Social Science Evaluation Report

Human Dimensions of Mesopredator Management in Indiana

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The Natural Resources Social Science Lab studies how human interactions with the environment impact natural resources. Our research, teaching, and engagement activities focus on how to best motivate farmers, stakeholders, and citizens of all kinds to participate in more environmentally friendly behaviors and practices. For more information, please go to https://www.purdue.edu/fnr/prokopy

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Introduction

Project purpose—Mesopredator Management and Why it Matters

The Indiana Department of Natural Resources (IDNR) is tasked with managing wildlife resources for the state's 6.5 million residents. Predominantly, this involves the regulation and support of fishing, hunting, and trapping; protection of endangered species; and wildlife research. Additionally, the IDNR works to mitigate wildlife conflict, and wildlife damage.

Wildlife management within Indiana and across the U.S. has changed drastically in the past 100 years. Anthropogenic changes to the landscape are occurring in many forms including habitat destruction, fragmentation, and alterations in landscape cover. For many wildlife species, these changes have resulted in and may continue to cause declining population sizes and possible extirpation (Andrén, 1994; Opdam & Wascher, 2004; Robinson et al., 1992).

However, some common mesopredators including striped skunks *(Mephitis mephitis)*, raccoons *(Procyon lotor)*, red foxes *(Vulpes vulpes)*, and coyotes *(Canis latrans)*, are less impacted and may indeed benefit from these anthropogenic changes (Liss et al., 2003). Indeed, most mesopredator population sizes have increased in abundance in the last 200 years, with 60% expanding their ranges into previously uninhabited areas (Prugh et al., 2009). In contrast, large carnivores are extremely uncommon within the state; a single sighting of a bear or wolf is so uncommon that it elicits dozens of news articles. Increased numbers of mesopredators generates a greater potential for human-wildlife conflict, which is of concern to the IDNR.

Large mesopredator populations will likely lead to negative impacts for humans. Mesopredator conflict has high economic and social costs including damage to homes through digging, chewing, and scent marking; depredation of crops and gardens; attacking livestock or pets; and the transmission of diseases like rabies, leptospirosis, or Lyme and parasites like roundworm (Bateman & Fleming, 2012; Liss et al., 2003; Ordeñana et al., 2010; Prugh et al., 2009).

Traditional control measures for these populations are decreasing across the nation (Liss et al., 2003). Indiana has seen a precipitous 2.2% annual decline in hunting license sales between 2005-2015 (Fig. 1; R^2=0.79). While trapping has not consistently declined in the state during this period, the overall number of trappers (~2600-5600 licenses per year) may be too small to have any significant effect on mesopredator population sizes at the state level.

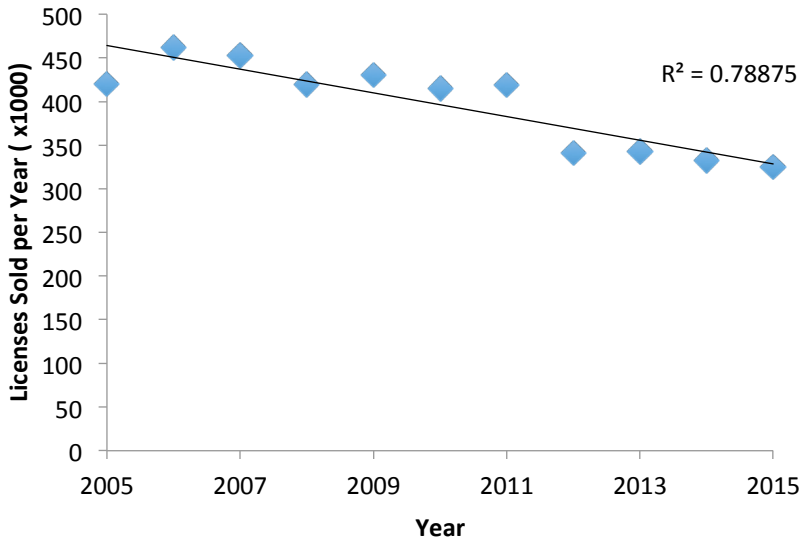

Fig 1. Indiana Hunting License Sales, 2006-2015

Additionally, traditional methods for controlling populations may be ineffective. Hunting, culling, and trapping are unsuccessful at inhibiting most wildlife conflicts because it is unlikely that the individual animal involved in the conflict will be removed, especially in urban or sub-urban areas where these practices may be illegal (Treves & Karanth, 2003). Further, for some species like coyotes, removing the dominant adult may have cascading impacts on wildlife social and breeding structure, compounding human-wildlife conflict (Milner et al. 2007). Lethal actions are also likely to be displeasing to the public: since 1950, increasing segments of the nation favor control measures that protect animal rights and sovereignty (Inglehart, 1981; Liss et al., 2003).

