

# CROPLAND AND SEDIMENT POLLUTION IN HURON COUNTY

## THE PROBLEM

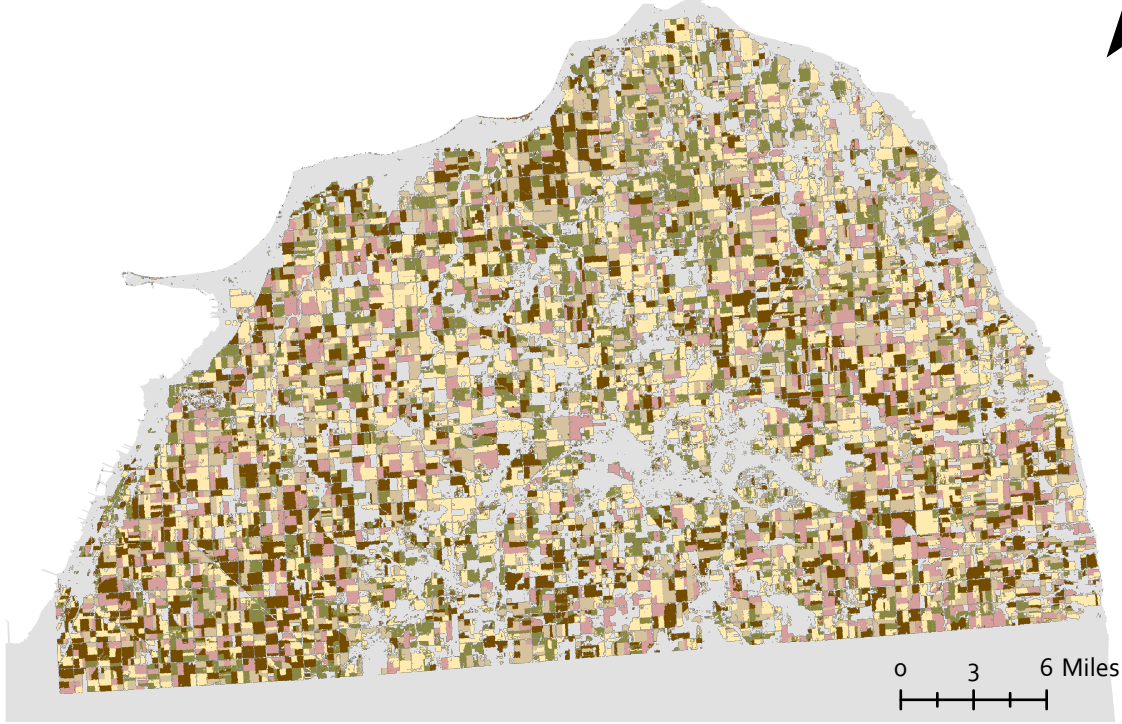
Soil erosion and sedimentation are pressing environmental issues in the Great Lakes region today. Sedimentation from erosion degrades water quality for both humans and wildlife. 66-75% of soil erosion in the Great Lakes region is from agriculture. Understanding the crop types associated with high levels of suspended sediment (SS) in waterways can help watershed management measures to better target agricultural practices to reduce sedimentation.

## AGRICULTURE IN HURON COUNTY

Huron County is one of the top five most agricultural counties in MI, ranking No. 1 for Dry Beans, Sugarbeets, and Wheat production. In 2017 alone, farmers in Huron County planted 99,000 acres of Corn, 81,600 acres of Dry Beans, 70,000 acres of Wheat, 59,000 acres of Soybeans, and 50,900 acres of Sugarbeets. Located in the "thumb of the mitten", Huron County is surrounded on three sides by Lake Huron. Because of its proximity to a Great Lake and its heavy agricultural land use, Huron County is an important place to understanding sediment pollution from agriculture.



Crop Types in Huron County



The top five crops by area grown in Huron County are Corn, Winter Wheat, Dry Beans, Soybeans, and Sugarbeets.

