

Prioritizing Places

An Application of Arc GIS 9.1 Network Analyst
to inform recreation planning in Wisconsin

Presentation to the ESRI Wisconsin Users Group
November 11, 2005



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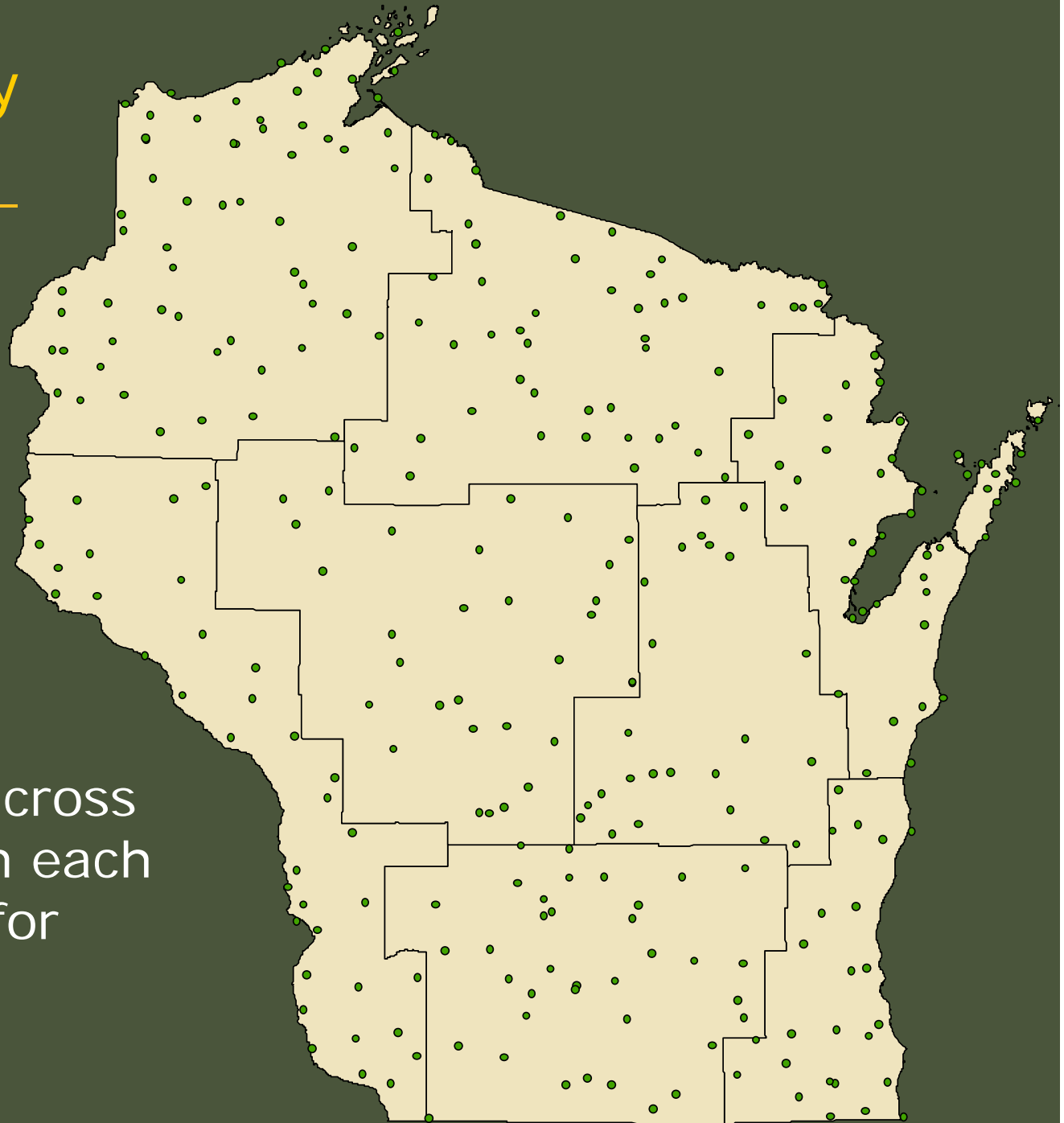