The IDNR already receives abundant communication about real and perceived conflict with mesopredators (IDNR, personal communication). It is important for the agency to understand which control actions are considered acceptable by the public and that are also reasonable for the IDNR to undertake. Thus, the Purdue NRSS Lab undertook this project to 1) public perception of mesopredators and 2) acceptable management actions to control these species.

Project Scope- Species Evaluated

For this project, we focused on four common and increasing mesopredator species in Indiana: coyote, striped skunk, raccoon, and red fox. We also evaluated two less common species, river otter *(Lontra canadenis)* and badger *(Taxidea taxus)*. We included river otter because they were successfully reintroduced and de-listed in the state. We included badger in this survey at the IDNR's request.

Public Perception of Mesopredators

Overview

- The frequency of viewing wildlife (common, uncommon) was not correlated with concern regarding wildlife conflict.
- More frequent viewing of wildlife was correlated with reporting conflict with raccoons, skunks, red foxes and coyotes. It was not correlated with reporting conflict with badgers or otters.
- Acceptance of lethal action against these species in conflict scenarios overall was high, ranging from 46-65%, depending on conflict scenario.
    - These figures are much higher than previous research would expect (e.g. Decker et al. 2006; Teel et al., 2005; Whittaker et al. 2006), suggesting that these species are not thought of in the same way as deer, bear, and other hunted or large species.
- Respondents significantly preferred to use hunting or trapping to control nuisance wildlife populations compared to using control experts.

Coyotes

- Coyotes were the least accepted species overall.
- Coyote presence was viewed as unacceptable overall, even when respondents were presented with a hypothetical situation in which the species was not causing conflict.
- Interview respondents reported high amounts of fear and unfamiliarity with the species.
    - Risk was perceived to be highest in relation to children and pets.
    - Interview respondents over age 50 especially noted lack of familiarity due to comparisons with childhood, when coyotes were less prevalent in cities.
- Informal social networks, through social media like Facebook, and neighbor-to-neighbor contacts are utilized frequently to alert others when coyotes have been seen.

Otters

- Otters were the most accepted species; lethal action was favored significantly less often in property damage scenarios, and doing nothing was significantly more favored in no conflict scenarios.
- Interview respondents described the species in entirely positive words, including “playful”, “friendly”, and “engaging”.
    - Multiple respondents stated that seeing the species in the wild or in a captive zoo setting was a positive experience.
- Fear of otters was likely low due to the voluntary nature of interacting with the species.
    - Otters do not naturally occur near most homes, and it is statistically unlikely that any respondents had experienced severe property caused by otters.

Otters tied with badgers as the species that caused the least reported damage (1% each; Fig. 2).

Raccoons

- Raccoons caused the most reported damage (47% of conflicts reported; Fig 2).
- Lethal action was favored similarly often to foxes, skunks, and badgers, despite strong variation in the amount of damage reported for each species.
- Interview respondents reported raccoon damage as “simple to mediate” and not of great concern.
- When asked to describe raccoons, interview respondents provided positive descriptions including “cute”, “cartoon-like”, and “friendly-looking”.

Foxes

- Foxes caused little reported damage (3%; Fig 2).
- Lethal action was favored similarly to skunks, raccoons, and badgers.
- Interview respondents spoke of foxes in positive terms, including “rare”, “attractive”, and “beautiful”, and expressed the desire to keep the species as a pet.
    - Interview respondents expressed that even though foxes exhibited similar behavior to coyotes, foxes were thought of as less threatening due, in part, to their appearance.

