

Improving **Farm Profitability** by “Farming the Best and Conserving the Rest”

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Outline

A Changing Midwest Landscape...

- Natural Resource **Challenges** in the 21st Century
- **Precision Conservation (PC)**



Check Out Our Lab!

wildlifeecologylab.unl.edu/about-lab

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APPLIED WILDLIFE SPATIAL ECOLOGY LAB

About the Lab People Research Current Projects Extension Products

WILDLIFE CONSERVATION IN AGRICULTURAL SYSTEMS

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Our lab focuses on developing innovative solutions to the growing wildlife conservation and management needs in multi-functional landscapes where there are competing interests for agricultural production, wildlife conservation, and ecosystem services.

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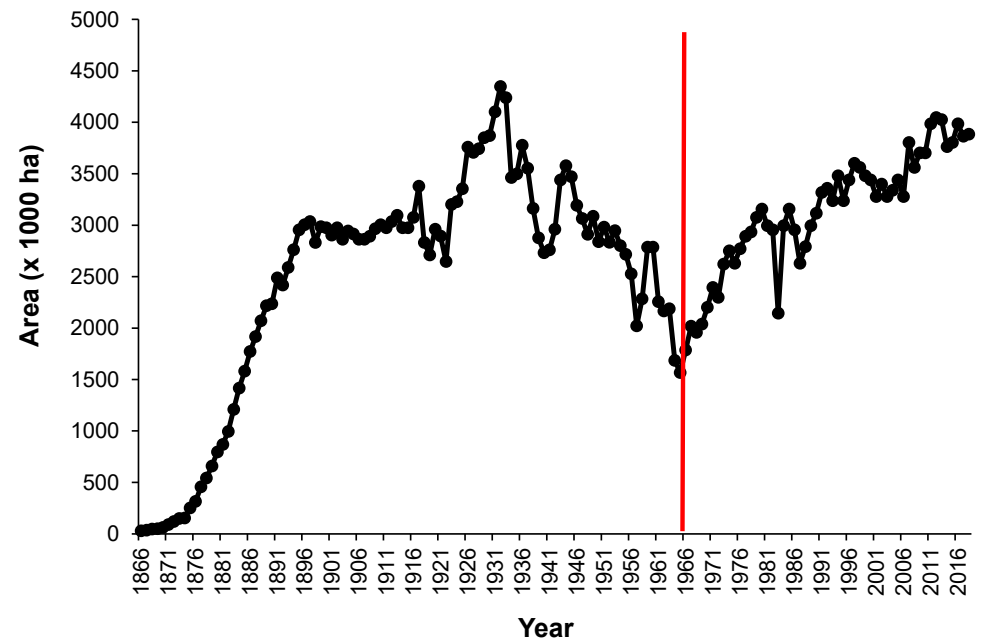
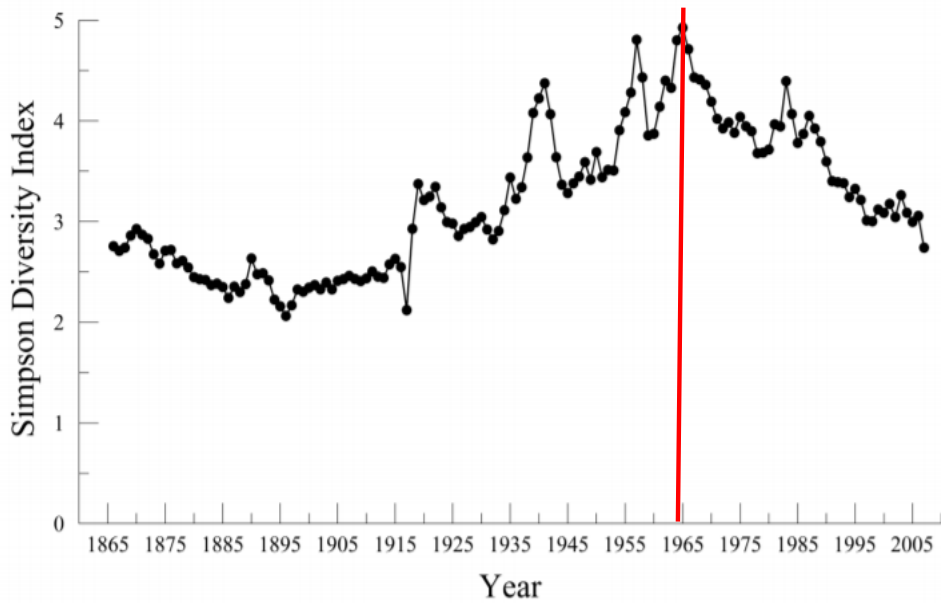
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An aerial photograph of a Midwest landscape. The foreground shows a winding river with a lush green bank. The river flows through a valley, flanked by agricultural fields. The fields are mostly green, with some brown patches, indicating different stages of crop growth or soil conditions. The background shows a flat expanse of land with scattered trees and small structures, typical of a rural Midwest setting. The sky is clear and bright.

