



Flood Resilience in the Coon Creek Watershed



WATER RESOURCES MANAGEMENT
2019-2021 COHORT

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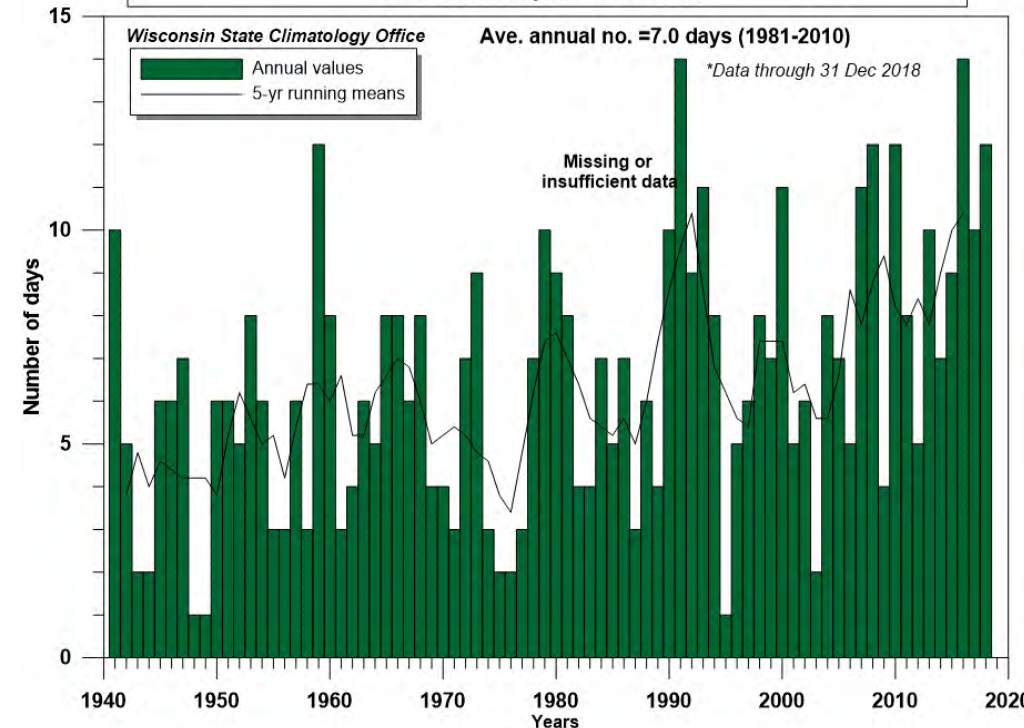


Coon Creek Watershed

- 90,000 acres in the Driftless region
- Land use/land cover change in 1800s/1900s
 - Caused ↓ infiltration capacity, ↑ runoff, ↑ erosion
- Erosion management projects by Civilian Conservation Corps (1930s)
 - Reforested hillslopes, contour strips, terraces, grassed waterways, etc.
- Severe flooding in 50s & 60s led to dam construction
- Precipitation projected to increase

