Geographic Information Systems Exploration and Applications

KRISTEN VINCENT ‘14

UW-MADISON GIS CERTIFICATE PROGRAM

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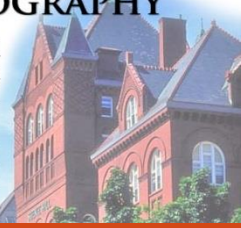


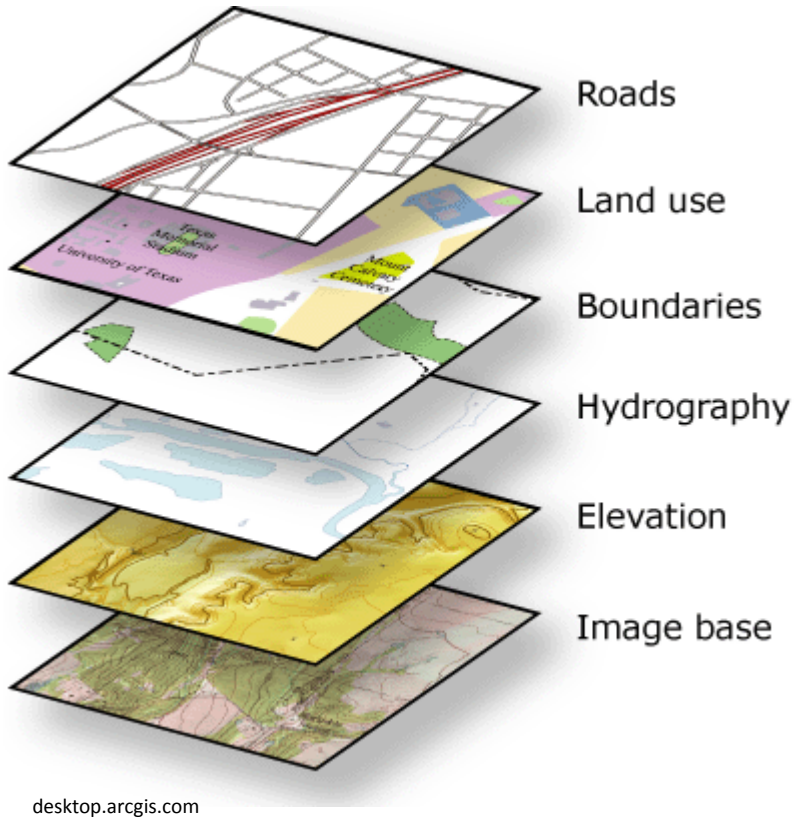
Outline

- What is GIS?
- What is my program?
- Natural Science Application
- Social Science Application

What is GIS?

Geographic Information Systems

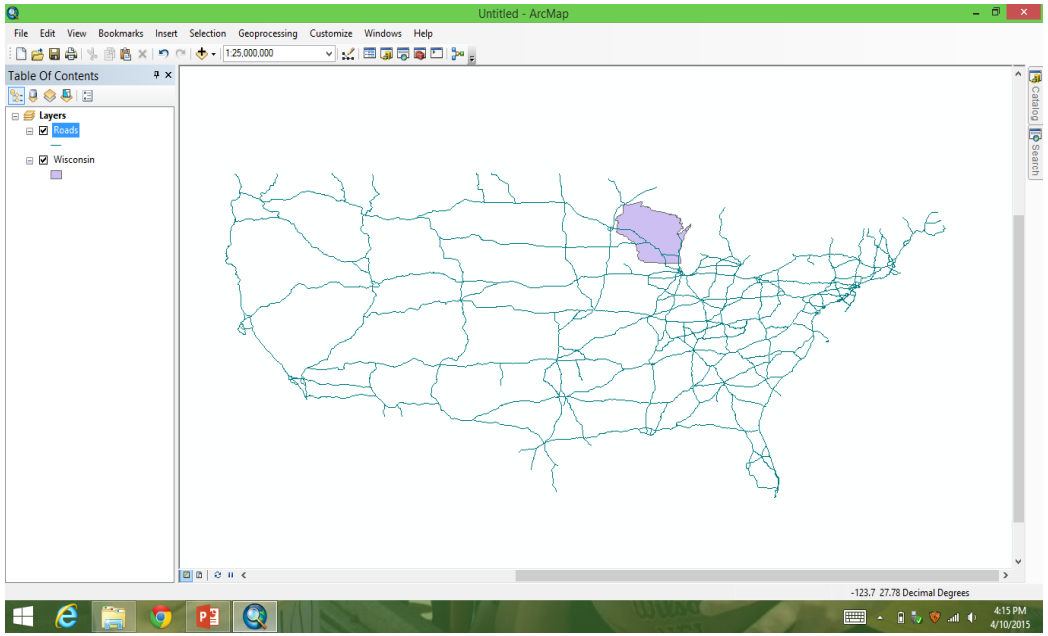
- Geography Discipline
- Computing techniques to represent, manage, and analyze geographic data
- More than just computer software: Process:
  - Conceptualization
  - Implementation
- Layers of Data