A Changing Midwest Landscape:

What **Challenges** Do We Face in the 21st Century?

Challenges: Ag Landscape Simplification



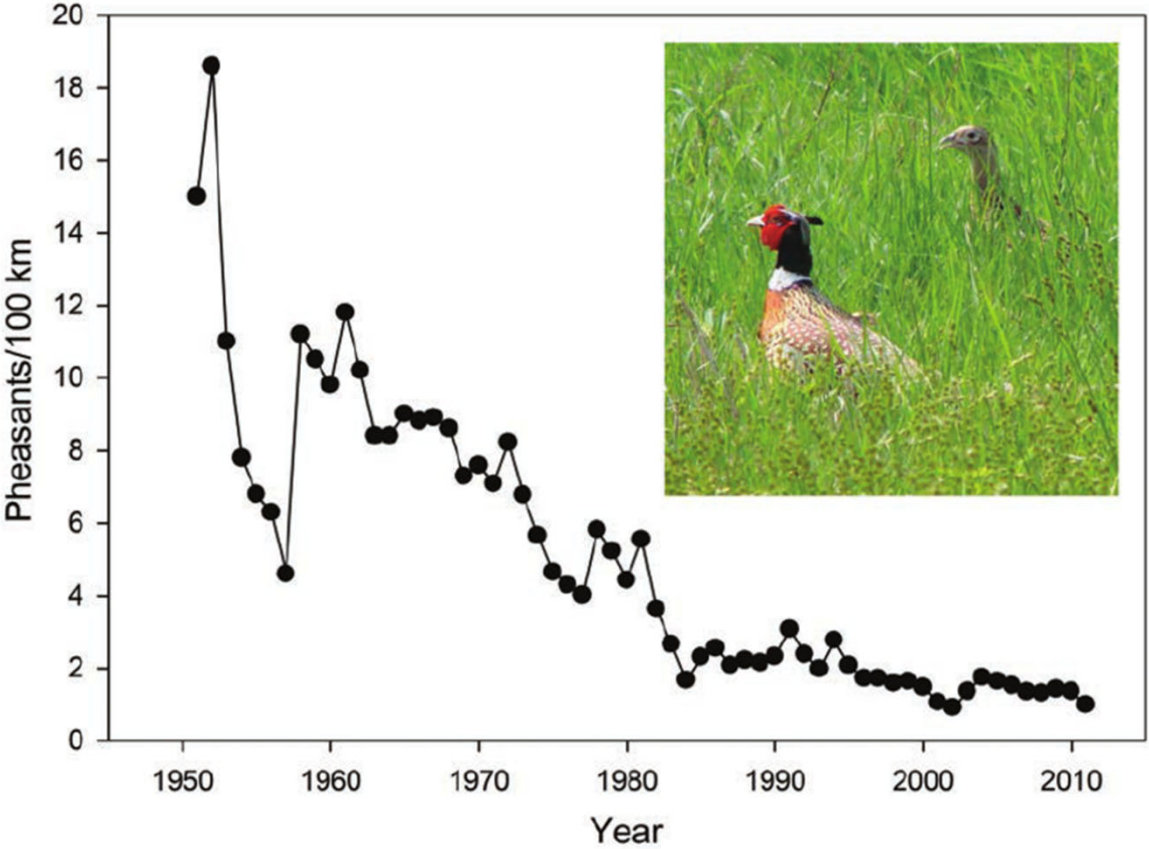
Hiller et al. 2009

Challenges: Ag Landscape Simplification



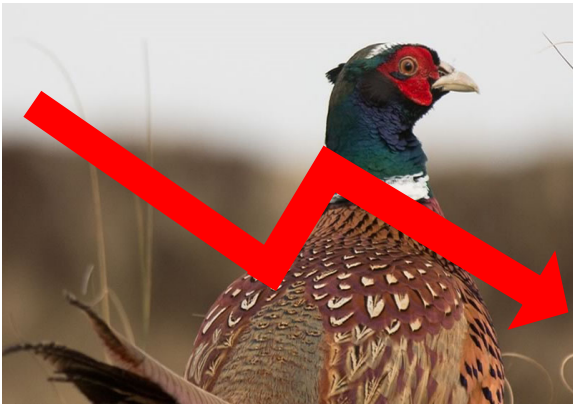
Clay Center, NE; Powell 2015

Challenges: Declining Pheasant Populations



Credit: Powell 2015

Pheasant Hunting is a **\$32 million** business in Nebraska annually



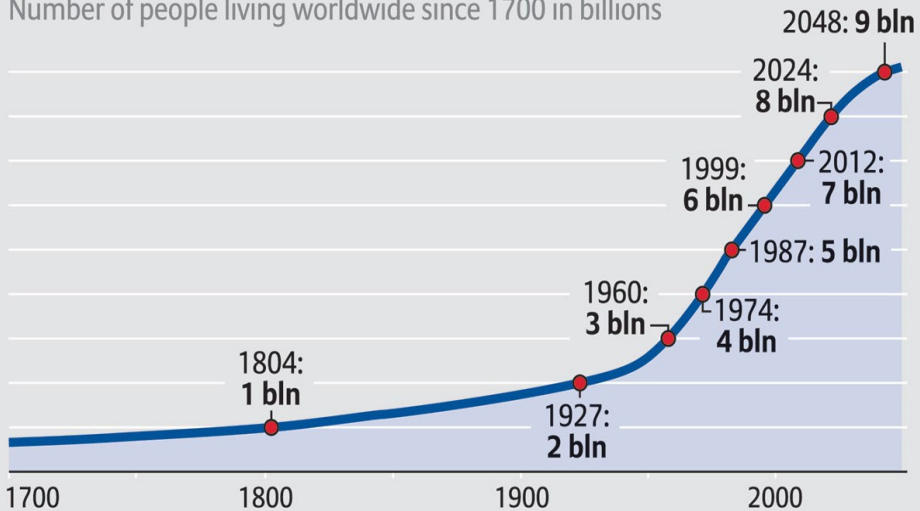
Trickle down effect to small communities in Nebraska that historically relied on hunting season to boost their economy



Challenges: Growing World Population


POPULATION OF THE EARTH

Number of people living worldwide since 1700 in billions



Source: United Nations World Population Prospects, Deutsche Stiftung Weltbevölkerung

For further information please visit: www.knowledge.allianz.com

Expected **9.7 billion people**
by **2050** will require
50%  in food production



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Challenges: Water Quality Issues

