

Black bears recolonizing historic ranges: Indiana human–bear interactions

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Abstract: Over a century after extirpation from Indiana, USA, 2 American black bears (*Ursus americanus*) were confirmed in the state during the summers of 2015 and 2016. The first bear encountered a public and management agency unaccustomed to living with large carnivores, which resulted in intentional and unintentional feedings, habituation, and ultimately its euthanasia. The Indiana Department of Natural Resources (DNR) attempted to learn from this encounter and began preparing for the next transient black bear. Education materials were created to help minimize human–bear interactions, promote living safely with bears, and inform about what to do when encountering a bear. Additionally, bear traps were purchased and staff were trained to safely deploy and use these traps. During the summer of 2016, when a second black bear was confirmed in Indiana, the DNR deployed targeted education and outreach materials to try to help maintain a positive living-with-bears environment and minimize human–bear interactions. Expanded public education and a slight increase in preparedness of the DNR provided 2 different outcomes for the recent bears in Indiana. These are likely not the last bears Indiana will host; habitat suitability models suggest that Indiana could potentially support bears in portions of the state. Natural range expansion in neighboring states suggest that Indiana will see more black bears in the future. These 2 bears highlighted the need for Indiana and other state agencies to have some preparations in place—especially related to education—to respond to transient large carnivores that are moving through and eventually recolonizing long extirpated areas.

Key words: American black bear, citizen science, human–bear interaction, Indiana, outreach, *Ursus americanus*

BLACK BEARS (*Ursus americanus*) historically inhabited forested areas of North America (Pelton et al. 1999, Laliberte and Ripple 2004). As European settlers moved westward, large carnivore populations decreased as they were killed for food, out of fear, for profit, or to protect property (Hellgren and Maehr 1992, Sobey 2007). Furthermore, habitat conversion removed portions of available habitat for black bear populations through much of their range (Scheick and McCown 2014). The synergistic effect of these factors led to the extirpation of black bears from much of their historic range in North America through the nineteenth century (Lackey et al. 2013). Valuation of wildlife and habitats had changed during the twentieth to twenty-first centuries; bounties were removed from most large carnivores, and management strategies for forests were developed (Keddy and Drummond 1996). Through subsequent reintroduction and natural expansion, black bear populations have increased and recolonized

portions of traditional habitats (Pelton et al. 1999, Puckett et al. 2014). In the summers of 2015 and 2016, 2 black bears, 1 young male and the other unknown, were confirmed in the state of Indiana, USA for the first time in >140 years (Whitaker and Mumford 2009, Scheick and McCown 2014). The preparedness and reaction of both the public and the Indiana Department of Natural Resources (DNR) varied for each encounter, which may have contributed to 1 bear becoming human-food conditioned.

Indiana's collective knowledge of living with top predators had atrophied after bears were extirpated in 1851 (Whitaker and Mumford 2009). In fact, black bears were listed as an exotic species by Indiana Code until 2018 (Indiana Natural Resources Commission, 312 IAC 9-3-18.5). The DNR biologists began to suspect black bears might enter the state because increasing bear populations in surrounding states indicated bears were recolonizing areas of historic range (Pelton et al. 1999). To monitor

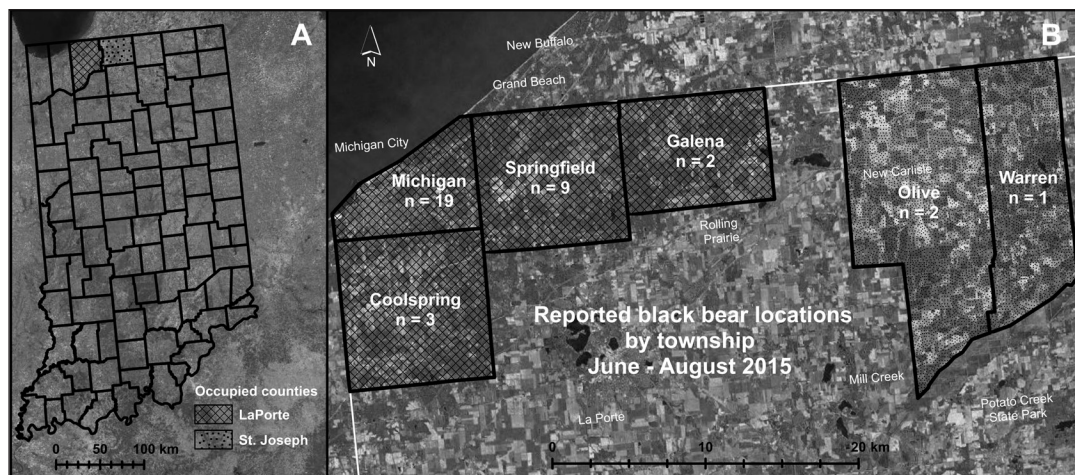


Figure 1. Counties with verified reports of a black bear (*Ursus americanus*) in northern Indiana, USA during summer 2015 (A), and number of reports per township during summer 2015 (B).

expanding bear and other large carnivore populations, the DNR created an online reporting tool (Large Mammal Report Form, <http://www.wildlife.in.gov/8497.htm>) to document any large mammal observation within the state beginning in February 2015. While many submissions are unverifiable due to misidentification or lack of evidence, biologists and conservation officers review all submissions and may investigate reports when evidence is provided. Additionally, DNR field staff verbally collect reports directly from the public. In June 2015, the first bear in 144 years was reported and confirmed in the state of Indiana with the help of these citizen reports.