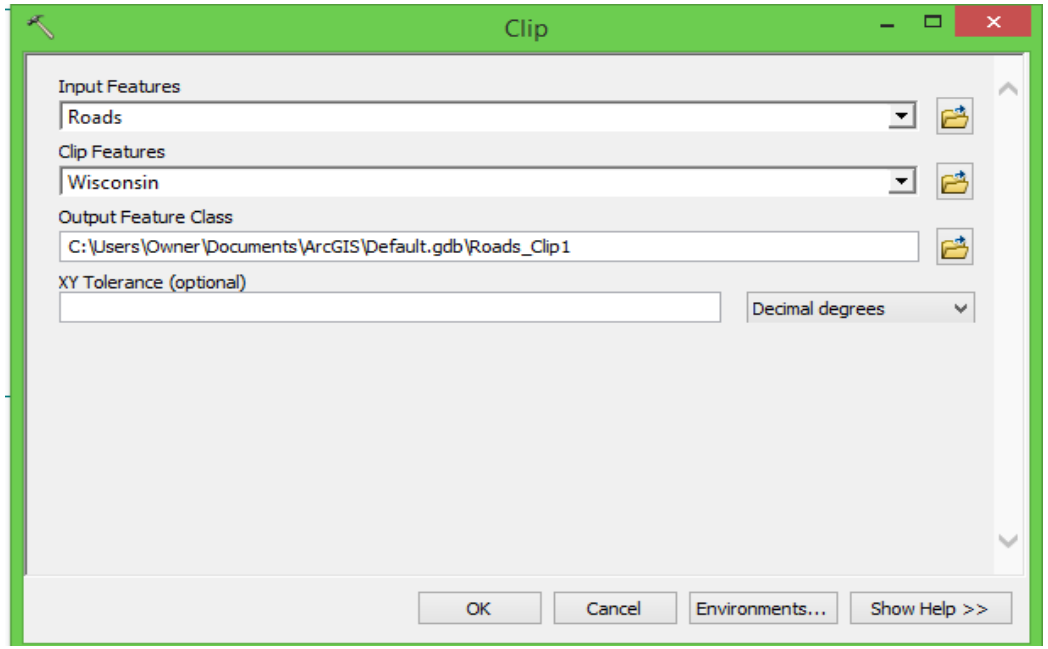
desktop.arcgis.com

What is GIS?

