

Capstone Project Final Report

Title Page

Project Title: Impact of Urban Development on Local Bird Populations

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University: State University

Degree Program: Bachelor of Science in Environmental Science

Advisor: Dr. Laura Kim

Executive Summary

This capstone project investigated the effects of urban development on the diversity and population density of local bird species in the Springfield area. Utilizing field observations, geographic information systems (GIS), and statistical analysis, the study aimed to provide actionable recommendations for urban planners to mitigate negative impacts on avian biodiversity.

Project Objectives

- To quantify changes in bird population density and diversity in areas undergoing urban development.
- To analyze habitat characteristics that support avian diversity in urban settings.
- To develop guidelines for urban development that are conducive to maintaining and enhancing bird populations.

Methodology

- **Field Surveys:** Conducted bi-weekly bird counts using point count methods in various stages of urban development over a 12-month period.
- **GIS Analysis:** Mapped land use changes and correlated these with changes in bird populations.
- **Statistical Analysis:** Employed regression and ANOVA tests to assess the impact of urbanization factors on bird diversity and density.

Achievements and Results

- Identified a 30% decline in bird diversity in heavily urbanized areas compared to undeveloped areas.
- Discovered that areas with at least 10% canopy cover maintained higher diversity levels despite urban pressure.
- Developed an urban planning guideline that incorporates green spaces and canopy corridors to support urban biodiversity.

Challenges and Solutions

- **Challenge:** Difficulty in accessing some urban areas for surveys due to private property restrictions.
- **Solution:** Negotiated access with property owners and collaborated with the local government for permits, supplementing inaccessible area data with satellite imagery analysis.

Financial Overview

- **Budget Allocated:** \$5,000
- **Total Spent:** \$4,800
- **Breakdown:** Major expenses included travel for field surveys, GIS software licensing, and statistical analysis software.

Conclusions and Recommendations

The findings highlight the significant impact of urban development on bird populations, underscoring the need for urban planning that considers ecological sustainability. Recommendations include:

- Incorporation of bird-friendly urban design principles in future developments.
- Regular monitoring of bird populations as part of environmental impact assessments for new projects.
- Community engagement initiatives to raise awareness about urban biodiversity.

Appendices

- **Appendix A:** Detailed Methodology and Field Survey Data
- **Appendix B:** GIS Maps and Analysis Charts
- **Appendix C:** Full Statistical Analysis Report
- **Appendix D:** Proposed Urban Planning Guidelines