

Habitat Suitability Survey of Downy Woodpeckers in Gourdneck State Game Area

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Geography: Environmental Analysis and Resource Management

Senior Honors Thesis

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Outline

- Introduction
- Purpose/Hypothesis
- Literature Review
- Methodology
- Results and discussion
- Conclusion



Introduction

- Area with decreased habitat through human modification
- Habitat Suitability of Downy Woodpecker
- Habitat Restoration at Gourdneck State Game Area
 - Loss of habitat through habitat restoration
- Study examines suitability of excluded restoration parcel in Gourdneck State Game Area

Purpose/Hypothesis

- Is a remaining parcel of forested land within Gourdneck State Game Area a suitable habitat for Downy woodpeckers?
- Hypothesis:
 - The study site is 100% suitable habitat for the Downy woodpecker according to the Habitat Suitability Index Model

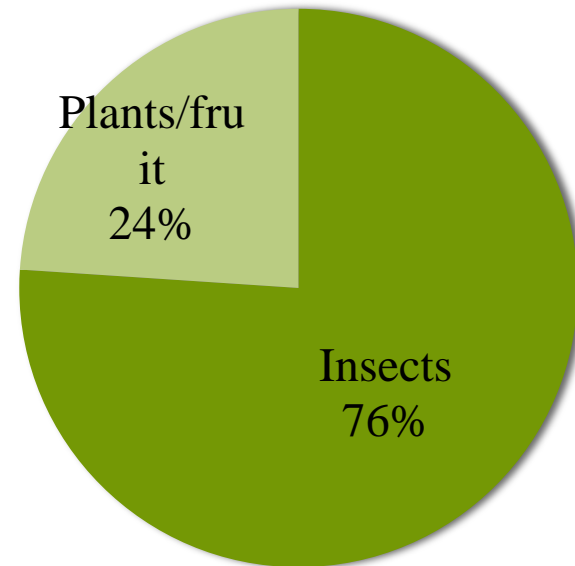
Literature Review

Landscape Change and Human Modification

- Three processes related to landscape change (Bennett and Saunders 2010)
 1. original vegetation decreases resulting in habitat loss
 2. habitat left intact after initial changes is subject to further subdivision, resulting in fragmented landscapes and increases in edge effect
 3. new land uses replace vegetation once present
- As human modification of landscapes increase, amount of suitable habitat decreases

