



UNIVERSITY OF MINNESOTA EXTENSION

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH

Big Woods, Big Rivers


MINNESOTA MASTER NATURALIST PROGRAM

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LESSON EIGHT: HUMANS AND THE BIG WOODS

Past, Present, and Future




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people
new homes
automobiles

sprawl
fragmentation
loss of native species

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Urbanized Land in the Twin Cities 1974

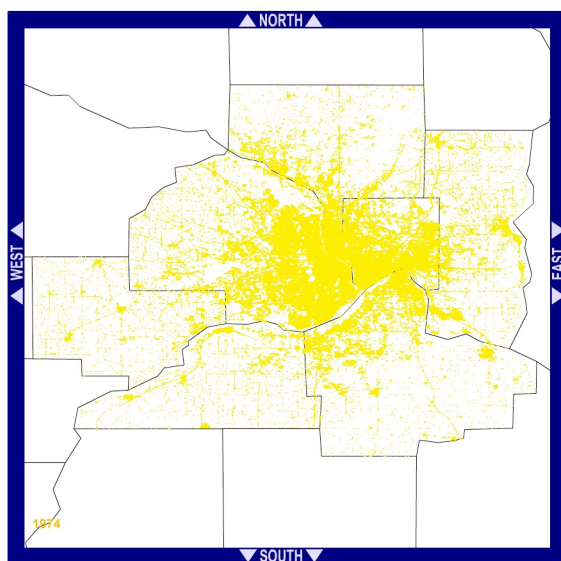


Image courtesy of U.S. EPA.

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Urbanized Land in the Twin Cities 1986

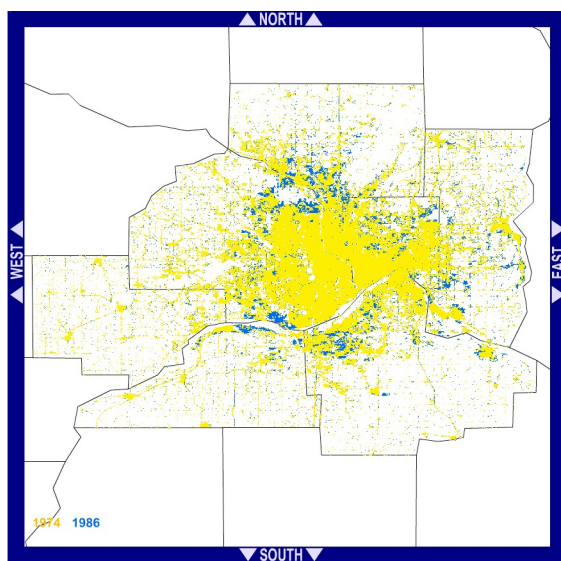


Image courtesy of U.S. EPA.

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Urbanized Land in the Twin Cities 1991

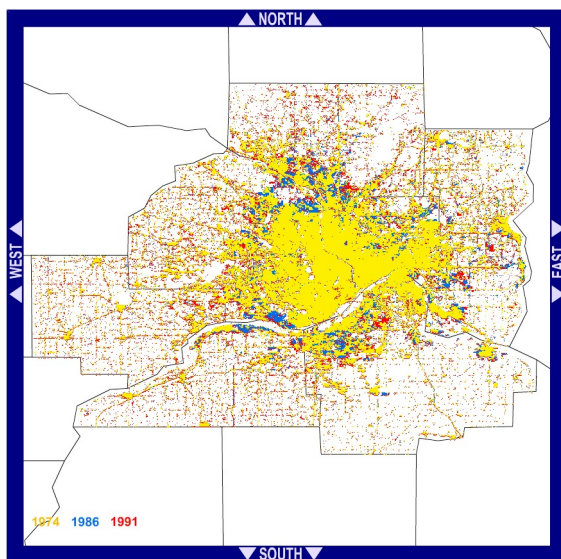


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Urbanized Land in the Twin Cities 1998

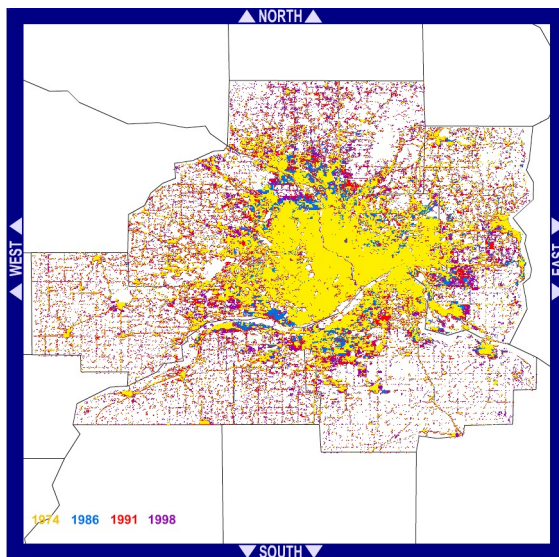
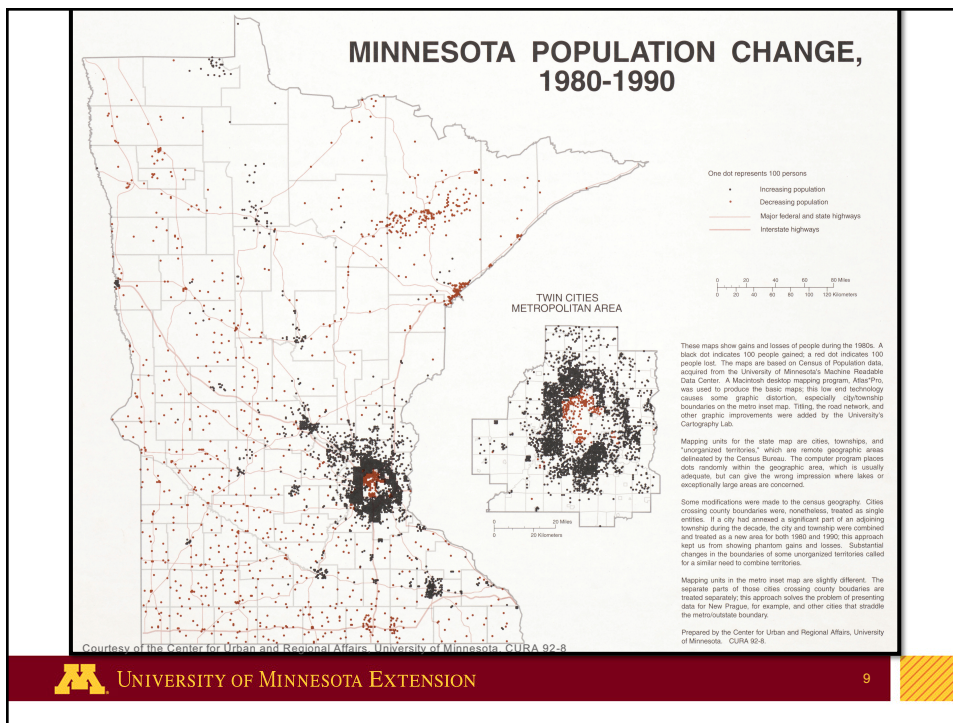


Image courtesy of U.S. EPA.

