First Verified Documentation of a Fisher in Illinois Since the American Civil War

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Abstract - *Pekania pennanti* Exerblen (Fisher) are mustelids that mainly occupy forested habitats across northern North America. After European colonization, Fisher distribution was halved due to extensive trapping, logging, and habitat conversion for agriculture. Now Fishers are expanding into many suitable portions of their historical distribution, aided by active reintroduction programs, albeit with uneven success. Illinois is one part of the midwestern U.S.A. in which Fishers have not yet reestablished themselves, with the last known individuals being documented in the 1850s. Here we report the first verified Fisher in Illinois since that time, killed by a vehicle collision in Rockford, Illinois. This three-year-old male is of unknown origin, but likely from the nearest self-sustaining population in Wisconsin (~190km away). We discuss this finding in the context of what is known of Fisher's recent expansion and their ability to colonize other portions of midwestern North America.

Species distributions are the broad-scale result of organisms interacting with their environments (Boulangeat et al. 2012, Rubidge et al. 2011). Ongoing human modifications of land cover (e.g., anthropogenic development and habitat fragmentation) and climate change have caused changes in many species' local and overall distributions (Brown et al. 2016, Sih et al. 2000). It is important to document changes in distribution to understand changing ecological processes but also inform species-specific conservation and management strategies (Kujala et al. 2018). Understanding changes in distribution also provides insights into a species' ecological limits and adaptations (Boulangeat et al. 2012), as use of edge zones reveals how a species responds to changing conditions.

Pekania pennanti Erxleben (Fisher) have traditionally been considered highly specialized forest-dependent species (Aubry and Lewis 2003) that historically ranged across North America in Canada and northern U.S.A. from the Pacific Ocean to Atlantic Ocean (Lewis et al. 2012). Fishers declined to 43% of their historical range in the previous two centuries due to trapping, timber harvesting, and land conversion (Lewis et al. 2012, Tucker et al. 2012). They now occupy approximately 68% of their historical range due in part to reintroduction efforts in many states and provinces, with Fishers being one of the most successfully reintroduced carnivore species (Lewis et al. 2012). Fisher expansion of their distribution has been most successful in the East, including parts of the Appalachian Mountains, but less so in the Midwest U.SA-outside of Wisconsin and Michigan where Fishers were actively reintroduced (LaPoint et al. 2015, Lewis et al. 2012). Geographical differences in their success may be due to lower predator diversity in the East, allowing Fishers to take larger prey and escape interspecific killing (LaPoint et al. 2015). While their distribution is limited by specific habitat needs, especially for denning, Fishers have expanded their distribution into forested areas in states dominated by prairie (e.g., North Dakota) over the past few decades (Triska et al. 2020).

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Here we report the first confirmed Fisher documented in Illinois since the mid-1800s (around the time of the American Civil War). Fossil remains of Fishers have been found in Illinois from the Holocene (Graham and Graham 1990), and there were sightings of Fishers into the 1850s in northern Illinois (Hoffmeister 2002, Kennicott 1855). For the 170 years since these sightings, however, Illinois has been considered outside the known distribution of Fishers (Fig. 1; Lewis et al. 2012).

On 16 March 2023, the Illinois Department of Natural Resources was alerted to a Fisher found dead alongside a road (at approximately 42.2885, -89.0942) in Rockford, Winnebago County, Illinois (Fig. 2). The Fisher was an adult male that weighed 7.7 kg. A necropsy performed at the University of Illinois indicated the Fisher was approximately 3 years old, in excellent condition, and was killed from trauma consistent with a vehicle collision.

The nearest self-sustaining Fisher population inhabits Wisconsin (e.g., Adams County ~190km away), and given the proximity of Rockford to the state border, that population is the likely origin of this Fisher. Many translimital observations, especially of carnivores, are the result of a subadult having an extended dispersal far outside of their expected distribution (e.g., Bartoń et al. 2019, Fattebert et al. 2013, Hawley et al. 2016). We presume the Fisher arrived under its own power, as there was no evidence to the contrary. Given this individual was three years old, it is unlikely that this was a typical dispersal event (Arthur et al. 1993, Matthews et al. 2013). It seems more likely, given the proximity of this observation to mating season, that it may have been a male traveling far out of its home range seeking potential mates.