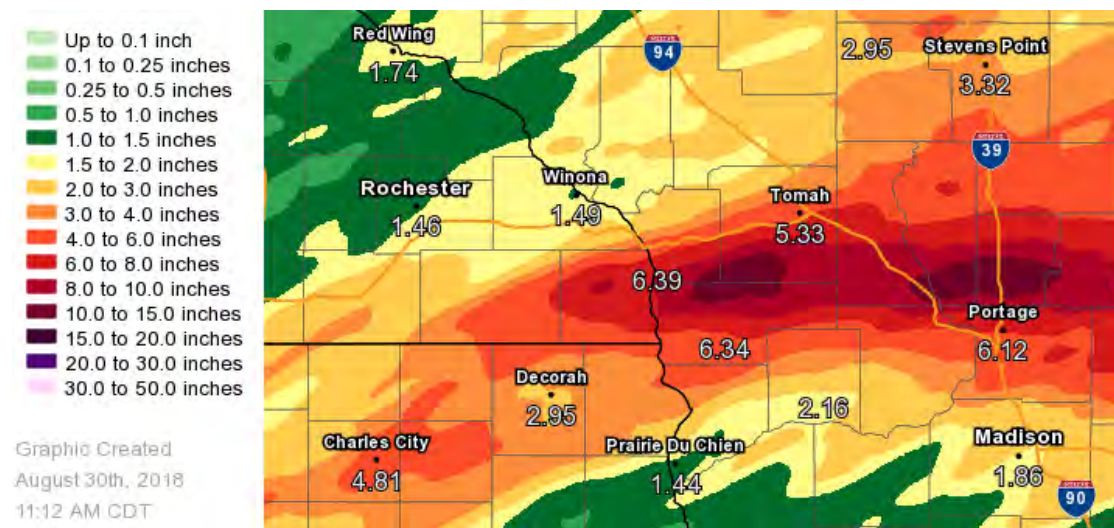


Annual number of days with 1 inch or more liquid-equivalent precipitation
La Crosse Airport 1940-2018*



August 2018 Flood

- Heavy rainfall and intense flooding caused:
 - Mudslides, washouts, and road closures
 - Emergency evacuations in Coon Valley, Cashton, and other local areas
 - 3 breached and 2 dams overtopped in the Coon Creek watershed



Graphic Created
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Project Sections

1. Public Perspectives
2. Flood Management Institutions
3. Infiltration and Land use
4. Economics of Land Use Practices
5. Community Resilience

“Resilience is the “ability of a system to **prepare** for threats, **absorb** impacts, **recover**, and **adapt** following persistent stress or a disruptive event.” (Marchese et al, 2018).



Public Perspectives



26 total interviews

- Explore views on flood management
- Gauge flood risk perception, responsibilities and experience

Interview Statistics	
Watershed Managers	12
Public Officials	6
General Public	8
Average Length	44 minutes
Longest Interview	1 hour, 7 minutes
Shortest Interview	21 minutes

Interviews Themes

- Spatial Influence
- Climate Change
- Role of Experience
- Trauma & Emotional Toll
- Distribution of Resources
- Distribution of Responsibility
- Flood Insurance
- Heritage & History
- Community

“I have my personal thoughts, which is global climate change, but that is not a phrase that I feel is very useful for me to use. It's too politically sensitive and I don't have time to get into that argument, so extreme weather events is a phrase that I'm comfortable using.”

Takeaways

- Flooding affects residents differently - not homogeneous group
- Causes of flooding are varied, therefore the “solution” is unlikely to be agreed upon
- Tension between decision makers and where the resources should come from
- Residents have a deep sense of community

Flood Management Institutions



- Understand and map the flood management institutional landscape
- Locate obstacles to successful flood management
- Develop recommendations to improve institutional relationships

