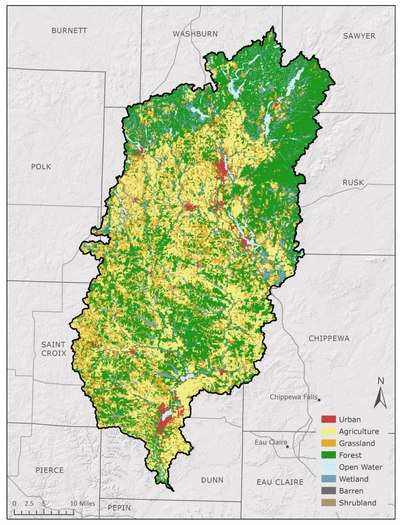
Mapping Nutrient Runoff Risk in the Red Cedar Watershed

Laura Flucke, University of Wisconsin - Madison; Arthur Kneeland, University of Wisconsin - Stout

Research Objective

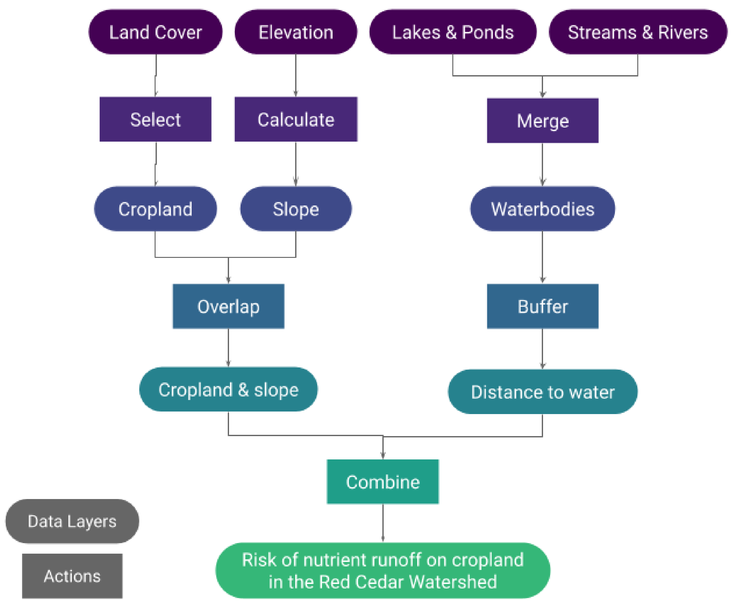
Identify cropland in the Red Cedar Watershed at high risk of nutrient runoff.