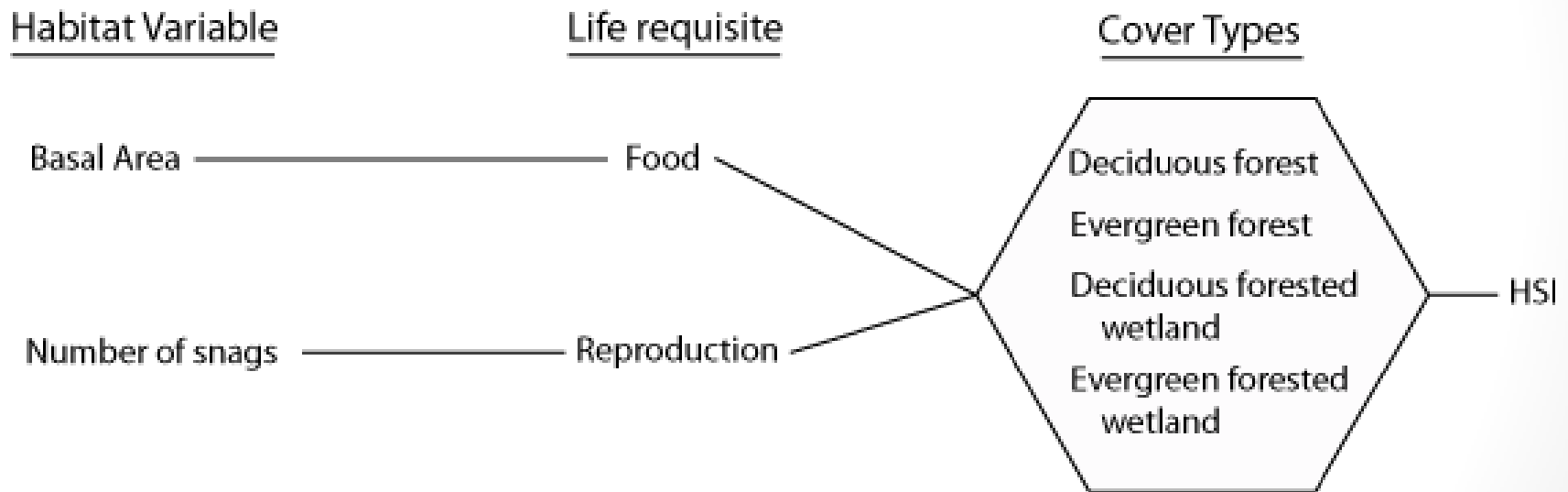
Downy Woodpecker General Research

“one of our most useful species ever” (Beal 1911)



Habitat Suitability Index Model

Two Variables: Basal Area and Number of Snags



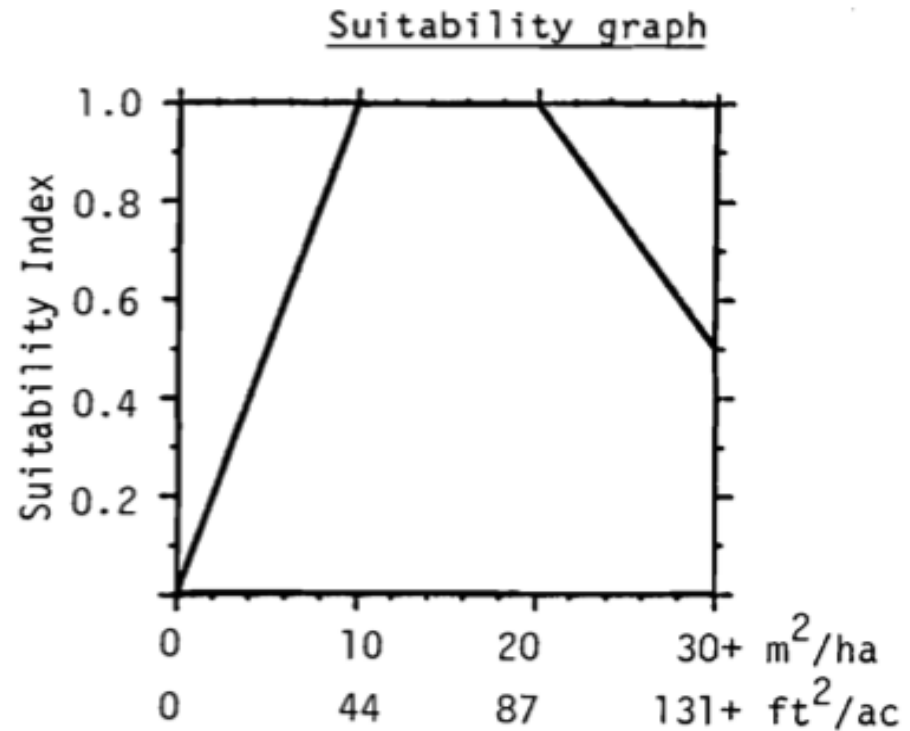
Basal Area

Basal Area – “The area of exposed stems of woody vegetation”

(Schroeder, R.L. 1982)

Variable

V_1 Basal area.