Background



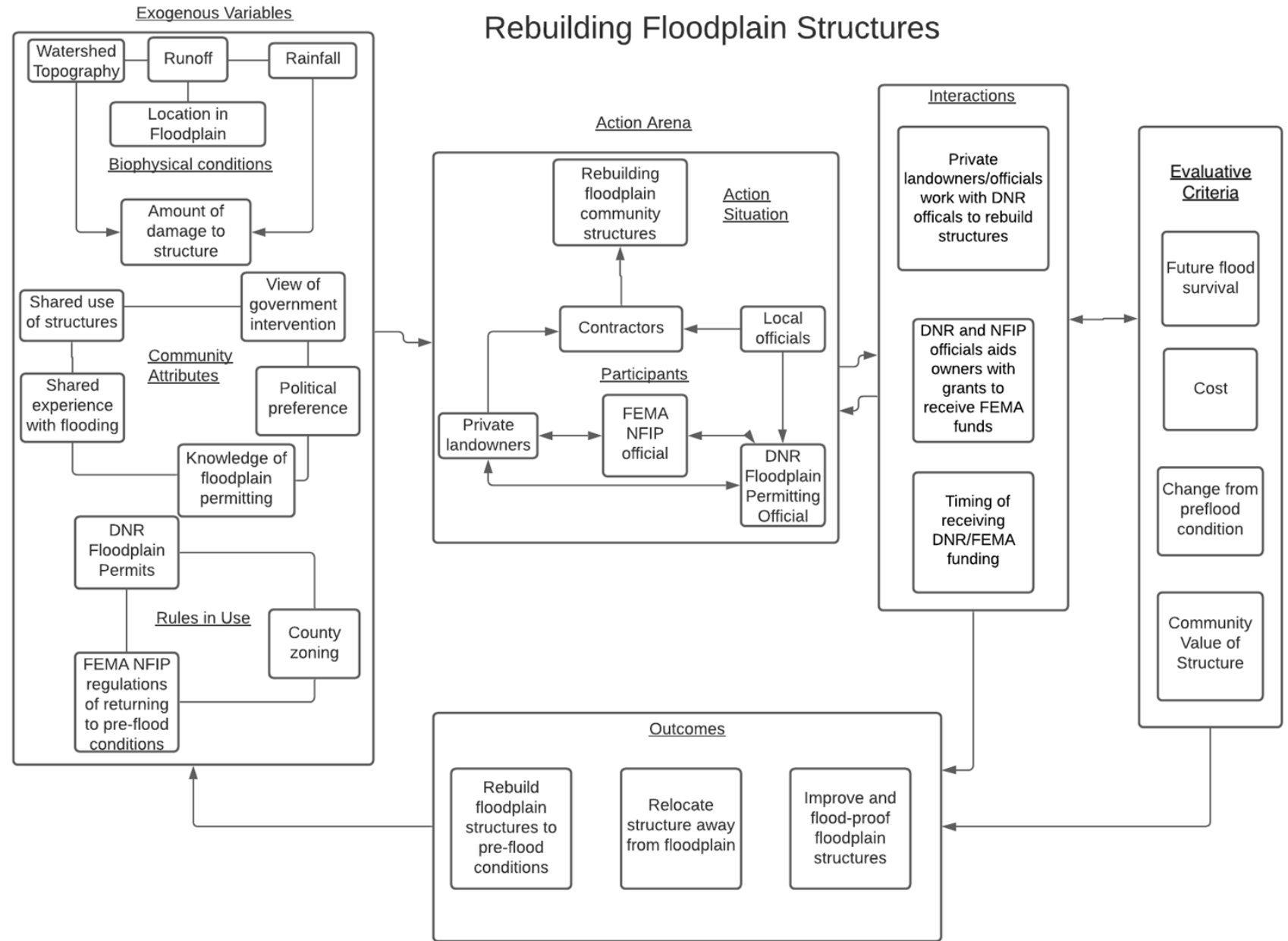
FEMA



Institutional Analysis and Development Framework to explore interactions

Institutional Map Example