U.S. INTERSTATE EXAMPLE

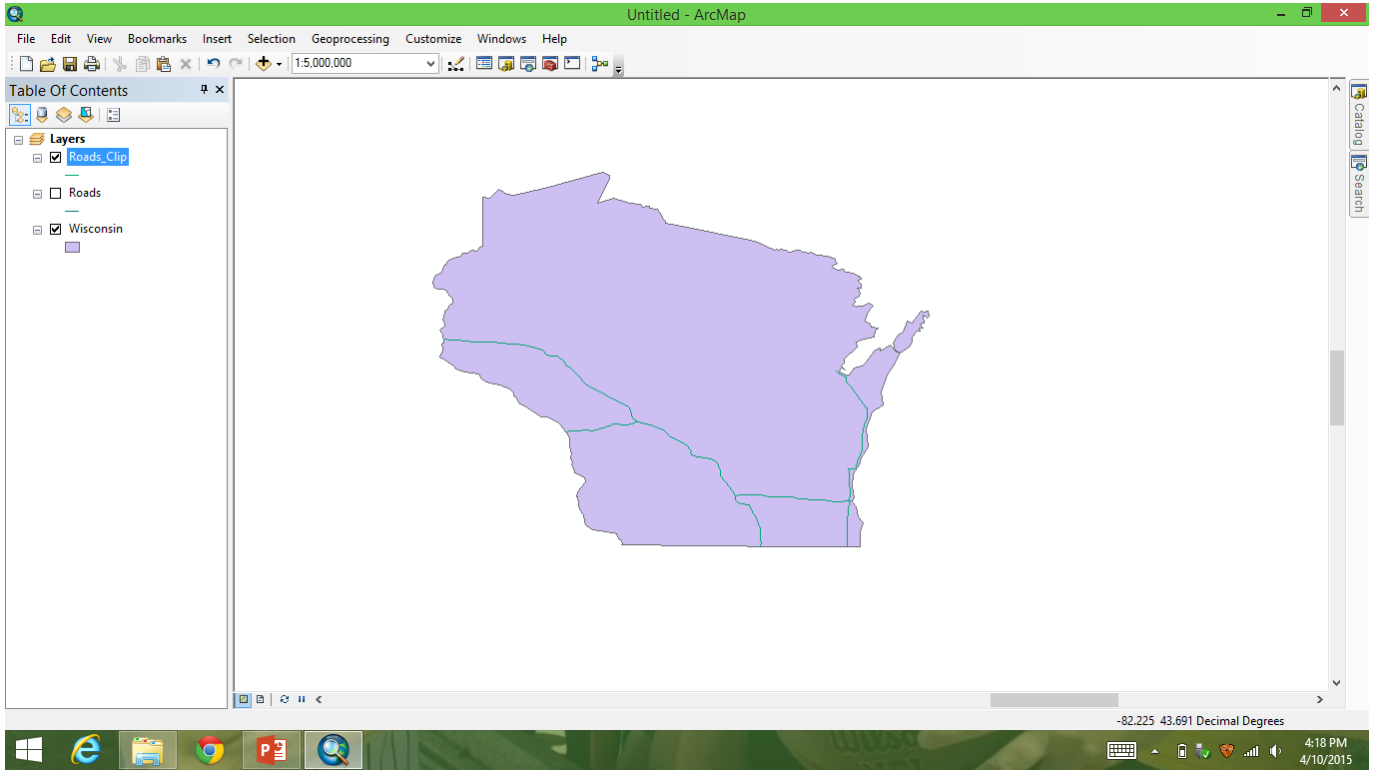


CLIP FUNCTION



What is GIS?

- End result: Interstates in Wisconsin
- Many other functions can be performed



GIS Certificate Program

UW-Madison Geographic Information Systems Capstone Certificate Program

-A one year (post-Bachelor Degree) program

-Enhance Bachelor Degree

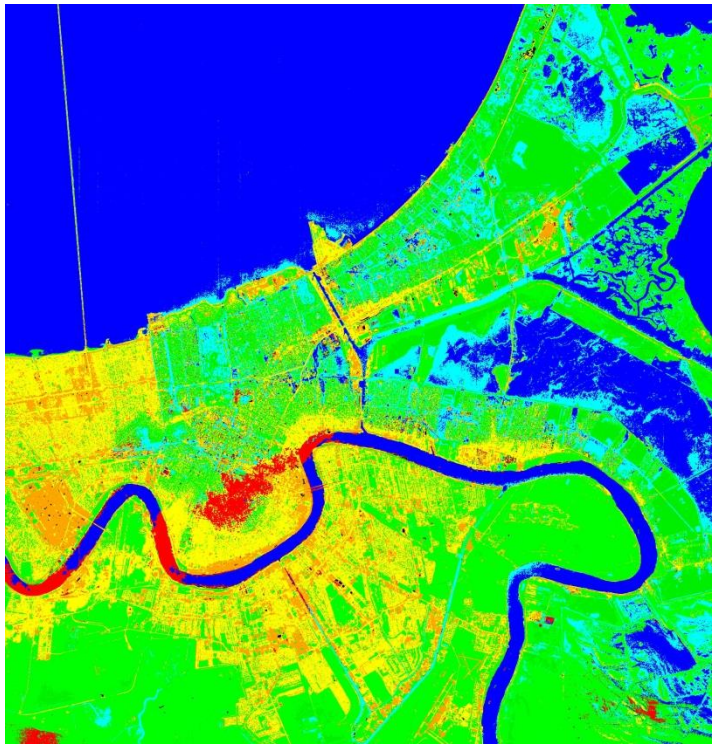
-Classroom Experience

-Workplace Experience with Capstone Project/Internship

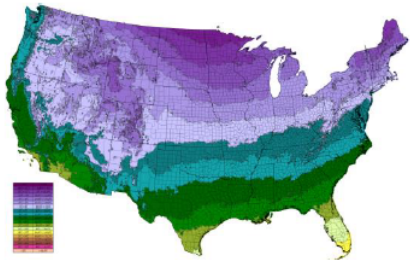
-Workforce or Grad School

Course Work

ENVIRONMENTAL REMOTE SENSING



ADVANCED QUANTITATIVE METHODS



So, using January temperature, fit a quadratic surface

$$\hat{J}AN0 = b_{00} + b_{10}X + b_{01}Y + b_{20}X^2 + b_{02}Y^2 + b_{11}XY$$

[Hint: The linear regression procedure can be used again, but this time the model equation is `JAN0 ~ X + Y + X^2 + Y^2 + X*Y`]

What is R^2? Compared to the linear model, what is the percentage change in R^2? Did R^2 increase by 1%, or 25% or by some other value?