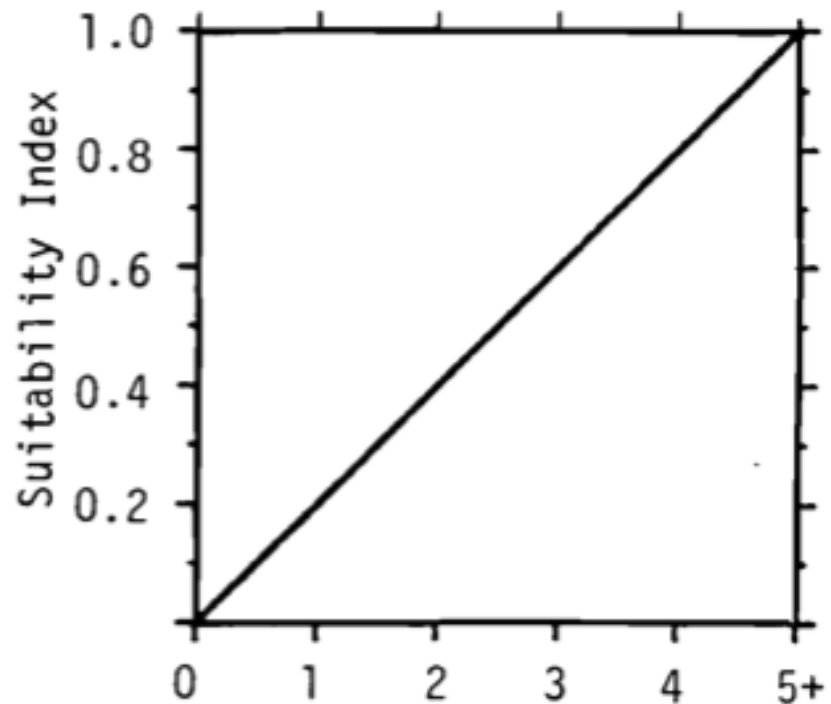
(Schroeder, R. L. 1982)

