Visitor perceptions of protected areas after tree-feeding beetle infestation

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Ingrid Schneider
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Bark beetle outbreaks have been identified as one of the top threats to forests in the U.S. and internationally. These outbreaks induce negative emotions and preferences toward the visual quality of forested landscapes. However, questions about visitor response remain.
Background

Place attachment is the symbolic relationship formed by people giving culturally shared emotional/affective meanings to a particular space (Low, 1992, p. 165).

Place identity refers to the connections people have between a place and their personal identity (Proshanksy, 1978).

Place dependence is the functional utility of the setting in providing for goal achievement (Stokols & Shumaker, 1981).
Past research regarding negative environmental impacts:

- For stakeholders new to a setting, as **Impacts ↑**, **Place Attachment ↓** (Stedman, 2003; Vorkinn & Riese, 2001)

- For existing stakeholders who are attached to a setting,

  ![Diagram]

  **Place Attachment**

  ➔ **Impact mitigation information**

  **Awareness of Impacts**

  (Wynveen et al., 2015)
Purpose

To identify the relationships among:

- Forest visitors’ perceptions of the presence of EAB impact
- Common antecedents to place attachment
- Forest visitors’ intensity of place attachment to the forest area
- Their self-reported knowledge about the EAB
Study Sites

Fort Snelling State Park, Minnesota
- EAB
- Response rate: 39%

Lobau & Praker Parks, Austria
- EAB
- Response rate: 34%

471 participants
310 participants
Methods

Onsite Survey

• EAB Impact Perception (Bivariate)
• Place Attachment (PA) Antecedents
  • EUH (Days and years visited)
  • Motivations (5-point importance scale)
• Place Attachment Scale (5-point agreement)
• Knowledge of EAB (1=Never heard of it, 4=Know a lot)
• Demographic variables

Analyses

• Descriptive statistics
• Confirmatory Factor Analysis
• Path analysis via OLS regression
## Respondent Demographics

<table>
<thead>
<tr>
<th></th>
<th>Austria</th>
<th>Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>46% Female</td>
<td>47% Female</td>
</tr>
<tr>
<td>Age</td>
<td>44 (sd=15)</td>
<td>42 (sd=14)</td>
</tr>
<tr>
<td>Education (college)</td>
<td>57%</td>
<td>78%</td>
</tr>
<tr>
<td>12-month visits</td>
<td>100</td>
<td>16</td>
</tr>
<tr>
<td>Year first visited</td>
<td>1988</td>
<td>2005</td>
</tr>
<tr>
<td>Most Popular Activity</td>
<td>Hiking ~34%</td>
<td>Hiking ~59%</td>
</tr>
</tbody>
</table>
Results

Place Attachment Confirmatory Factor Analysis and Reliability

• CFA confirmed the place identity/place dependence model
  • Austria: $\chi^2_{df=7}=15.26$, $RMSEA=.06$, $NNFI=.97$, $CFI=.99$, $GFI=.98$
  • Minnesota: $\chi^2_{df=7}=11.78$, $RMSEA=.04$, $NNFI=.99$, $CFI=.99$, $GFI=.99$

• $\alpha \geq .68$ for place identity and place dependence in both samples

• Place Identify/Dependence means (sd)

<table>
<thead>
<tr>
<th></th>
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<th>Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place Identity</td>
<td>3.45 (.88)$^a$</td>
<td>3.18 (.97)$^b$</td>
</tr>
<tr>
<td>Place Dependence</td>
<td>3.94 (.90)$^a$</td>
<td>3.80 (.96)$^b$</td>
</tr>
</tbody>
</table>

$^a,b$ Means with different superscripts are significantly different at $p<.05$
Results

Austria

EAB Impact Perceptions $\rightarrow$ Place Attachment $\rightarrow$ EAB Knowledge

$B = 0.17 \ast$

PA Antecedents

MN

EAB Impact Perceptions $\rightarrow$ Place Attachment $\rightarrow$ EAB Knowledge

$B = 0.24 \ast\ast$

PA Antecedents
## Table 2. Antecedents to place identity

<table>
<thead>
<tr>
<th>Item</th>
<th>Austria</th>
<th>Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (sd)</td>
<td>β</td>
</tr>
<tr>
<td><strong>Experience Use History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visits in last 12 months</td>
<td>100 (105.87)</td>
<td>-.21</td>
</tr>
<tr>
<td>Years visiting forest</td>
<td>27 (17.5)</td>
<td>.05</td>
</tr>
<tr>
<td><strong>Motivations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To be physically active</td>
<td>4.15 (1.12)</td>
<td>-.70</td>
</tr>
<tr>
<td>To be close to nature</td>
<td>4.57 (.65)</td>
<td>.29</td>
</tr>
<tr>
<td>To experience natural sounds</td>
<td>4.12 (.92)</td>
<td>.31</td>
</tr>
</tbody>
</table>