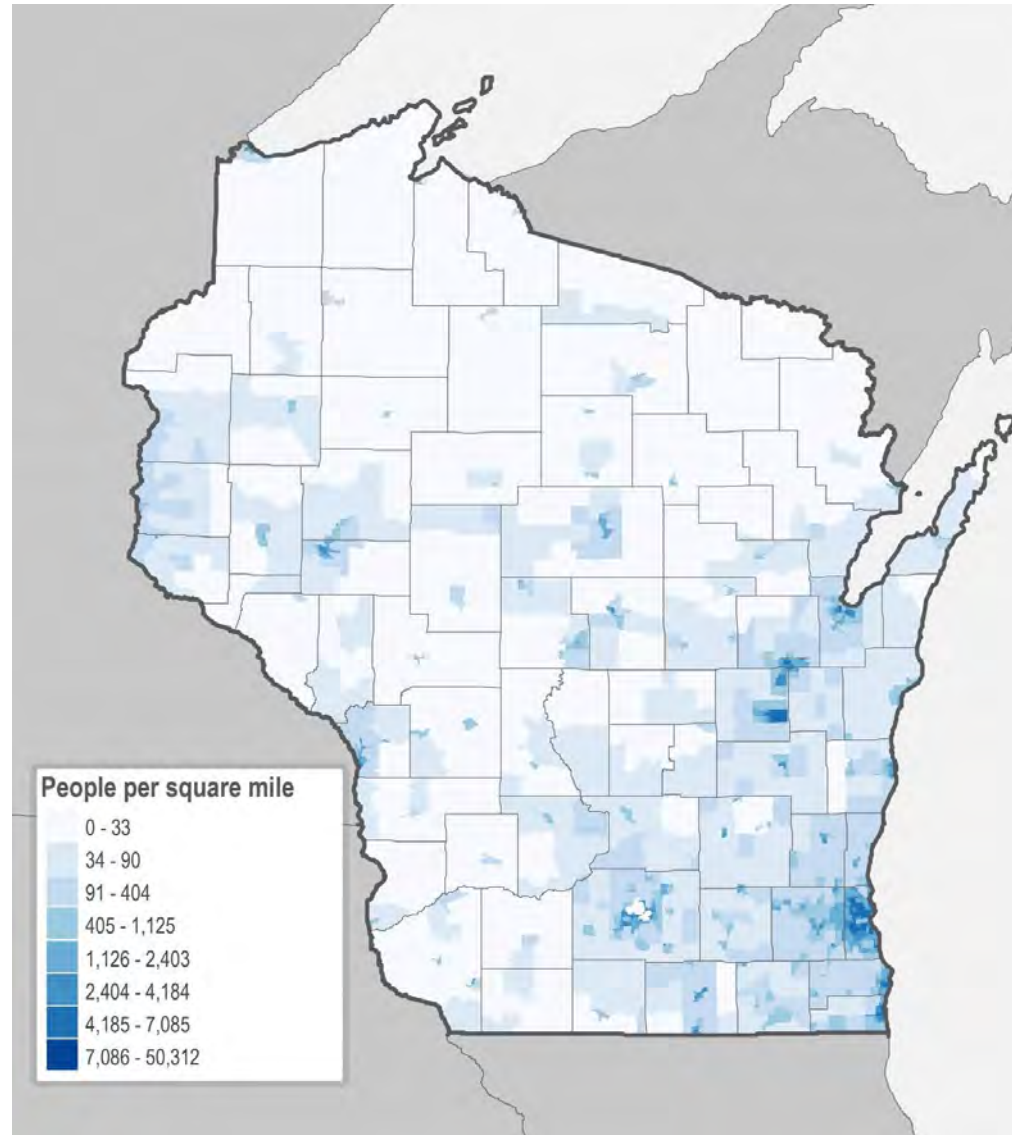
- Rebuilding floodplain structures: issue for stakeholders
- Complex system
- Dependent on DNR, FEMA, local floodplain zoning