Rank	Crop Type	Cell Count
1	Corn	456386
2	Winter Wheat	328178
3	Dry Beans	317505
4	Soybeans	296446
5	Sugarbeets	235716
6	Other Grains/Hay	145999
7	Vegetables/Fruit	2312
8	Other	456

Percent of Catchment Area in Cropland



Over a quarter of the river catchments in Huron County are 90% or more cropland.

Percent Cropland
0-20%
20-40%
40-60%
60-80%
80-100%

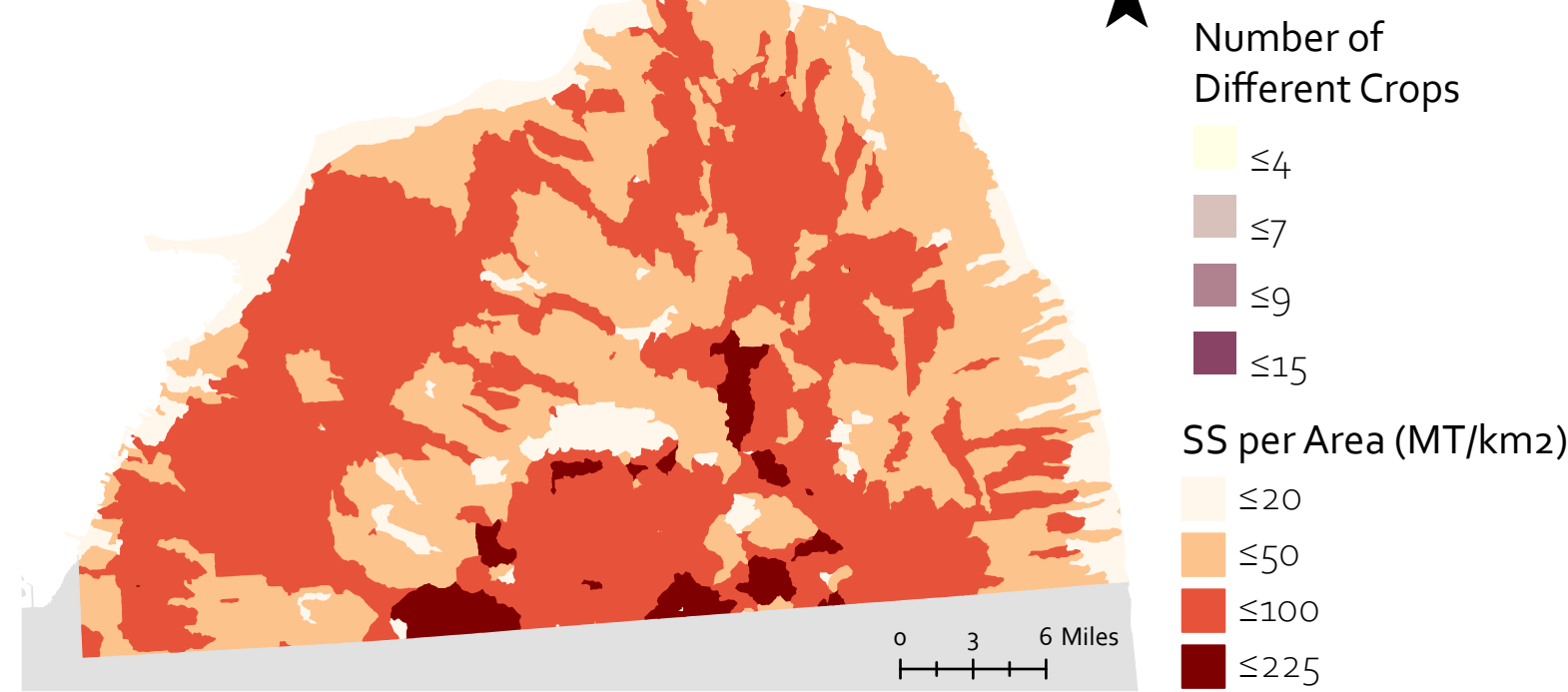
## METHODS

This model characterizes the crop composition of catchments with varying levels of sediment pollution from agriculture (measured in incremental MT/km<sup>2</sup>) in three distinct sections:

1. Preprocessing Model: users specify a study area and crop types; the model selects the appropriate data for analysis.
2. Main Model: users specify distance from river reaches for analysis; the model uses Zonal Statistics calculates the crop statistics in each river catchment zone.
3. Side Model: calculates the percent of each catchment in cropland.