Background

- The Applied Population Lab
 - Social and economic data
 - Geo-demographic analysis
- The Recreation Planning Issue
 - What is SCORP?
 - Identify places for acquisition and development
- Starting point: Land Legacy Place Study

Land Legacy Places

Goal: Prioritize Legacy Places across state and within each SCORP Region for acquisition and development

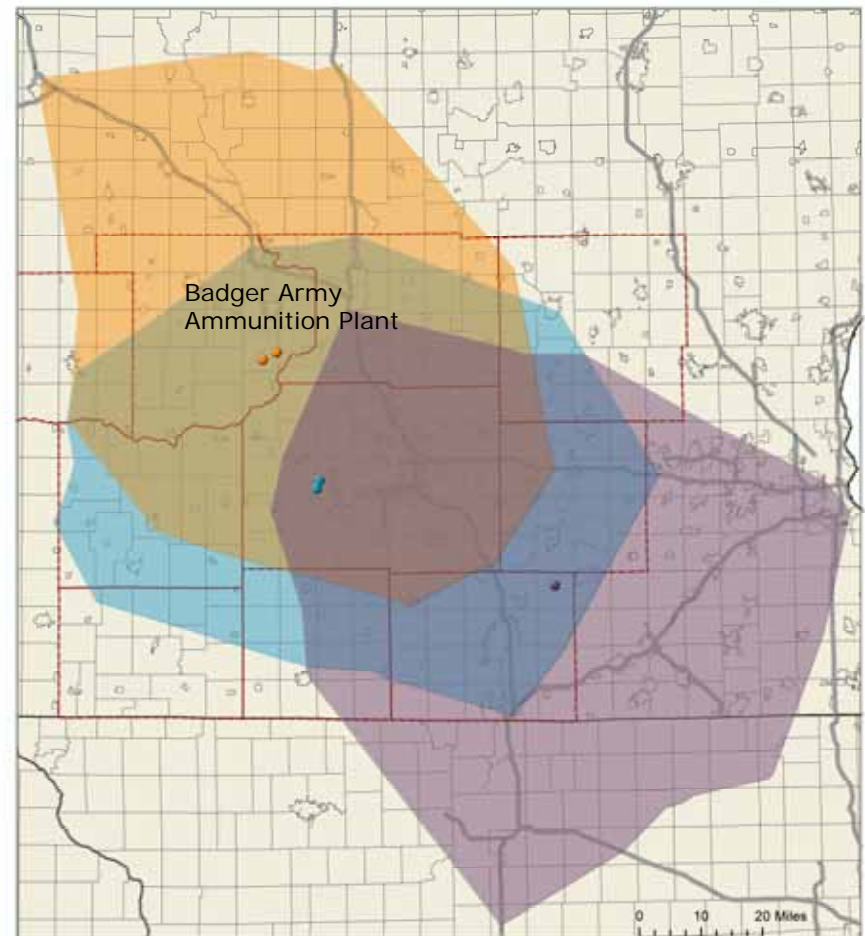


Methods: 6 Components

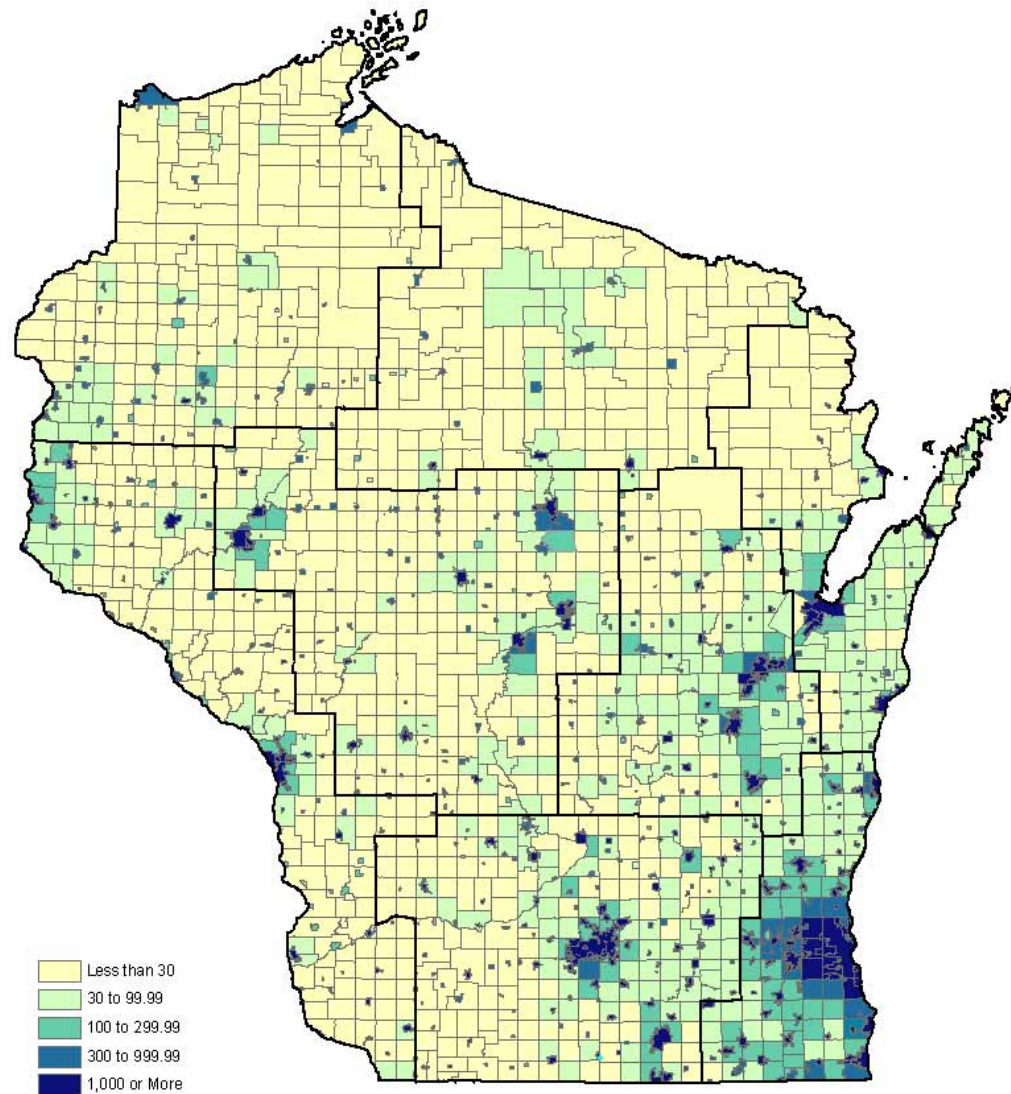
1. **Number of potential visitors**
 - How many people live within an hour's drive?
2. **Population/development pressure**
 - How much growth is projected for the area?
3. **Cost of land for acquisition**
 - What is the value of undeveloped land?
4. **Conservation significance**
 - Is the Place important in meeting conservation needs?
5. **Recreation potential**
 - Is the place a "neat" place to recreate?
6. **Recreation use**
 - Does the place provide access for recreation activities that are in high demand?

1- Potential Visitors:

- ❑ 1-hour Drive?
- ❑ Roads data & Network Analyst
- ❑ MCDs that intersect buffers
- ❑ Sum 2003 population estimates for MCDs




