

A GIS-Based Landscape Scale Model for Native Bee Habitat

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(Abstract)

Through pollination, bees are responsible for the persistence of many biological systems on our planet. Bees have also been used for thousands of years in agriculture to improve crop quality and yield. Recently, there have been declines in honeybees worldwide. This decline is concerning because it threatens food supplies and global biodiversity. An alternative to alleviating the effect of a honey bee shortage could be to use native bees. Problems with adoption of native bees in agriculture occur because of a lack of large scale analysis methods for native bees, regional species lists and management knowledge.

This research explores the use of GIS in modeling native bee habitat to provide a landscape scale analysis method for native bees and develop a systematic sampling method for regional species list development. Raster GIS modeling, incorporating decision support and Poisson statistical methods were used to develop a native bee habitat model. The results show landscape composition is important to bee abundance and diversity. In addition, habitat fragmentation may not be as detrimental to bees as previously thought. Bees are most sensitive to landscape composition at a scale of 250 m, but require large patches of floral resources. GIS proved to be very useful in modeling bee habitat and provides an opportunity to conduct landscape scale bee population analysis.

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Table of Contents

| | Page |
|---|-----------|
| Abstract | ii |
| Acknowledgements | iii |
| Table of Contents | v |
| List of Tables | vi |
| List of Figures..... | vi |
| Chapter 1: Introduction and Problem Statement..... | 1 |
| 1.1 Significance of Research..... | 3 |
| Chapter 2: Literature Review | 5 |
| 2.1 Pollination and Ecosystem Services..... | 5 |
| 2.2 Biogeography of Honey Bee..... | 7 |
| 2.3 Biogeography of Native Bee..... | 9 |
| 2.4 Biogeography of Bee Species of Interest..... | 11 |
| 2.5 Spatial Components of Bee Habitat..... | 13 |
| 2.6 Concepts from Geography and Landscape Ecology..... | 18 |
| Chapter 3: Methods and Procedures | 22 |
| 3.1 Study Area..... | 22 |
| 3.2 Digital Data Collection and Preparation..... | 23 |
| 3.3 Bee Habitat GIS Model Development..... | 30 |
| 3.4 Field Sampling..... | 34 |
| 3.5 Statistical Analysis..... | 37 |
| Chapter 4: Results and Discussion..... | 40 |
| 4.1 Results..... | 40 |
| 4.2 Discussion..... | 56 |
| 4.3 Conclusions..... | 62 |
| 4.4 Future Research..... | 63 |
| References: | 64 |
| Appendix A: Maps..... | 69 |
| Appendix B: Field Data..... | 72 |
| Vita..... | 74 |

List of Figures

| | |
|---|----|
| Figure 2.1: Honey bee..... | 7 |
| Figure 2.2: Varroa Mite..... | 8 |
| Figure 2.3: Digger bee..... | 11 |
| Figure 2.4: Bumble bee..... | 12 |
| Figure 2.5: Sweat bee..... | 13 |
| Figure 3.1: Map of study area..... | 22 |
| Figure 3.2: Conceptual framework for model..... | 30 |
| Figure 3.3: Bee trap sample map..... | 35 |

List of Tables

| | |
|---|----|
| Table 3.1: Climate statistics..... | 23 |
| Table 3.2: Original data information..... | 24 |
| Table 3.3: Land cover class definitions..... | 27 |
| Table 3.4: Aspect class definitions..... | 27 |
| Table 3.5: Hydrologic group class definitions..... | 29 |
| Table 3.6: Preprocessed data information..... | 29 |
| Table 3.7: Weights for model..... | 32 |
| Table 3.8: Bee trap class break information..... | 34 |
| Table 3.9: Statistical analysis variables..... | 37 |
| Table 4.1: Whole model test results on MCE and bee abundance (B.A.)..... | 41 |
| Table 4.2: Goodness of fit results on MCE and B.A..... | 42 |
| Table 4.3: Parameter estimates test results on MCE and B.A..... | 42 |
| Table 4.4: Whole model test results on color of bee traps, MCE and B.A..... | 43 |
| Table 4.5: Goodness of fit test result on color of bee traps, MCE and B.A..... | 44 |
| Table 4.6: Effects test results on color of bee traps, MCE and B.A..... | 44 |
| Table 4.7: Parameter estimates test on color of bee traps, MCE and B.A..... | 45 |
| Table 4.8: Whole model test results on presence of flowers, MCE and B.A..... | 46 |
| Table 4.9: Goodness of fit test results on presence of flowers, MCE and B.A..... | 47 |
| Table 4.10: Effects test results on presence of flowers, MCE and B.A..... | 47 |
| Table 4.11: Parameter estimates test on presence of flowers and B.A..... | 48 |
| Table 4.12: Whole model test results on MCE and bee diversity (B.D.)..... | 49 |
| Table 4.13: Goodness of fit tests results on MCE and B.D..... | 50 |
| Table 4.14: Parameter estimates results on MCE and B.D..... | 50 |
| Table 4.15: Whole model test results on color of bee traps, MCE and B.D..... | 51 |
| Table 4.16: Goodness of fit result on color of bee traps, MCE and B.D..... | 51 |
| Table 4.17: Effects test results on color of bee traps, MCE and B.D..... | 52 |
| Table 4.18: Parameter estimates result on color of bee traps, MCE and B.D..... | 52 |
| Table 4.19: Whole model test on presence of flowers, MCE and B.D..... | 53 |
| Table 4.20: Goodness of fit test results on presence of flowers, MCE and B.D..... | 54 |
| Table 4.21: Effects test results on presence of flowers, MCE and B.D..... | 54 |
| Table 4.22: Parameter estimates results on presence of flowers, MCE and B.D..... | 55 |