

# Rachel Karnak

GIS Specialist/Environmental Scientist

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# GIS Training

## ESRI Training

Introduction to ArcIMS

Learning ArcIMS

Introduction to Urban & Regional Planning Concepts

Exploring the Visual Basic Applications Environment

Geoprocessing CAD Data with ArcGIS



## University of Michigan Ann Arbor

Principles of GIS

Remote Sensing of the Environment

## Penn State

Nature of Geographic Information

Problem Solving with GIS

GIS Database Development (Fall '05)

Geospatial System Analysis and Design (Fall '05)

## Computer Skills

### Graphics:

ArcView GIS (v. 8.2, 8.3, 9.0), ArcIMS, ERDAS IMAGINE, AutoCAD, gINT, Powerpoint

### Website Publishing:

ArcIMS, Microsoft Frontpage

### Database:

Access, Equis Chemistry

### Modeling:

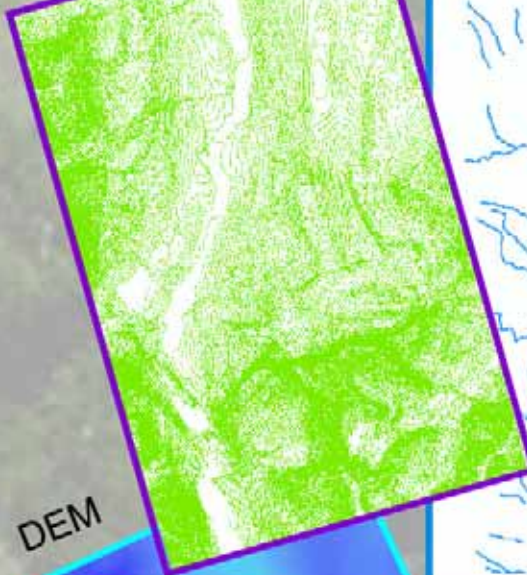
MODFLOW, Surfer, GIS Spatial Analyst/ 3D Analyst

