains are proving valuable as baseline and reference in the context of more extensive studies.

A more concrete indicator of the attention of the scientific community is the rate at which papers are cited in other research publications. This metric is incorporated into a variety of sophisticated "impact factors," and I've recently compiled a few very basic stats (using the very powerful tools at "scholar.google.com"). Here are some results that have surprised and gratified me. Since the 1980s, papers on the list at the HMWF website have been cited over 3900 times. Most of these citations have been in the last decade. Citation rate reached 100 per year in 2010, and papers reporting HMWF-sponsored research have been cited over 400 times so far in 2021. 27 papers have been cited over 50 times, and seven over 100 times. This is an impressive record, and it attests to both the world-class scientific value of the Huron Mountain landscape and the remarkable "yield" of contributions to support the Foundation's program.

## PEER-REVIEWED PAPERS

- Chavarie, L., S. Voelker, M. J. Hansen, C. R. Bronte, A. M. Muir, M. S. Zimmerman, and C. C. Krueger. 2021. Temporal instability of lake charr phenotypes: Synchronicity of growth rates and morphology linked to environmental variables? *Evolutionary Applications* 14:1159–1177. <https://doi.org/10.1111/eva.13188>
- Clark, J. S., ..., J. M. LaMontagne, (and others). 2021. Continent-wide tree fecundity driven by indirect climate effects. *Nature Communications* 12:1242. <https://doi.org/10.1038/s41467-020-20836-3>
- Colborn, A. S., C. C. Kuntze, G. I. Gadsden, and N. C. Harris. 2020. Spatial variation in diet–microbe associations across populations of a generalist North American carnivore. *Journal of Animal Ecology* 89:1952–1960. <https://doi.org/10.1111/1365-2656.13266>
- Gadsden, G. I., R. Malhotra, J. Schell, T. Carey, and N. C. Harris. 2020. Michigan ZoomIN: validating crowd-sourcing to identify mammals from camera surveys. *Wildlife Society Bulletin* 45:221–229 <https://doi.org/10.1101/2020.06.09.143180>
- Houghton, D. C. 2021. A new species of Setodes Rambur (Trichoptera: Leptoceridae) from northern Michigan, USA. *Zootaxa* 4965:293–300–293–300. <https://doi.org/10.11646/zootaxa.4965.2.4>
- Houghton, D. C. 2021. A tale of two habitats: whole-watershed comparison of disturbed and undisturbed river systems in northern Michigan (USA), based on adult Ephemeroptera, Plecoptera, and Trichoptera assemblages and functional feeding group biomass. *Hydrobiologia* 848:3429–3446. <https://doi.org/10.1007/s10750-021-04579-w>
- Houghton, D. C., and R. E. DeWalt. 2021. If a tree falls in the forest: terrestrial habitat loss predicts caddisfly (Insecta: Trichoptera) assemblages and functional feeding group biomass throughout rivers of the North-central United States. *Landscape Ecology* 36:3061–3078. <https://doi.org/10.1007/s10980-021-01298-4>
- Lambrech, N., S. Katsev, C. Wittkop, S. J. Hall, C. S. Sheik, A. Picard, M. Fakhraee, and E. D. Swanner. 2020. Biogeochemical and physical controls on methane fluxes from two ferruginous meromictic lakes. *Geobiology* 18:54–69. <https://doi.org/10.1111/gbi.12365>
- Leeper, M. A. C., and D. J. M. LaMontagne. 2021. Cone characteristics and insect predation levels vary across years in mast seeding white spruce. *Canadian Journal of Forest Research* 51:. <https://doi.org/10.1139/cjfr-2020-0442>
- Riege, D. A. 2020. Effects of beaver disturbance on vegetation of a permanent plot in the Huron Mountain Club reserve. *The Great Lakes Botanist* 59:202–217. <http://hdl.handle.net/2027/spo.0497763.0059.306>
- Riege, D. A. 2021. The Versatile Role of *Pinus strobus* Within the Composition and Structure of Permanent Plots in Five Mature Mixed Forests of the Upper Midwest U.S.A. *The American Midland Naturalist* 185:1–14. <https://doi.org/10.1637/0003-0031-185.1.1>
- Swanner, E. D., N. Lambrecht, C. Wittkop, C. Harding, S. Katsev, J. Torgeson, and S. W. Poulton. 2020. The biogeochemistry of ferruginous lakes and past ferruginous oceans. *Earth-Science Reviews* 211:103430. <https://doi.org/10.1016/j.earscirev.2020.103430>
- Williams, E. W. 2021. Population genetics of species in the genera *Botrychium* and *Botrypus* (Ophioglossaceae). *American Fern Journal* 111. <https://doi.org/10.1640/0002-8444-111.2.129>
- Woods, K. D., T. A. Nagel, B. Brzezicki, C. M. Cowell, D. Firm, P. Jaloviar, S. Kucbel, Y. Lin, Z. Maciejewski, J. Szwagrzyk, and J. Vencurik. 2021. Multi-decade tree mortality in temperate old-growth forests of Europe and North America: Non-equilibrium dynamics and species-individualistic response to disturbance. *Global Ecology and Biogeography* 30:1311–1333. <https://doi.org/10.1111/geb.13291>