## RESULTS

SS per Catchment Area



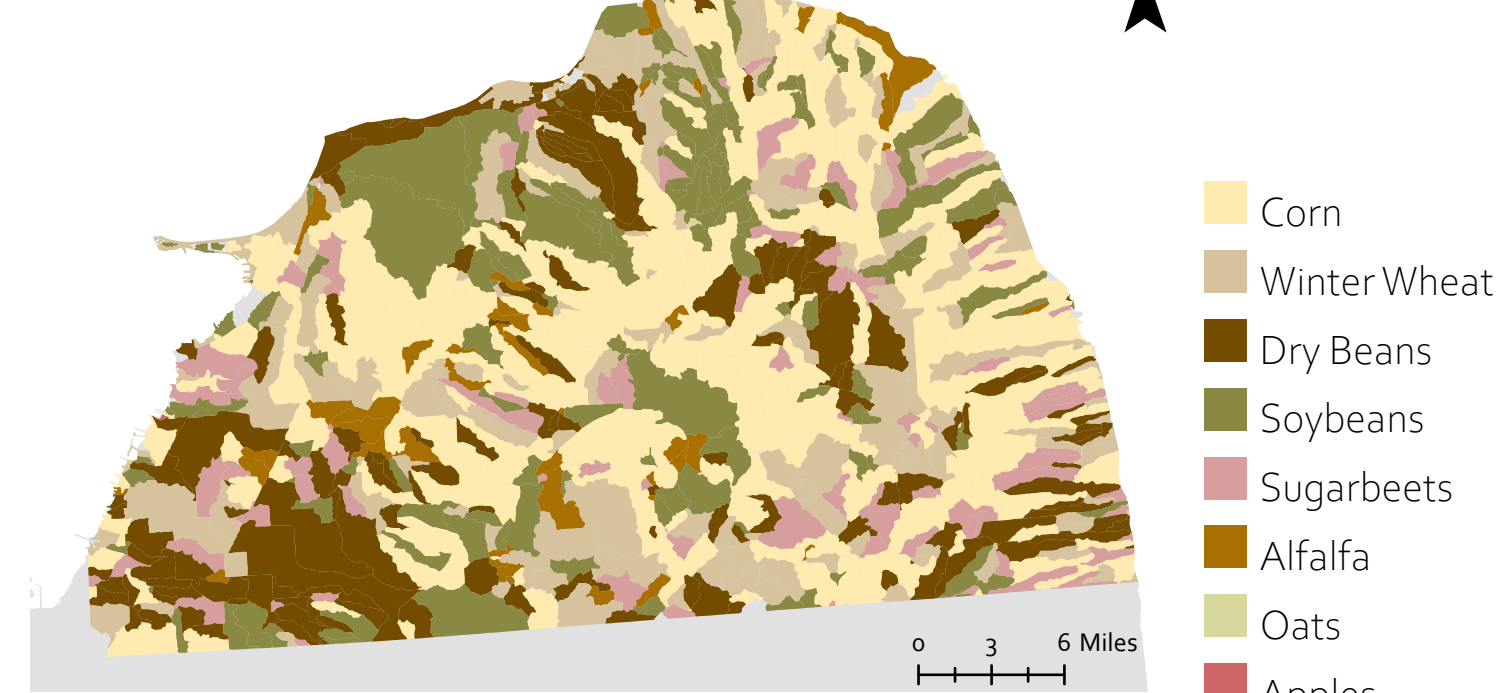
While we might have expected crop homogeneity (low variety) to be correlated with high SS, the graph shows no clear relationship between Total SS and Crop Variety.