R^2 = 0.9312, which is an increase of 8.9% from the linear model.

Course Work

GEO-COMPUTING

Code Sample

Buffer Example (Python Window)

The following Python Window script demonstrates how to use the Buffer tool:

```
import arcpy
arcpy.env.workspace = "C:/data"
arcpy.Buffer_analysis("roads", "C:/output/majorrdsBuffered" "100 Feet", "FULL", "ROUND"
```

Buffer Example (Stand-alone Script)

Find areas of suitable vegetation that exclude areas heavily impacted by major roads:

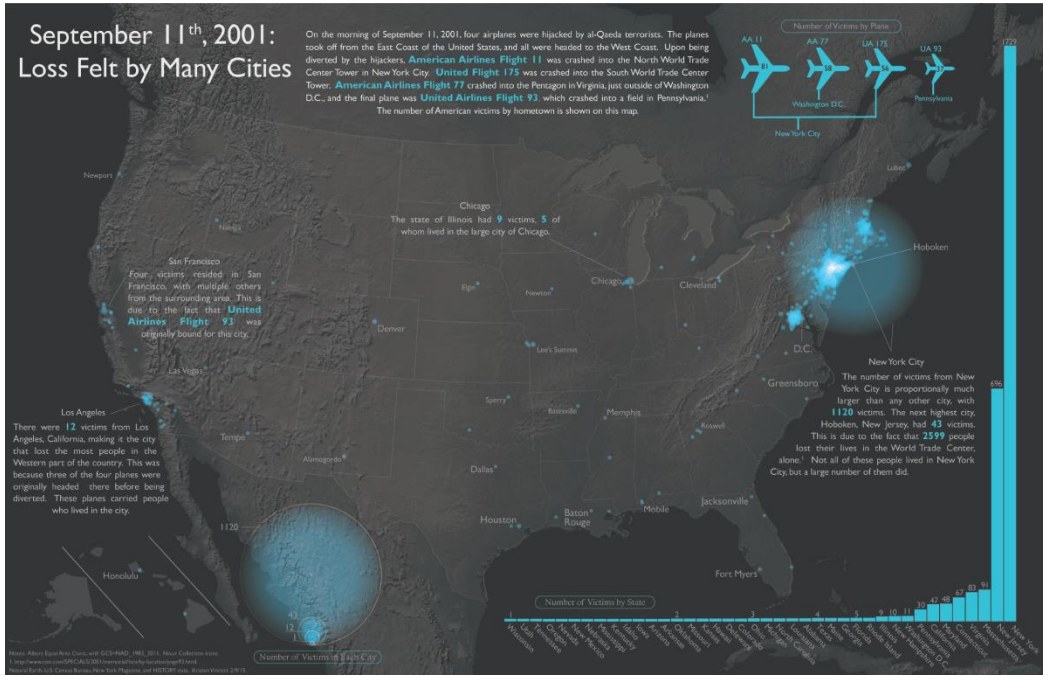
```
# Name: Buffer.py
# Description: Find areas of suitable vegetation which exclude areas heavily impacted b
# Author: ESRI

# import system modules
import arcpy
from arcpy import env

# Set environment settings
```