### Other:

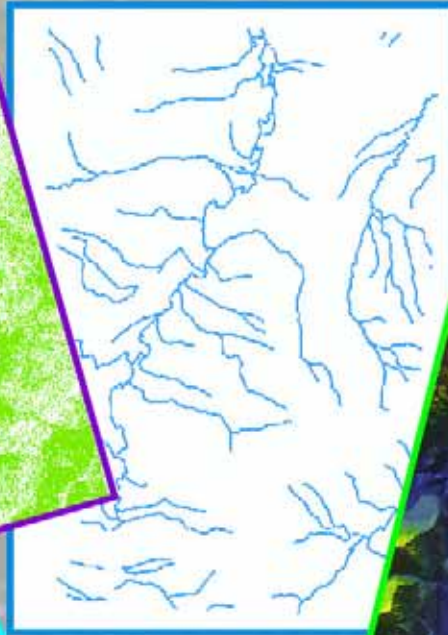
Excel, Word, Adobe Acrobat Writer

# ArcGIS 3D Analyst

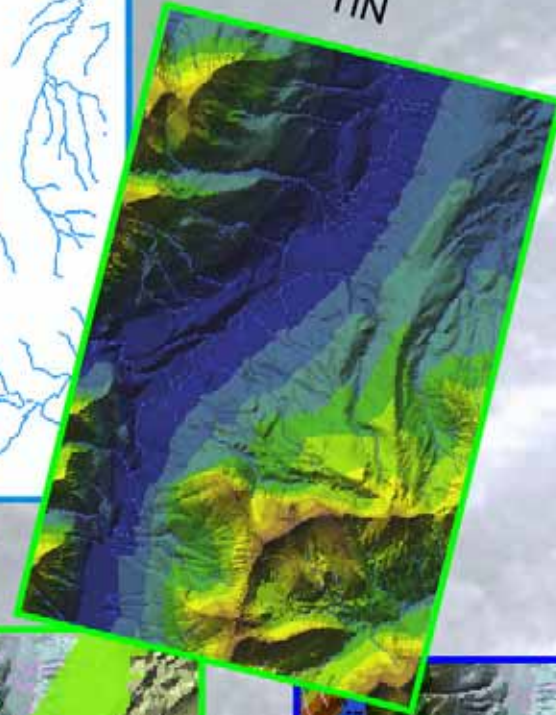
Topographic Map



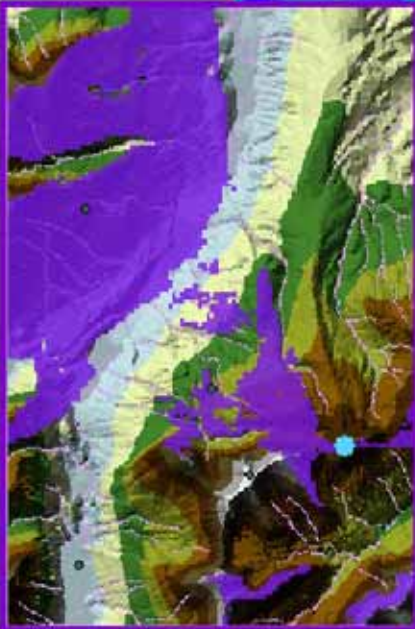
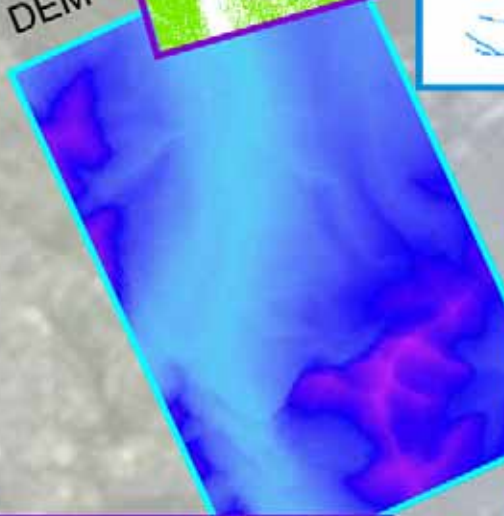
River Data