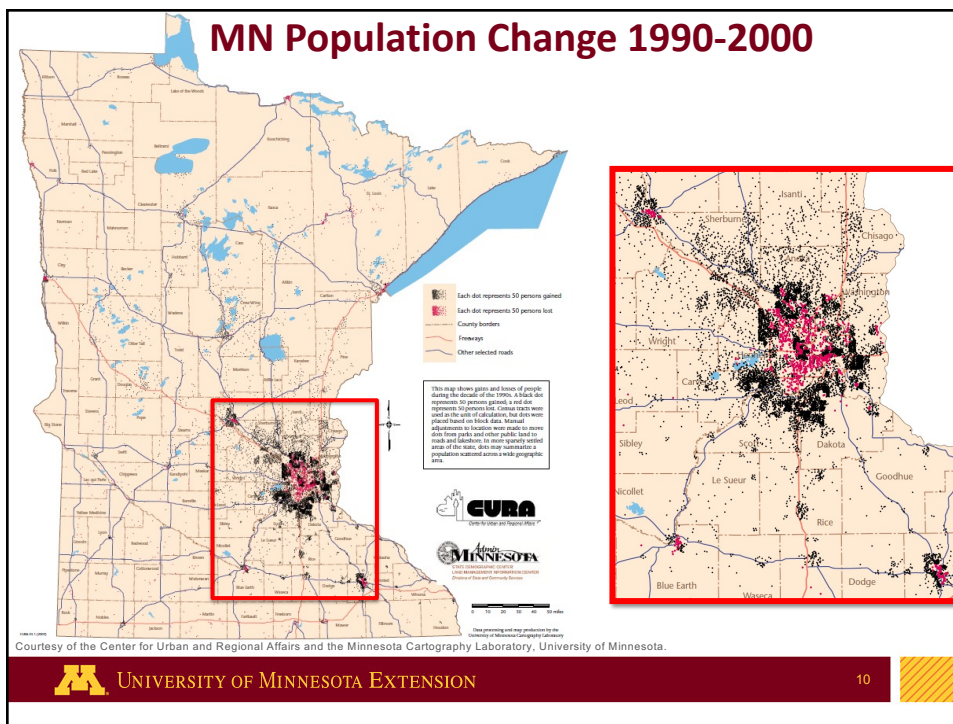
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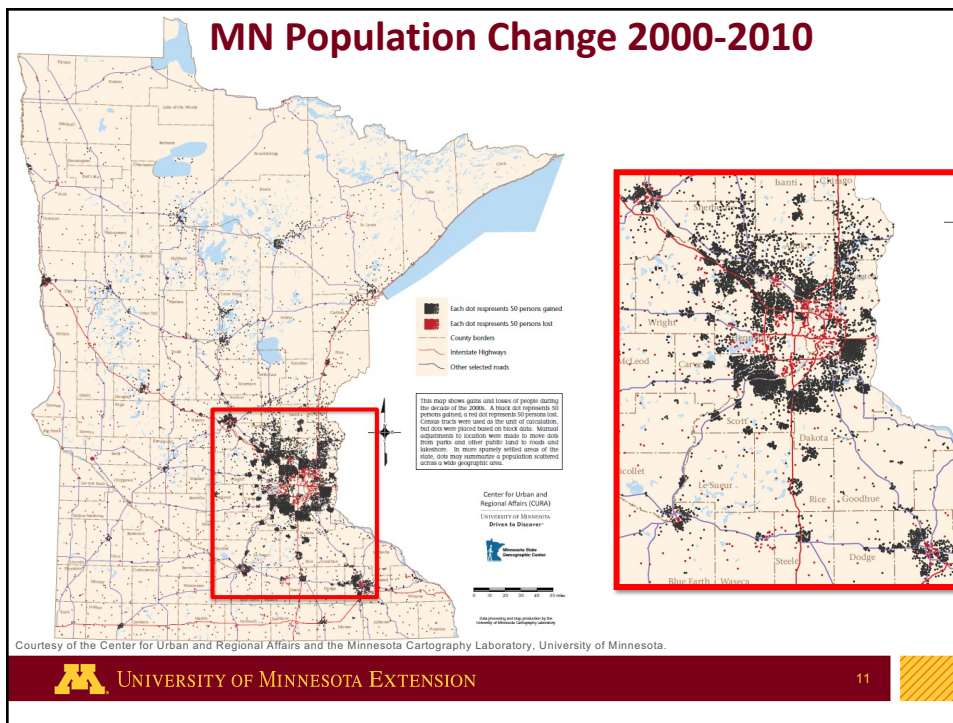
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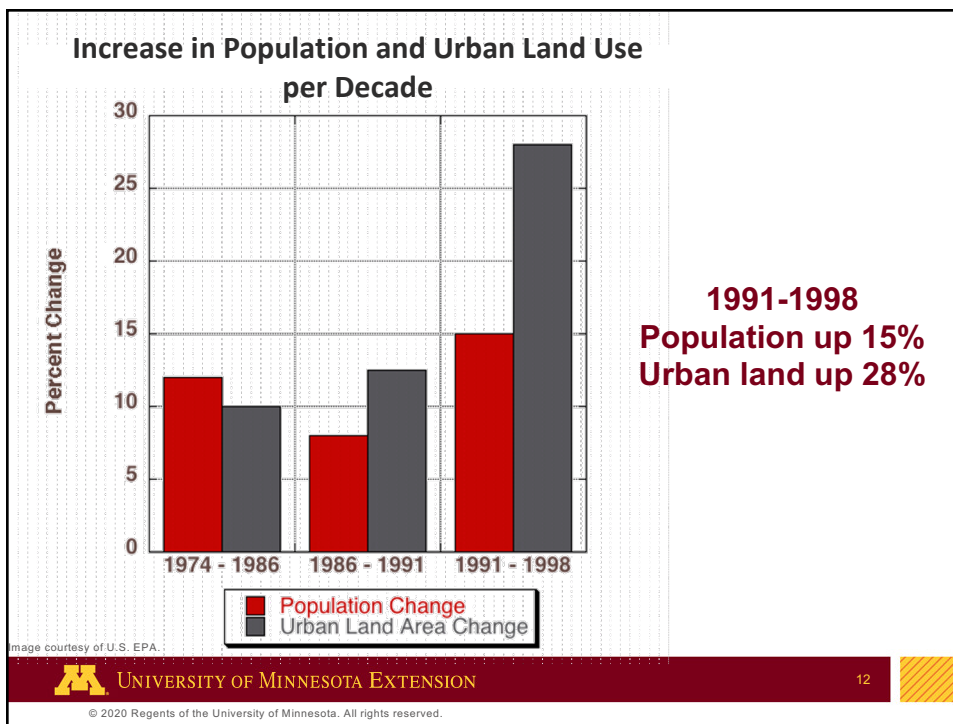
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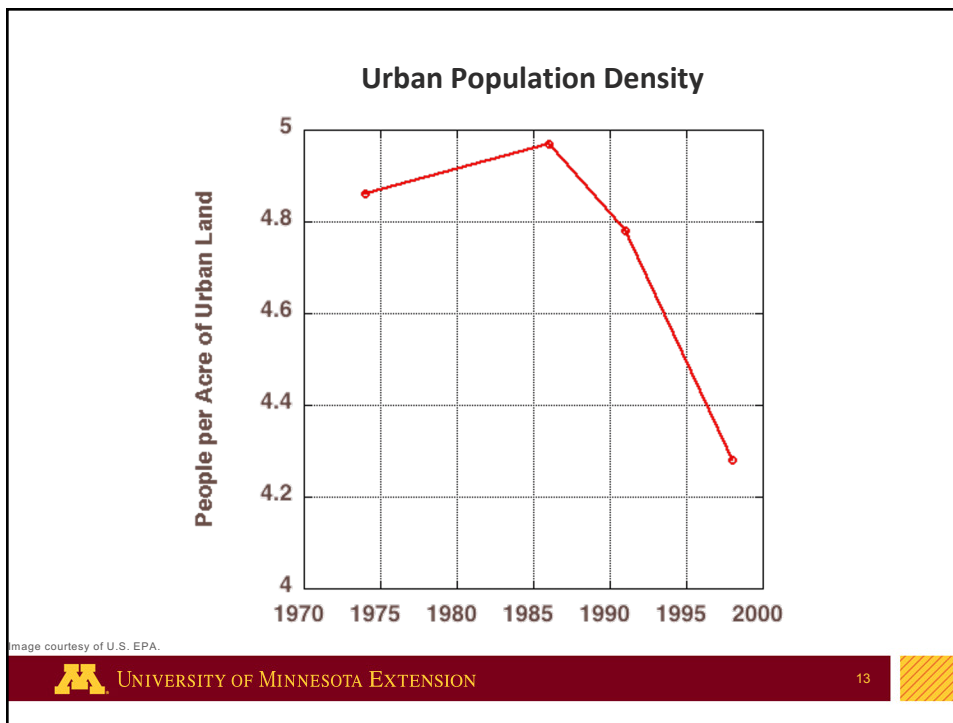