Persons per Square Mile, 2003
Calculated at the Municipal Level



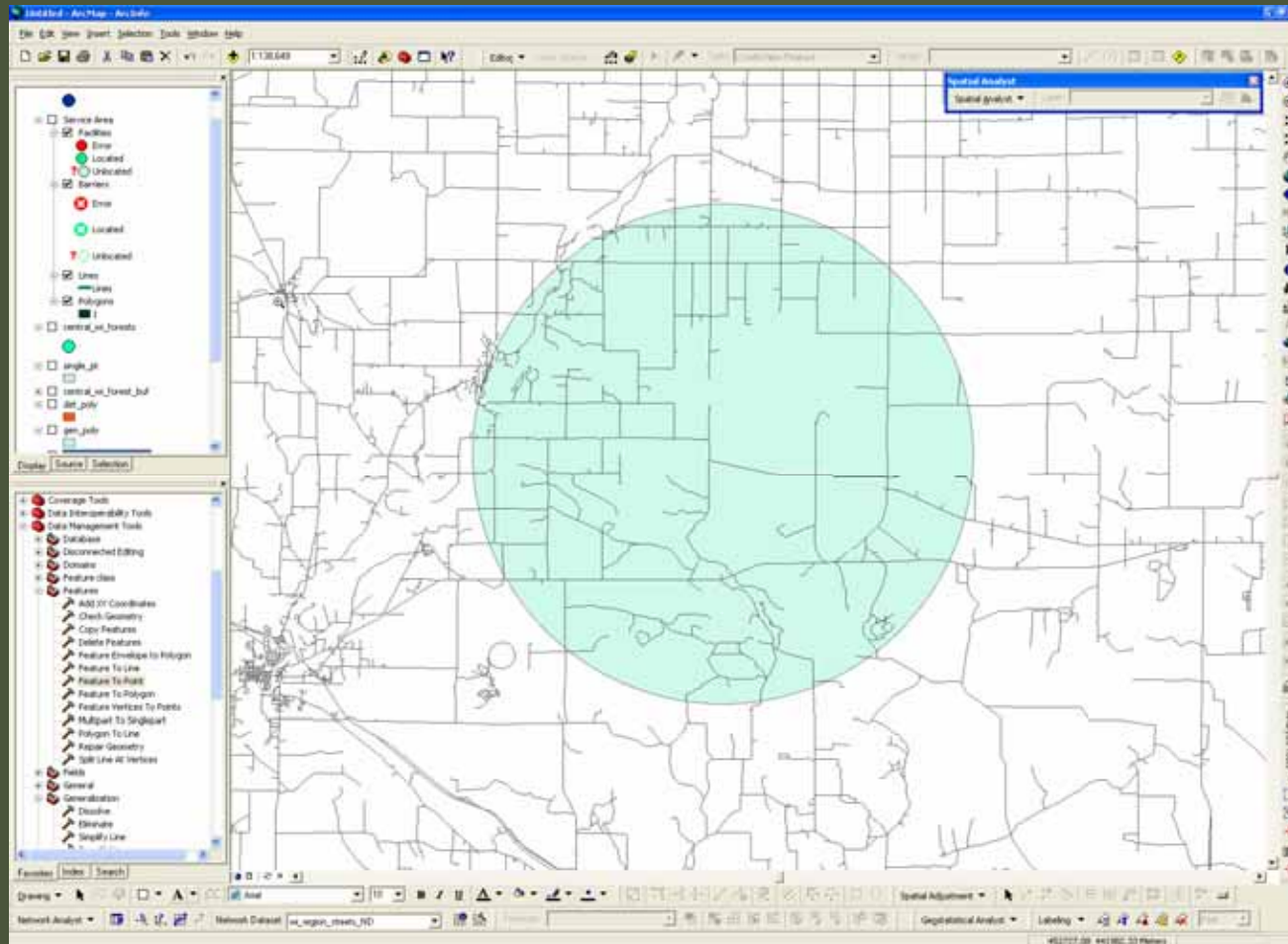
Sources: Wisconsin DOA 2005, TIGER 2003

Network Analyst – ArcView 3.3 v ArcGIS 9.1

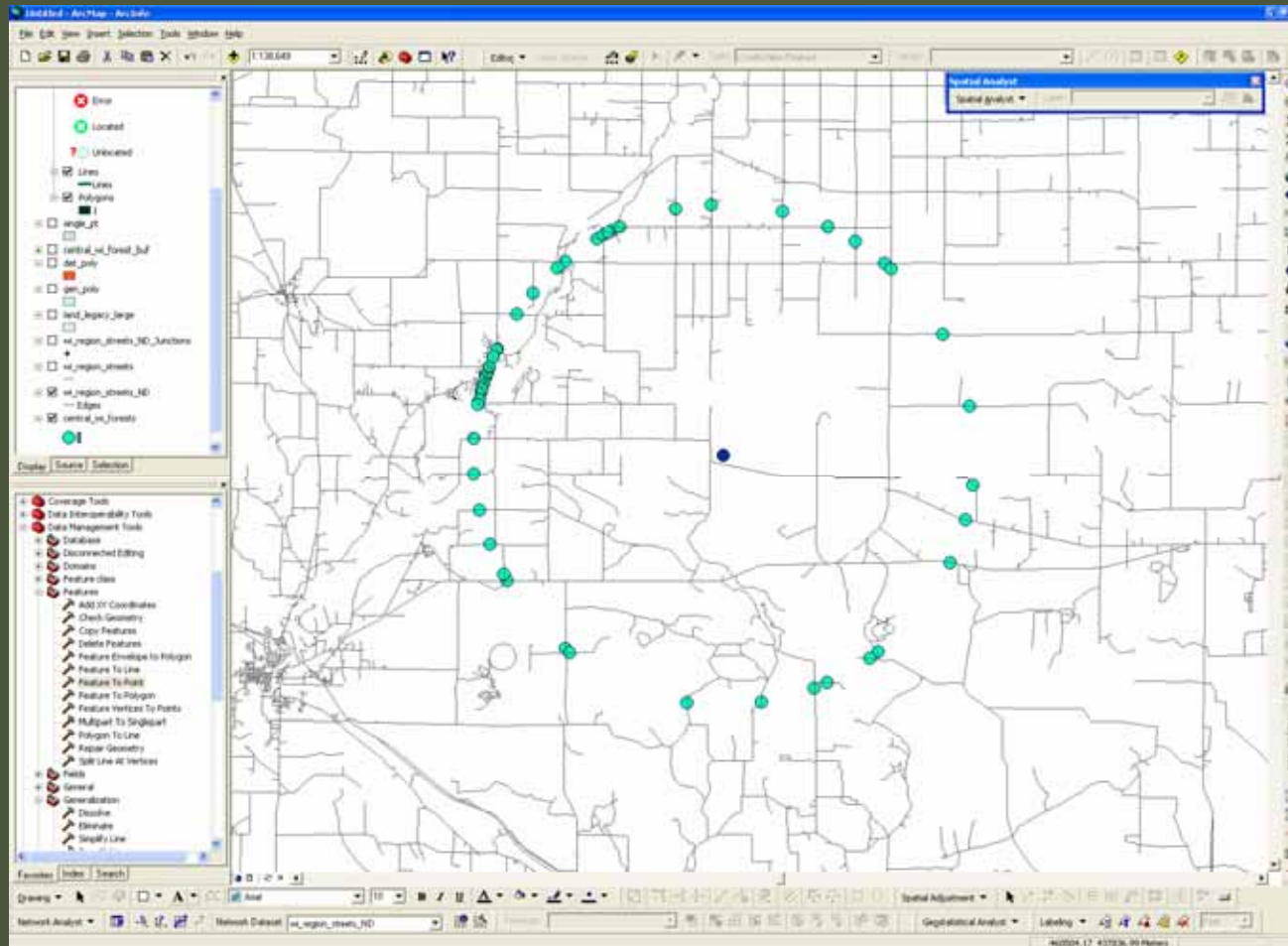


Methods and Comparisons

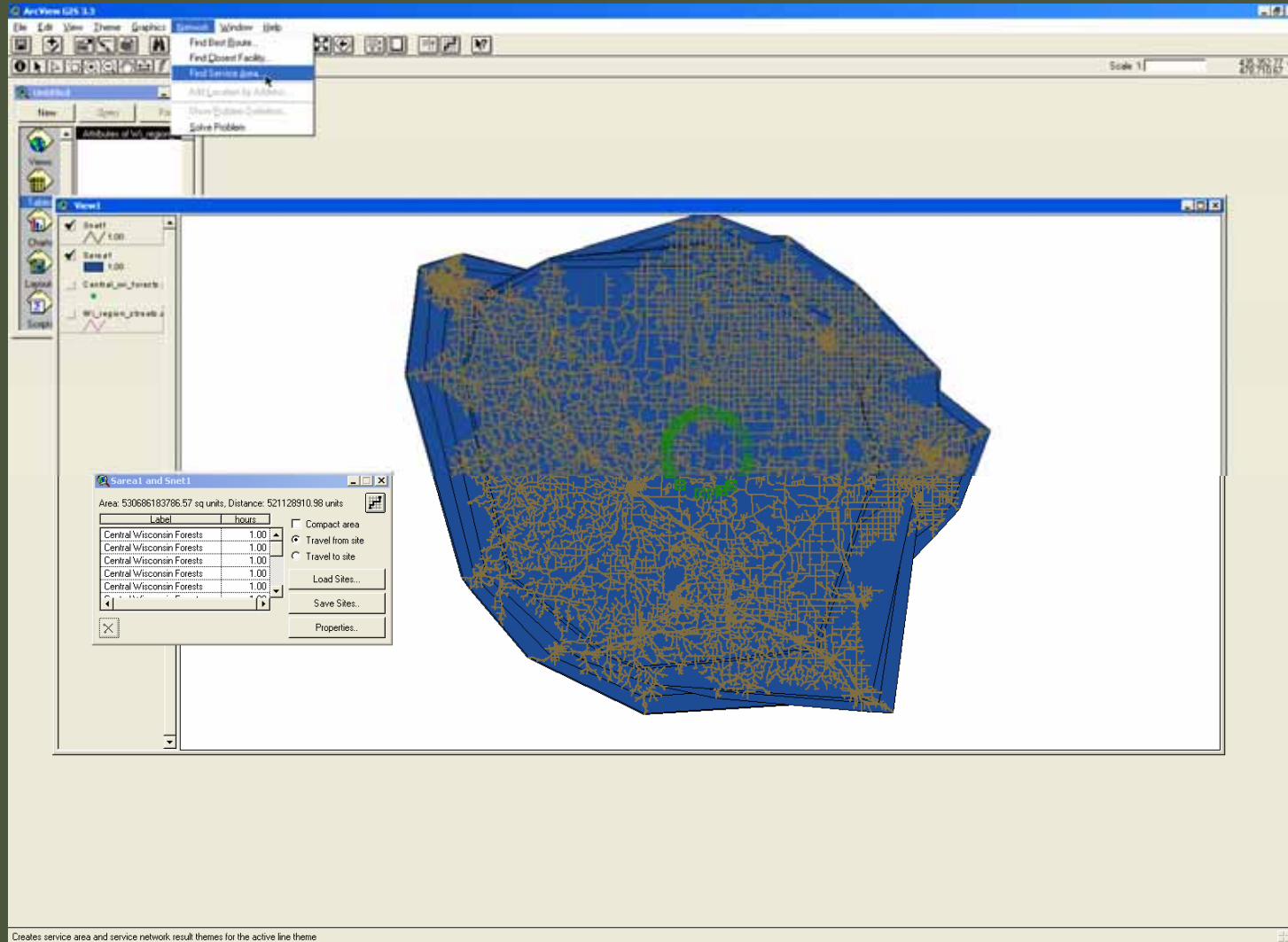
Starting Land Legacy Point



Facility Creation



ArcView 3.3 Network Analyst



Network Cost Field (AV3.3)

The screenshot shows the ArcCatalog interface with the metadata for the file 'central_wi_forests.shp'. The metadata table is displayed in the 'Metadata' tab, showing a list of records with columns for 'Shape Area', 'LABEL', and 'REPORTCOST'. The 'REPORTCOST' column contains the value '1' for all records.

Shape Area	LABEL	REPORTCOST
404687138.777	Central Wisconsin Forests0	1