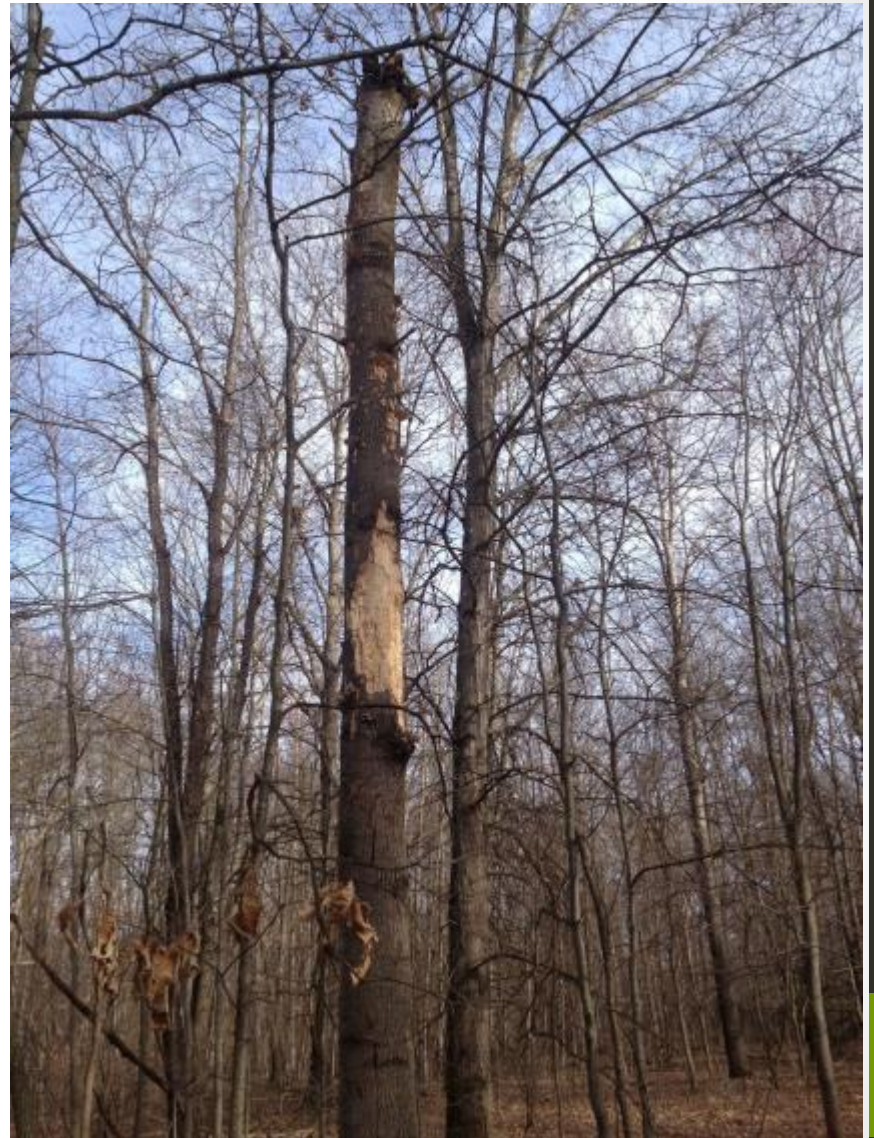
Number of snags

Snag – “Trees in which at least 50% of the branches have fallen, or are present and no longer bear foliage” (Schroeder, R. L. 1982)

V_2

Number of snags
> 15 cm dbh/0.4 ha
(> 6 inches dbh/
1.0 acre).





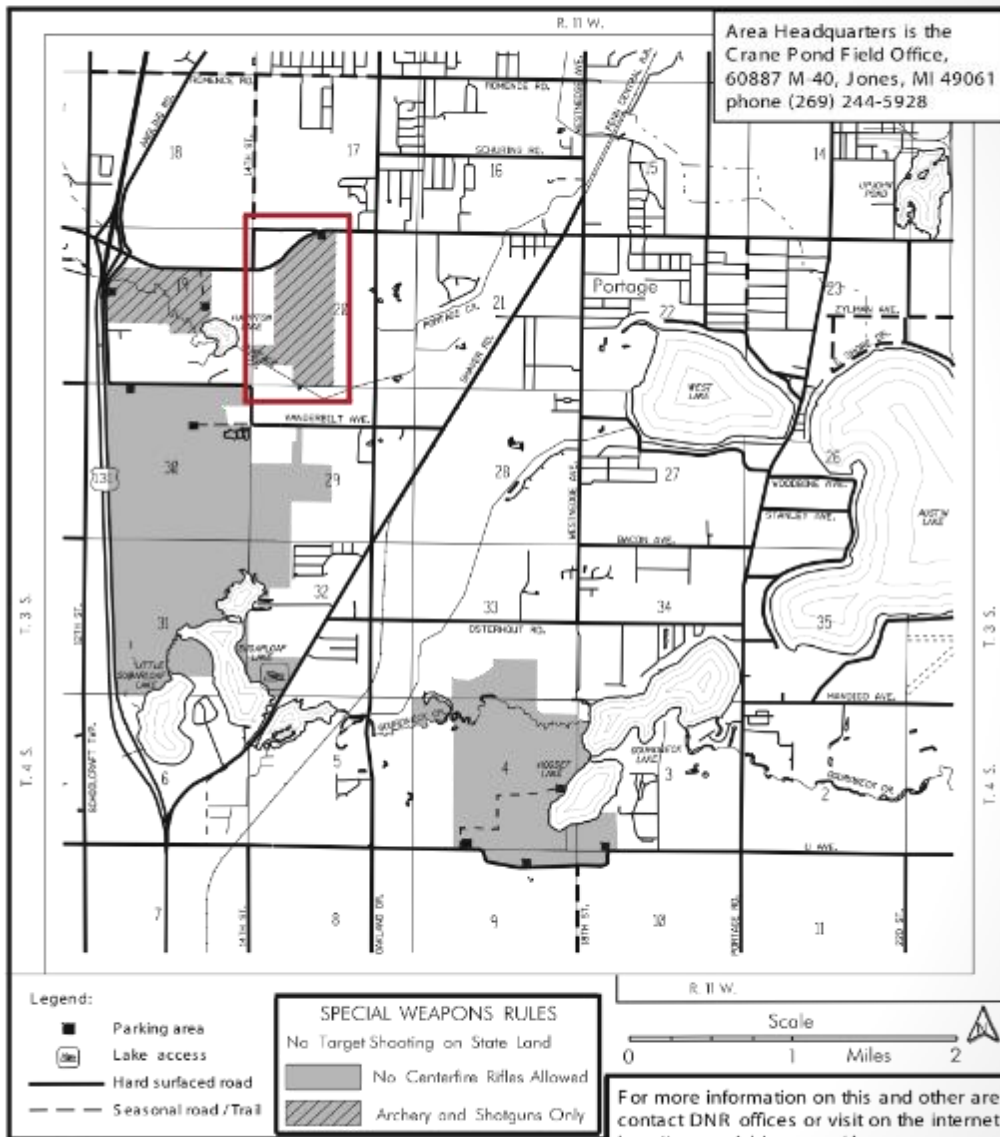
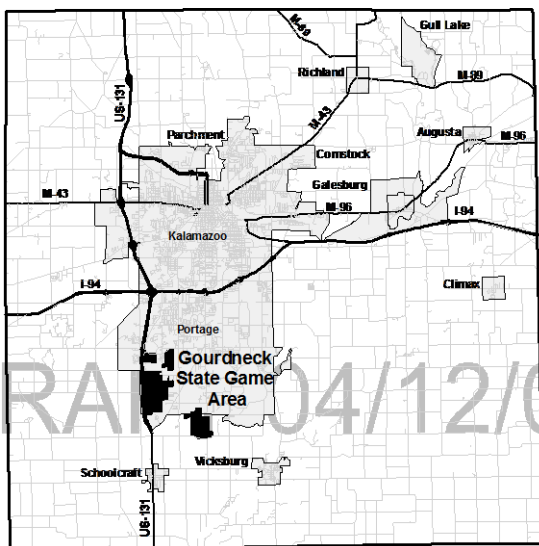