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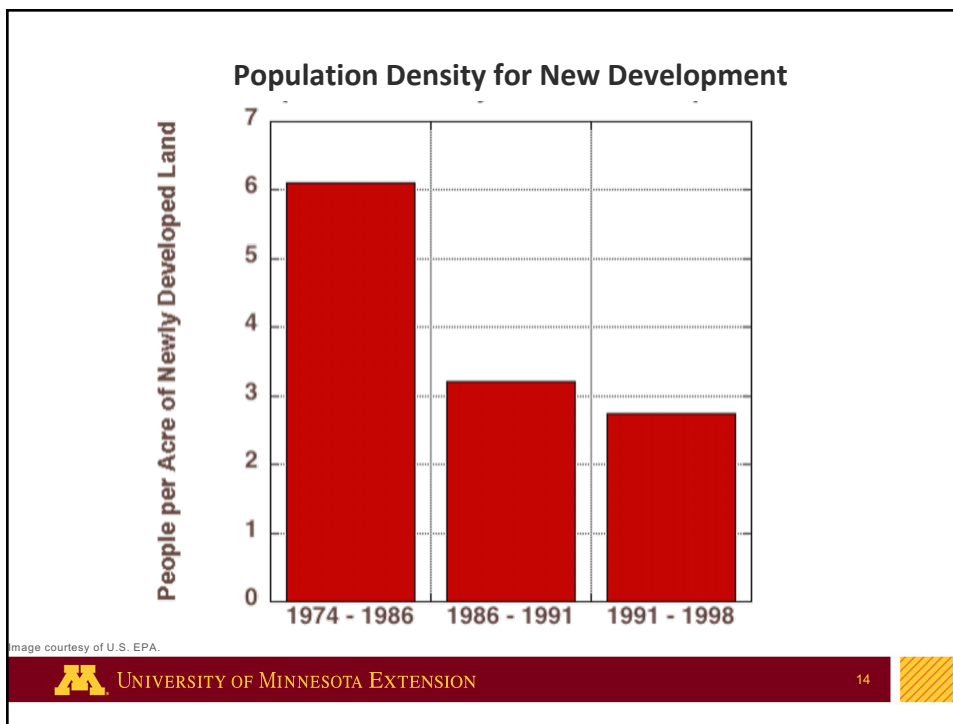
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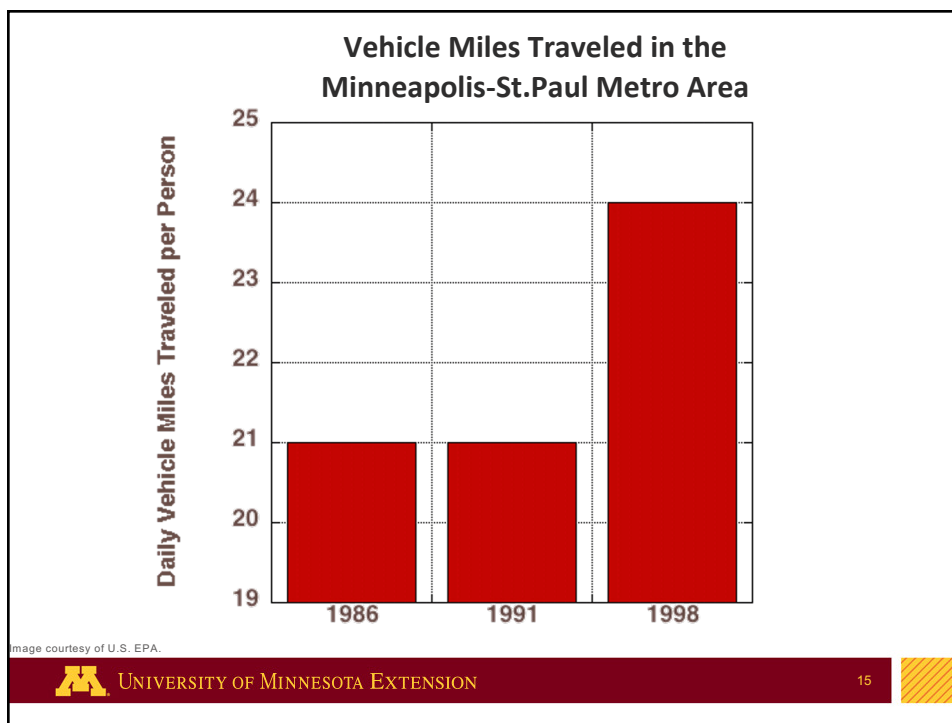
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URBAN SPRAWL LINKED TO...