TIN



DEM



Site 1 with Viewshed

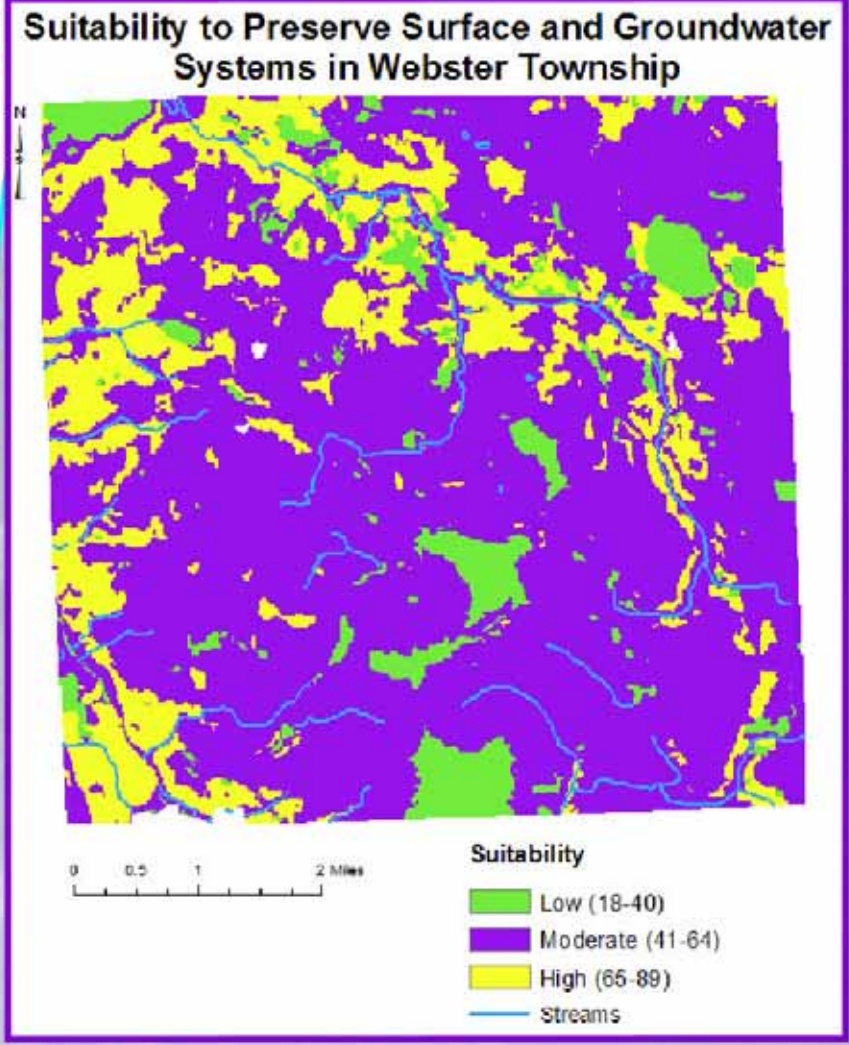
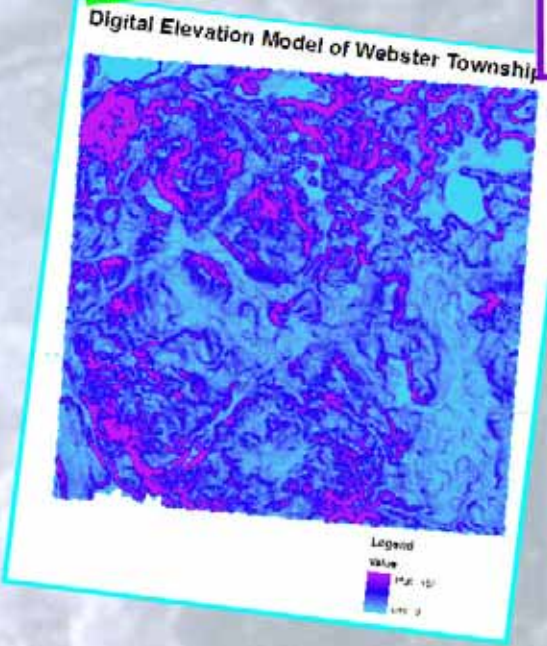
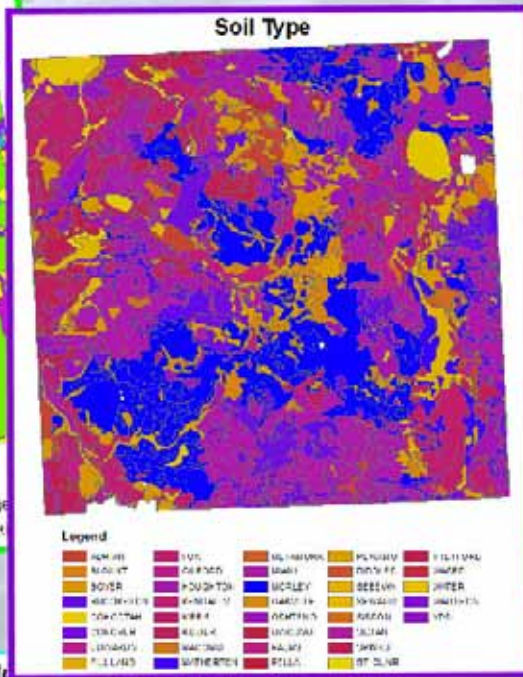
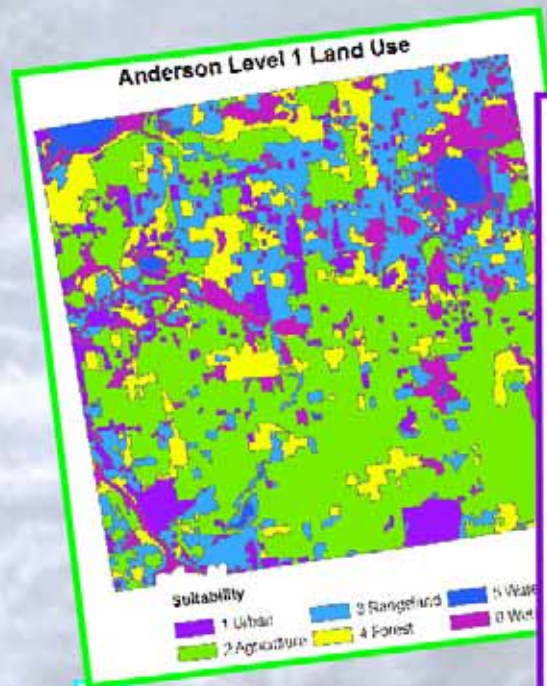