Institutional Challenges to Flood Resilience

Challenges for small and rural municipalities/counties

- limited funding, resources, and staff
- lack of current capacity prevents obtaining future resources
- knowledge of and interest in flood mitigation projects, but unfulfilled due to institutional barriers



Institutional Challenges to Flood Resilience

Intergovernmental Interactions

- Conflict between local decision making and need for financing
- Silo-ed agencies across multiple levels of government (and NGOs)
- Learning to navigate the institutional landscape through repetitive flooding



Recommendation: Create a Joint Powers Board

- **Goal:** Increase financial and administrative capacity, improve communication and coordination
- **Governmental Units:** La Crosse, Monroe, Vernon Counties
- **Membership:** County officials, agriculture, soil and water conservationists, public works, industry
- **Authority:** Education & outreach, grant writing, emergency management communications, zoning, buyouts and land acquisition

Infiltration and Land Use

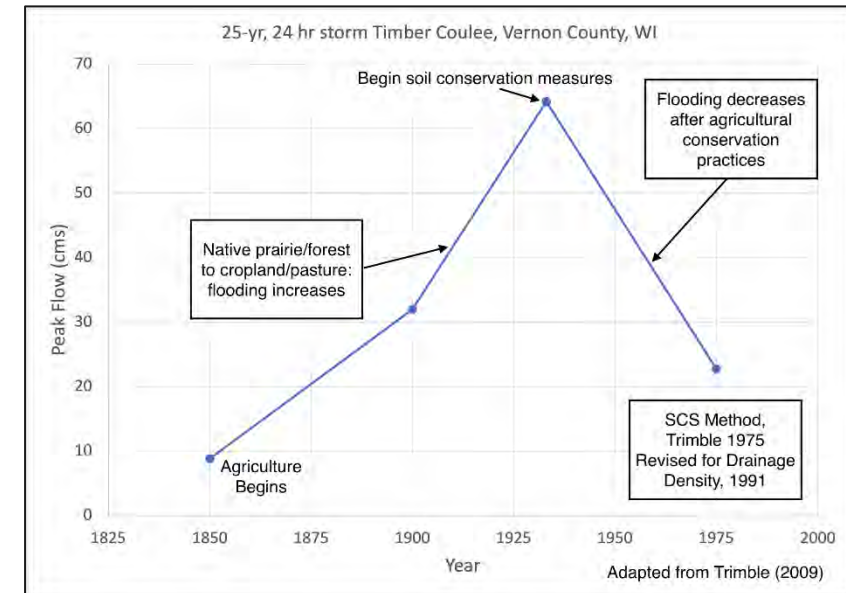
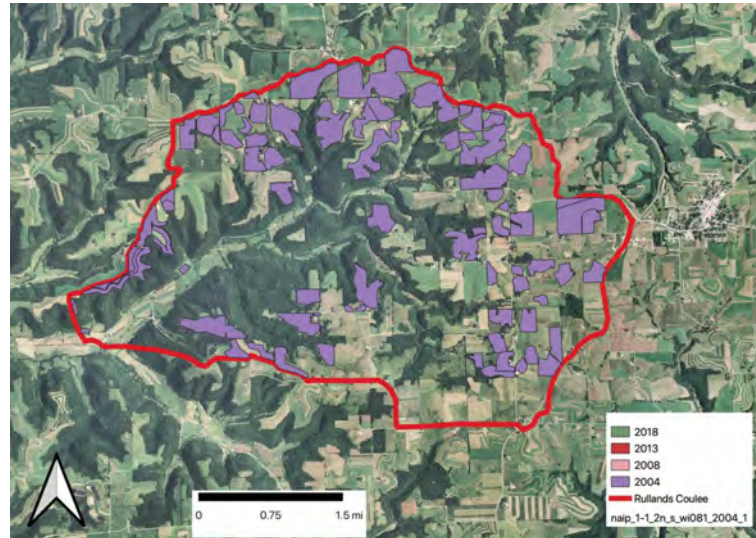
Goal: Increase infiltration on the watershed's landscape