Motivations based on a 1-5 importance scale
Table 3. Antecedents to place dependence

<table>
<thead>
<tr>
<th>Item</th>
<th>Austria</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (sd)</td>
<td>β</td>
</tr>
<tr>
<td><strong>Experience Use History</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visits in last 12 months</td>
<td>100 (105.87)</td>
<td>-.18</td>
</tr>
<tr>
<td>Years visiting forest</td>
<td>27 (17.5)</td>
<td>-.04</td>
</tr>
<tr>
<td><strong>Motivations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To be physically active</td>
<td>4.15 (1.12)</td>
<td>.08</td>
</tr>
<tr>
<td>To be close to nature</td>
<td>4.57 (.65)</td>
<td>-.04</td>
</tr>
<tr>
<td>To experience natural sounds</td>
<td>4.12 (.92)</td>
<td>.39</td>
</tr>
</tbody>
</table>

Motivations based on a 1-5 importance scale
Results

Austria

EAB Impact Perceptions

Place Attachment

Place Identity

Place Dependence

EAB Knowledge

B = .17 *

B = -.18 **

PA Antecedents

MN

EAB Impact Perceptions

Place Attachment

Place Identity

Place Dependence

EAB Knowledge

B = .23 **

B = -.18 **

PA Antecedents
Discussion

• **Implications: Theoretical**
  • Increased place attachment correlated with more likely perceptions of impact and vice versa
  • Association holds true in the presence of other place attachment antecedents
  • Increased place attachment is correlated with knowledge of beetles/impacts
    • Place identity: Positively
    • Place dependence: Negatively
Discussion

• Implications: Managerial
  • In the absence of other factors, impacts from beetles may lead to a loss in stakeholder connection to the forest
    • Educate and involve stakeholders in management of EAB
  • Increased place attachment may lead stakeholders to seek knowledge about impacts and mitigation strategies
    • Managers should:
      • Interact with stakeholders
      • Encourage continued visitation
      • Facilitate unique experiences for stakeholders, educate about the forest and impacts
      • Involve stakeholders in decision making and mitigation
Questions

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## Results

Table 1. Place attachment descriptive and CFA results

<table>
<thead>
<tr>
<th>Factor/Item</th>
<th>Austria ($n=310$)</th>
<th></th>
<th></th>
<th>Minnesota ($n=471$)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>$\lambda$</td>
<td>SE</td>
<td>$\alpha$</td>
</tr>
<tr>
<td><strong>Place Dependence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PD₁ Doing what I do at this recreation area is more important to me than doing it in any other place.</td>
<td>3.63</td>
<td>1.06</td>
<td>.86</td>
<td>.07</td>
<td>3.36</td>
</tr>
<tr>
<td>PD₂ I wouldn't substitute any other recreation area for the type of recreation I do here.</td>
<td>2.91</td>
<td>1.22</td>
<td>.53</td>
<td>.07</td>
<td>3.08</td>
</tr>
<tr>
<td>PD₃ No other place can compare to this recreation area.</td>
<td>3.82</td>
<td>1.11</td>
<td>.71</td>
<td>.08</td>
<td>3.12</td>
</tr>
<tr>
<td>PD₄ Doing my activities here is more important to me than doing them in any other places.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Place Identity</strong></td>
<td>3.94&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.09</td>
<td>.80</td>
<td>.05</td>
<td>3.80&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>PI₁ This recreation area means a lot to me.</td>
<td>4.20</td>
<td>1.03</td>
<td>.80</td>
<td>.05</td>
<td>3.95</td>
</tr>
<tr>
<td>PI₂ I identify strongly with this recreation area.</td>
<td>3.53</td>
<td>1.20</td>
<td>.63</td>
<td>.06</td>
<td>3.74</td>
</tr>
<tr>
<td>PI₃ I am very attached to this recreation area.</td>
<td>4.08</td>
<td>1.06</td>
<td>.87</td>
<td>.05</td>
<td>3.70</td>
</tr>
</tbody>
</table>

<sup>a,b</sup> Means with different superscripts are significantly different at $p<.05$

<sup>†</sup> PD₄ removed due to low factor loading