Site 2 with Viewshed



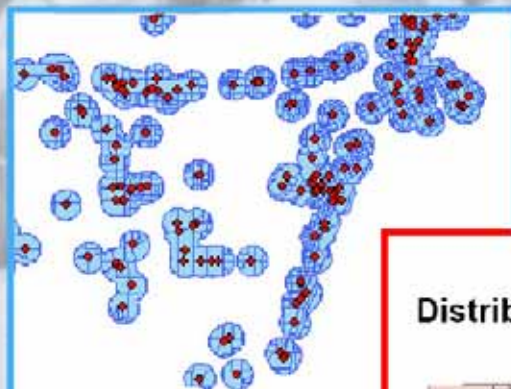
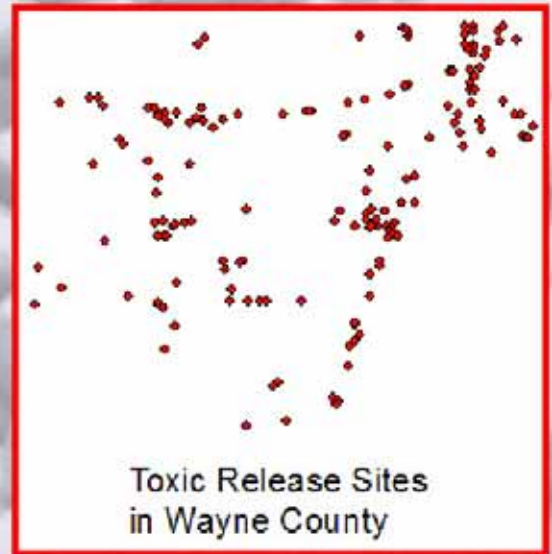
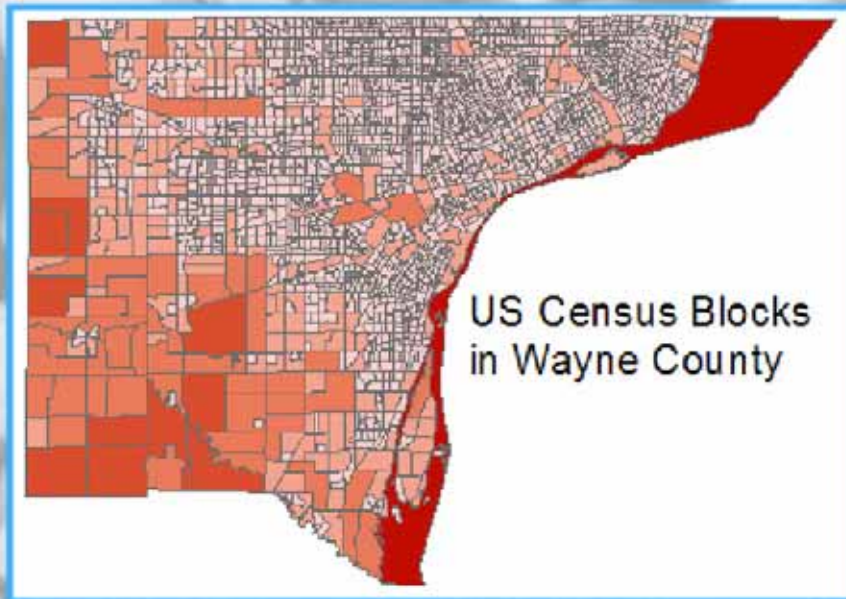
Site 3 with Viewshed

Topographic maps, river data, triangular irregular networks (TIN), and digital elevation models (DEM) were combined with hillshading and viewsheds in ArcGIS 3D Analyst in order to determine the optimal location for a ski resort in Wyoming.