gispathway.com

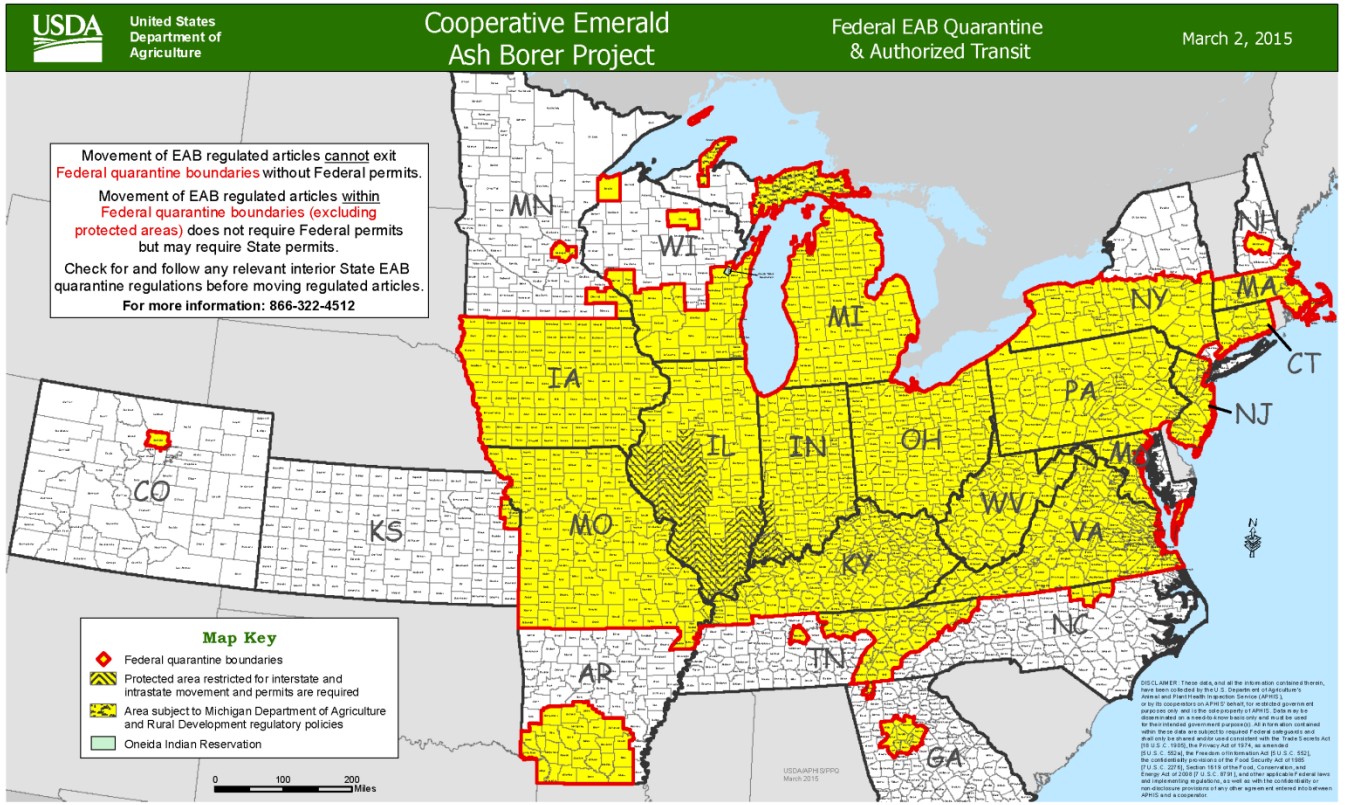
CARTOGRAPHY



Natural Science Application

Spread of the Emerald Ash Borer

- Native to Asia
- Came to the U.S. in 2002
- Feed on inner bark of ash trees, hindering their ability to transport water and nutrients (USDA)
- Environmental and economic effects