MOST RECENT NITRATE-N CONCENTRATIONS

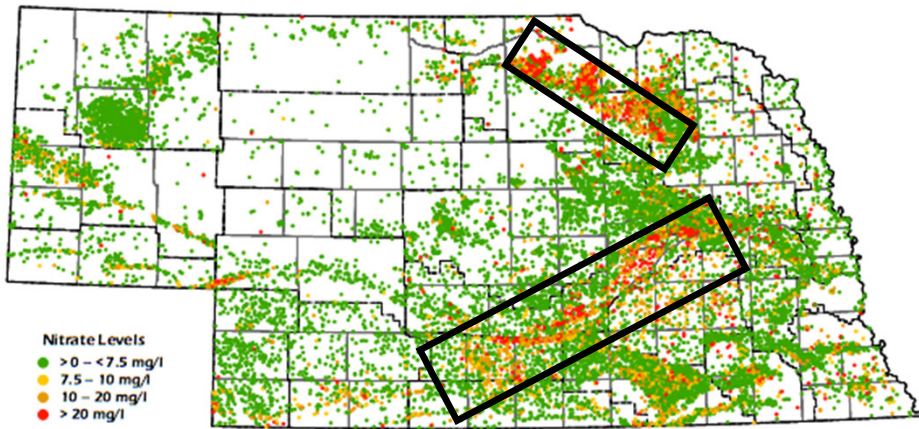


Figure 11. Most recent recorded Nitrate-N concentrations of 20,306 wells from 1994-2014.
(Source: Quality-Assessed Agrichemical Database for Nebraska Groundwater, 2015)
Empty areas indicate no data reported, not the absence of nitrate in groundwater.





Life is a continuous exercise
in creative problem solving.

Michael J. Gelb



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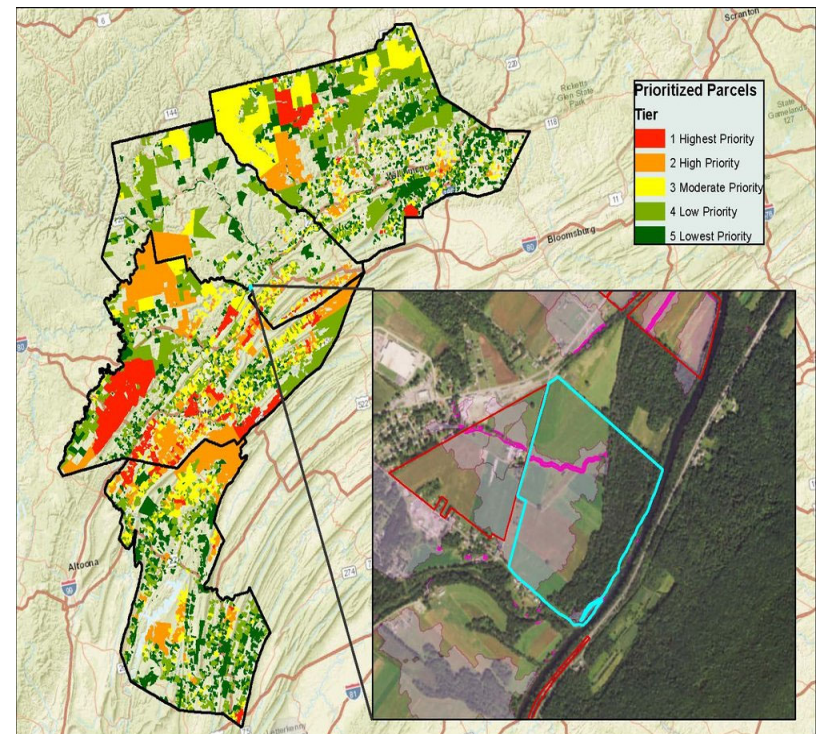


Precision Conservation Delivery – Multi-Scale Approach

Local (or Field) Scale



Regional Scale



Precision Agriculture

(The Future of Farming)

1) Increase farm production:

- Efficiency
- Productivity
- Profitability (\$\$\$)