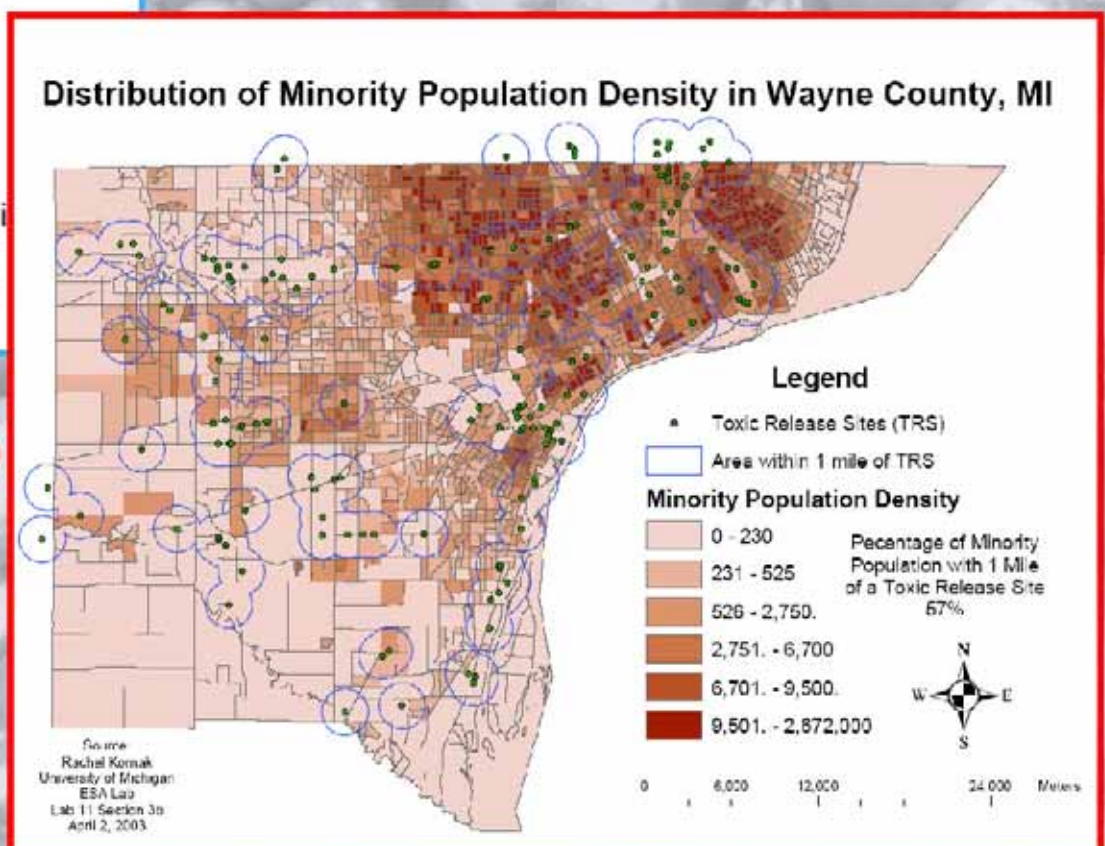


ArcGIS Spatial Analyst was used to calculate the weighted sum of land use, soil texture, elevation variability, and nearness to water bodies for parcels in Webster Township. The output grid represents the ability of each cell to effect water quality in the region. Preservation efforts should be concentrated in the areas with the greatest suitability.

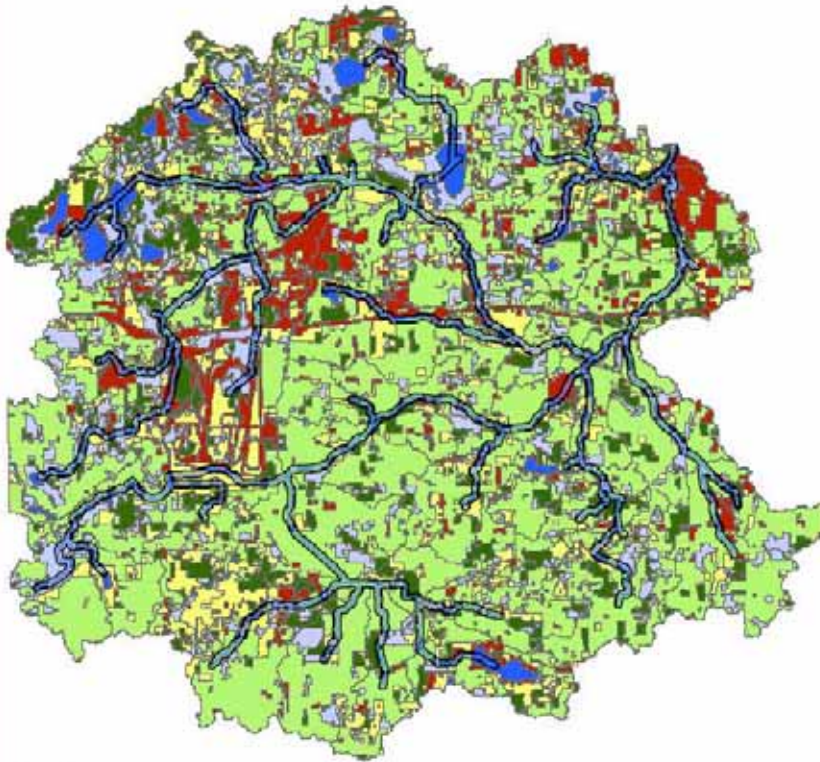
# Toxin Releasing Facilities



U.S. Census data and Toxic Release Inventory data from the EPA were analyzed using the dissolve and buffer functions in ArcGIS to investigate what percentage of minority groups live near toxic facilities in Wayne County, MI.