Variety of Crop Types



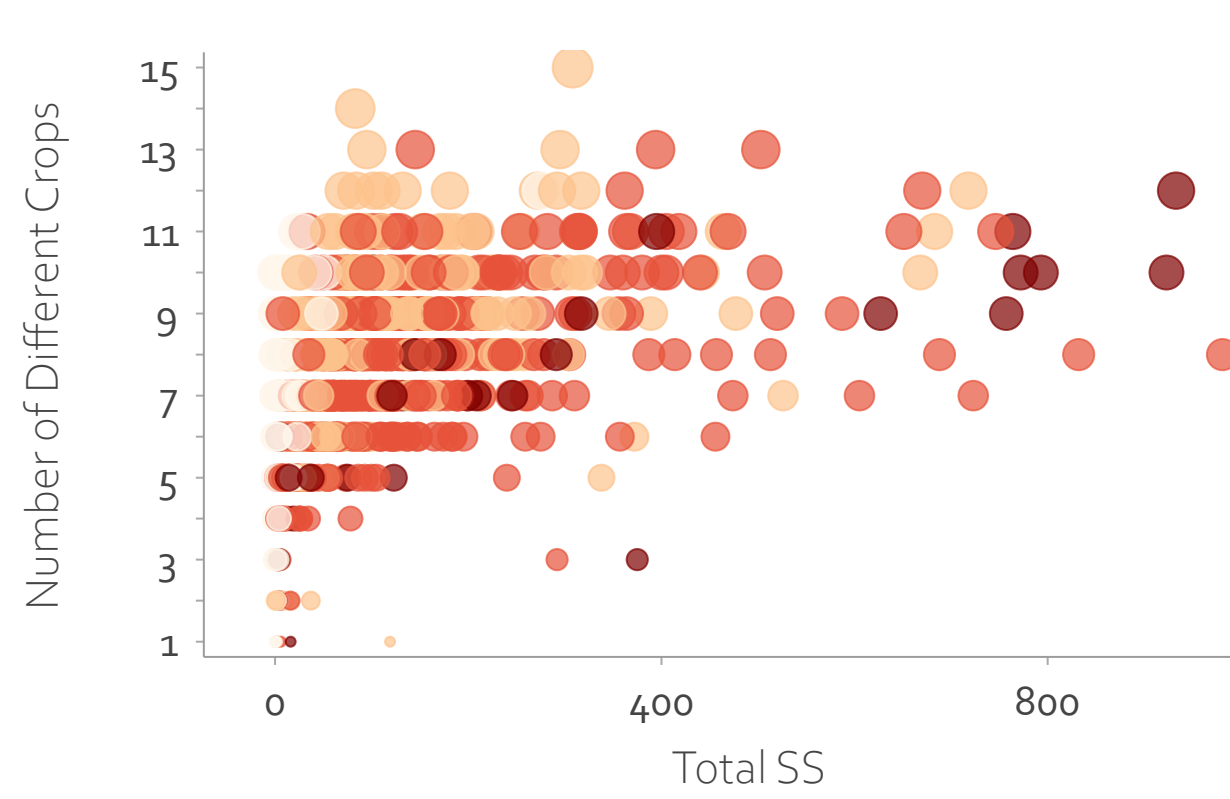
Most catchments have 7 or 8 different crop types.

