Assessing the Spatial Distribution of Agricultural Conservation Practices

Did Practices Target Critical Areas?

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Specific Research Questions

- What is the spatial distribution of conservation practices (BMPs) within the watershed?
- Is there evidence that the BMPs implemented specifically targeted critical areas?
  - **Critical Areas**: *areas where the potential contribution of pollutants (i.e., sediments, phosphorus) to the receiving water is significantly higher than other areas*

Methods Overview

BMP Spatial Distribution
- Digitized BMPs
  - NRCS Files (maps)
  - Landowner input
- Geo-Database
  - Contract
  - Interview

Critical Area Assessment
- Map overlays
  - -Soil (k)
  - -Slope
  - -Land Use
  - -Water course
  - ➢ Critical Area Map

Contrasted BMP spatial distribution against map of Critical Areas

Methods: BMP spatial distribution

- **Contract Data: Formal practice info from NRCS files**
  - Worked in county USDA/NRCS office
  - Went through every file associated with LBR Watershed project (90 landowners)
  - Locate in time & space
  - Copied key maps for interviews
- **Interview Data: Field interviews with participants**
  - 55 landowners
  - Validate file information: timing, location, involvement experience
  - Modified maps accordingly

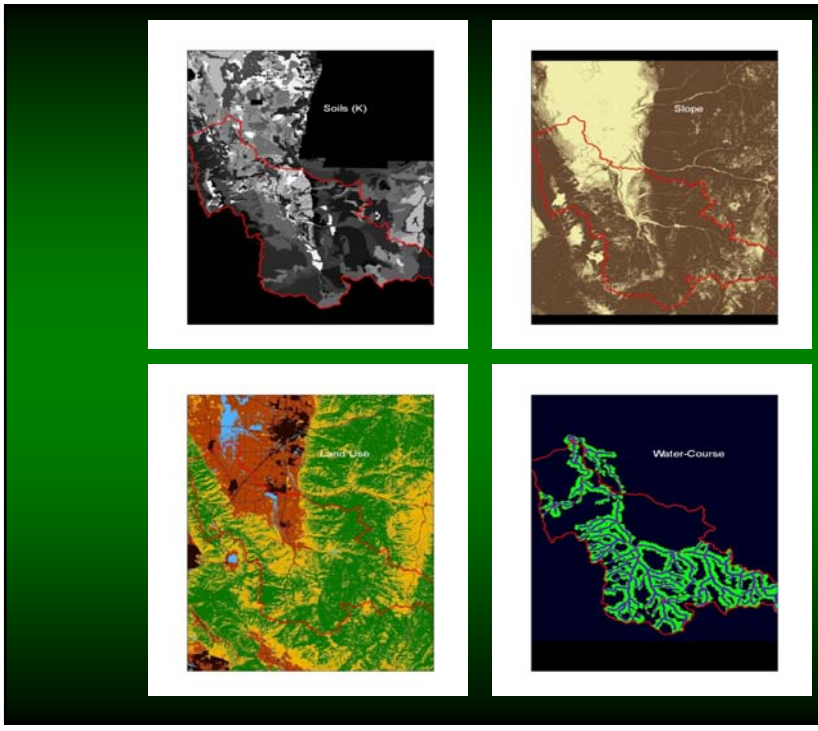
Methods: BMP Spatial Distribution

- **Digitized contract and interview data**
  - Points (e.g., waste storage)
  - Lines (e.g., fencing)
  - Polygons (e.g., Nutrient Management)
- **Created geo-databases for contract and interview datasets**