## Landuse for Mill Creek Watershed, 1995



### Landuse



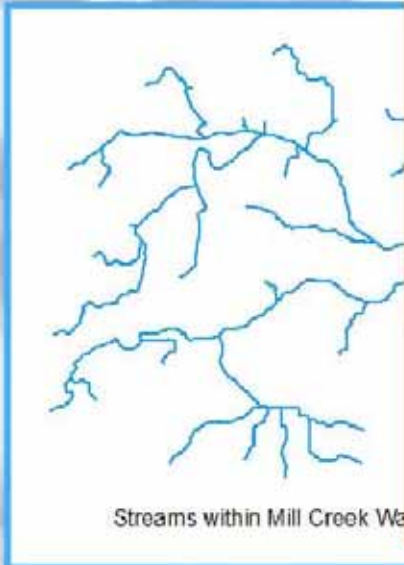
0 4,600 9,200 18,400 27,600 36,800 Feet

Source: Landuse polygons: Southeastern Michigan Council of Government  
 MillCreek Watershed: SURE researcher  
 University of Michigan  
 Map Creation: Rachel Komak  
 NRE 420 Section 3b  
 3/13/03

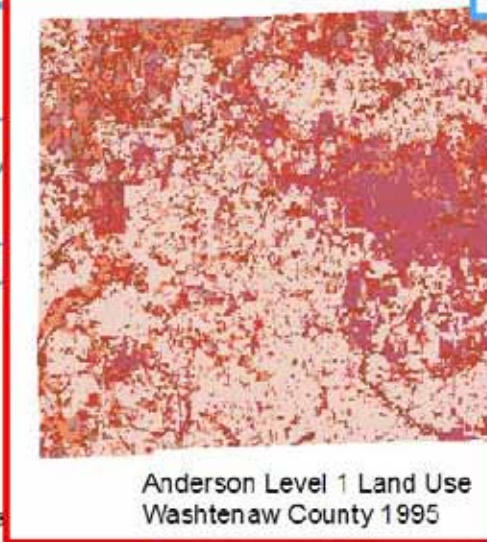
The clip operation in ArcGIS was used to trim two county-wide land use coverages to cover the spatial extent of the Mill Creek Watershed. Landuse change between 1985 and 1995 was calculated for each Anderson Level 1 Land Use Category using the statistics function.