The unexpected observation of a Fisher in Illinois and the uneven expansion of Fishers into their historical distribution raises many questions. Key among these is what factors underly variation in recolonization success across different geographical regions of North America. Fisher populations from the Northeast have been more successful than

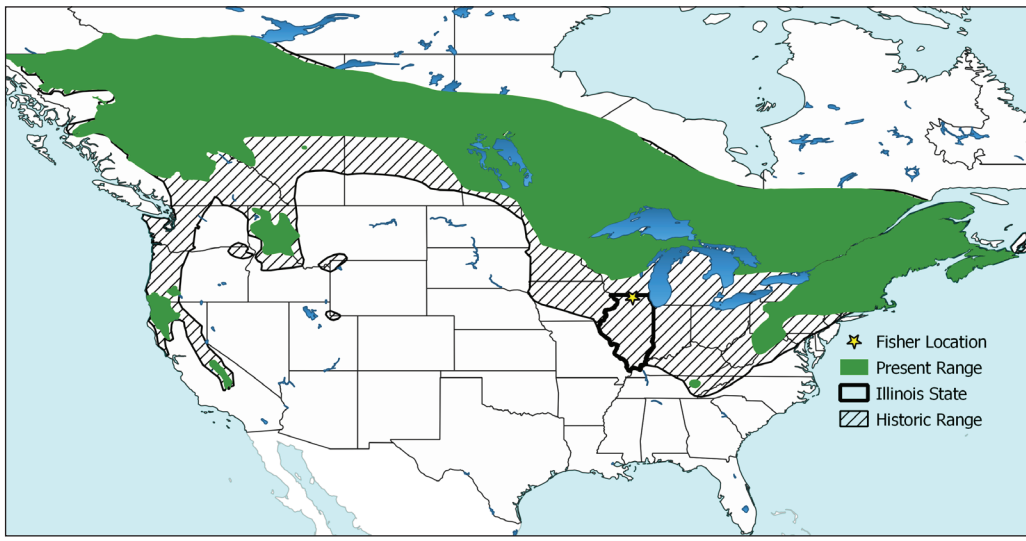

Figure 1. A map of current (green; from Helgen and Reid 2018) and historical (crosshatched; from LaPoint et al. 2015) fisher distribution in North America, with a star indicating the location of recent documentation. A small population also exists in North Dakota and a reintroduced population lives in the Olympic Peninsula, but these distributions are less certain and not yet included within the IUCN range.

those in the West, although this may be due to a concentration of successful reintroduction attempts in eastern Canada, New England, and New York (Lewis et al. 2012). In a meta-analysis examining Fisher range expansion, LaPoint et al. (2015) found that eastern populations have also expanded their dietary niche to include larger prey, with concomitant increases in body size detected from museum specimens. The authors posited that the relative lack of predator richness in the East released Fishers from competitive and predation pressure, facilitating adaptation (LaPoint et al 2015). While Fishers have also expanded their distribution in the West, with observations outside of their known distribution in the Coast Range of California (Allen et al. 2015) and reintroductions in other areas, they are still largely constricted in the southern Sierra population (Tucker et al. 2012). Human modification of the landscape may also facilitate expansion and escape from competition from the similarly sized American Marten (*Martes americana*), as Fishers appear to better tolerate areas of low-level development, using low-traffic roads for traveling, while martens require less disturbed habitat (Manlick et al. 2020).

The recent expansion of Fishers into prairie-dominated North Dakota provides an interesting comparison to the prairie and agriculture dominated land cover of Illinois (Illinois is 75% row crop agriculture with most forest in the southern third of the state; Emmet et al. 2024). Fishers arrived in North Dakota by 1999 from a well-established population in Minnesota (Triska et al. 2020). Although North Dakota is dominated by prairie, Fisher use of wooded riparian areas in the northeastern portion of the state likely facilitated expansion (Triska et al. 2020), and the population has grown sufficiently to allow for a regular

Figure 2. A fisher killed by a vehicle collision found on 16 March 2023 near Rockford, Illinois.

annual harvest in these areas in North Dakota. Individual sightings of animals are often not considered valuable enough for inclusion in the scientific literature, which may be a reason that the expansion of Fishers into North Dakota was initially not well documented. We encourage the documentation and publication of confirmed observations of species, like the Fisher, outside of their known distributions, as such sightings can provide a foundation to help understand long-term distribution trends.

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Literature Cited

Allen, M.L., B.E. Evans, and M.S. Gunther. 2015. A potential range expansion of the coastal Fisher (*Pekania pennanti*) population in California. California Fish and Game 101:280–285.

Aubry, K.B., and J.C. Lewis. 2003. Extirpation and reintroduction of Fishers (*Martes pennanti*) in Oregon: implications for their conservation in the Pacific states. Biological Conservation 114:79–90.