Management history

On June 3, 2015, the Michigan Department of Natural Resources (Michigan DNR) informed DNR staff of a bear in Berrien County in southwestern Michigan, USA, which could potentially disperse into Indiana. Reports of a bear were received from Indiana citizens in St. Joseph County—adjacent to Berrien County in northeastern Indiana—on June 6 and June 9, and a black bear was confirmed from scat by DNR staff on June 11. The DNR confirmed tracks in neighboring La Porte County on June 13. The bear was thought to be a young male, which was later confirmed after the animal was captured by Michigan DNR. During the following months, the DNR and Michigan DNR tracked the bear's movements and activities with the help of the online reporting tool (Figure 1). In an attempt to prevent the bear from becoming

human-food conditioned, the DNR advised citizens to remove potential sources of food from the area by securing garbage cans and removing bird feeders and outdoor pet food. This messaging, distributed through social media and press releases, primarily included living-with-bears content.

However, unaccustomed to living with bears, not all citizens were receptive of or employed the DNR's recommendations. One instance included a bear that was observed feeding at birdfeeders and attempting to gain access to a human dwelling. This learned behavior by the bear raised a red flag to both DNR and Michigan DNR as bears can become bolder and more aggressive when they discover an anthropogenic food source. This can result in property damage and increased risk to human safety. In addition, black bears that consume anthropogenic foods with no negative reinforcement often become human-food conditioned and human-habituated, which can also increase human–bear conflicts (McCullough 1982, Herrero et al. 2011). The DNR attempted to trap the bear in fall 2015, but a trap flaw enabled the bear to escape, and further attempts of capture failed. In October 2015, the bear returned to Michigan and over-wintered. After emerging in the spring, it once again attempted to gain access to human dwellings and was thereby deemed by the Michigan DNR a potential threat to public safety. Michigan DNR subsequently captured, chemically immobilized, and humanely euthanized the bear to prevent an escalation of

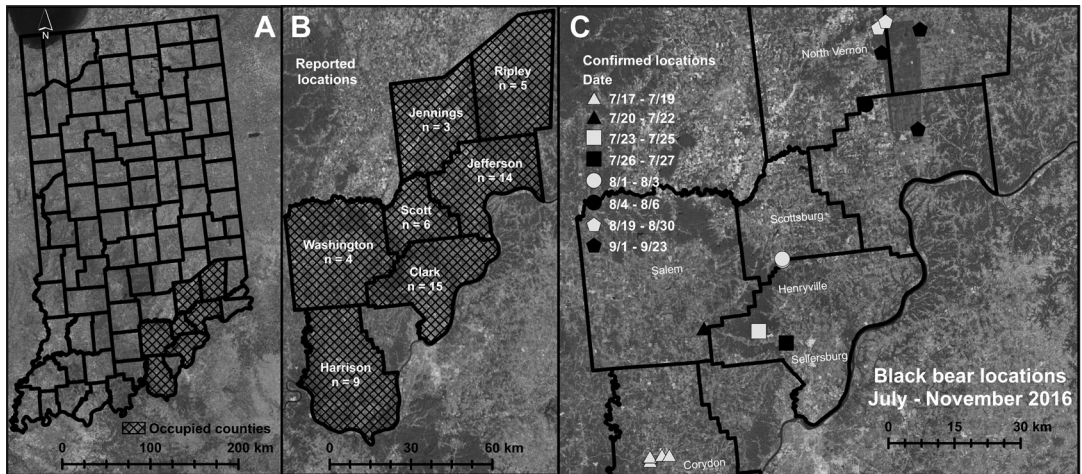


Figure 2. Counties with verified or unverified reports of a black bear (*Ursus americanus*) in southern Indiana, USA during fall of 2016 (A), black bear reports per county during fall of 2016 (B), and timeline of verified reports of a black bear in southern Indiana during fall 2016 (C).

damage or loss of human life.

