LANDSCAPES FOR BIRDS: ASSESSING THE IMPACT OF DEVELOPMENT DECISIONS IN CITIES

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Overview

- Avian Background
- Evaluation Tool

Credit: Audubon, www.audubon.org
No *simple* evaluation tool that translates empirical research into practical, usable information for urban land developers.
How to Evaluate Different Development Designs and Impacts on Forest Birds?
SEASONS OF A BIRD

- Breeding
- Wintering (non-breeding season)
- Migrating (Fall and Spring Migration)

Credit: Audubon, www.audubon.org
Neotropical Migrants

Yellow Warbler

Black throated green warbler

Yellow-throated vireo
A SITE

Can Serve As:
- A breeding site
- A wintering site
- A stop-over site
- (A dispersal site)

Different species may appear in a development at different times of the year
Systematic Review: Forest Bird Species Lists

- **Breeding Review**
  - Studies on birds’ area-sensitivity in forest fragments during breeding seasons

- **Stopover Review**
  - Studies on use of forest fragments during spring and/or fall migration seasons

- **Built Environment Review**
  - Research on birds’ presence within residential neighborhoods (with trees) during breeding or migration season
Results: Overall Comparisons - Breeding in Forest Fragments

- 75 species could breed in forests ranging in size from 1 to 50 acres
- 15 interior forest specialist species (will not breed in small fragments)
  - Area-sensitive species that need large, contiguous forest

Archer and Hostetler 2018, Landscape and Urban Planning
Results: Overall Comparisons - Stopover in Forest Fragments

- 116 species could use forest fragments between 1 and 50 acres in size during migration seasons
- Mostly long-distance/Neotropical migrants (some interior-forest species)
Results: Built Environment

- 109 species could use residential areas for breeding or stopover
  - 70 species could breed in residential areas
  - 82 species could use residential areas as stopover sites during migration seasons
- Some interior forest specialists used residential areas as stopover sites

https://arlingtonunwrapped.files.wordpress.com/2011/06/arlington-forest-houses1.jpg
Online Evaluation Tool
Introduction

The goal of the building for birds online tool is to provide decision makers with a way to evaluate different development scenarios and how they affect habitat for different species of forest birds that can use fragmented areas. This evaluation tool should primarily be used for situations where the development footprint is relatively small and/or occurs in already fragmented landscapes.
Inputs

• Patch sizes of conserved late and early successional forest

• Conserved tree canopy cover in built areas
Late Successional

Early Successional

Successional Forest

Early Successional Forest
Outputs

- Avian Habitat Scores
  - Breeding/wintering habitat score and bird list
  - Stopover habitat score and bird list
  - Built environment habitat score and bird list

![Yellow-throated vireo](image)

### Forest Bird Habitat Scores

- **Breeding/Wintering**: 75
- **Stopover**: 72
- **Tree Canopy**: 40

![Forest Bird Habitat Scores Graph](chart)
II. Forest Bird Habitat Scores for Breeding/Wintering

- Breeding/Wintering: 75
- Stopover: 72
- Tree Canopy: 40
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Habitat Type</th>
<th>Migrant Status</th>
<th>Breeds in Forest Fragment</th>
<th>Stopover in Forest Fragment</th>
<th>Breeds in Residential Area</th>
<th>Stopover in Residential Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruby-throated Hummingbird</td>
<td>Open Woodland</td>
<td>MD / LD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>American Redstart</td>
<td>Forest</td>
<td>LD</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Black-and-white Warbler</td>
<td>Forest</td>
<td>YR / SD / LD</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>?</td>
</tr>
<tr>
<td>Yellow Warbler</td>
<td>Forest</td>
<td>LD</td>
<td>✓</td>
<td></td>
<td></td>
<td>?</td>
</tr>
</tbody>
</table>
AMERICAN REDSTART (AND OTHER MIGRANTS)

- Breeding, requires large tracts of forest (at least 1000 acres in area); interior-forest specialist
- Migrating, can use small urban patches and individual trees in residential areas to forage and rest

Credit: Audubon, www.audubon.org
TAKE HOME MESSAGES

• Residential areas provide stopover and breeding habitat for over 100 forest bird species (could be over 180)

• Forest fragments provide stopover and breeding habitat for over 130 forest bird species (could be over 200)

• Some interior-forest specialists use forest fragments and residential areas as stopover habitat (10 of 15)

Credit: Audubon, www.audubon.org
TIPS TO PROVIDE BIRD HABITAT

• Conserving both forest fragments and individual trees in residential areas helps improve habitat scores.

• Late successional is better than early successional.

• Larger patches tend to attract more migrants as stopover habitat.

Credit: Audubon, www.audubon.org
Summary

- Building for birds online tool
- Can run through scenarios to get scores

Credit: Audubon, www.audubon.org