Letter to the Editor

Modeling migratory nongame birds: a plea for data

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The Bird Damage Management Conference (BDMC) held February 10–13, 2020 in Salt Lake City, Utah, USA (https://conference.usu.edu/blackbirds/) provided a forum for professionals from across the United States to discuss and share management approaches, research strategies, policy, and messaging regarding the management of blackbirds (Icteridae), starlings (*Sturnus vulgaris*), corvids (Corvidae), and vultures (Cathartidae). Several presentations incorporated mathematical population, bioenergetics, and economics models to depict the effects of management application on population abundance and damage mitigation. Papers reporting on models are discussed in the special topics section of this issue of *Human–Wildlife Interactions* (Clark et al. 2020, Dolbeer 2020, Kluever et al. 2020, Peer et al. 2020).

While listening to the presentations, George Box's (1919–2013) famous quote, "All models are wrong, but some are useful," came to mind. What exactly makes a model "useful"? As a nonmodeler, I ask myself, do the inputs in the model represent the best available information (BAI)? This is particularly important for models that drive significant bird management decisions involving lethal take (Zimmerman et al. 2019). Nothing is wrong with the BAI approach as long as the author(s) inform their readers the model has deficiencies, particularly when the model lacks recent data that can only be obtained with additional well-designed studies and regular monitoring data (see Otis 2006, Runge et al. 2009, Runge and Sauer 2017).

I submit the models presented at the BDMC are useful because they point out existing data, admit data deficiencies (some of the data are 30 years old), and help managers prioritize information needs. Many readers will say fair enough, as the data are updated, the model can be updated. That said, when migratory birds are subjected to lethal culling, interactions among scientists, managers, and affected publics can get, well, interesting. Criticism can range from there is better information available, to the goal posts are too wide (confidence limits reflecting uncertainty) to allow meaningful interpretation and therefore the model is useless. Fair enough, but let's give modelers a break and point out better sources of information and provide them robust systematically collected field data to input into their models. These data could supplant the obligatory assumptions required to complete many models. The result will be better models reflecting higher confidence (less uncertainty) in estimates. What data do the modelers need? Ask them; in my experience, they want to help. For starters, good monitoring data collected at periodic intervals would be fantastic (Igl and Johnson 1997).

Developing population, landscape, bioenergetics, and economic models must allow for the mobility of birds in relation to nesting and foraging site selection. For example, in the northern Great Plains, drought and wet cycles affect blackbird populations reliant on wetland vegetation for nest and roost substrate (Nelms et al. 1994, Peer et al. 2003). The interaction of birds and agriculture is particularly complex, as over a relatively short time landscape parameters can change (Krapu et al. 2004). In particular, (1) crop selection can change rapidly due to economics, (2) new crops can appear on the landscape (e.g., hemp), (3) cropping patterns are changing due to rapid advances in crop genetics that allow certain crops to be planted in areas previously thought inhospitable for growing crops (see Schindele et al. 2020), (4) organic farms are becoming more prominent (typically organic

fields contain more weed seeds), and (5) the addition of cover crops and the use of strip-till planting methods are present on an ever-increasing number of farms. And of course, all these parameters may interact with climate change (Forcey and Thogmartin 2017). Without a doubt (in my mind anyway), all of these landscape changes do influence blackbird rates of reproduction and survival and influence migration and feeding patterns. All these factors, once again, point to the need for detailed systematic population monitoring programs with specific objectives. Nationwide periodic monitoring would provide data about changes not only in bird populations due to changing landscapes but also could be used to assess management activities (Igl and Johnson 2005).

Alas, generally native songbirds are not subject to sport hunting (mourning doves, [*Zenaida macroura*] are an exception) and associated need to set limits of take; thus, resources to monitor songbird populations are limited. Regardless, repetition of quadrat-based historical surveys in specific regions of interest, such as the one developed by Stewart and Kantrud (1972), and repeated, in part, by Nelms et al. (1994) and wholly by Igl and Johnson (1997), should be considered in other parts of the country. Certainly, on a national basis, the annual North American Breeding Bird Survey indices and the Audubon Christmas Bird Counts will be maintained and the analytics will continue to be refined to provide maximum use for monitoring changes in bird numbers (Strassburg et al. 2015, Sauer et al. 2017, Meehan et al. 2019). While these counts have well-documented flaws, the data are obtained by volunteers at their expense, which is no small thing.

Finally, lest we forget, allowable take, bioenergetics, and economics models, albeit very important, are just part of the puzzle when bird damage management decisions are developed and promulgated. Program administrators make damage management decisions based on the results obtained through the National Environment Policy Act (NEPA) process. The NEPA requires that decisions take into account laws, policies (Migratory Bird Treaty Act, 16 U.S.C. §§ 703–712), biology and economics (Peer et al. 2003), environmental safety, wildlife stewardship, social considerations, and practicality (Linz et al. 2015).

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