On July 17, 2016, a second black bear was observed in southern Indiana. The DNR confirmed the bear's presence the next day, a response several days faster than the previous summer. The DNR moved forward with another public education campaign emphasizing best practices to minimize conflict, how to report bear sightings, and the importance of not provoking bears. The latter relied on strong messaging about black bear biology and typical behaviors as they are solitary animals that generally avoid conflicts unless provoked (Herrero 2018). These educational materials were discussed at a news conference and disseminated to citizens through social media and press releases. The public aided state biologists in tracking the bear through both the online reporting system and other verified reports, which included photos or video evidence (Figure 2). This allowed state biologists to track the bear for months across 7 counties in southern Indiana, supporting a low-density human population, to Big Oaks National Wildlife Refuge. It is presumed the bear over-wintered here because no bears were reported outside of the refuge until the spring. After May 2017, bear reports in Indiana ceased. A bear was subsequently reported in Kentucky, USA, just south of the Indiana bear's last known location, leading the DNR to assume the bear had dispersed out of Indiana and into Kentucky.

Management implications

In October 2015, following the first black bear reports, the DNR offered educational programs in northeastern Indiana. These programs were attended by local citizens, many of whom were perceived by agency staff to be engaged in the events and appeared to have a positive attitude about adjusting to a living-with-bears lifestyle. Though it is likely these events were more heavily attended by citizens interested in and engaged with wildlife activities, the DNR felt they were productive at the time in helping to spread key messaging. Furthermore, the DNR provided city officials with guidance on how to avoid future human–bear conflicts.

Due to the charismatic nature of megafauna, it was expected that the public would not deem euthanasia an appropriate response in most situations. In fact, many citizens attribute the loss of the first bear to the DNR (DNR staff, personal communication). Therefore, when a second bear was confirmed in the state the following year, the DNR increased its efforts to utilize social media, media outlets, and targeted public education on living safely with bears to try to prevent further negative perceptions. The DNR led the news releases with 2 phrases—"a fed bear is a dead bear," and "let a bear be a bear"—urging the public to avoid intentional or accidental feeding and not to harass the bear. These messages appeared to resonate with the public to some degree as, to our knowledge, the bear was respected from a distance and was not