aphis.usda.gov

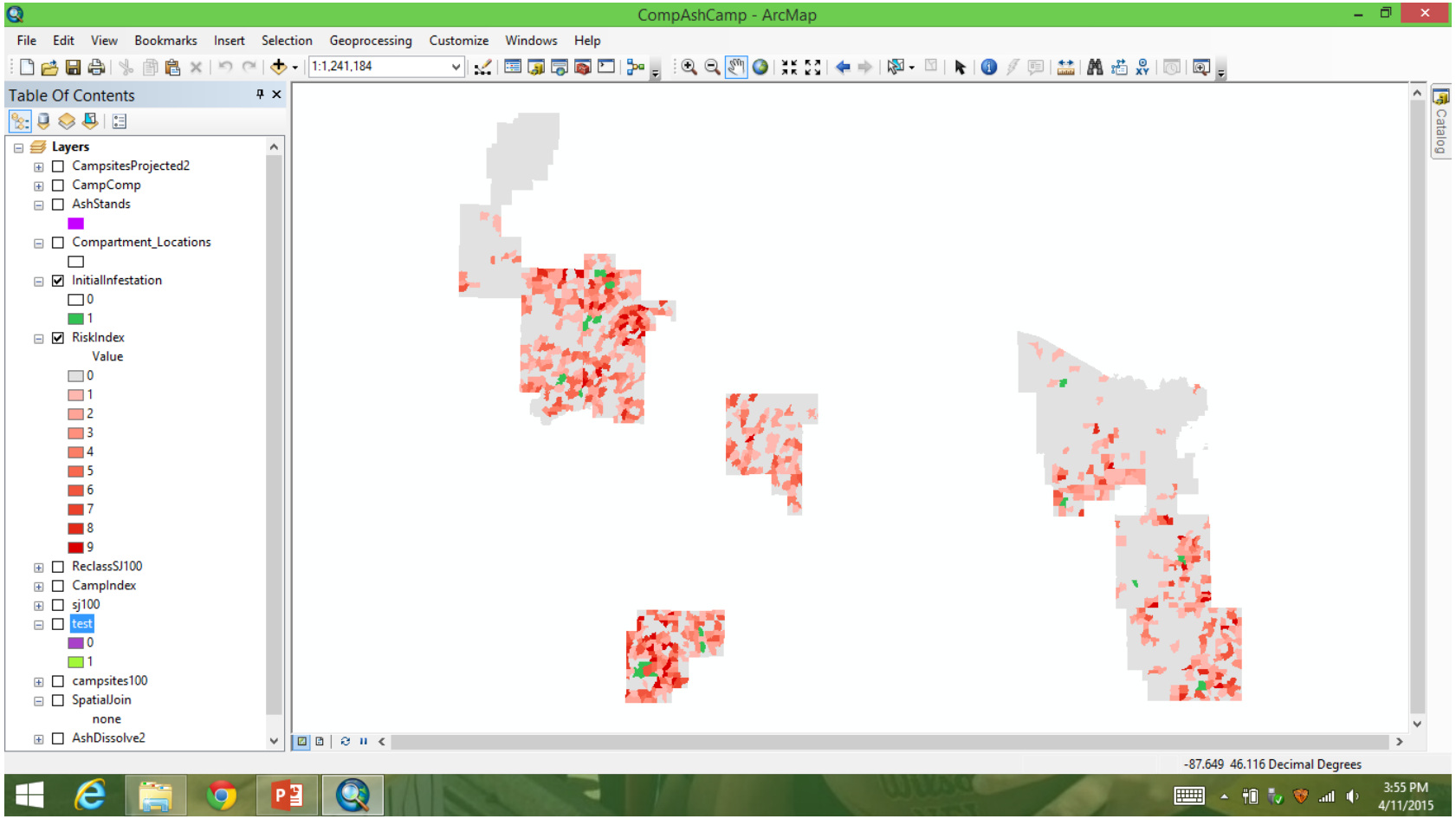
Background

- Our research question: How do human activities affect potential future spread of the Emerald Ash Borer within the CNNF?
- Study Area-Chequamegon-Nicolet National Forest
- Focus on spread from firewood
- Can spread through saw mills and nurseries, too