Skunks

- Skunks caused a relatively high amount of reported damage (31%; Fig.2), but lethal action was favored similarly often to foxes, raccoons, and badgers despite much lower amounts of damage reported for foxes, raccoons, and badgers.
- Interview respondents noted skunks for their odor, but overall did not express any strong distaste for the species.
- The species was frequently tied to cartoon representations (Pepe LaPew) in interviews.

Badgers

- Badgers caused very little reported damage (1%; Fig.2), though this is likely biased by badgers’ relatively low population sizes. Additionally, badgers are grassland and prairie obligates, and are thus uncommon in urban and sub-urban areas, where 2/3 of respondents live.
- Respondent familiarity with badgers was low; the species was rarely seen and commonly misidentified.
    - Most interview respondents noted never having seen the animal before.

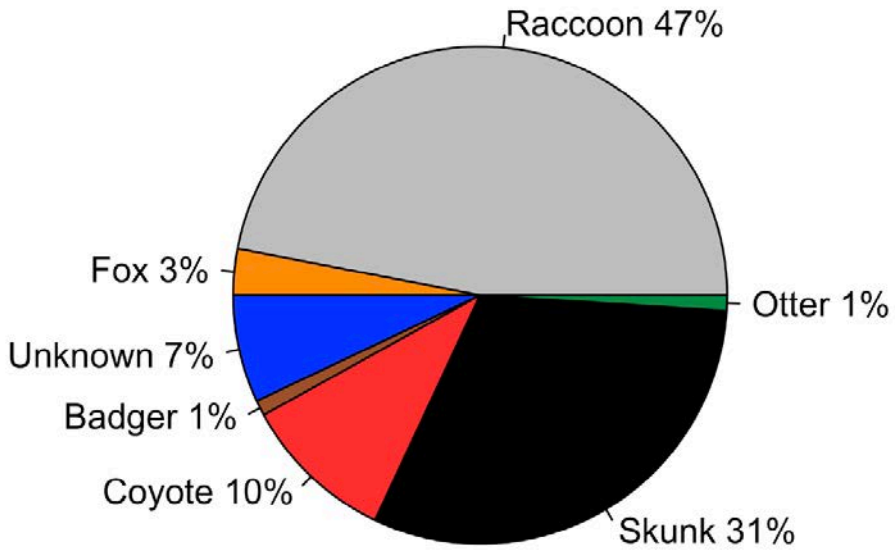

Figure 2. Percent of total conflicts experienced (n=832), by species

Acceptability of Management Actions

Overall Acceptability by Action

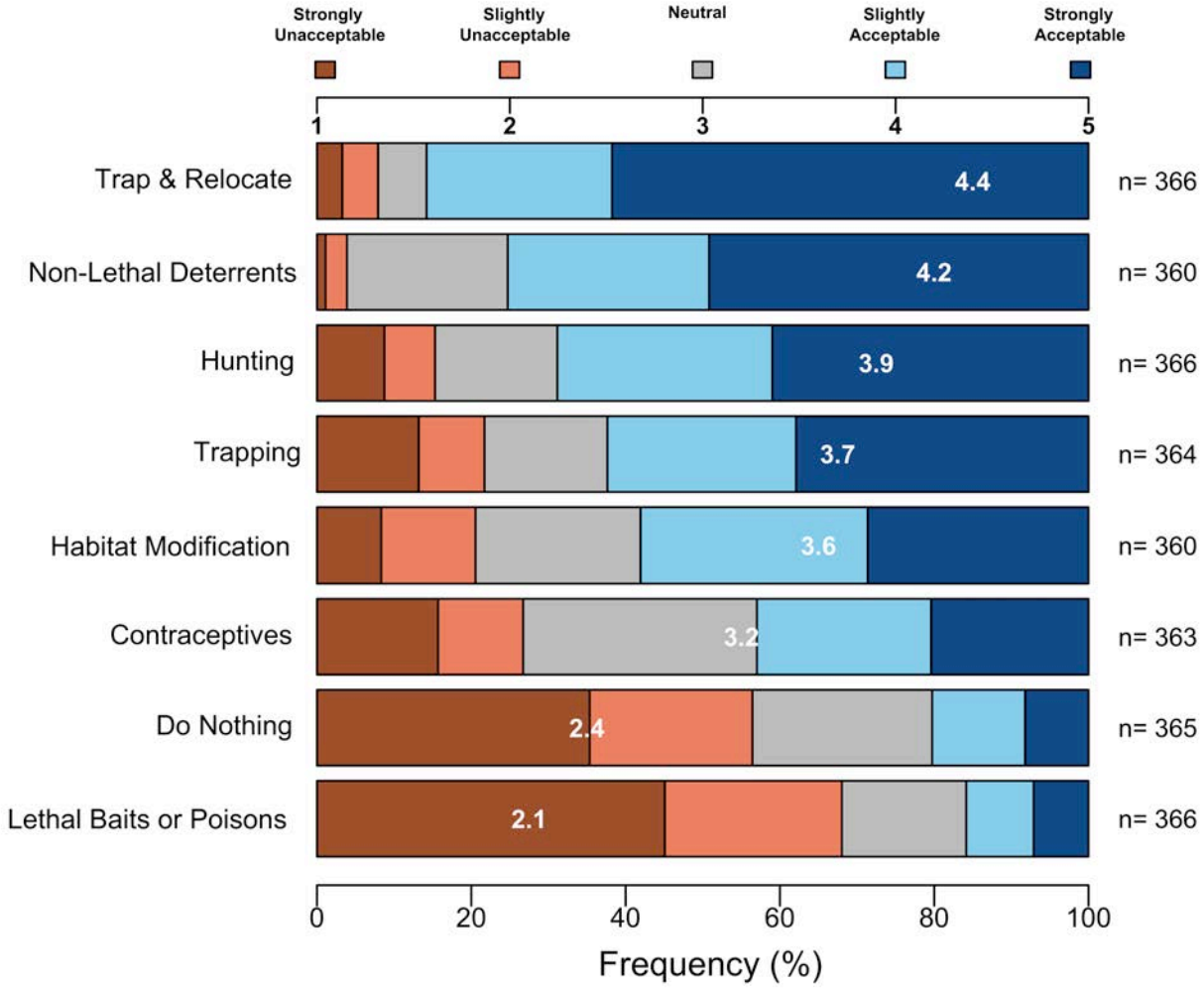

Figure 3. Acceptability of each proposed management action from 1 (strong unacceptable) to 5 (strongly acceptable). White numbers indicate mean response; n= number of respondents per question.

Trapping and Relocating

- Trapping and relocating was highly acceptable.
    - Even in "threats to pets or humans" conflict scenario, 85% of respondents stated that the action was "acceptable".
- Interview respondents were unaware of the potential negative effects of trapping and relocating (e.g. disease spread, community dynamics)
    - Many interview respondents stated that they would prefer to relocate nuisance wildlife, because they did not feel the animal was at fault for the conflict but still wished to remove the animal.