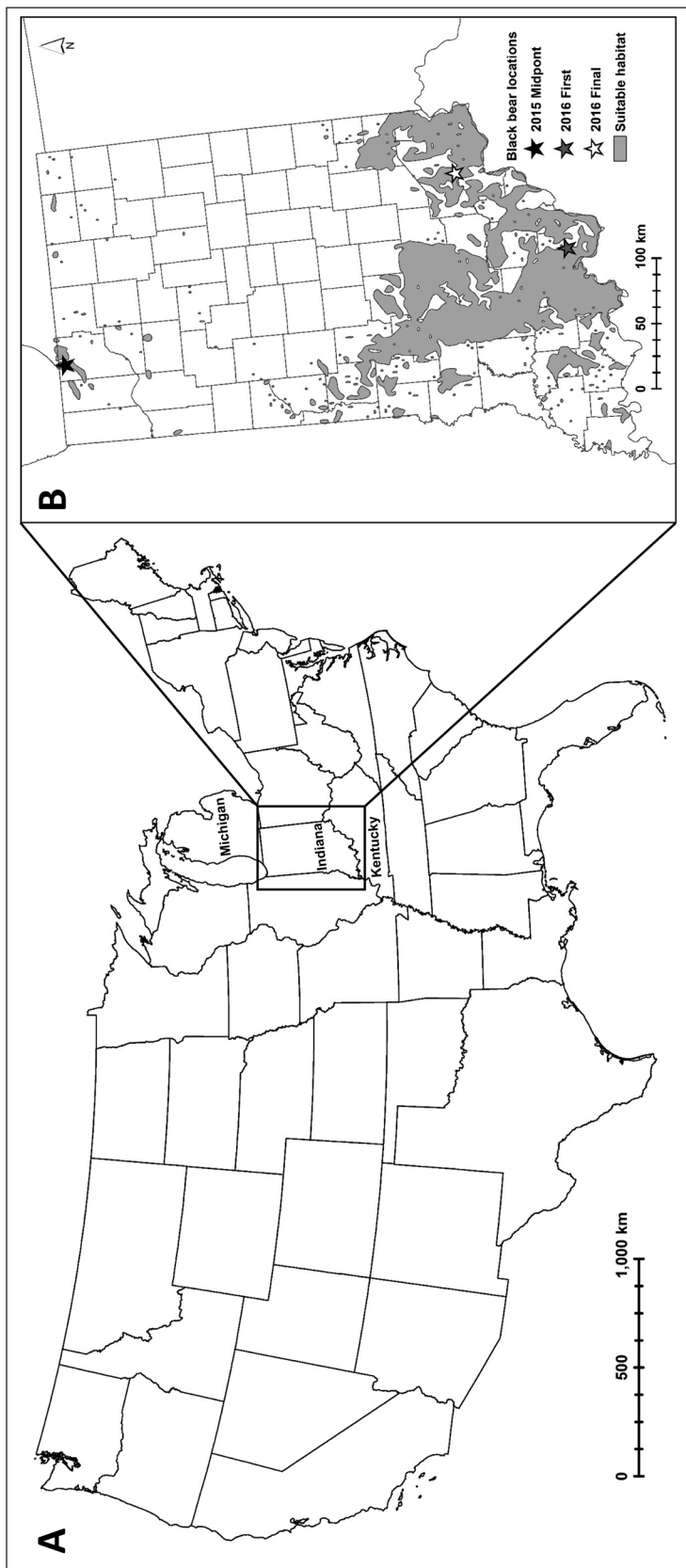


Figure 3. Reference map of Indiana, USA and bordering states: Kentucky to the south, and Michigan to the north (A). Shaded areas showing potential suitable black bear (*Ursus americanus*) habitat in Indiana based upon habitat suitability modeling from existing bear literature (B). Stars indicate bear locations in Indiana during 2015 and 2016.

known to be disturbed while over-wintering in Indiana.

As black bear populations continue to grow and expand their current geographic range, Indiana will likely play host to dispersing individuals in search of suitable habitat. Because there are relatively few records of black bears in Indiana, we developed a layer of habitat suitability utilizing previous studies of black bear habitat use (Jones and Pelton 2003, Rice et al. 2009, Carter et al. 2010, Sadeghpour and Ginnett 2011, Hiller et al. 2015, Sollmann et al. 2016, Tri et al. 2016). This preliminary modeling indicated that suitable black bear habitat does presently exist in Indiana and these 2 bears dispersed into these suitable habitats (Figure 3).

Discussion

These 2 isolated bear visitations provided Indiana with a test of its preparedness and ability to live with bears. Indiana was found partially lacking in the first encounter; the DNR did not have the necessary equipment or education materials prepared for deployment, and the public was unaware of the role they play in human–bear interactions. In the following year, the DNR was

better prepared with living-with-bears education materials for immediate dissemination and staff confirmation of the bear in <24 hours. Additionally, DNR had purchased 2 bear traps, 1 swing-door Pennsylvania box trap and 1 guillotine-style culvert trap (Teton Welding, Chotaeu, Montana, USA). The vastly different outcomes and public perception of the 2 bear events may have been influenced by a less dense human population in southern Indiana with more uninhabited areas (i.e., National Wildlife Refuge), resulting in fewer opportunities for human–bear interactions. Alternatively, the northern bear in 2015 may have crossed the border of Indiana having been previously human-food conditioned or habituated through prior encounters with humans in Michigan.

From a practical perspective, state agencies should have appropriate tools available (e.g., traps, tags, collars, monitoring systems) even if resident large carnivores are not present. In Indiana, comprehensive large carnivore policy that includes black bears is in development to provide DNR staff with guidelines, should another large carnivore dispersal event occur. Developing, reviewing, and updating clear directions as necessary for staff to appropriately respond to large carnivore reports through internal processes such as internal policies may help state agencies coordinate responses and support actions taken by agencies as large carnivore expansion continues, especially as recorded policies are not dependent on long-term institutional knowledge.

Education will be the most practical tool available, and fortunately, education has been shown to be effective throughout extant black bear ranges (Gore et al. 2006, <https://bearwise.org>). Should future needs arise, DNR is also prepared to deploy long-term ecological monitoring efforts such as arrays of baited cameras and hair snare traps to conduct DNA analysis. These tools will provide confirmation of where black bears are crossing into the state, but also allude to the lineage of bears attempting to establish a population.

As in other states, especially in the eastern United States, outreach to a public that is unaccustomed to large carnivores will need to be extensive to maintain tolerance of black bears and to encourage appropriate human behaviors to prevent conflicts. The DNR

plans to disseminate information and educate citizens statewide, with focused efforts in areas where bears are more likely to inhabit, prior to black bear exploratory movements. However, the possibility of human–bear conflict will also be planned for through the aforementioned large carnivore response policy, outlining options for education, nonlethal management, hazing, monitoring, mark and relocation with subsequent monitoring practices, appropriate euthanasia guidelines, and other potential needs related to black bears (Spencer et al. 2007). The DNR staff will continue to foster ongoing communication on human–bear conflicts and expanding populations with biologists from neighboring states to ensure Indiana will be able to manage recolonizing black bear populations.

Acknowledgments

Mention of companies or products does not imply recommendation or endorsement by Indiana DNR. We thank the citizens of Indiana for their submissions to the Large Mammal Report, which aided DNR efforts to track the dispersing black bears. We thank K. Benavidez, T. Shier, T. Messmer, HWI editor, and 3 anonymous reviewers for valuable feedback on previous versions of this manuscript.

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Associate Editor: Carl Lackey

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