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GOURDNECK STATE GAME AREA

KALAMAZOO COUNTY, MICHIGAN



(Crane Pond Field Office 2005)



Hunter Monies Made This Area Possible

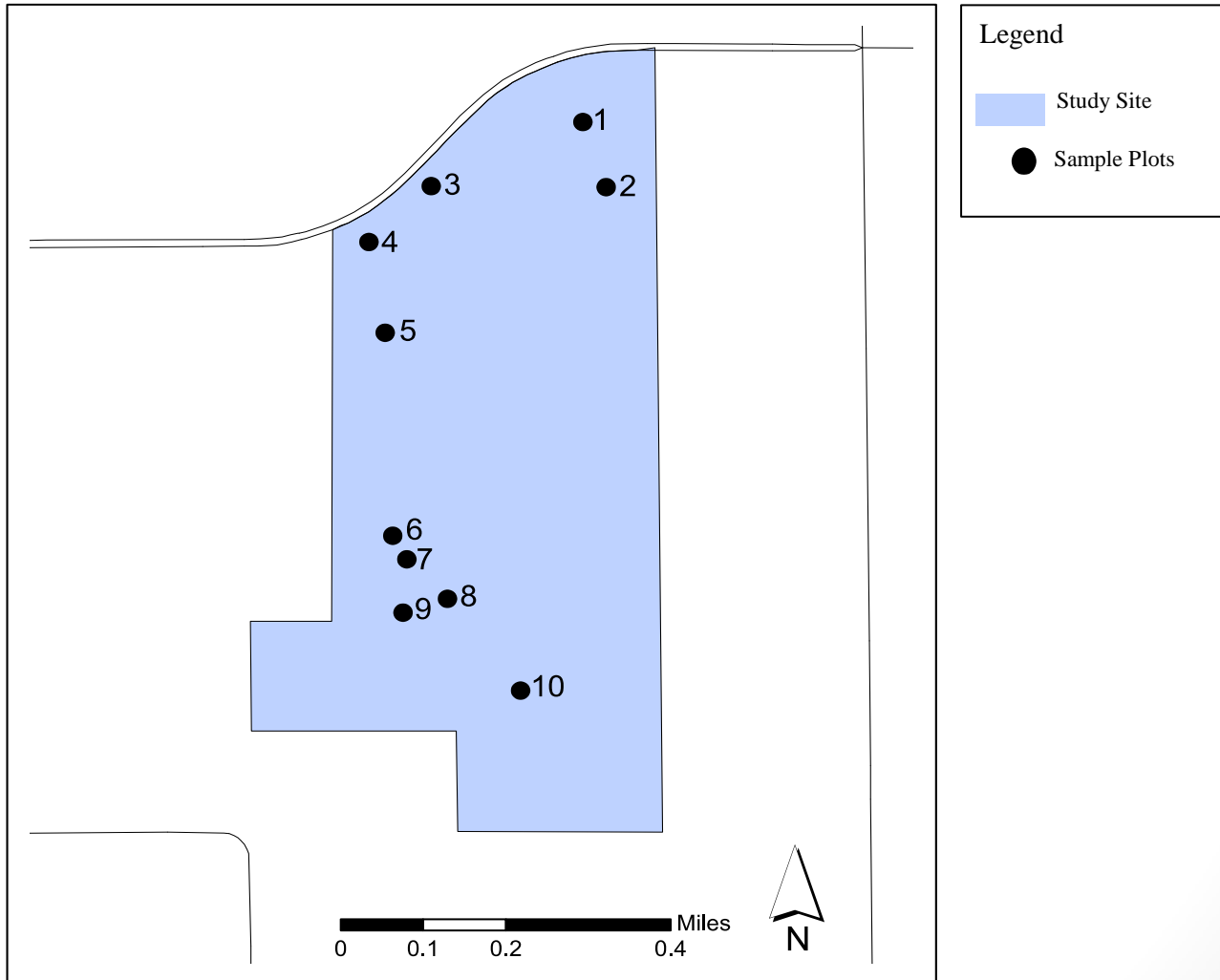
DNR Wildlife Map - area 390101 (was 1212) rev. 10/2006 -MLS