Hunting or Trapping

- Respondents found hunting and trapping acceptable overall; 45% said it was acceptable when no conflict was occurring, 57% in property damage scenarios, and 65% in threats to pets/human scenarios.
    - Hunting or trapping was accepted considerably more often than previous studies on charismatic megafauna (e.g. bear, cougar, elk, deer: see Riley and Decker 2000, Decker et al. 2006, Gore et al. 2007).
- Trapping and hunting were seen as similarly acceptable despite a growing national trend in which the public views trapping as more inhumane and unacceptable than hunting (see Daigle et al. 1998, Manfredo et al. 1999).
- Hunting/trapping was considerably more acceptable than using control experts to remove wildlife.

Non-lethal Deterrents and Habitat Modification

- Respondents were highly accepting of non-lethal deterrents and habitat modification.
- Respondent familiarity about what either practice involved was very low.
    - While respondents appeared generally positive, it is likely that opinions expressed in the survey were not strongly formed due to a lack of evidentiary standing.
    - Strong education campaigns would be needed to implement either practice.
- These control actions were not evaluated in our results due to the public's lack of understanding.

Contraceptives

- Contraceptive use was neutral overall, with relatively equal numbers of respondents stating the practice was either unacceptable and acceptable.
- Public familiarity with this practice was also low.

Doing Nothing

- Respondents generally disfavored 'doing nothing' to mitigate conflict.
- Interviews suggest that the public maintains a divisive human/wildlife boundary, wherein wildlife is free to roam until it comes too close to human structures, at which point, the animal(s) must be removed.