404687138.777	Central Wisconsin Forests1	1
404687138.777	Central Wisconsin Forests2	1
404687138.777	Central Wisconsin Forests3	1
404687138.777	Central Wisconsin Forests4	1
404687138.777	Central Wisconsin Forests5	1
404687138.777	Central Wisconsin Forests6	1
404687138.777	Central Wisconsin Forests7	1
404687138.777	Central Wisconsin Forests8	1
404687138.777	Central Wisconsin Forests9	1
404687138.777	Central Wisconsin Forests10	1
404687138.777	Central Wisconsin Forests11	1
404687138.777	Central Wisconsin Forests12	1
404687138.777	Central Wisconsin Forests13	1
404687138.777	Central Wisconsin Forests14	1
404687138.777	Central Wisconsin Forests15	1
404687138.777	Central Wisconsin Forests16	1
404687138.777	Central Wisconsin Forests17	1
404687138.777	Central Wisconsin Forests18	1
404687138.777	Central Wisconsin Forests19	1
404687138.777	Central Wisconsin Forests20	1
404687138.777	Central Wisconsin Forests21	1
404687138.777	Central Wisconsin Forests22	1
404687138.777	Central Wisconsin Forests23	1
404687138.777	Central Wisconsin Forests24	1
404687138.777	Central Wisconsin Forests25	1
404687138.777	Central Wisconsin Forests26	1
404687138.777	Central Wisconsin Forests27	1
404687138.777	Central Wisconsin Forests28	1
404687138.777	Central Wisconsin Forests29	1
404687138.777	Central Wisconsin Forests30	1
404687138.777	Central Wisconsin Forests31	1
404687138.777	Central Wisconsin Forests32	1
404687138.777	Central Wisconsin Forests33	1
404687138.777	Central Wisconsin Forests34	1
404687138.777	Central Wisconsin Forests35	1