fs.usda.gov

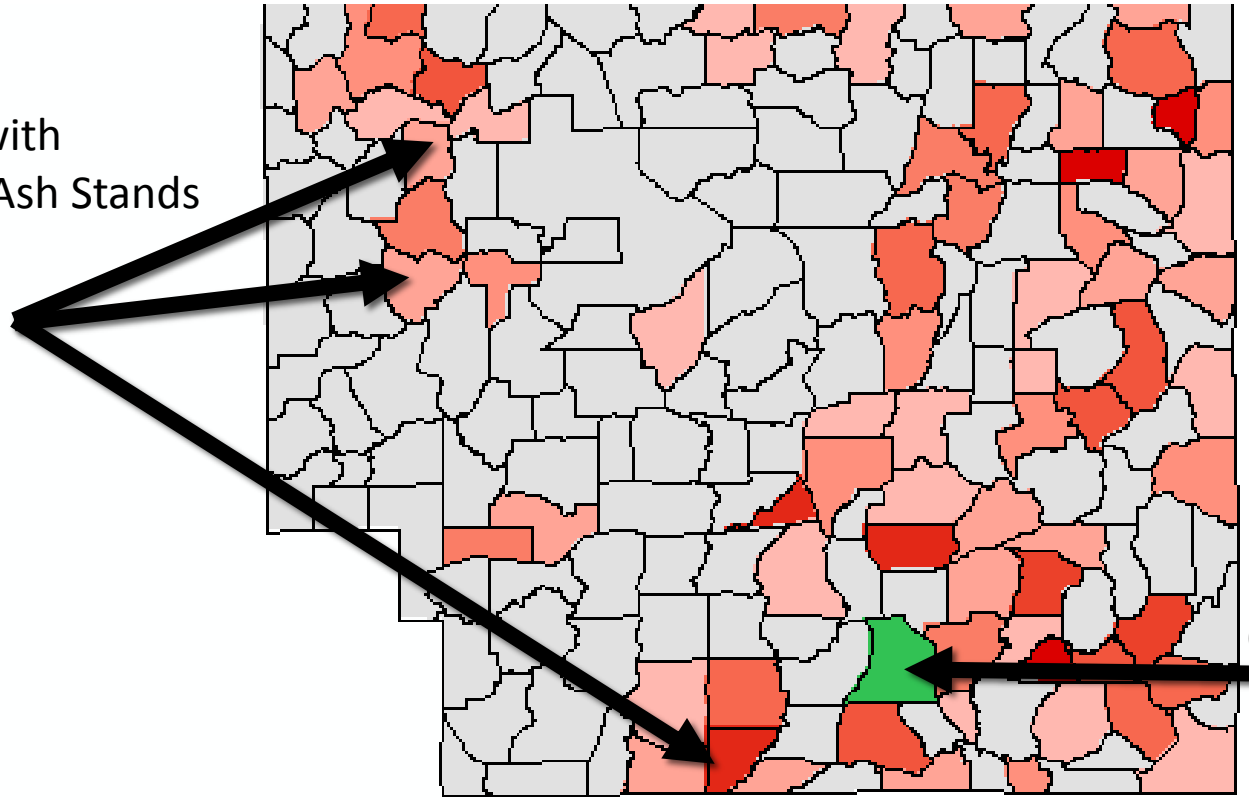
Process

- Find campsites
- Find compartments with both campsites and ash stands
- Code spread radius from campsites/ash stand starting point

