A comparison of citizen scientist-based approaches to monitor the abundance and distribution of bobcats in New Hampshire

**Introduction**

Carnivores existing at low densities, such as bobcats, are difficult to detect and monitor. Citizen science provides monitoring effort for low cost. Volunteer-based monitoring approaches were analyzed for agreement in the distribution and relative abundance of bobcats, and compared to a model of bobcat habitat suitability for New Hampshire.

**Methods**

Records from the following approaches were summarized by wildlife management unit and compared by correlation to each other and the HSI:

- **PO**
  Public Observations
  Observations of bobcats (including deceased) reported by the public to NH F&G and through a webpage (2009 – 2012)

- **HS**
  Hunter Surveys
  Records of hunting outings including number of bobcat seen and hours in the field (2009 – 2013)

- **CS**
  Camera Surveys
  Trail camera surveys conducted by volunteers in 3 study areas (Nov-Dec 2013)

- **HSI**
  Habitat Suitability Index
  Model based on habitats selected by GPS-collared bobcats

**Results**

Bobcat observations per 10,000 residents

- 0.00 - 2.38
- 2.39 - 6.30
- 6.31 - 12.45

Bobcat observed per 1,000 hunting hours

- 0.00 - 0.90
- 0.91 - 1.87
- 1.88 - 2.80

Mean HSI value

- 0.20 - 0.44
- 0.45 - 0.53
- 0.54 - 0.58

**PO, HS, and the HSI were positively correlated. Standardization of PO by human population may weight this approach too heavily in northern NH, but seems to be a more valid index than raw numbers of PO.**

Because PO and HS likely occurred in different regions within each management unit (residential areas and wilderness areas, respectively), disagreement may have resulted from (1) heterogeneous bobcat density within management units and (2) geographic fluctuation of variables that influence numbers of PO and observations from HS (e.g., tendency to avoid humans, likelihood of observations to be reported).

**Conclusions**

From 2009 through 2013, PO detected bobcat in 198 towns whereas HS detected bobcat in 172 towns. Although PO provided more detection events (n = 1,028 vs. 738 from HS), we believe HS are a more credible index of bobcat abundance because they provide a measure of effort (hunting hour), whereas there is no convenient way to determine variation in the public’s tendency to report bobcat observations.

Thus, PO may be most cost effective for determining distribution. HS are a more credible index of relative abundance. CS produced low detection rates and may have limited utility in New Hampshire.

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