Most Common Crops

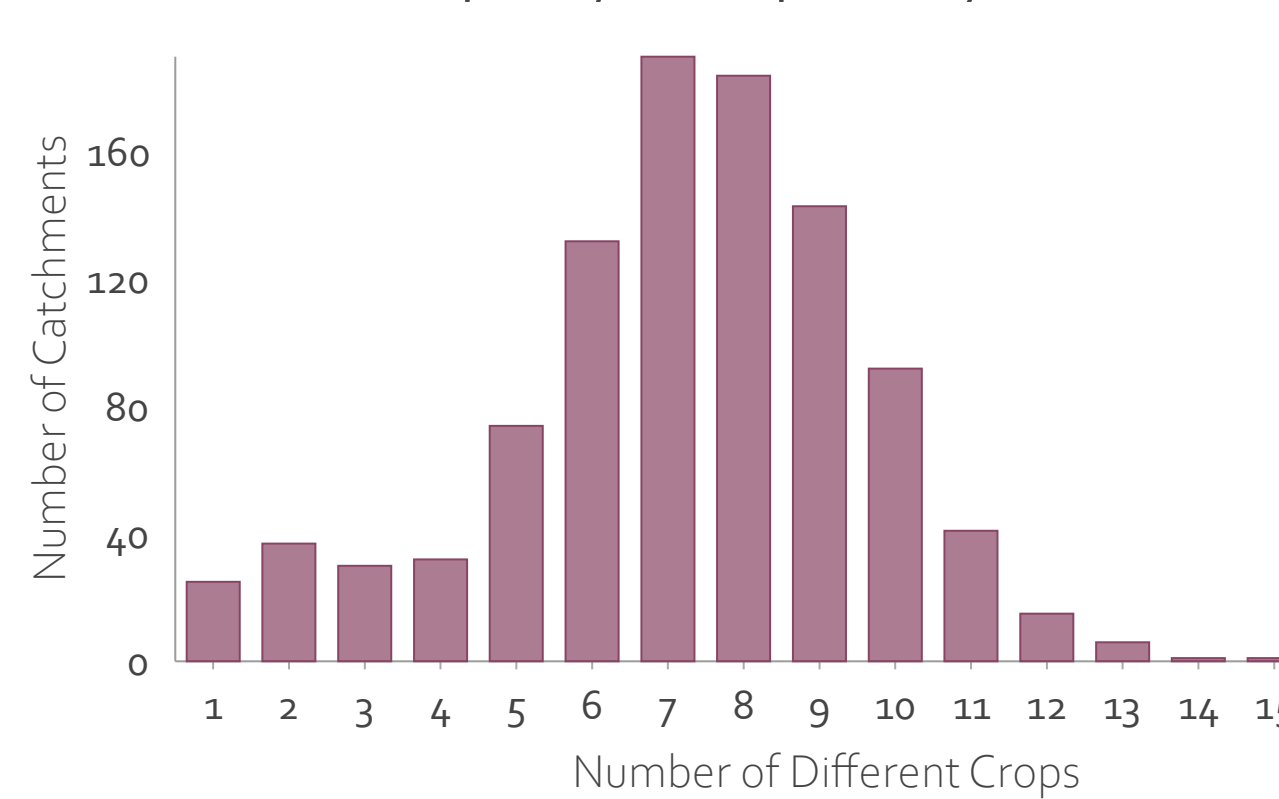


Summing over all the catchments, catchments with Corn as the majority crop have the highest total SS and SS per area, followed by Wheat, Dry Beans, Soybeans, and Sugarbeets.