- Review historic and current land use/management
- Investigate effect of land use/management practices on infiltration
- Assess changes in contour strip cropping, land use/management
- Determine effect of change on storm runoff and flood peaks



Analysis Techniques

- Effect of Land Use/Land Management on Infiltration
- Infiltration Fieldwork
- GIS Analysis: Contour Strips
- GIS Analysis: SCS CN Method



Recommendations

1. Restore and maintain contour strips and grassed waterways
2. Promote and implement perennial pasture in watershed
3. Provide more funding for technical staff to help farmers install BMPs



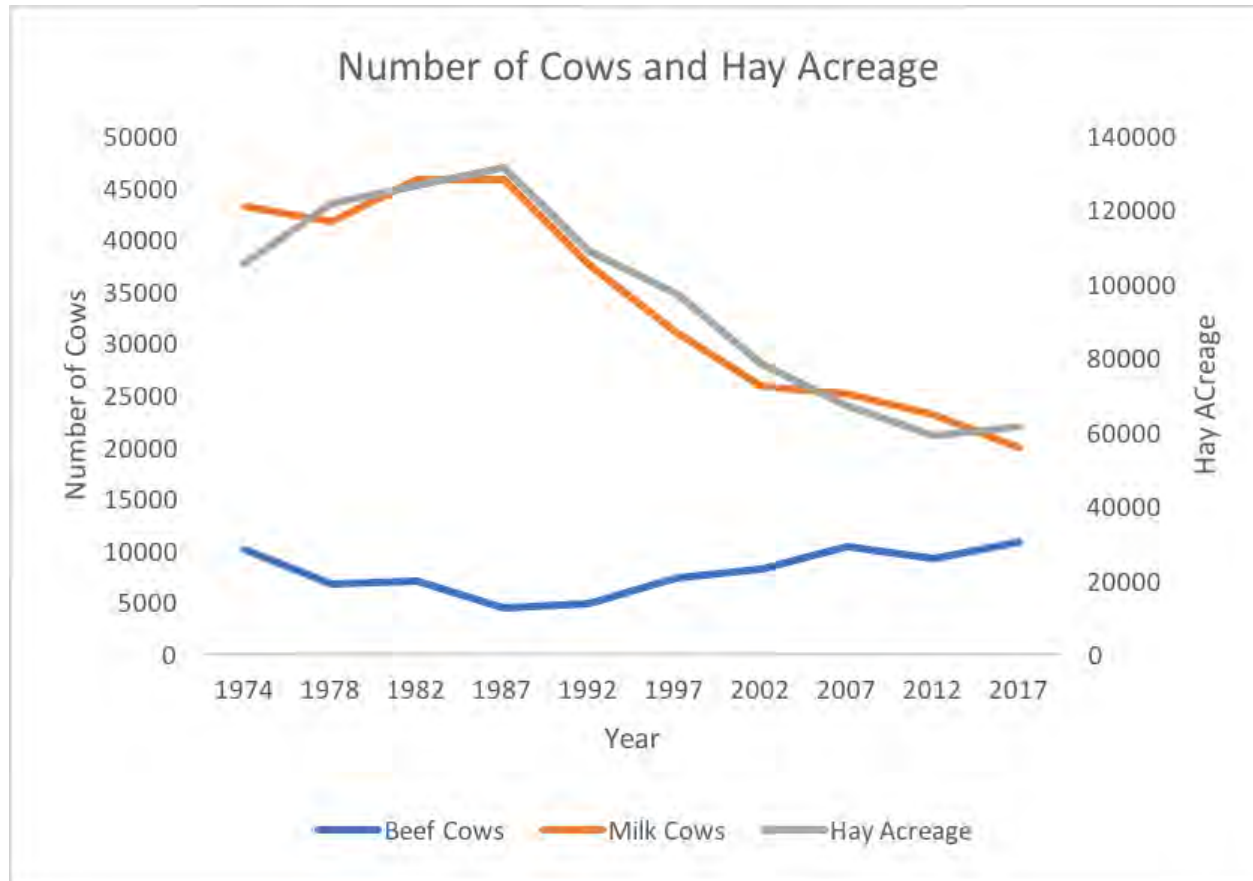
Economics of Land Use Practices

Goal: Quantify private costs associated with best management practices to identify opportunities to incentivize implementation

- Identify costs and benefits associated with contour strip cropping, cover cropping, and managed grazing
- Conduct a Monte Carlo simulation (10,000 observations) to account for uncertainty in cost parameters
- Average results to determine the probably cost for implementation of each practice