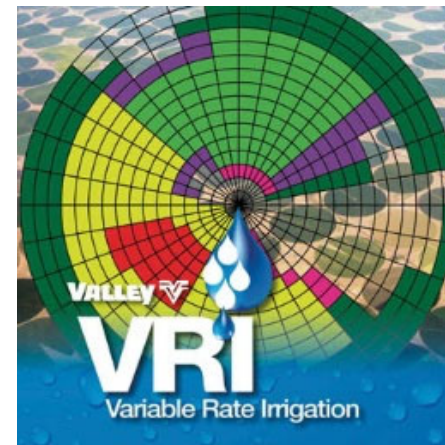


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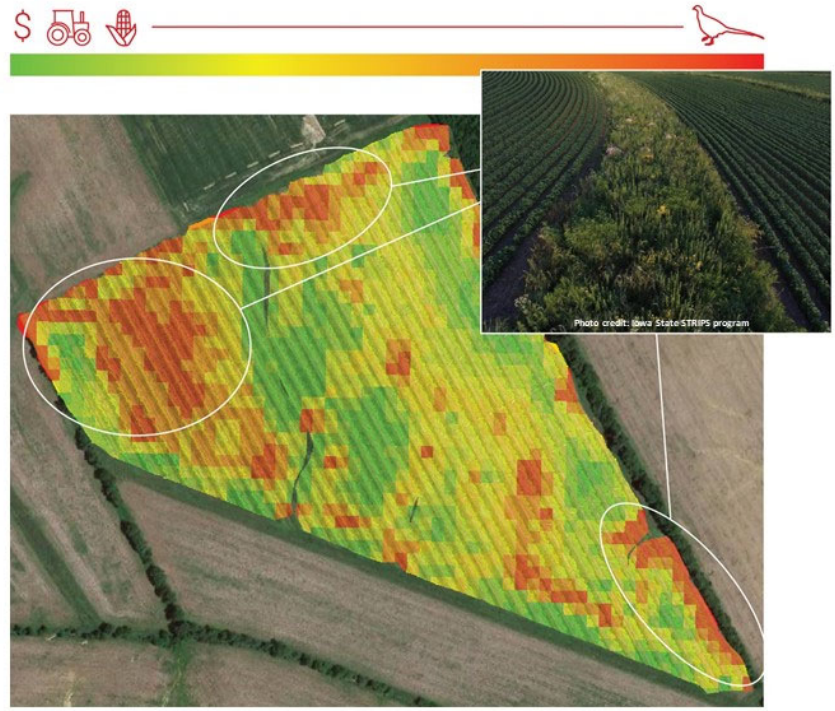
Precision Agriculture

(The Future of Farming)

2) ↓ impacts on wildlife and the environment



Where Does Precision Conservation Fit Into Farming?



Precision Conservation

(The Future of Sustainable Farming)

1) Balance competing interests (i.e., production, wildlife)



Credit: ISU Prairie Strips

Precision Conservation

(The Future of Sustainable Farming)

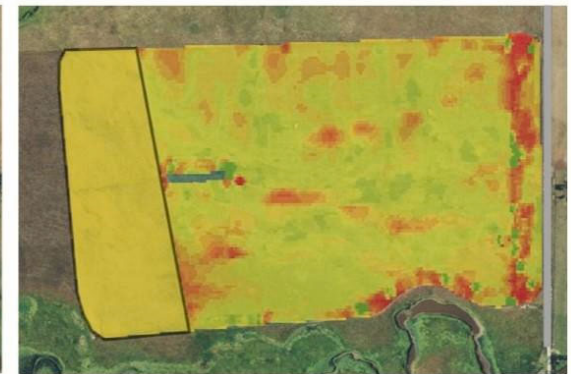
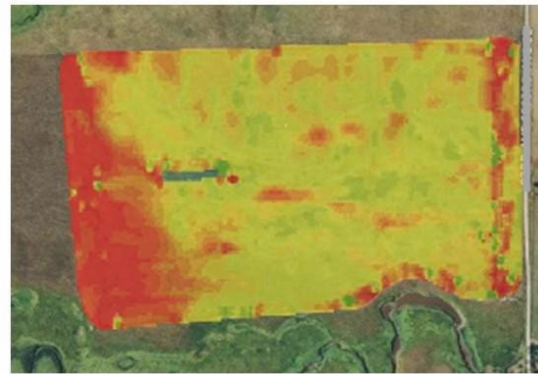
2) Improves **landscape diversity** (e.g., prairie strips in Iowa)