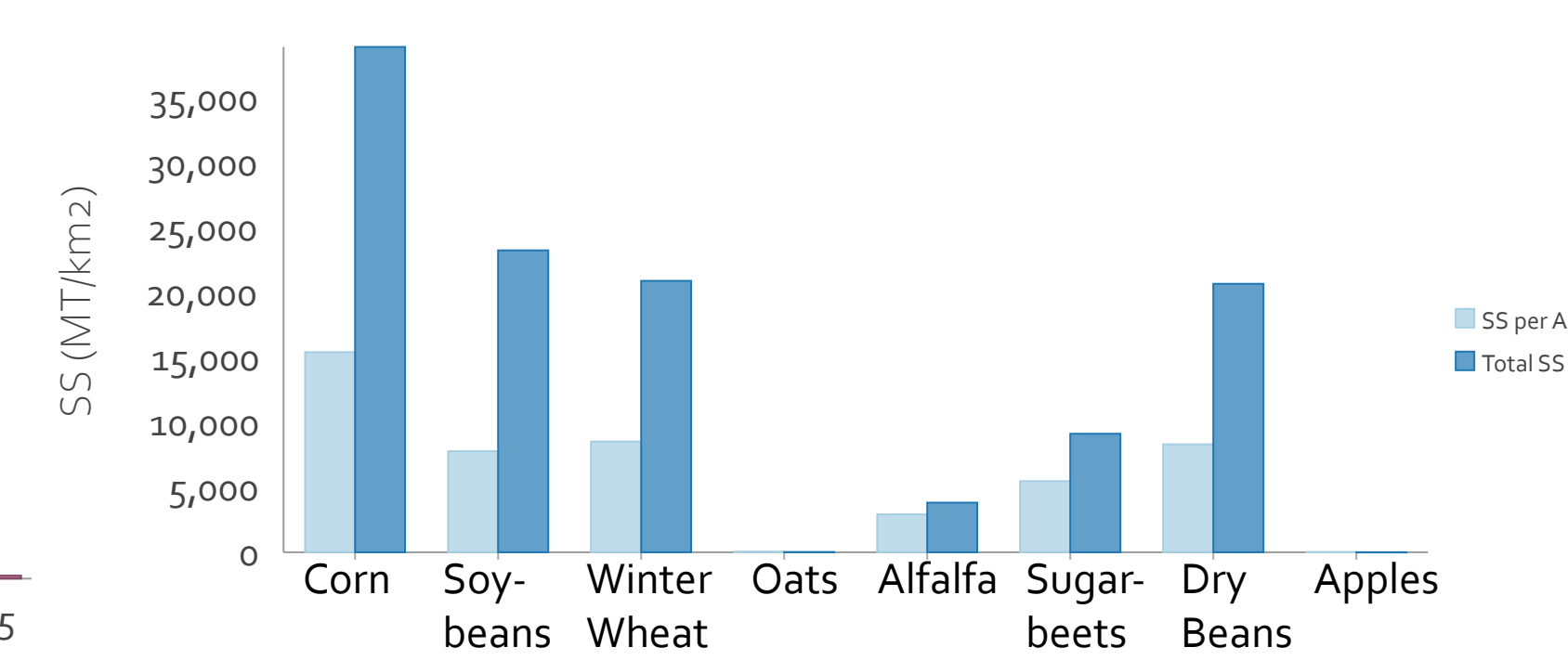
Total SS and Crop Variety



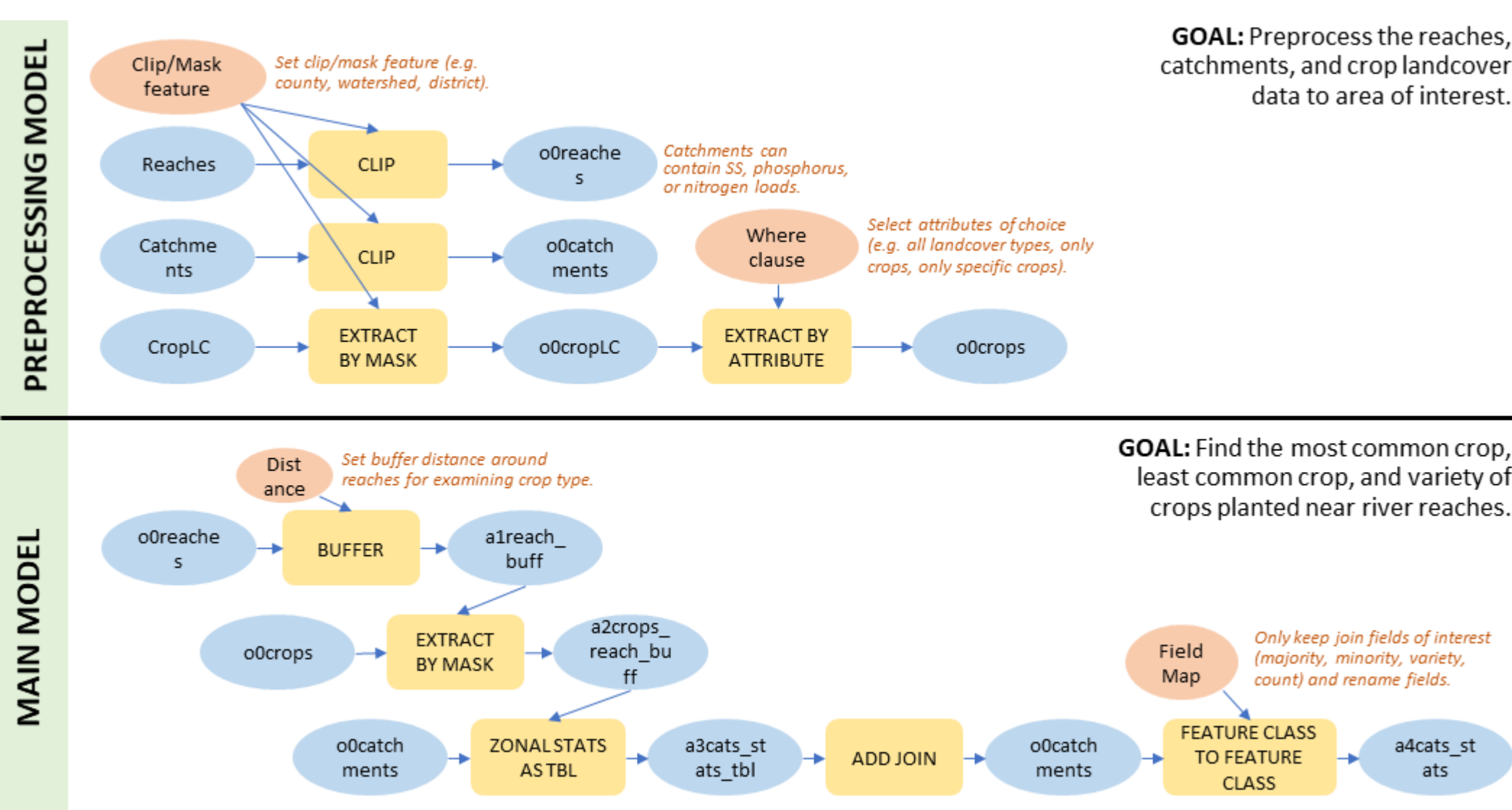
Frequency of Crop Variety



SS per Area & Total SS by Most Common Crop



## MODEL



## 10 Catchments with Highest SS per Area

Ag SS per Area	Total Ag SS	Majority Crop	Variety of Crops	Pct in Cropland
220.5	627	Wheat	9	71%
203.8	208	Soybeans	7	86%
197.2	52	Alfalfa	6	62%
178.1	772	Wheat	10	60%
177.7	219	Wheat	9	57%
177.4	38	Alfalfa	8	83%
176.9	121	Corn	7	95%
176.6	317	Dry Beans	9	73%
169.4	793	Wheat	10	83%
167.3	14	Corn	5	88%

Despite Corn being the most common crop in Huron County, the catchments with the highest SS loads are mostly comprised of Wheat, Alfalfa, and Soybeans near river reaches. Interestingly, only one of the catchments in the Top Ten for SS is over 90% cropland.

## CONCLUSION

By targeting specific agriculture practices, environmental management can more effectively reduce sediment pollution from agriculture in MI. This model demonstrates a methodology for identifying crop types and characterizing crop composition near river reaches in catchments with varying levels of suspended sediment. The model is designed to be flexible and adaptable to a variety of uses.