- Physical inactivity
- Obesity
- Traffic fatalities
- High blood pressure
- Lower life expectancy
- Poor air quality
- Higher combined costs of housing and transportation
- Lower economic mobility



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What are the ecological effects of sprawl?

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Big Woods in 1884 (Brule River in WI)

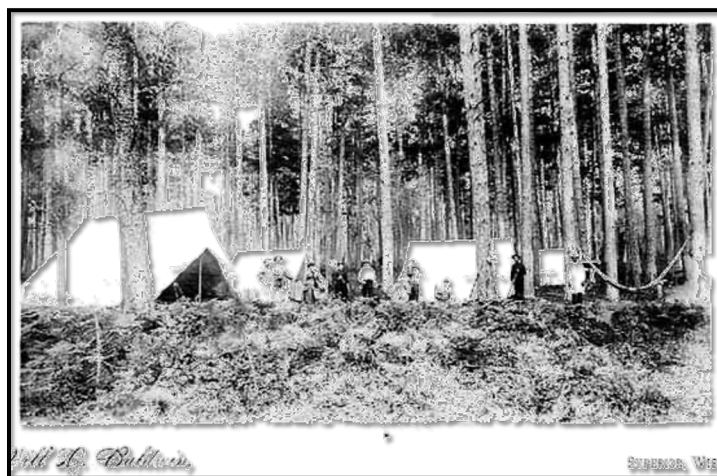


Image courtesy of Minnesota Historical Society

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Big Woods in 1890 (Rum River near Mille Lacs)



Image courtesy of Minnesota Historical Society


Big Woods in 1910 (High Reservoir in Roseville MN)




Image courtesy of Minnesota Historical Society

Big Woods in 2009
(Same road: High Reservoir/Reservoir Woods Park in Roseville MN).

Changes aren't always permanent.



Minnesota Off-Road Cyclists

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Alteration leads to:
Fragmentation

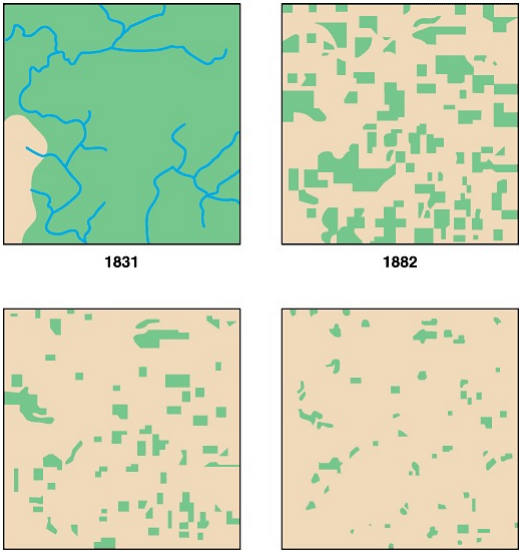


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Images shows fragmentation in a Wisconsin township.

What happens to “patch size”?



1831 1882

1902 1950


J. Curtis and William L. Thomas (ed), Man's Role in Changing the Face of the Earth © 1956 by The University of Chicago Press. All rights reserved

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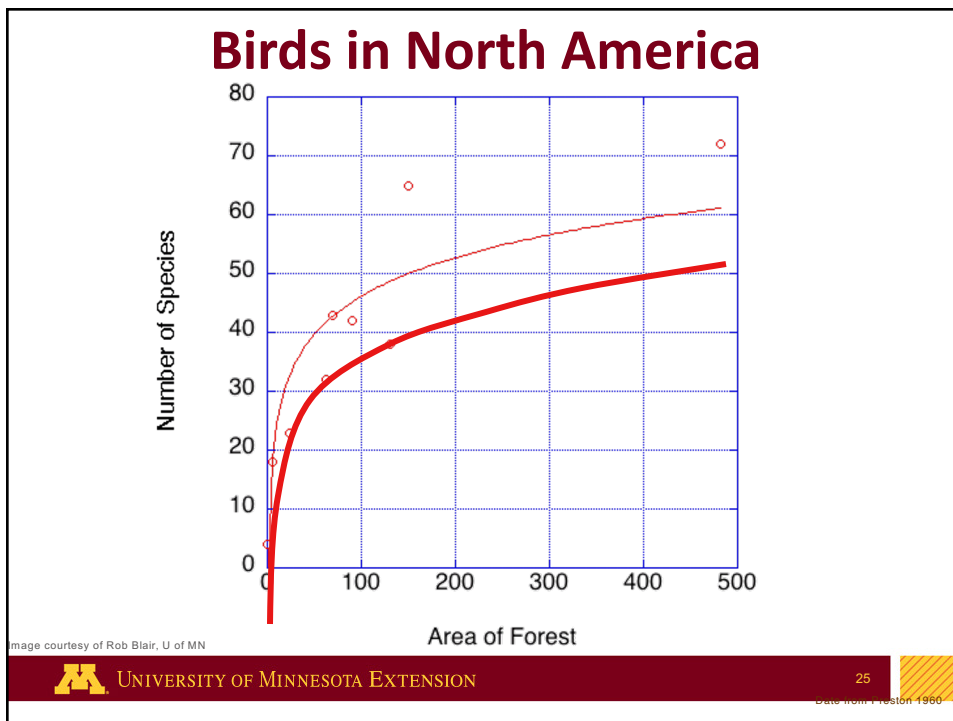
Fragmentation leads to:

Area Effects



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Fragmentation leads to: Edge Effects

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Figure 2.39: Edge and interior habitat of a woodlot.
 Interior plants and animals differ considerably from those that prefer or tolerate the edge's variability.

Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

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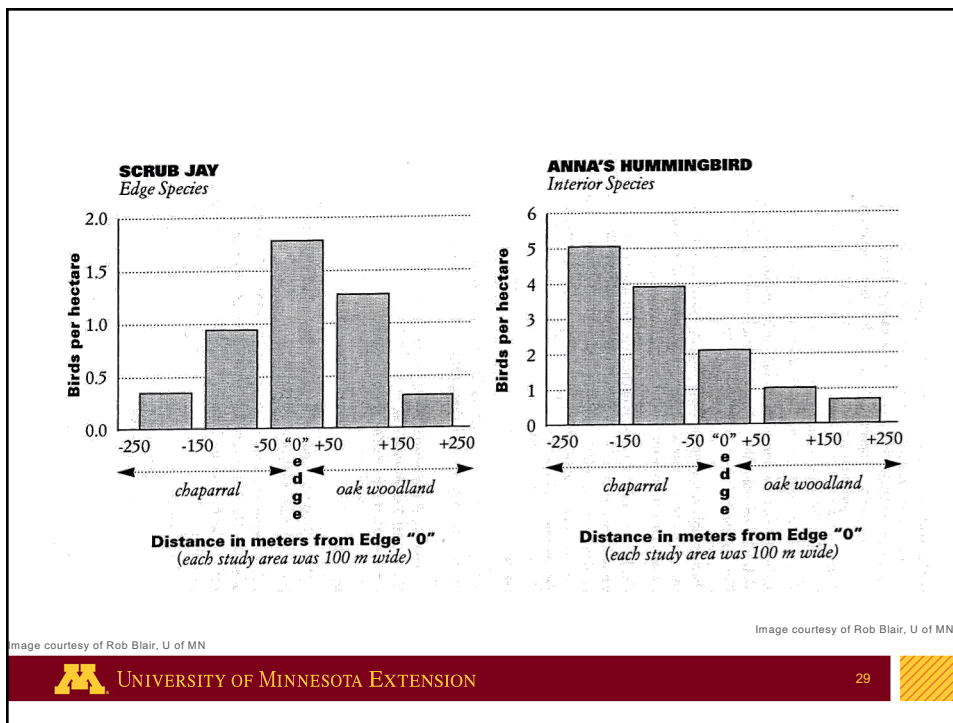
Predation on Bird Nests in a Forest Edge

Distance from Forest Edge (m)	Percent Predation (14 Days)	Percent Predation (7 Days)
0	~88	~30
300	~55	~20
600	~25	~20
1000	-	~20