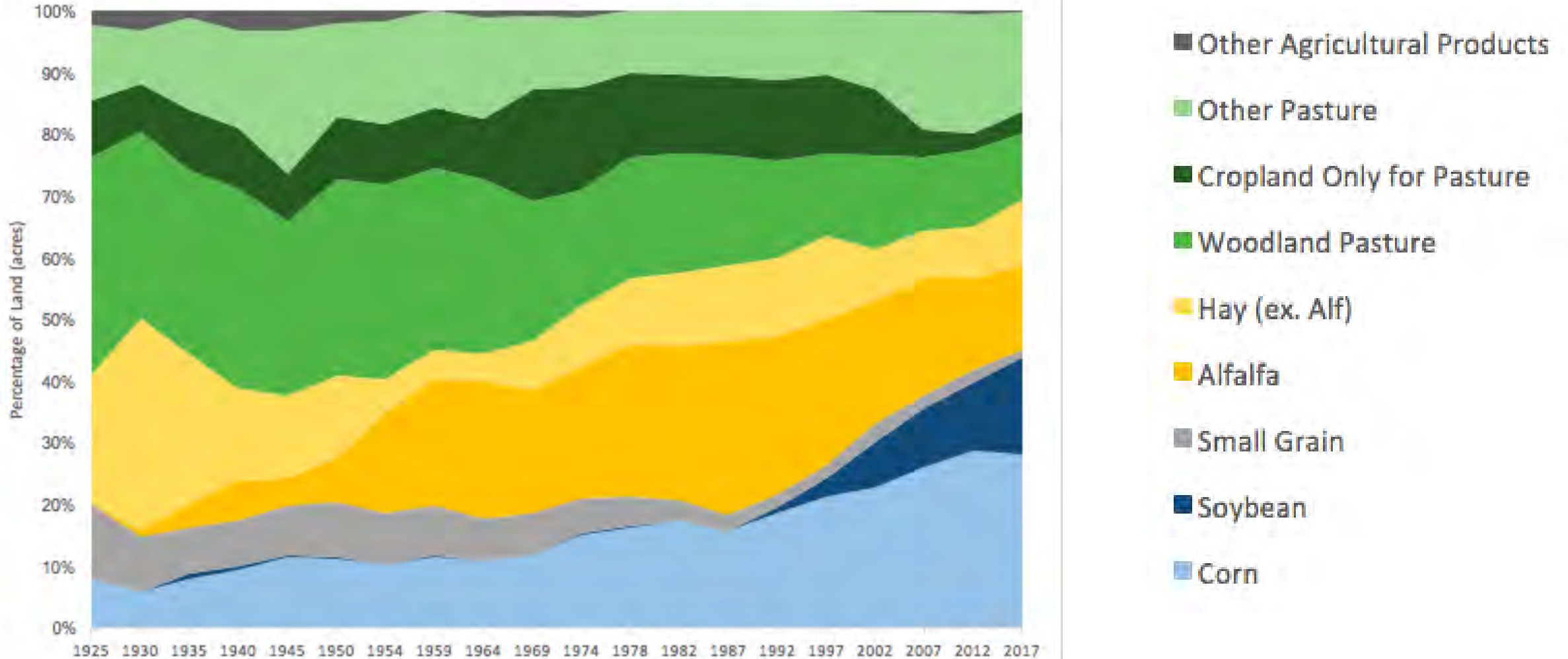
Economics of Land Use Practices



“We're getting a lot of farmers that are getting out of the dairy industry and going into renting or going into cash cropping, corn and soybeans, which are more highly erosive than having hay in your rotation.”

Economics of Land Use Practices

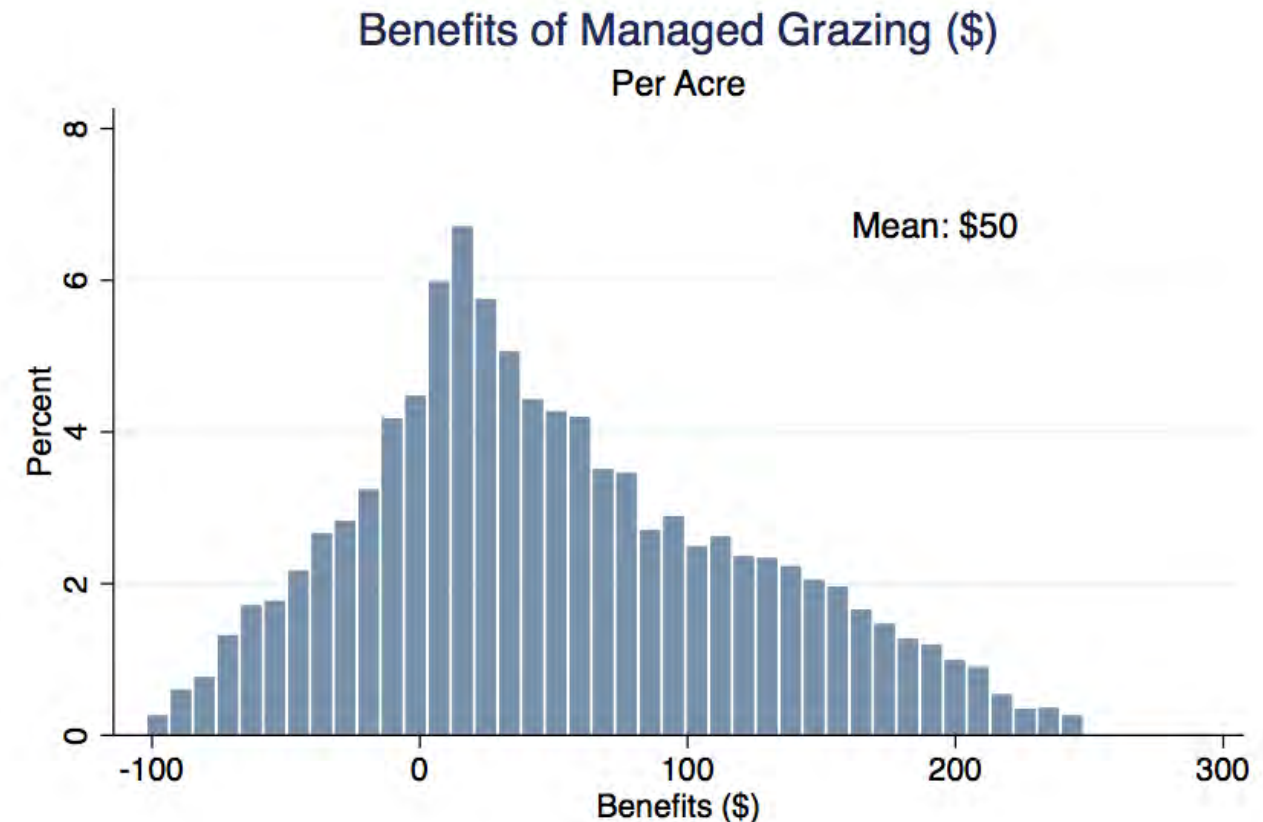
Agricultural Land Use Changes, 1925 - 2017, Vernon County