- **2.1-fold** ↑ in native bird species richness
- **37%** ↓ in total water runoff
- **20x** ↑ in soil retention



Precision Conservation Delivery – Multi-Scale Approach

Local Scale (Sub-field Analysis)

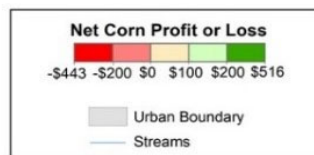
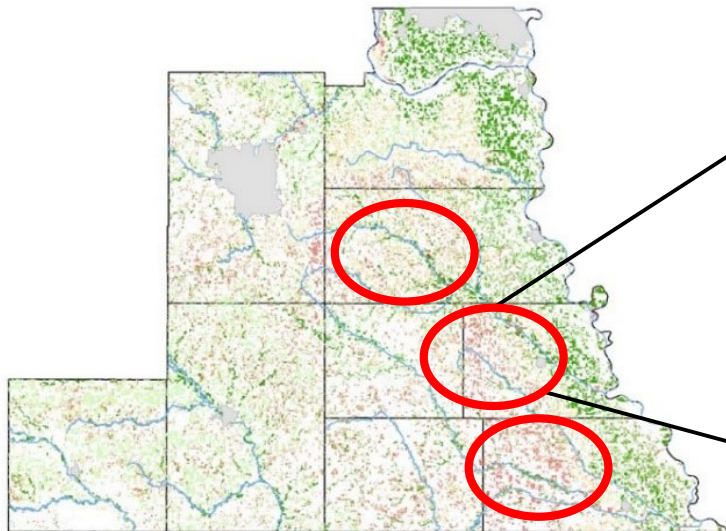


Before: 2015 Corn Production		After: 2017 Plan w/Pasture	
Average Yield:	155.2 bu/ac	Average Yield:	177.7 bu/ac
Profit:	(\$50.05)/ac	Profit:	\$13.74/ac
ROI:	-8.4%	ROI:	2.8%

Credit: Melissa Shockman (PF)

Precision Conservation Delivery – Multi-Scale Approach

Regional Scale (Hot Spot Analysis)



Targeted Conservation Delivery – Producer Relations



Understanding Conservation Decisions of Agriculture Producers

LILY A. SWEIKERT,^{1,2} *South Dakota State University, Department of Natural Resource Management, Box 2140B, SNP 138, North Campus Drive, Brookings, SD 57007-1696, USA*

LARRY M. GIGLIOTTI, *U.S. Geological Survey, South Dakota Cooperative Fish and Wildlife Unit, South Dakota State University, Department of Natural Resource Management, Box 2140B, SNP 201C, North Campus Drive, Brookings, SD 57007-1696, USA*

Absentee landowners of agricultural land: Influences upon land management decision making and information usage

P. Petzelka and A. Armstrong

Nebraska farmers and farmland owners' attitudes of targeted conservation





Precision Conservation

(The Future of Sustainable Farming)

Reduce Habitat Loss



Increase Profits (\$\$\$)