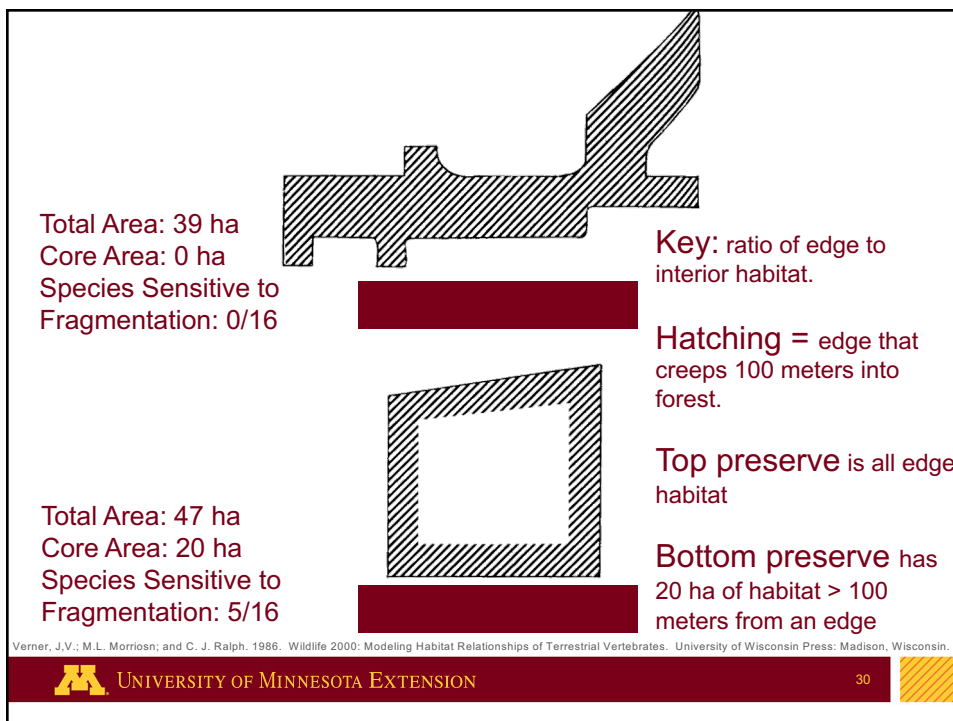
Image courtesy of Rob Blair, U of MN

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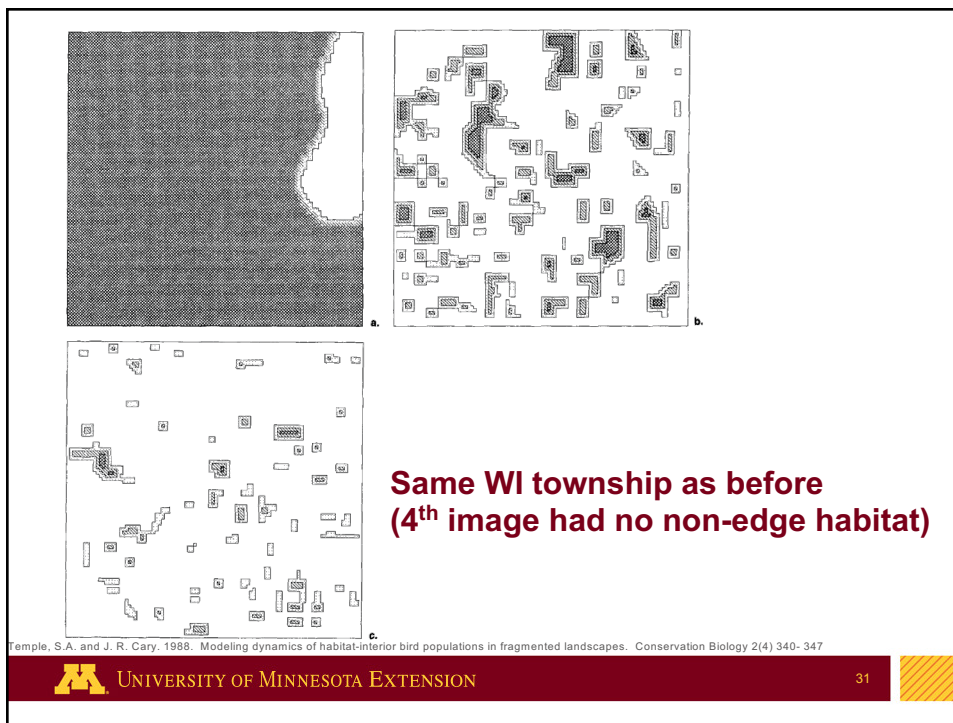
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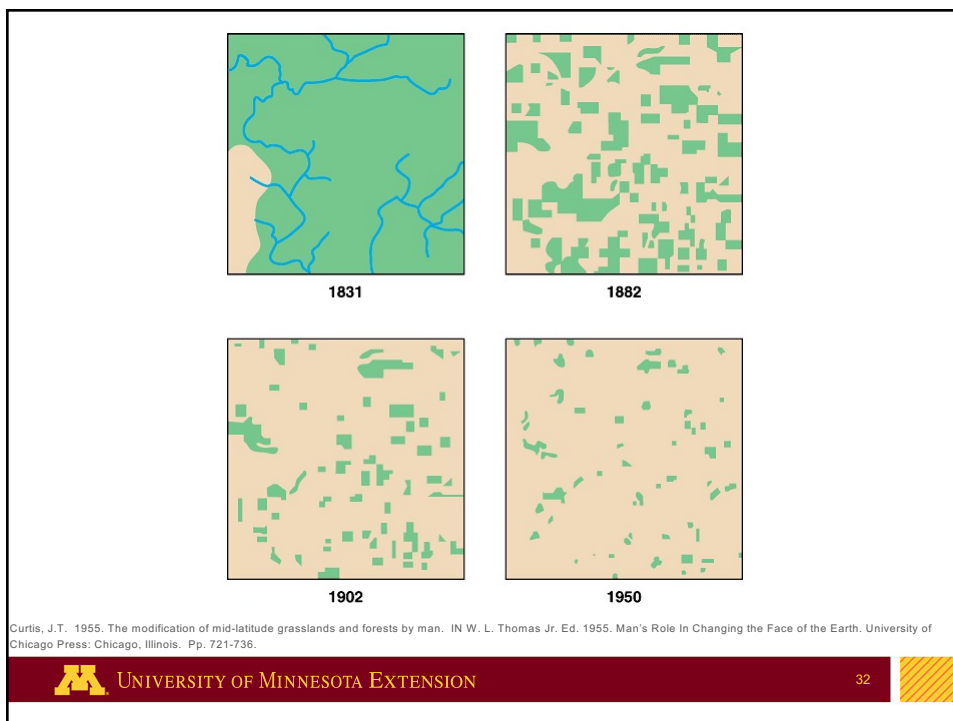
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Fragmentation changes: Connectivity



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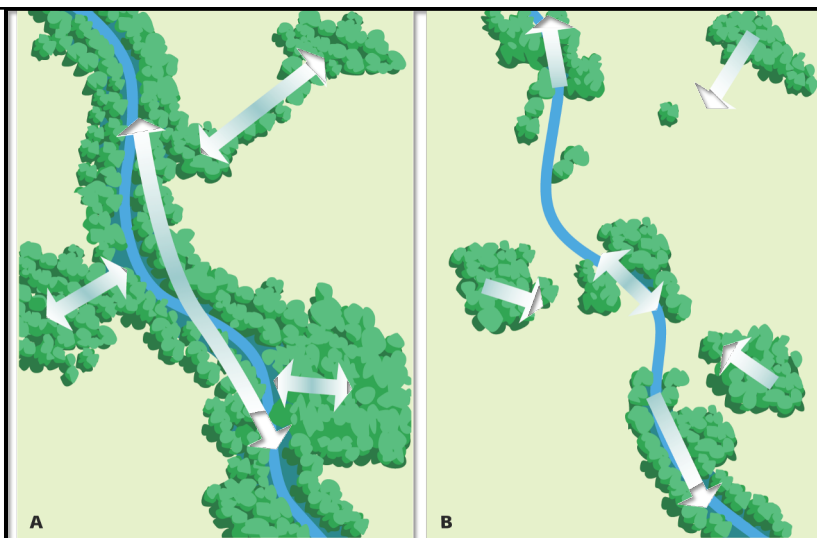


Figure 2.38: Landscapes with (A) high and (B) low degrees of connectivity. A connected landscape structure generally has higher levels of functions than a fragmented landscape.

Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

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What happens as forest becomes fragmented and urbanized?

A study of 6 communities

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Old growth oak forest in county park



By Jona Thunder (CC BY-SA)

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**Reservoir in
Roseville
(remember this?)
used for
recreation**



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Do you recognize this??



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Dinkytown



Wikipedia (Public domain)

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Aerial Views of Gradient in Minnesota



