



# Housing and Road Density Growth in and around Indiana Dunes National Lakeshore 1938-2005



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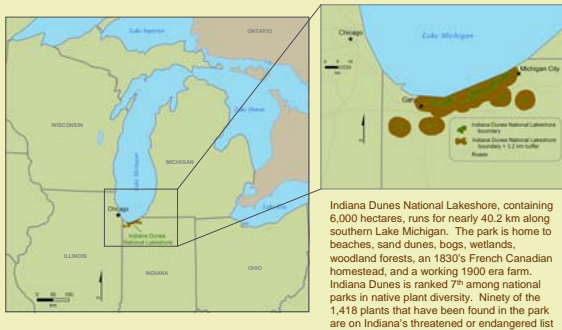
## Introduction

- National Parks serve as areas of ecological conservation by protecting habitat and preventing landcover change.
- Housing and road development near national parks can isolate them and limit their ecological function by:
  - Fragmenting wildlife habitat
  - Altering hydrology
  - Spreading exotic species
  - Polluting natural areas
- We focused on one park, Indiana Dunes National Lakeshore (INDU), established in 1966, for this study.

## Objective

Quantify the change in road and building density in and around Indiana Dunes National Lakeshore between 1938 and 2005 using aerial photography and satellite imagery.

## Study Area



## Methods

Roads and buildings within the boundaries of INDU and within a 3.2 km buffer outside of the park were digitized for 1938 and 2005.

25 meter buffers around roads was applied to account for edge effects.

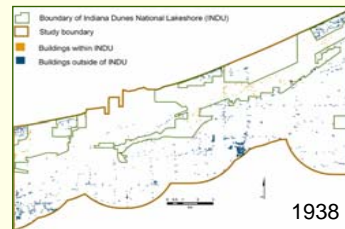
Change in road and building density and the resulting landscape fragmentation was calculated.

## 2005 Orthophoto of Study Area

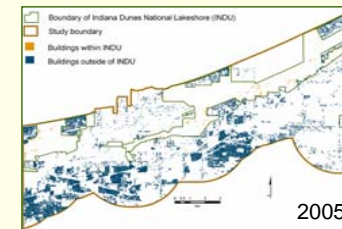


1938

2005

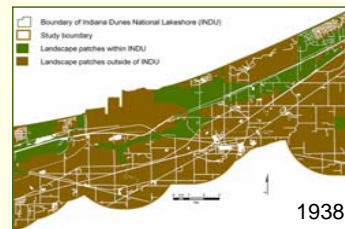


1938

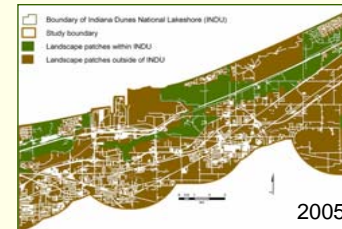


2005

Buildings



1938

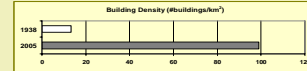


2005

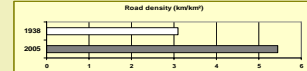
Roads

## Results

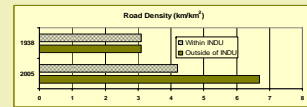
Building density has increased 7 fold between 1938 and 2005.



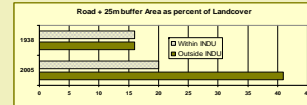
Road density has nearly doubled between 1938 and 2005.



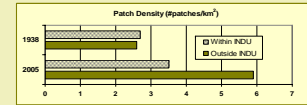
Road density outside of INDU has seen a pronounced increase, while the increase within INDU has been more subtle.



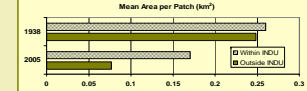
The percentage of the study area occupied by roads (+25 meter buffer) is highest outside the park in 2005.



Patch density has increased both within and outside of INDU, although to a much greater degree outside the park.



Landscape fragmentation is occurring, with decreasing mean area per patch both within and outside of INDU.



## Conclusions

- The current landscape is highly fragmented and few areas are free from human disturbance.
- Patch density and road density have increased significantly, resulting in decreased mean patch size.
- Road and housing growth outside the park have increased at more than twice the rate as growth inside the park.
- Housing and road development are creating fragmentation patterns on the landscape that are not easily reversed.
- Future fragmentation could be limited by:
  - Protecting existing large forest patches
  - Clustering new development
  - Decommissioning unnecessary roads

## Future Work

Upcoming steps in this project will include expanding to the rest of INDU, incorporating a 1980 time point, classifying landcover, and expanding our methods to other Great Lakes network National parks, beginning with Pictured Rocks National Lakeshore.

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