Precision Conservation

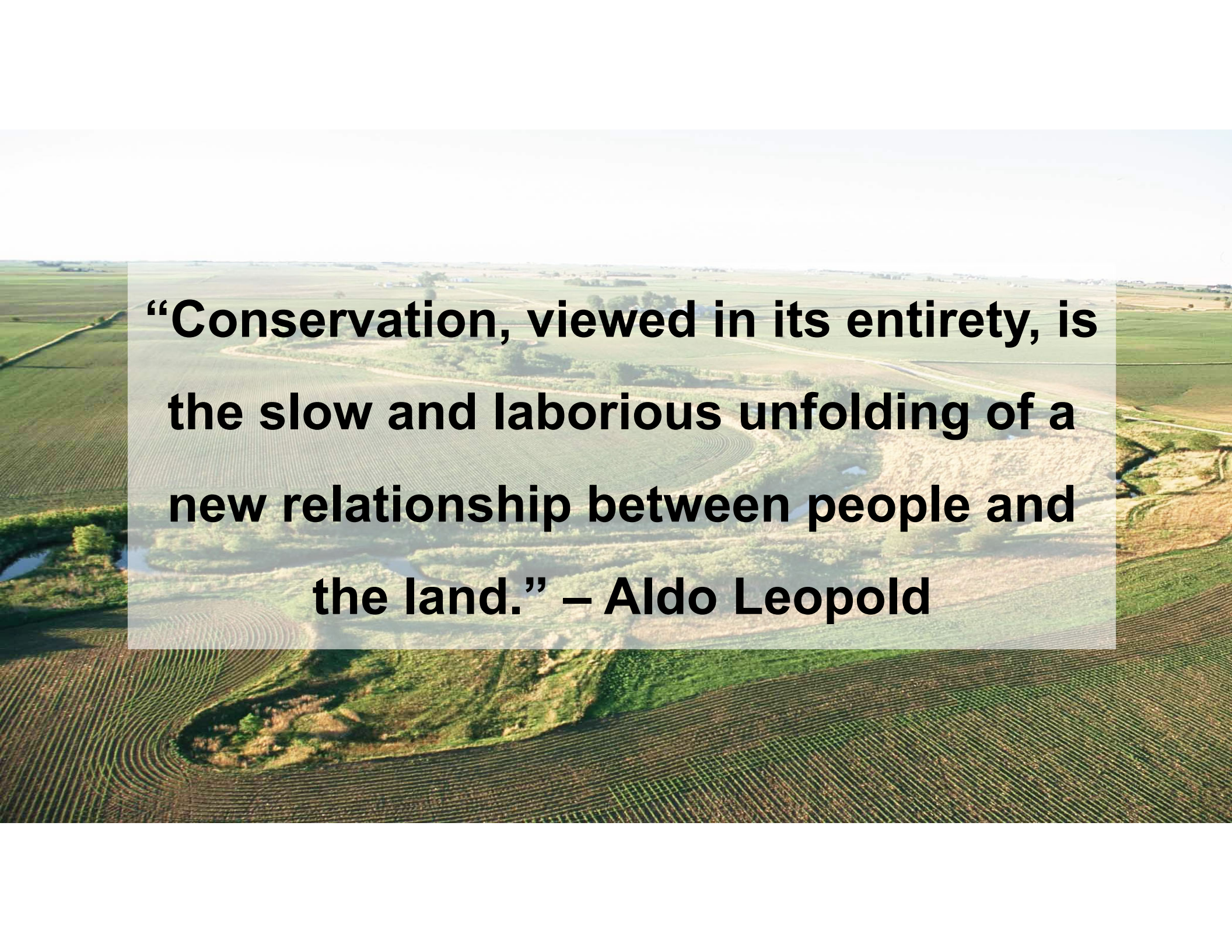
(The Future of Sustainable Farming)

**Reduce Soil Erosion and
Water Runoff**



Leave a Lasting Legacy!



An aerial photograph of a rural landscape. A river winds through the center of the image, surrounded by lush green vegetation. The foreground and middle ground are dominated by agricultural fields, some of which are plowed, showing distinct furrows. The background shows a flat expanse of land under a clear sky, with a few distant buildings and trees. The overall scene is a mix of natural beauty and human-made agricultural patterns.

“Conservation, viewed in its entirety, is the slow and laborious unfolding of a new relationship between people and the land.” – Aldo Leopold

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