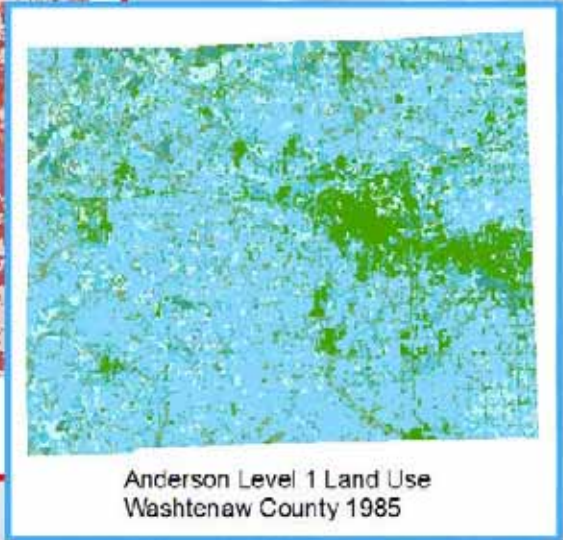
Sub basins within Mill Creek Watershed



Streams within Mill Creek Watershed



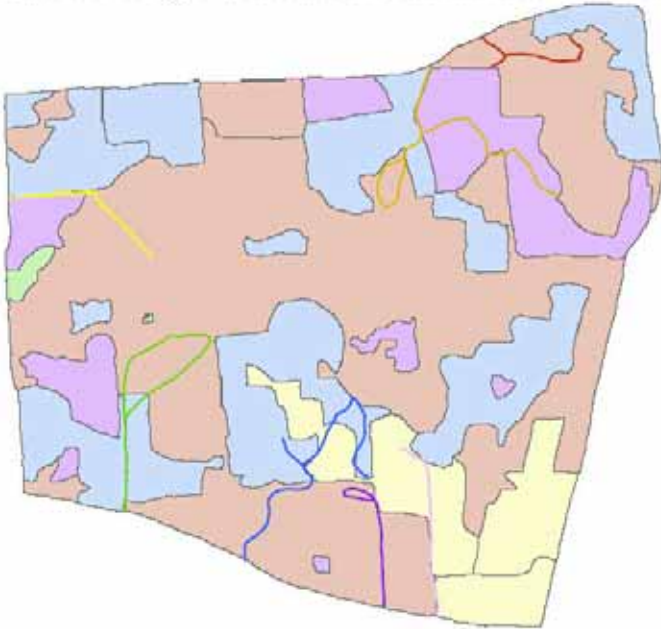
Anderson Level 1 Land Use  
 Washtenaw County 1995



Anderson Level 1 Land Use  
 Washtenaw County 1985

# Land Cover Mapping

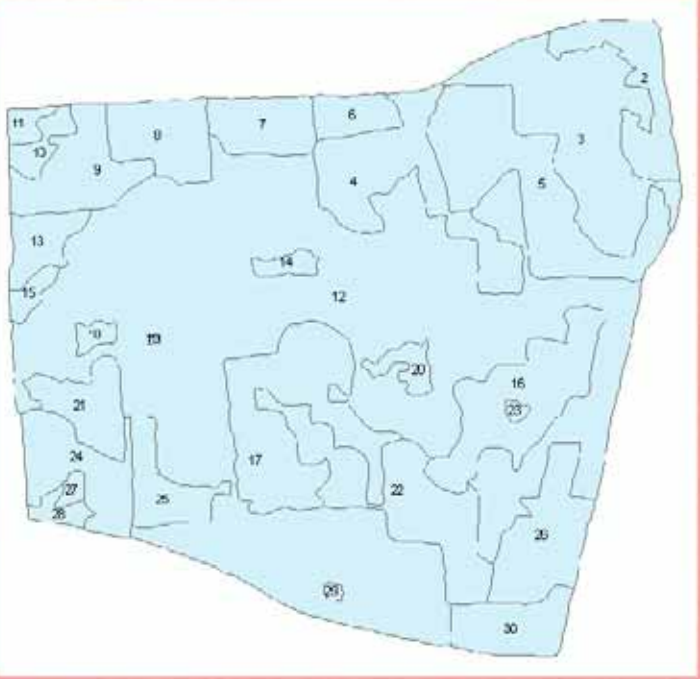
Land Cover Type and Trails in Stinchfield Woods Area