Economics of Land Use Practices

Managed Grazing

- Costs include (Edwards et al. 2012):
 - Labor
 - Fence materials
 - Seed cost
 - Equipment cost
- Benefits include (Bay et al. 2016):
 - Reduced harvest costs
 - Reduced feed costs
- Average Benefit: \$50 per acre
 - Cost vs. benefit depends on status quo of land
 - Benefits increase over longer time horizon



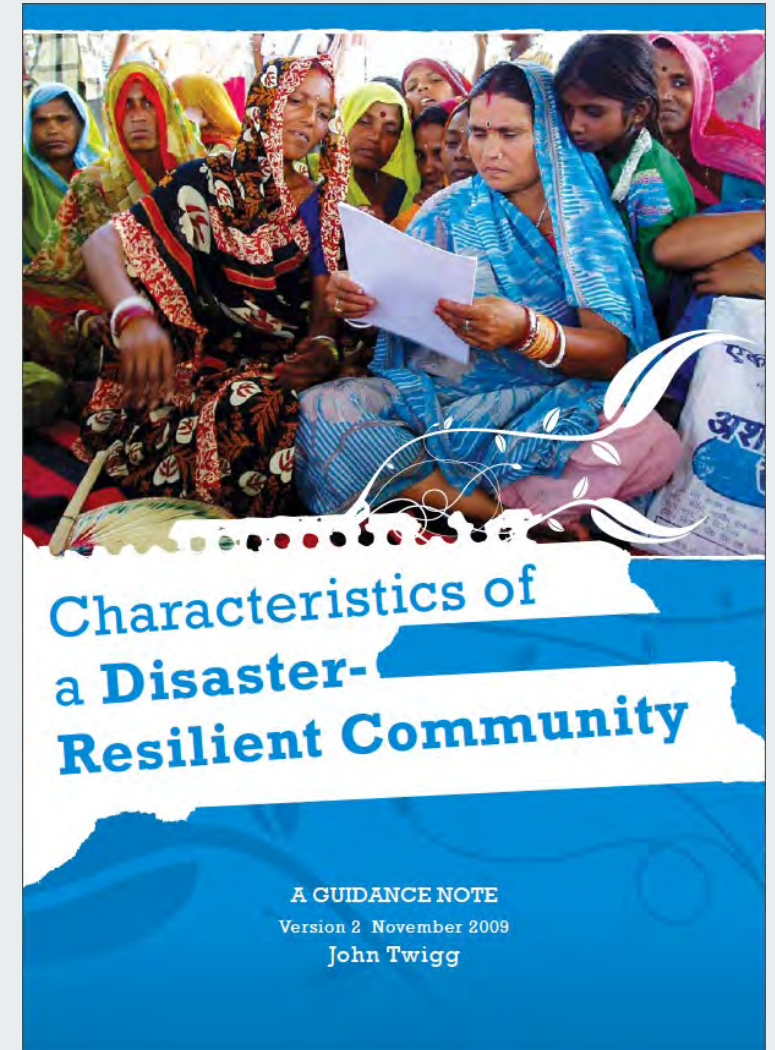
Economics of Land Use Practices

- Private vs. Public costs and benefits
- Costs create a barrier to participation
- Cost-share programs are generally underfunded and require more resources



Community Resilience

- To understand indicators of a resilient community and how communities in the Coon Creek watershed demonstrate resilience
- To analyze capacities and vulnerabilities of communities in the Coon Creek watershed to flooding
- Develop recommendations based on areas of vulnerability



Capacities

- Being “flood aware” - a constant eye on upcoming weather
- “Flood friendly” practices: physical changes and adoption of new habits
- Strong community network
- Shared hardship
- Volunteer emergency rescue teams
- Trust in local government

Vulnerabilities

- Lack of early warning systems
- Need to strategize land development for flood adaptation
- Emphasize importance and potential of individuals’ land use/management practices in flood reduction
- Lack of communication between ridgetop and valley property owners



Recommendations

- Promote targeted floodplain buyouts
- Adopt early warning and two way communication systems
- Develop more comprehensive county emergency management websites
- Establish better communication practices between Vernon, Monroe and La Crosse Counties

Conclusion

- Existing resiliency work in the community
- Need for more perennial cover on landscape
- Need for support of local staff
- Interdisciplinary approach to resilience
- Please check out our website for more detail: <https://www.cooncreekwrm.org/>



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Questions ?