## RECENT CONFERENCE PRESENTATIONS

- Sterman, J., A.C. Leeper & J.M. LaMontagne. Synchrony of mast seeding patterns in a boreal forest community. Conference of the Canadian Society for Ecology and Evolution.
- Wielgomas, J., C. Krabenhof, A. Burtner, B. Friday, D. Kashian. Mathematical modeling for Ephemeroptera, Plecoptera, and Trichoptera (EPT) prediction. by Jacob Wielgomas, Corey Krabbenhof, Ashley Burtner, Brenna Friday and Donna Kashian. Conference of The Society for Freshwater Science
- Freiday, B., J., J. Wielgomas, D. Kashian. Long-term analysis of stream macroinvertebrate communities using gradientForest analysis. Conference of The Society for Freshwater Science
- Headley, R., A. Johnston, J.M. Orlofske, B. Sieren, B., and C.D. Tyrell, C. D. Linking Fluvial Sedimentation Characteristics to Larval Dragonfly Habitat. Meeting of the Geological Society of America



*By Kerry Woods*

After a covid-caused hiatus in 2020, the Foundation's annual meeting convened once again in August at the HMC Playhouse. In addition to updates on the Foundation's work and the Ives Lake Field Station from President Henry Dykema, the meeting featured a talk by Foundation researcher, Dr. Karen Murchie, of Chicago's Shedd Aquarium.

A fisheries biologist with experience in a wide variety of tropical and temperate systems, Murchie's research interests revolve around the causes and effects of fish migrations. What environmental factors regulate fish migrations and how are these affected by human activities? How do migrations of large fish populations affect aquatic environments?

In 2017, Murchie initiated broad-scale studies of the massive, salmon-like spawning migrations of native sucker species into tributaries of Lakes Michigan and Superior. Because this phenomenon occurs over a very large region and a relatively brief period (and because suckers are not valued as a game or food fish), it has never been closely studied. Murchie has adopted a 'citizen-science' approach to mitigate the logistical challenges, recruiting teams of local observers at 17 streams in Illinois, Wisconsin, and Michigan to make brief daily observations of stream conditions and fish presence at designated locations (at the Huron Mountains, HMC staff are the 'citizen scientists.') Murchie's study was featured in the Winter 2018 issue of the HMWF newsletter (<http://www.hmwf.org/news/newsletters/>).

Featuring underwater videos of suckers at spawning sites, Murchie's talk focused, as well, on the consequences of the migration for stream ecosystems and potential effects of environmental change. For example, spawning suckers transport nutrients from the larger lakes upstream where they enter stream food-webs. The timing of the migration appears to be triggered by temperature and water levels, both of which are likely to change with changing climate; only long-term monitoring, however, will allow fuller anticipation of likely changes.

Like so many HMWF-sponsored projects, the Murchie study depends on the long-term protected status and availability of Huron Mountain streams. At the same time, it places the natural systems of the Huron Mountain landscape in a regional context.

## *Manierre Award*

The 2021 Manierre Award was presented to Dr. Jalene LaMontagne, of DePaul University, and to her graduate student and co-author, Abigail Leeper. This is in recognition of two papers that emerged from LaMontagne's lab as a result of work sponsored in part by HMWF.

LaMontagne has been studying cone and seed production of white spruce trees at the Huron Mountains since 2012. White spruce is a boreal species at the southern edge of its range, and its reproductive success is likely particularly important for understanding longer-term effects of climate change. Complicating such understanding, spruce is a 'masting' species, meaning it produces cones and seeds irregularly, with very large crops at intervals of several years, with very few cones in intervening years. Understanding the environmental controls and triggers for 'mast' years, while critical, requires long-term experiments and monitoring. Enabled by initial funding from HMWF, LaMontagne's project has been recognized and supported by a grant from the National Science Foundation.

The project typifies several of the priorities of HMWF's research program. The research makes use of distinctive attributes of the Huron Mountain landscape, has an explicit long-term perspective, has demonstrated potential for accessing larger 'external' funding sources, and focuses on important environmental processes and dynamics.

The Manierre Award is given annually and is named in honor of Dr. William and Anne Manierre, who were Huron Mountain Club member-naturalists and long-time HMWF supporters. The award recognizes a recent publication (or multiple publications from a single project) of HMWF-sponsored research in the peer-reviewed literature.

All Manierre Award winners, with links to associated publications, are listed at the HMWF website (<http://www.hmwf.org/news/manierre-award/>). The papers recognized by the 2021 award are: Leeper, A. C., B. A. Lawrence, and J. M. LaMontagne. 2020. Plant-available soil nutrients have a limited influence on cone production patterns of individual white spruce trees. *Oecologia* 194:101-111. and Leeper, A. C., and J. M. LaMontagne. 2021. Cone characteristics and insect predation levels vary across years in mast seeding white spruce. *Canadian Journal of Forest Research* 51



**The Manierre Award recognizes publications that emerge from work sponsored by HMWF. Kerry Woods, the Foundation's director of science, (center) presented this year's award to Dr. Jalene LaMontagne, of DePaul University (right) and to her graduate student and co-author, Abigail Leeper (left).**

*Photo by Buffie Finkel*

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