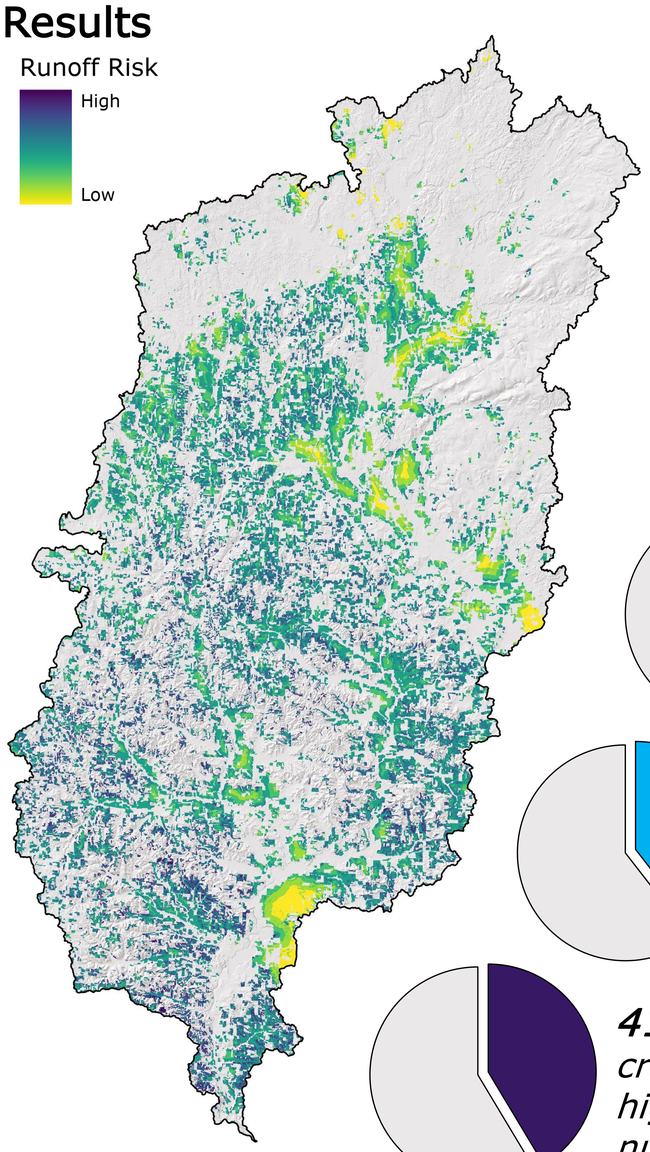
Land Use in the Red Cedar Watershed

Introduction

- Nitrogen and phosphorus are natural parts of the ecosystem, but an excess can create significant problems, such as harmful algal blooms.
- After a rain or snow melt event, nutrients that are not utilized by crops can be washed into nearby waters.
- Nutrients are more likely to end up in the watershed if applied to areas close to nearby waterways or areas with a steep slope.
- Grasslands use water more efficiently than croplands, so the conversion of cropland to grassland can reduce runoff.



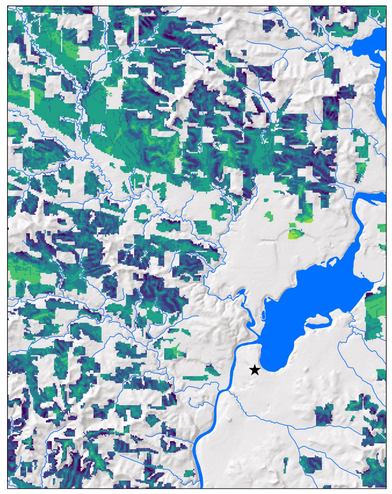
Results

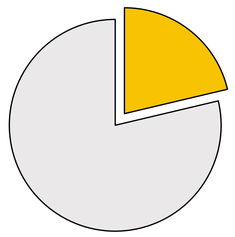


Runoff risk of cropland (left): The darkest areas have the greatest risk of nutrient runoff, and the lightest areas have the least risk.

Menomonie runoff risk (top right): This map highlights how proximity to water and slope impact runoff risk in Menomonie, WI.

High runoff risk (bottom right): Areas of greatest runoff risk, or areas with a steep slope and close distance to water.

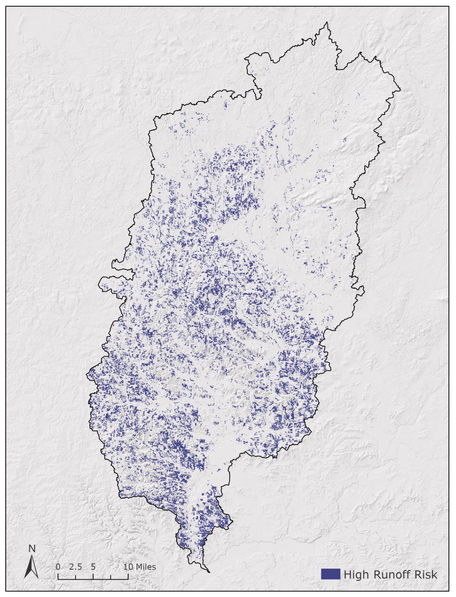




21.3% of cropland is on a steep slope

39.5% of cropland is close to nearby waterways

***41.4%** of cropland has a high risk of nutrient runoff*



352,431 acres of the watershed used for agriculture

Methods

- To identify the risk of nutrient runoff, three variables were used: use of land for agricultural crops, slope, and proximity to water.
- Using data layers from the DNR, a GIS analysis was run to determine where the variables combined to create an assessment of runoff risk.
- Implementation diagram (left) visualizes the method used from initial layers to results.
  1. Selection of cropland
  2. Calculation of slope
  3. Combination of lakes and streams
  4. Calculation of cell distance to water
  5. Assignment of index values to slope and proximity to water layers
  6. Combination of data layers & determination of high-risk cropland

Discussion

- There is great potential throughout the Red Cedar Watershed for the reduction of nutrient runoff.
- The implementation of conservation practices to any cropland would make a positive impact on the watershed, regardless of runoff risk.
- The conversion of existing cropland to grassland can be a way to maintain profitable use of the land, while also improving watershed quality.
- This analysis identifies areas of greatest interest for conservation but is useless without support or interest from the community.
- **Next steps:**
  - Identify specific conservation practices that could be implemented in target areas
  - Recognize barriers to supporting conservation projects & provide education and funding

UNIVERSITY OF WISCONSIN STOUT
WISCONSIN'S POLYTECHNIC UNIVERSITY

Freshwater Collaborative OF WISCONSIN

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