Reviewing a decade of movement ecology for conservation

Rocío Joo\textsuperscript{1}, S. Picardi \textsuperscript{1}, T.A. Clay \textsuperscript{2}, M.E. Boone \textsuperscript{1}, S.C. Patrick \textsuperscript{2}, M. Basille \textsuperscript{1}

\textsuperscript{1} University of Florida \quad \textsuperscript{2} University of Liverpool

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Conservation of mobile species must account for movement
(Thirgood et al. 2014; Torres et al. 2011)

Need for: 1) sound research in movement ecology, 2) linking movement ecology to conservation

source: State of North American Birds report
In this work
In this work
In this work
In this work

QUANTITATIVE REVIEW

species & taxa

mov. process

external factors

MOV ECO
In this work

QUANTITATIVE REVIEW

species & taxa

data collection & analysis

mov. process
external factors

MOV ECO
In this work
Methods

Identify mov-eco papers

Download & extract text

Extract key information

Statistical analysis
1060 movement ecology papers related to conservation and management
Overview

Number of articles vs. Year of publication
Overview
Movement ecology framework

- Movement process
- External factors
- Internal state

- Navigation capacity
- Motion capacity
- Movement path

Diagrams show
- Navigation process
- Motion process
- Movement process
- Movement propagation process
- Internal state dynamics
- External state dynamics

(From Nathan et al. 2008)
Movement ecology framework

(From Nathan et al. 2008)
## Movement ecology framework

<table>
<thead>
<tr>
<th>External factor</th>
<th>Perc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Environment</td>
<td>64.7%</td>
</tr>
<tr>
<td>2 Anthropogenic</td>
<td>14.1%</td>
</tr>
<tr>
<td>3 Animal interaction</td>
<td>13.3%</td>
</tr>
<tr>
<td>4 Other</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

### Diagram

The diagram illustrates the movement ecology framework, showing the interplay between external factors, navigation, motion capacity, internal state, and movement path. The percentages indicate the contribution of each factor to the overall movement process, as follows:

- Environment: 64.7%
- Anthropogenic: 14.1%
- Animal interaction: 13.3%
- Other: 0.1%

(From Nathan et al. 2008)
Species & Taxa

- Mammals: 400 articles
- Fish: 300 articles
- Birds: 200 articles
- Reptiles: 100 articles
- Humans: 50 articles
- Insects: 10 articles

Number of articles
Data collection & analysis

Tracking devices

Proportion of articles in a year

- GPS
- radio
- acoustic
- satellite
- video
Data collection & analysis
Data collection & analysis

Statistical methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Perc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVA</td>
<td>11.8%</td>
</tr>
<tr>
<td>density kernel</td>
<td>4.9%</td>
</tr>
<tr>
<td>GLM</td>
<td>4.2%</td>
</tr>
<tr>
<td>min convex polygon</td>
<td>3.3%</td>
</tr>
<tr>
<td>individual-based model</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
Movement for conservation

(adapted from Allen & Singh 2016)
Thanks for your attention

✉️ rocio.joo@ufl.edu

🐦 rocio_joo