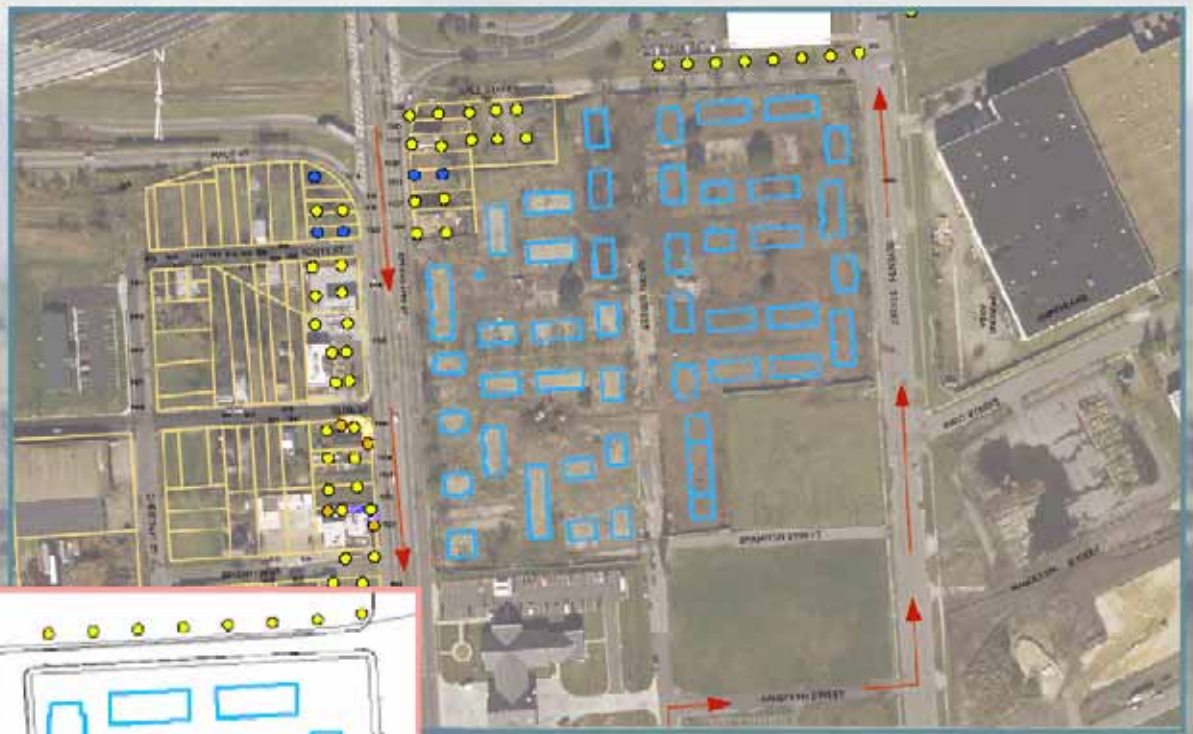


Land Cover Type and Trail Names

PATH_ID	LAND_COVER
Blue	Agricultural
Green	Clearcut/Extractive
Orange	Coniferous Forest
Pink	Deciduous Forest
Purple	Open Field
Red	
Yellow	

Shapefiles to represent areas of different landcover were created from a satellite image using ArcGIS in order to design hiking trails that would provide a view of a variety of ecosystems in Stinchfield Woods, Pinckney, MI.





**LEGEND:**

- SAMPLE LOCATIONS
- PROPOSED DELINEATION SAMPLES
- PROPOSED ORIGINAL RI
- PROPERTY LINES
- FORMER WASHINGTON PARK HOUSING
- EXCAVATIONS 0-1 ft
- EXCAVATIONS 0-2 ft
- TRUCK HAUL ROUTE

0 250 Feet



The aerial photo was georeferenced to the CAD basefiles which show property boundaries, buildings, and sampling locations. A geodatabase was created to store information about the sampling points and property owners. This information was queried in GIS to only represent specific areas of interest. Shapefiles were then created to show areas where soil excavations will be located and routes for truck drivers to haul the soil through a residential neighborhood.



# Recommendations



**Daniel Brown**

Associate Professor & Director  
Environmental Spatial  
Analysis Laboratory

"Rachel clearly understands GIS at a level that will serve well her future opportunities to apply GIS to various applications. Her lab grade in Principles of GIS, which reflects her level of practical understanding of the concepts and methods covered in the course, was 98.7%."



**Carola Stearns**

Lecturer  
Geology Department  
University of Michigan Ann Arbor

"Rachel is a bright student who is capable of pursuing her interests. She even took the initiative to find a field course in Central America in which she could learn both science and Spanish. Also, she is easy to get along with in the field. I strongly recommend that you consider Rachel for employment opportunities."



**Stephen Kesler**

Professor & Associate Chair  
Geology Department  
University of Michigan Ann Arbor

"On a personal level, Rachel is an enthusiastic, interested person with a lot of energy. She is also well organized in terms of assignments and life goals. She sets clear goals and keeps on schedule."

"I have worked with Rachel as a mentor, staff manager, and a project manager on many environmental consulting projects. She conducted field work, interpreted data, and prepared presentation materials for many of my projects. Rachel has few limitations. She has a strong knowledge and understanding of GIS applications and database management."



**Craig Savage**  
Senior Hydrologist  
Haley & Aldrich, Inc.

"Rachel's work on the project's AutoCAD and GIS files was superior. She was extremely efficient at updating databases and creating new ones. The product she helped create exceeded the customer's expectations."



**David Breedon**  
Senior Hydrologist  
Haley & Aldrich, Inc.

"Rachel is a very positive and driven person. This has helped in many aspects of her work. She is very creative and intelligent when it comes to getting the job done. She is always determined at finding better ways to get work done more efficiently and with higher quality. Rachel's technical abilities are impressive."



**Ban Aragona**  
Staff Scientist, CHMM  
Haley & Aldrich, Inc.

"Rachel has demonstrated an ability to look beyond the immediate requirements of an assigned task and to anticipate future problems and work needs. Also noteworthy are Rachel's technical abilities with AutoCAD and GIS and her positive and enthusiastic demeanor."



**Susan Hoert**  
Senior Scientist  
Haley & Aldrich, Inc.