Google Earth

Preserve

Recreation

Golf Course

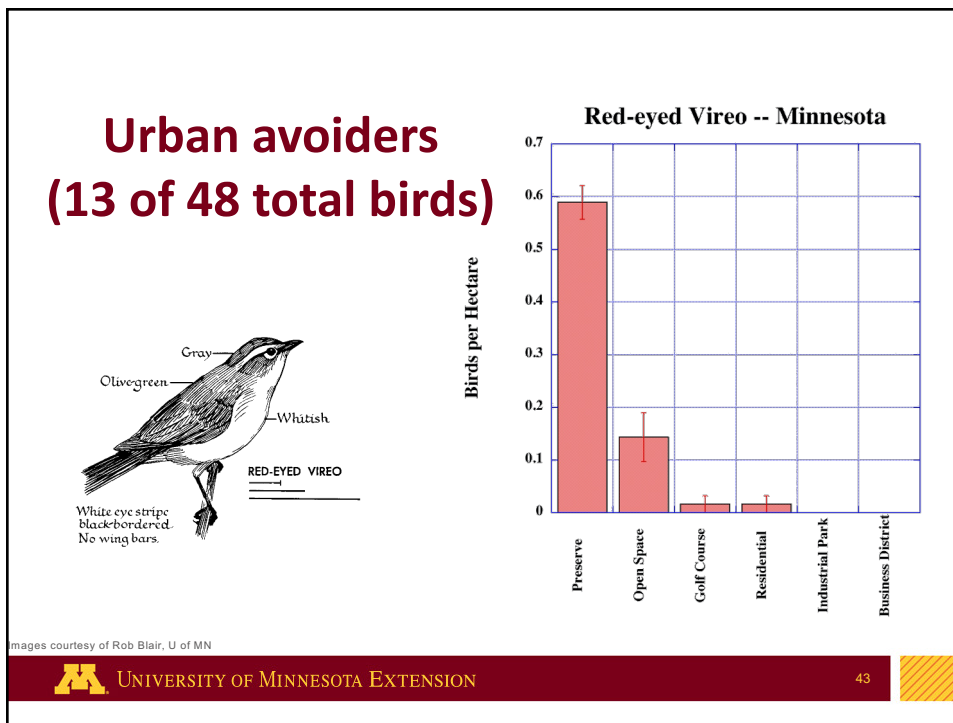
Residential

Industrial Park

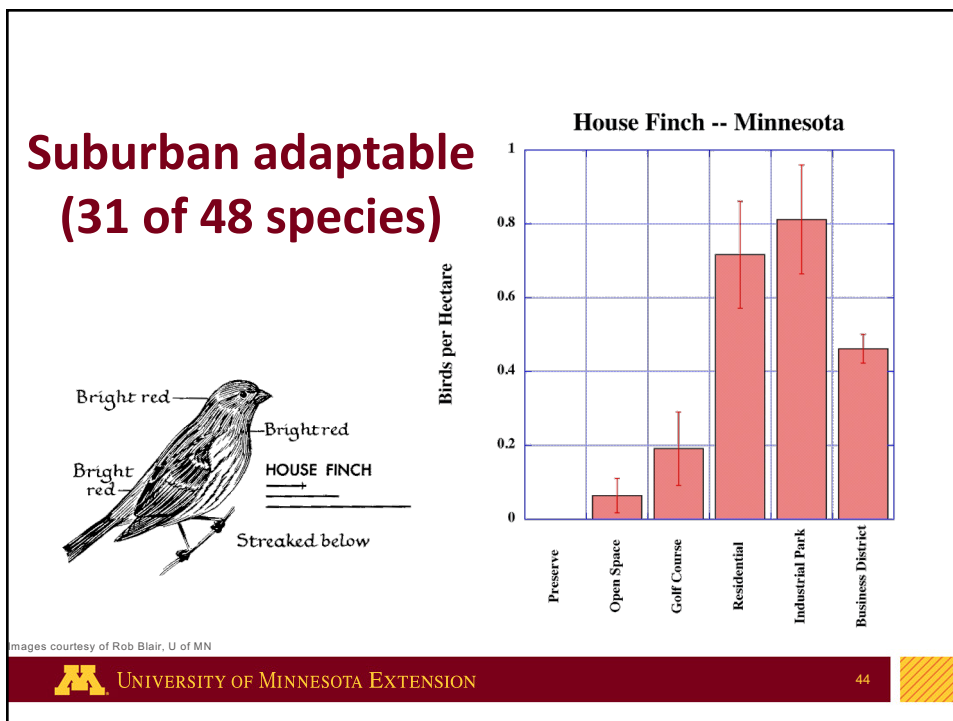
Business District

Images courtesy of Google Earth

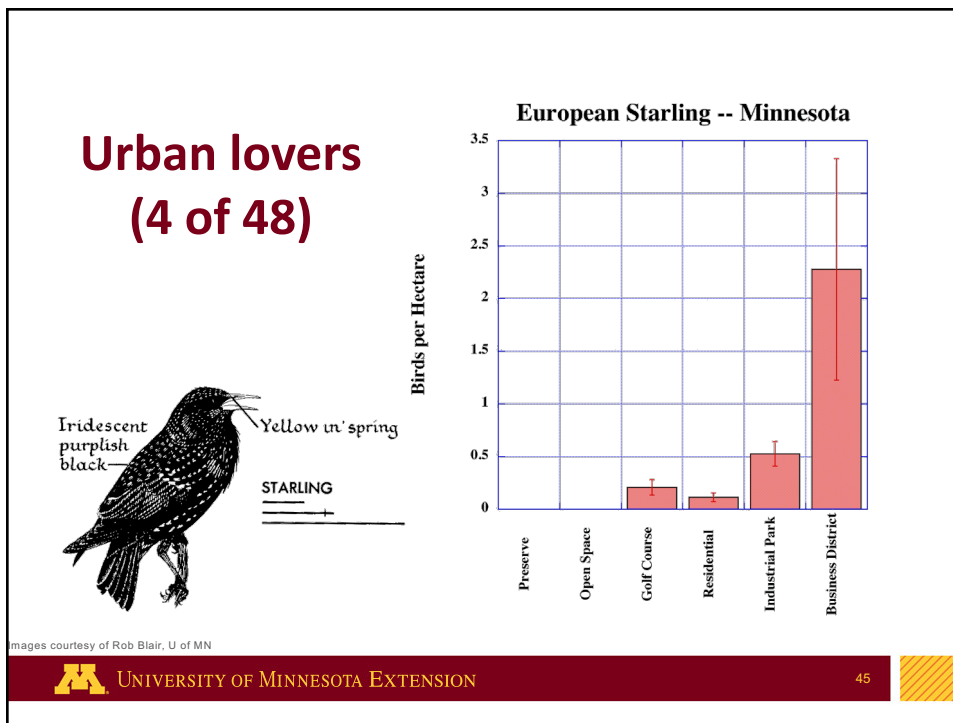
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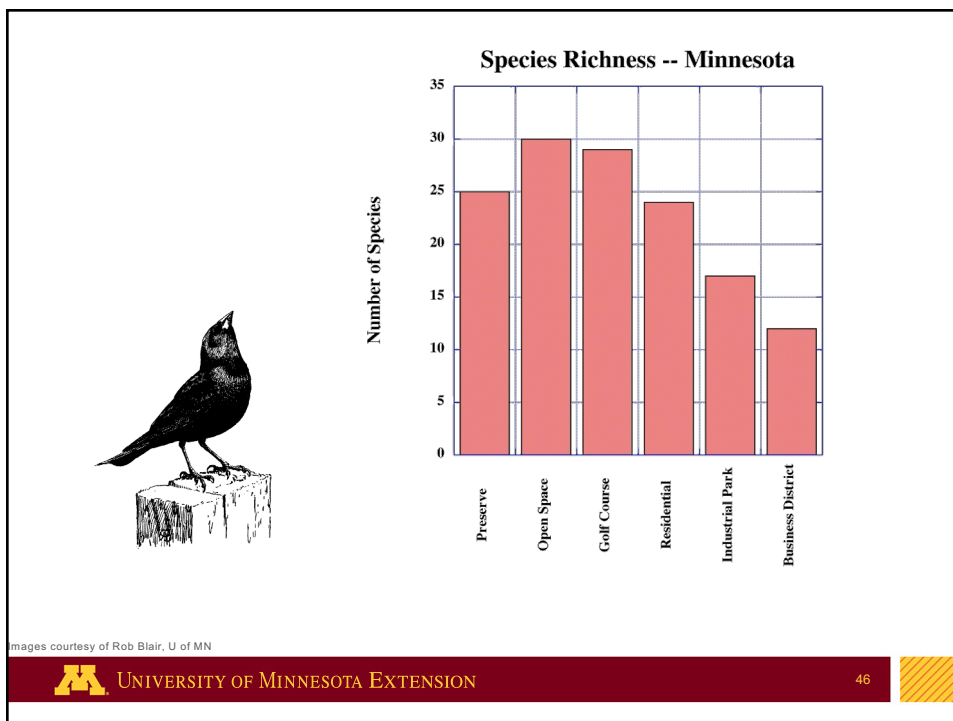
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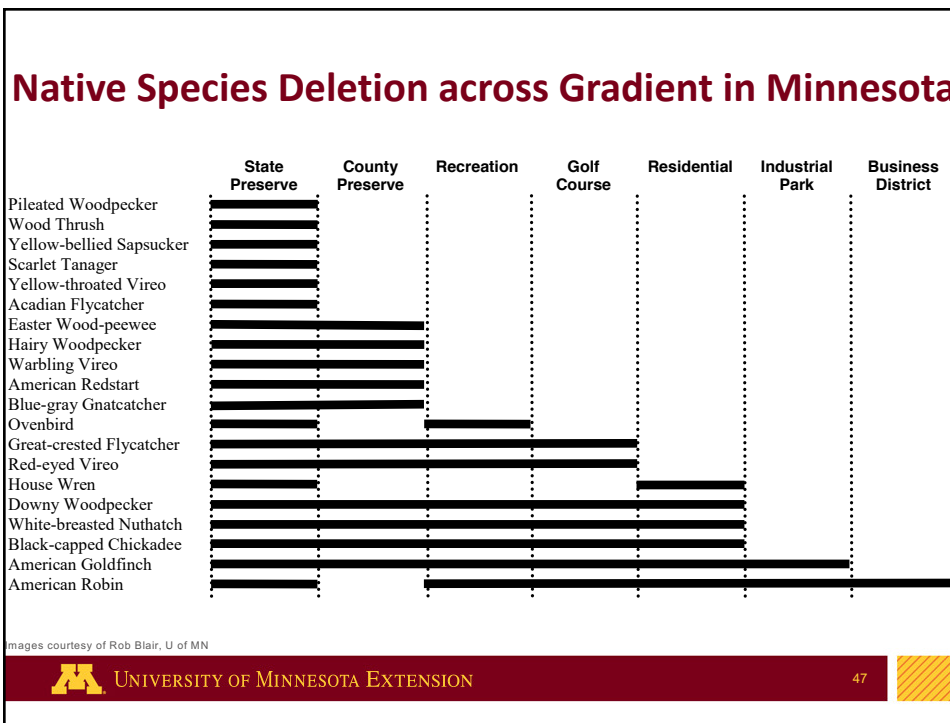
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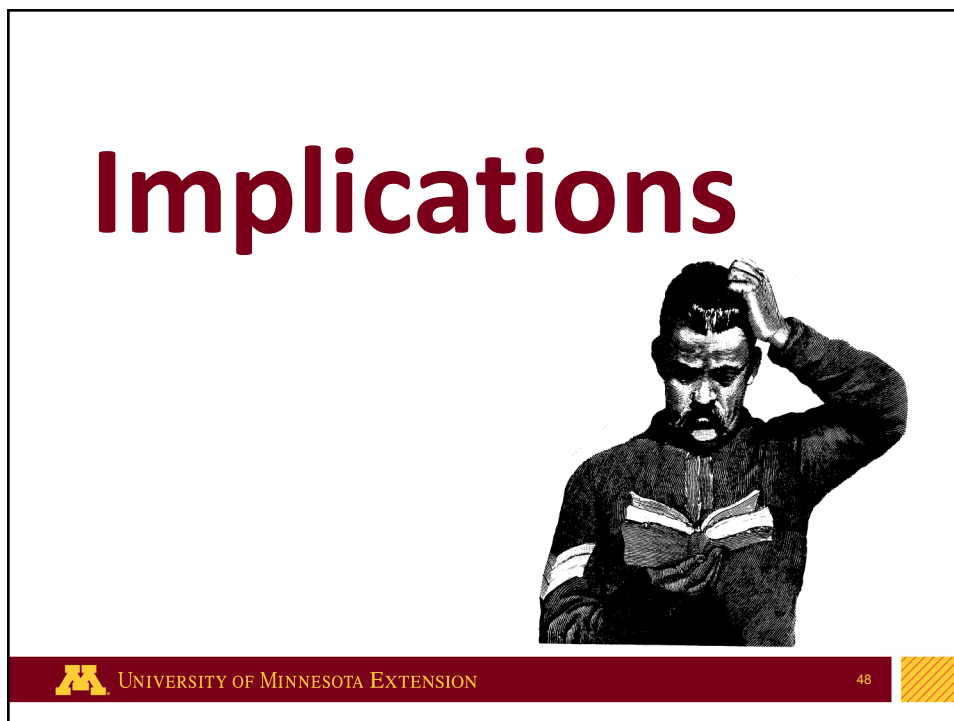
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RESERVE DESIGN GUIDELINES

- Bigger is better.
- Single large is usually better than several small.



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DESIGN GUIDELINES CONTINUED







- Intact habitat is better.
- Connected habitat is usually better than fragmented.
- Blocks of habitat that are roadless or otherwise inaccessible are better than roaded and accessible habitat blocks.










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PRINCIPLES FOR DESIGN OF FAUNAL PRESERVES

better









worse


What principles are being illustrated?

Image: Diamond, J.M. (1975). The island dilemma: Lessons of modern biogeographic studies for the design of natural reserves. Biological Conservation, 7(2), 129-146.

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HOW DOES DECREASING SPRAWL HELP HUMANS?

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PEOPLE WHO LIVE IN COMPACT METRO AREAS HAVE...

- Greater economic opportunity
- Lower combined cost of housing and transportation
- Greater number of transportation options
- Safer communities
- Better health and live longer
 - Lower BMI
 - Lower blood pressure
 - Lower rate of diabetes


Info from Measuring Sprawl 2014, SmartGrowthAmerica.org

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54


people
 new homes
 automobiles
 +
 —————
 sprawl
 fragmentation
 loss of native species

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*Isn't it paradoxical that the old factories
 are now the place of efficient and
 desirable urban living, while the
 suburban escape from them have
 become consumptive, environmentally
 unsustainable, noxious places.*

Michael Morrissey

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OPTIONAL VIDEO

- Title: Shaping the Urban Environment.
- Author: University Metropolitan Consortium of the University of Minnesota
- Co-produced in cooperation with Twin Cities Public Television MN Channel and additional support from the University of Minnesota College of Design, explores the challenges and choices facing communities developing land in an environment of scarce and fragile natural resources.
- Watch at: <https://www.tpt.org/shaping-the-urban-environment/video/shaping-the-urban-environment/>



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ACKNOWLEDGMENTS

Images used in this presentation were taken from multiple sources and we thank all of the people who gave us permission to use them.



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Driven to DiscoverSM

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