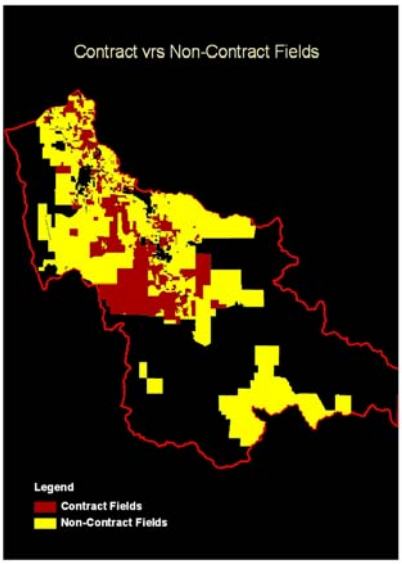
Methods: Critical Area Assessment

- GIS METHOD *(Sivertun et al, 1988 and 2003)*
  - Focus on selecting critical areas for problems of sediment-related water quality
  - Based on USLE *(Wischmeier and Smith 1978)*
  - Map overlays: simple raster multiplication

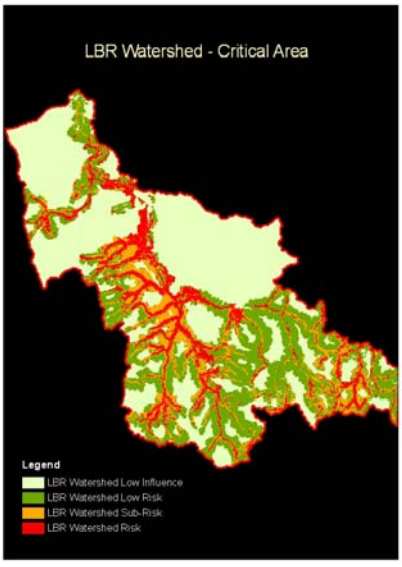
    P = K * S * U * W
  - 4 Digitized factors maps
    - **Soil (K):** Soil Survey Geographic (SSURGO) database
    - **Slope (S):** From USGS National Elevation Dataset (NED); analyzed using terrain analysis software (TauDEM)
    - **Land Use (U):** Utah State Geographic Information Database (SGID)
    - **Water Course (W)**: River network and analysis of proximity to surface water



Results



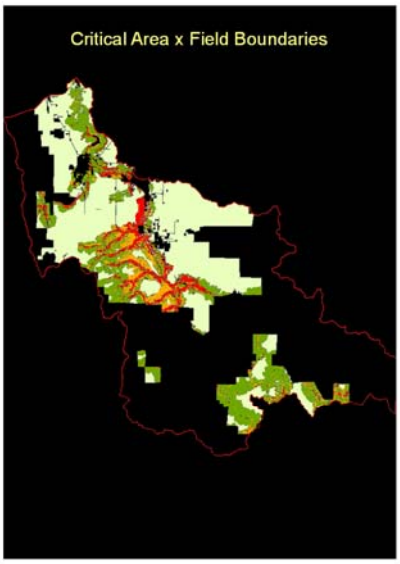
	Area (km²)	%
Total LBR Watershed	682	
Farm Fields	312	46 %
Non-Contract	**232**	**74 %**
Contract	**80**	**26 %**



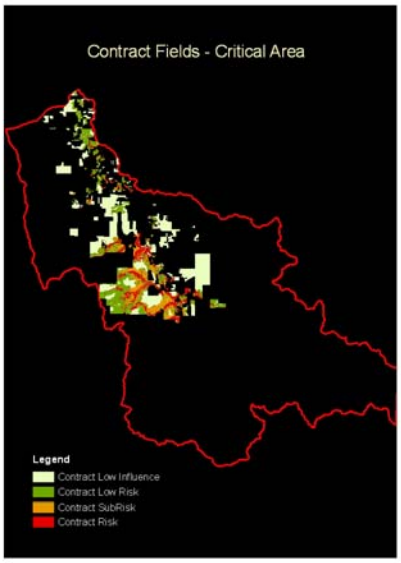
P = K * S * U * W

Range= 0 – 22,500
Mean = 99
SD= 320

Critical Area	LBR Watershed (Km²)	%
Low Influence [< mean]	365	53
Low Risk [0-1 SD]	225	33
Sub-Risk [1-2 SD]	57	8
Risk [> 2 SD]	35	5
Total	682	100