Lethal Baits or Poisons

- The use of lethal baits or poisons was the least favored management action.
- Interview respondents expressed that the practice was inhumane and presented too much risk to outdoor pets and non-target wildlife.

Wildlife Value Orientations

Overview

Wildlife value theory provides a conceptual framework to evaluate how basic human perceptions and values apply to wildlife and wildlife management. It divides the public into four groups: utilitarians, mutualists, distanced, and pluralists.

Utilitarian: Wildlife should be managed to benefit humans. (Domination)
Mutualist: Wildlife should be managed so that humans and wildlife can live together in harmony. (Protectionist)
Pluralist: Holds both mutualist and utilitarian values, dependent on the situation; this value orientation is thought to be representative of the transitional state of society at present wherein society is moving from a utilitarian viewpoint to a mutualistic one.
Distanced: Holds no strong values towards wildlife, possibly due a lack of value for wildlife or issue salience.

Wildlife Value Distribution- Indiana

- Survey respondents were predominantly (40%) utilitarian, 27% mutualist, 21% pluralist and 12% distanced (Fig 4a).
- Females were significantly more likely to be mutualists, while males were more likely to be pluralists or utilitarians. Gender of distanced individuals was nearly equally distributed (Fig 4b).
- Mutualists were significantly younger than both utilitarians and pluralists
- Education level was not correlated with wildlife value orientation

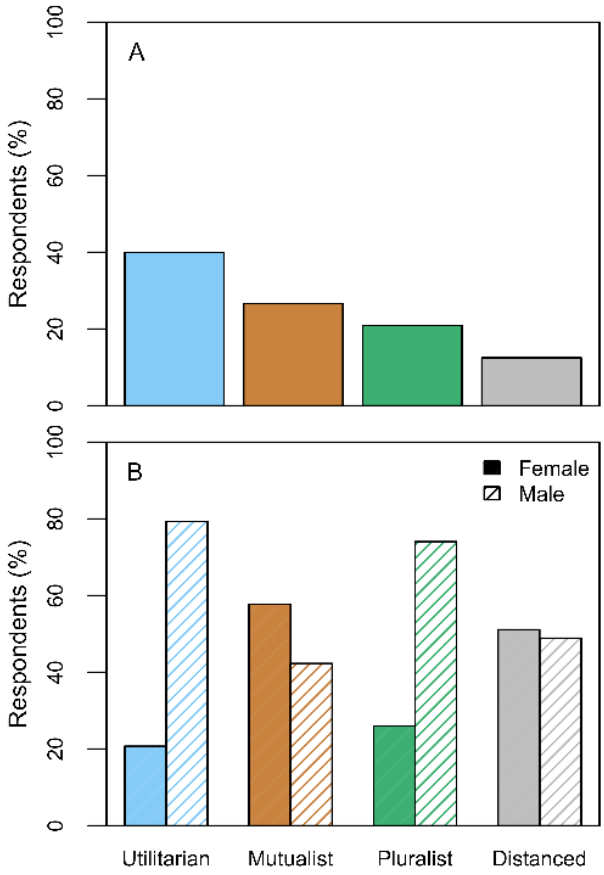

Figure 4: Wildlife Value Orientation Distribution of Survey Sample, overall and by gender

Implications for management

Lethal Action Acceptability

- Pluralists and utilitarians were consistently more accepting of lethal action compared to mututalists.
- Pluralists were consistently less accepting than utilitarians of lethal action, but more so than mutualists.
    - Regarding lethal action, these three groups' responses were consistent with prior research.
- The distanced wildlife value orientation was unpredictable in regard to when lethal action was acceptable or unacceptable.
    - This was likely due, in part, to the low sample size (n=44) of this group.

Other Management Actions

- Mutualists were the only group that preferred to use control experts instead of hunting or trapping.
- Potential for conflict about a wildlife management action is highest regarding hunting or trapping
    - Mutualists stated the action was unacceptable overall, while all other value orientation groups stated it was acceptable overall.
- Regardless of value orientation, overall, trapping and relocating and contraceptive use are acceptable means to manage wildlife. However, acceptability of contraceptives varies highly.
- Regardless of value orientation, overall, lethal baits or poisons and doing nothing are unacceptable means to respond to wildlife conflict.