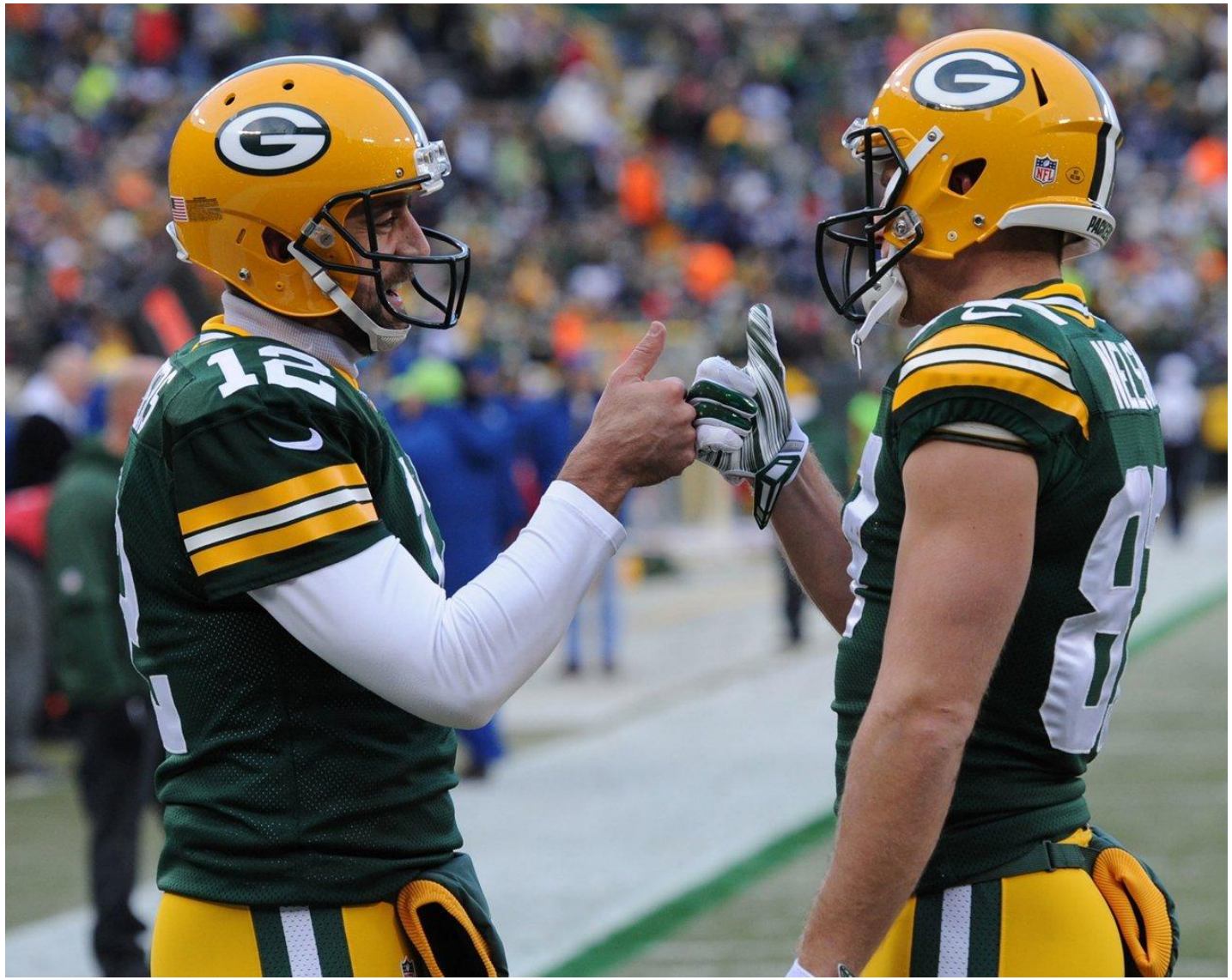


Results

Compartments with
Varying Percentages of Ash Stands



Compartments with Ash Stand
and Campground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Social Science Application

- Site selection for a new City Stadium-1956
- New site or current site
- Manual survey by Osborn Engineering Company
- If GIS were in use at the time, would the result have been the same?
- Using GIS to explain the history

packershistory.net

Process

- Collect maps of the city from 1956
- Define constraints
  - Soil type
  - Parking
  - Ease of accessibility-roads
- Soil data
- Road data-from maps

GREEN BAY, WIS., TUESDAY EVENING, JULY 17, 1956 — GAZETTE ESTABLISHED IN FEBRUARY, 1883 FREE PRESS, ESTABLISHED IN MAY, 1914 — PRICE 6c

Council Approves New Site For Stadium by 17-7 Vote

Name Katers Chairman Of Brown County Board

Preble Official Chosen on Second Ballot Over Denissen; Highway Bond Sale Okayed

Kenneth Katers, chairman of the Town of Preble, today won election as new Brown County Board chairman.

Katers, 32, was elected on the second ballot on which he polled 30 votes against 16 for Sup. Roman Denissen, Green Bay City Council president, three votes for Sup. Leo Bordeleau, Ashwaubenon, and one vote for Sup. Harold Reynolds, Green Bay.

Katers will serve the remainder of the term of the late E. J. Smith, who died July 4. His father, the late Henry Katers, served as county chairman for 16 years until his

$880,000 More Required for Lake Project

Council Authorizes Negotiations for Additional Funds

An additional $880,000 will have to be borrowed to complete the Lake Michigan water supply project.

Paul Speer, Chicago, financial consultant for the Water Commission, gave that report to the City Council meeting as

Highland Ave.-Ridge Road Area Picked; Four Steps Leading to Building Set

With 17-7 votes, the City Council Monday night selected Highland Avenue at Ridge Road for the site of Green Bay's new stadium and approved Mayor Otto Rachals' plan of four preliminary steps leading to construction.

The Council met as a committee of the whole, and its actions will be formalized tonight as part of its regular session.

The four steps outlined by Rachals and approved by the Council were:

1. Purchase of the 53-acre site on a three-year term basis with a down payment of $26,000 to be advanced by the Packer Corp. as part of its pledge to pay half of a $960,000 bond issue over 20 years. The sale will stipulate that the

Defense Wins Right To Check Marines' Poll

Results

	Soil	Drive to Each Exit	Average Drive	Parking
Highland	Fill Land	1. 29/32- 3.3 mi 2. 41/141- 3.6mi 3. 41 South- 0.9mi	2.6mi	7,977 cars
Perkins	Allendale Loamy Fine Sand, Manawa Silty Clay Loam, Oshkosh Silt Loam, Poygan Silty Clay Loam	1. 29/32- 2.2 mi 2. 41/141- 1.4 mi 3. 41 South- 3.2mi	2.3mi	7,607 cars
City	Allendale Loamy Fine Sand, Fill Land	1. 29/32-4.6 mi 2. 41/141- 4.6 mi 3. 41 South- 3.6 mi	4.3mi	32,733 cars
Hurlbut	Fill Land	1. 29/32- 3.6 mi 2. 41/141- 3.2 mi 3. 41 South- 2.8 mi	3.2mi	45,388 cars

Questions?

Feel free to contact me at kvincent2@wisc.edu

Or visit geography.wisc.edu