Data Collection

- Model requires 0.4 hectares, or 1 acre, or land to be measured
 - Determined ten – 1/10th acre sample plots (Washington State University Extension)
 - 11.3 meter radius circle plots

Study Site with Numbered Sample Plots



Study Site - Measurement Collection

- Basal Area
 - Each tree in each sample plot; measured Diameter at Breast Height (DBH) using DBH Tape

- Number of Snags
 - Each tree over 15cm DBH - a snag or not
 - Recorded as YES or NO

Data Analysis

Basal Area – Variable 1

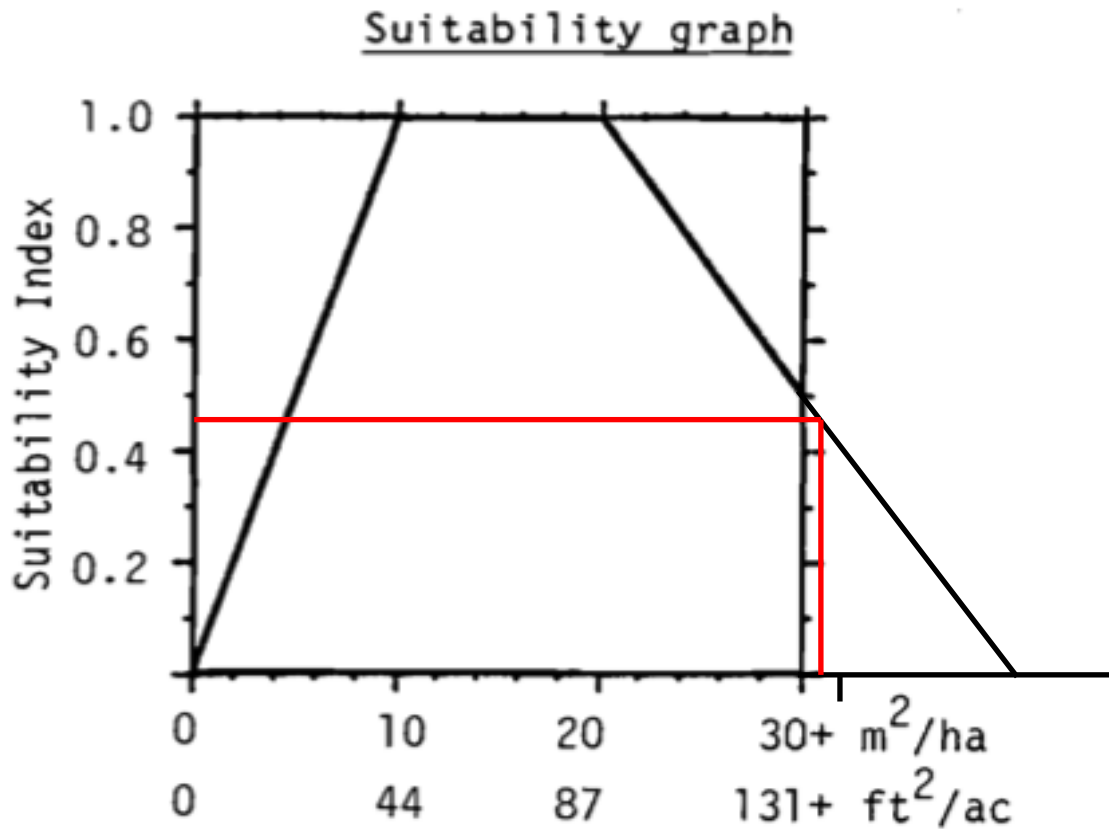
- To get Basal Area from DBH
 - Equation 1 $\square 0.005454 \times \text{DBH}^2 = \text{Basal Area}$
- Converted all DBHs recorded to Basal Area
 - Sum all basal area calculations over entire study site