Literature Cited

Andrén, H. (1994). Effects of Habitat Fragmentation on Birds and Mammals in Landscapes with Different Proportions of Suitable Habitat: A Review. *Oikos*, *71*(3), 355.

Bateman, P. W., & Fleming, P. A. (2012). Big City Life: Carnivores in Urban Environments. *Journal of Zoology*, *287*(1), 1–23.

Daigle, J. J., Muth, R. M., Zwick, R. R., & Glass, R. J. (1998). Sociocultural dimensions of trapping: a factor analytic study of trappers in six northeastern states. *Wildlife Society Bulletin*, *26*(3), 614–625.

Decker, D. J., Jacobson, C. A., & Brown, T. L. (2006). Situation-specific "impact dependency" as a determinant of management acceptability: Insights from wolf and grizzly bear management in Alaska. *Wildlife Society Bulletin*, *34*(2), 426–432.

Gore, M., Knuth, B., Curtis, P., & Shanahan, J. (2007). Factors Influencing Risk Perception Associated with Human–Black Bear Conflict. *Human Dimensions of Wildlife*, *12*(768409283), 133–136.

Inglehart, R. (1981). Post-Materialism in an Environment of Insecurity. *The American Political Science Review*, *75*(4), 880–900.

Liss, K. N., Mitchell, M. G. E., Macdonald, G. K., Mahajan, S. L., Méthot, J., Jacob, A. L., Bennett, E. M. (2003). Exploring the Ecology of Suburban Wildlife. *Frontiers in Ecology and the Environment*, *1*(2), 95–101.

Manfredo, M. J., Pierce, C. L., Fulton, D., Pate, J., & Gill, B. R. (1999). Public Acceptance of Wildlife Trapping in Colorado. *Wildlife Society Bulletin*, *27*(2), 499–508.

Milner, J. M., Nilsen, E. B., & Andreassen, H. P. (2007). Demographic side effects of selective hunting in ungulates and carnivores: Review. *Conservation Biology*, *21*(1), 36–47.

Opdam, P., & Wascher, D. (2004). Climate Change Meets Habitat Fragmentation: Linking Landscape and Biogeographical Scale Levels in Research and Conservation. *Biological Conservation*, *117*, 285–297.

Ordeñana, M. a, Crooks, K. R., Boydston, E. E., Fisher, R. N., Lyren, L. M., Siudyla, S., Haas, Christopher D., Harris, Sierra, Hathaway, Stacie A., Turschak, Greta M., Miles, A. Keith, Van Vuren, D. H. (2010). Effects of Urbanization on Carnivore Species Distribution and Richness. *Journal of Mammalogy*, *91*(6), 1322–1331.

Prugh, L. R., Stoner, C. J., Epps, C. W., Bean, W. T., Ripple, W. J., Laliberte, A. S., & Brashares, J. S. (2009). The Rise of the Mesopredator. *BioScience*, *59*(9), 779–791.

Riley, S., & Decker, D. J. (2000). Risk perception as a factor in Wildlife Stakeholder Acceptance Capacity for cougars in Montana. *Human Dimensions of Wildlife*, *5*(3), 50–62.

Robinson, G. R., Holt, R. D., Gaines, M. S., Hamburg, S. P., Johnson, M. L., Fitch, H. S., & Martinko, E. A. (1992). Diverse and Contrasting Effects of Habitat Fragmentation. *Science*, *257*(5069), 524–526.

Teel, T. L., Dayer, A., Manfredo, M. J., & Bright, A. (2005). *Wildlife Values in the West*. *Western Association of Fish and Wildlife Agencies*.

Treves, A., & Karanth, K. U. (2003). Human-Carnivore Conflict and Perspectives on Carnivore Management Worldwide. *Conservation Biology*, *17*(6), 1491–1499.

Whittaker, D., Vaske, J. J., & Manfredo, M. J. (2006). Specificity and the Cognitive Hierarchy: Value Orientations and the Acceptability of Urban Wildlife Management Actions. *Society & Natural Resources*, *19* (October 2014), 515–530.