Arthur, S.M., T.F. Paragi, and W.B. Krohn. 1993. Dispersal of juvenile Fishers in Maine. The Journal of Wildlife Management 57:868–874.

Bartoń, K.A., T. Zwijacz-Kozica, F. Zięba, A. Sergiel, and N. Selva. 2019. Bears without borders: long-distance movement in human-dominated landscapes. Global Ecology and Conservation 17:e00541.

Brown, C.J., M.I. O'Connor, E.S. Poloczanska, D.S. Schoeman, L.B. Buckley, M.T. Burrows, C.M. Duarte, B.S. Halpern, J.M. Pandolfi, C. Parmesan, and A.J. Richardson. 2016. Ecological and methodological drivers of species' distribution and phenology responses to climate change. Global Change Biology 22:1548–1560.

Boulangeat, I., D. Gravel, and W. Thuiller. 2012. Accounting for dispersal and biotic interactions to disentangle the drivers of species distributions and their abundances. Ecology Letters 15:584–593.

Emmet, R.L., K.W. Stodola, T.J. Benson, and M.L. Allen. 2024. Effects of multiple aspects of anthropogenic landscape change on mesopredator relative abundance. Wildlife Research 51:WR22080.

Fattebert, J., T. Dickerson, G. Balme, L. Hunter, and R. Slotow. 2013. Long-distance natal dispersal in leopard reveals potential for a three-country metapopulation. South African Journal of Wildlife Research 43:61–67.

Graham, M.A., and R.W. Graham. 1990. Holocene Records of *Martes pennanti* and *Martes americana* in Whiteside County, Northwestern Illinois. The American Midland Naturalist 124:81–92.

Hawley, J.E., P.W. Rego, A.P. Wydeven, M.K. Schwartz, T.C. Viner, R. Kays, K.L. Pilgrim, and J.A. Jenks. 2016. Long-distance dispersal of a subadult male cougar from South Dakota to Connecticut documented with DNA evidence. Journal of Mammalogy 97:1435–1440.

Helgen, K., and F. Reid. 2018. *Martes pennanti* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2018: e.T41651A125236220. https://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T41651A125236220.en.

Hoffmeister, D.F. 2002. Mammals of Illinois. University of Illinois Press, Champaign, IL, USA. 348 pp.

Kennicott, R. 1855. Catalogue of animals observed in Cook County, Illinois. Transactions of the Illinois State Agricultural Society 1:577–595.

Kujala, H., A. Moilanen, and A. Gordon. 2018. Spatial characteristics of species distributions as drivers in conservation prioritization. Methods in Ecology and Evolution 9:1121–1132.

LaPoint, S.D., J.L. Belant, and R.W. Kays. 2015. Mesopredator release facilitates range expansion in Fisher. Animal Conservation 18:50–61.

Lewis, J.C., R.A. Powell, and W.J. Zielinski. 2012. Carnivore translocations and conservation: Insights from population models and field data for Fishers (*Martes pennanti*). PloS One 7:e32726.

Manlick, P.J., S.K. Windels, J.E. Woodford, and J.N. Pauli. 2020. Can landscape heterogeneity promote carnivore coexistence in human-dominated landscapes? Landscape Ecology 35:2013–2027.

Matthews, S.M., J.M. Higley, K.M. Rennie, R.E. Green, C.A. Goddard, G.M. Wengert, M.W. Gabriel, and T.K. Fuller. 2013. Reproduction, recruitment, and dispersal of Fishers (*Martes pennanti*) in a managed Douglas-fir forest in California. Journal of Mammalogy 94:100–108.

Rubidge, E.M., W.B. Monahan, J.L. Parra, S.E. Cameron, and J.S. Brashares. 2011. The role of climate, habitat, and species co-occurrence as drivers of change in small mammal distributions over the past century. Global Change Biology 17:696–708.

Sih, A., B.G. Jonsson, and G. Luikart. 2000. Habitat loss: Ecological, evolutionary and genetic consequences. Trends in Ecology & Evolution 15:132–134.

Triska, M.D., S.L. Loughry, and T.L. Serfass. 2020. Fisher (*Pekania pennanti*) distribution in riparian forest patches of northeastern North Dakota: Habitat plasticity or a short-term aberration. Canadian Wildlife Biology & Management 9:68.

Tucker, J.M., M.K. Schwartz, R.L. Truex, K.L. Pilgrim, and F.W. Allendorf. 2012. Historical and contemporary DNA indicate Fisher decline and isolation occurred prior to the European settlement of California. PloS One 7:e52803.