Number of Snags – Variable 2

- Simply counted how many of the trees were recorded as snags
- Because a total of 1 acre was measured, no extrapolation of the final count was necessary

Results

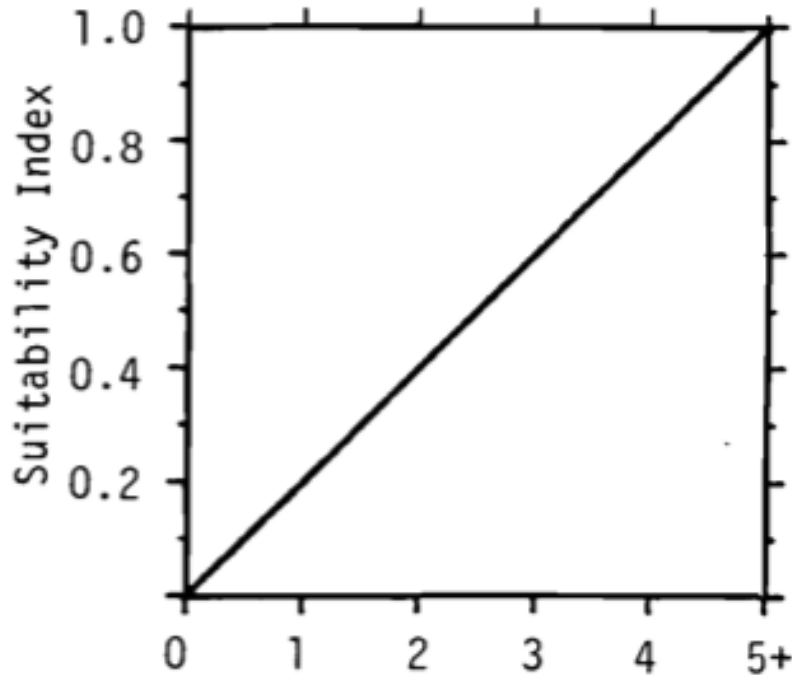
- Basal Area = 31.03 m²/ha, ~ 46% Suitability



(Schroeder, R. L. 1982)

Results

- Number of Snags = 15 per 0.4 ha, 100% Suitability



(Schroeder, R. L. 1982)

Discussion

- Hypothesis Analysis
 - The study site will hold 100% suitable habitat for the Downy woodpecker according to the Habitat Suitability Index Model

Results:

Basal Area ~ 46%

Number of Snags ~ 100%

Hypothesis cannot be accepted

Discussion continued

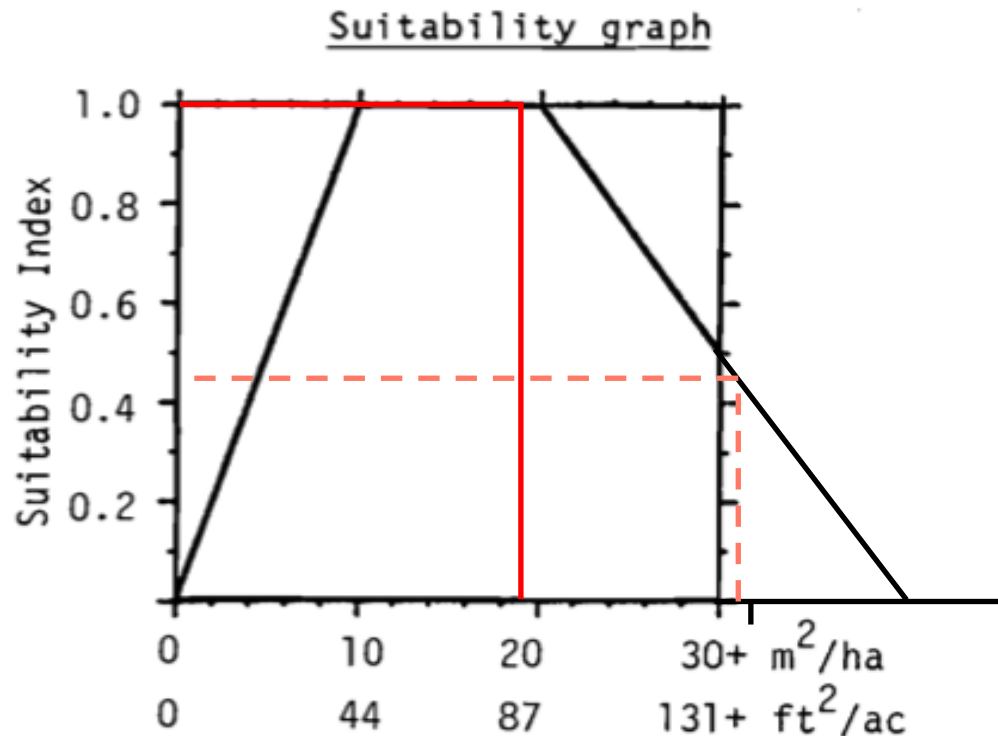
- Basal Area ~ 46% suitability
 - HSI model does state, “stands with basal areas greater than 30 m²/ha, or about 50% suitability, are assumed to have moderate value for Downy woodpeckers.” (Schroeder, R. L. 1982)
 - Although hypothesis was not accepted, study site still holds moderate value for food life requisite and high value for reproductive life requisite

Discussion continued

- If management would like to create optimal habitat
 - Decrease amount of Basal Area of parcel
 - Optimal densities ~ 10 to 20 m²/ha
 - Reduction of 11 m²/ha of Basal Area, or 35% reduction, to reach 100% suitability for Variable 1
- **Caution! Must not reduce number of snags or viable snags!**

Creating Optimal Habitat

- If the five largest snags and ten largest non-snags were cut down, basal area would be reduced to 18.3966 m²/ha, making the site 100% suitable in basal area.
- By reducing the number of snags from fifteen to ten, the suitability stays at 100% for number of snags



Conclusion

- Despite habitat restoration in larger parcel, Downy woodpeckers do have suitable habitat available to them in SGA
- Study could be expanded to other areas of SGA
 - Parcel immediately west of study site seemed to have smaller basal area (viewed through aerial photography) could hold more suitable habitat
- Study could be expanded to entire SGA
 - SGA is large and could hold much more suitable habitat for Downy woodpecker

Limitations

- Lack of Suitability Models
 - Only one suitability model available for Downy woodpecker
- Time
 - Limited amount of time for study
 - Potential for larger study site, entire SGA
- Lack of Accessibility
 - Restricted by land cover, mostly wetland and brush

Acknowledgements

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Thank you for coming!