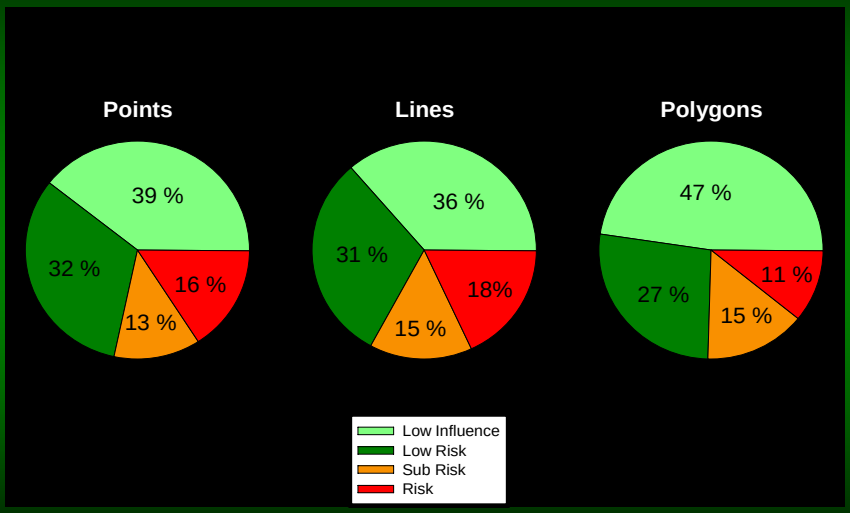
Critical Area	Farm Fields (Km2)	%
Low Influence	191	61
Low Risk	77	25
Sub-Risk	24	8
Risk	20	6
Total	312	100



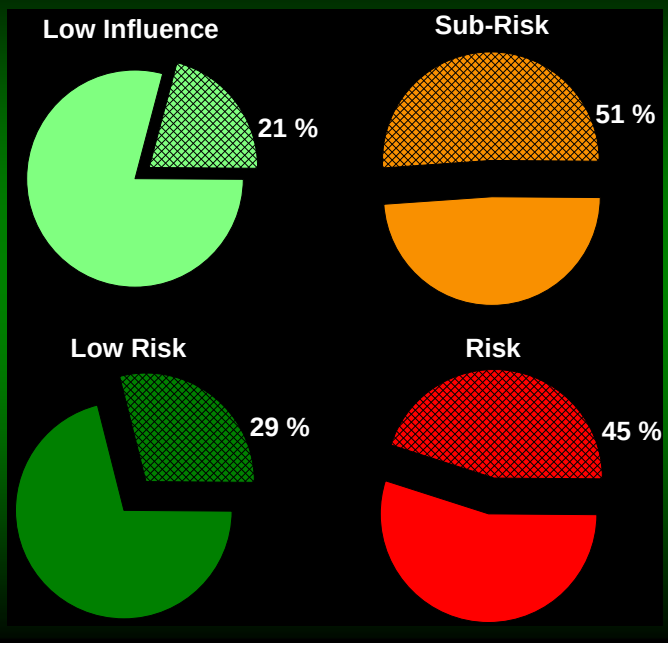
Critical Area	Contract Farm Fields (Km²)	%
Low Influence	38	47
Low Risk	21	26
Sub-Risk	12	15
Risk	9	11
Total	80	100

Critical Area	Farm Fields (Km^2)	Contract Farm Fields (Km²)	%
Low Influence	191	38	20
Low Risk	77	21	27
Sub-Risk	24	12	51
Risk	20	9	43
Total	312	80	26

Percent of Practice Area within Risk Categories



Relative coverage of contract polygons



Conclusions

- Targeting occurred
  - Practices found in Risk & Sub-risk areas at higher rates than expected if no targeting
  - Conservation practices were implemented on a substantial proportion of Risk and Sub-Risk areas within contract fields.
  - About half of the Risk Area within field boundaries has not been targeted (i.e., total risk area in non-contract fields).
  - Significant efforts still directed at areas of Low Influence & Low Risk.

Future Research Questions

- What types of practices were more prevalent in critical areas?
- Are there any relationships between practices maintained and their spatial distribution?