Type in a location and press Return to go to it

Road Calculation (Meters to Miles)

The screenshot displays the ArcCatalog interface with a metadata table for the file 'wi_region_streets.shp'. The table lists various road segments with columns for STATE_L, STATE_R, STATE, Length, and HOURS. The 'Length' column represents the road length in meters, and the 'HOURS' column represents the calculated time in hours. The status bar at the bottom indicates that 1709289 records are shown.

STATE_L	STATE_R	STATE	Length	HOURS
WI	WI	Wisconsin	72.852381127	0.0012883097815
WI	WI	Wisconsin	34.1649921374	0.000606546911117
WI	WI	Wisconsin	146.637796469	0.00364460007051
WI	WI	Wisconsin	155.527012059	0.00389500019485
WI	WI	Wisconsin	77.7625268704	0.00193277576058
WI	WI	Wisconsin	77.7708022439	0.001902980343211
WI	WI	Wisconsin	156.857360119	0.0039483754886
WI	WI	Wisconsin	148.855871027	0.00389979000065
WI	WI	Wisconsin	148.058132501	0.00389984620924
WI	WI	Wisconsin	127.456324731	0.00316790753704
WI	WI	Wisconsin	99.9807280131	0.0024850057857
WI	WI	Wisconsin	144.424733477	0.0035896547518
WI	WI	Wisconsin	111.088914767	0.00276134860395
WI	WI	Wisconsin	161.08403371	0.00400371912154
WI	WI	Wisconsin	158.965321304	0.00397591368509
WI	WI	Wisconsin	75.5379958581	0.00187748538111
WI	WI	Wisconsin	149.96595801	0.00372738104352
WI	WI	Wisconsin	143.314587875	0.00356206225196
WI	WI	Wisconsin	144.424665695	0.00358965306708
WI	WI	Wisconsin	275.503834419	0.00684760583974
WI	WI	Wisconsin	90.0784930298	0.0022388872235
WI	WI	Wisconsin	150.001369271	0.00372826118502
WI	WI	Wisconsin	210.001765156	0.00521956188548
WI	WI	Wisconsin	22.225600516	0.000552413915422
WI	WI	Wisconsin	191.117220725	0.00475018941014
WI	WI	Wisconsin	278.874320572	0.00693137875968
WI	WI	Wisconsin	66.6685324747	0.00165703621971
WI	WI	Wisconsin	155.558827063	0.00386639095193
WI	WI	Wisconsin	100.038521884	0.00248644223256
WI	WI	Wisconsin	296.62921822	0.0073726740363
WI	WI	Wisconsin	149.985712306	0.00372787203354
WI	WI	Wisconsin	231.085735844	0.00574360076542
WI	WI	Wisconsin	157.764076775	0.00392120209762
WI	WI	Wisconsin	84.4430085437	0.00209881811499
WI	WI	Wisconsin	102.218856732	0.0025406341141
WI	WI	Wisconsin	282.191145308	0.00701381793328

Network Analyst Properties (AV 3.3)

1

The screenshot shows the 'Properties' dialog box for a network theme. The 'Line Theme' is 'Wi_region_streets.shp'. The 'Cost field' is set to 'Hours'. The 'Cost units' are 'hours'. The 'Working units' are 'hours'. The 'Round values at' is 'd.dd'. There is a checkbox for 'Make default' which is unchecked. 'OK' and 'Cancel' buttons are at the bottom.

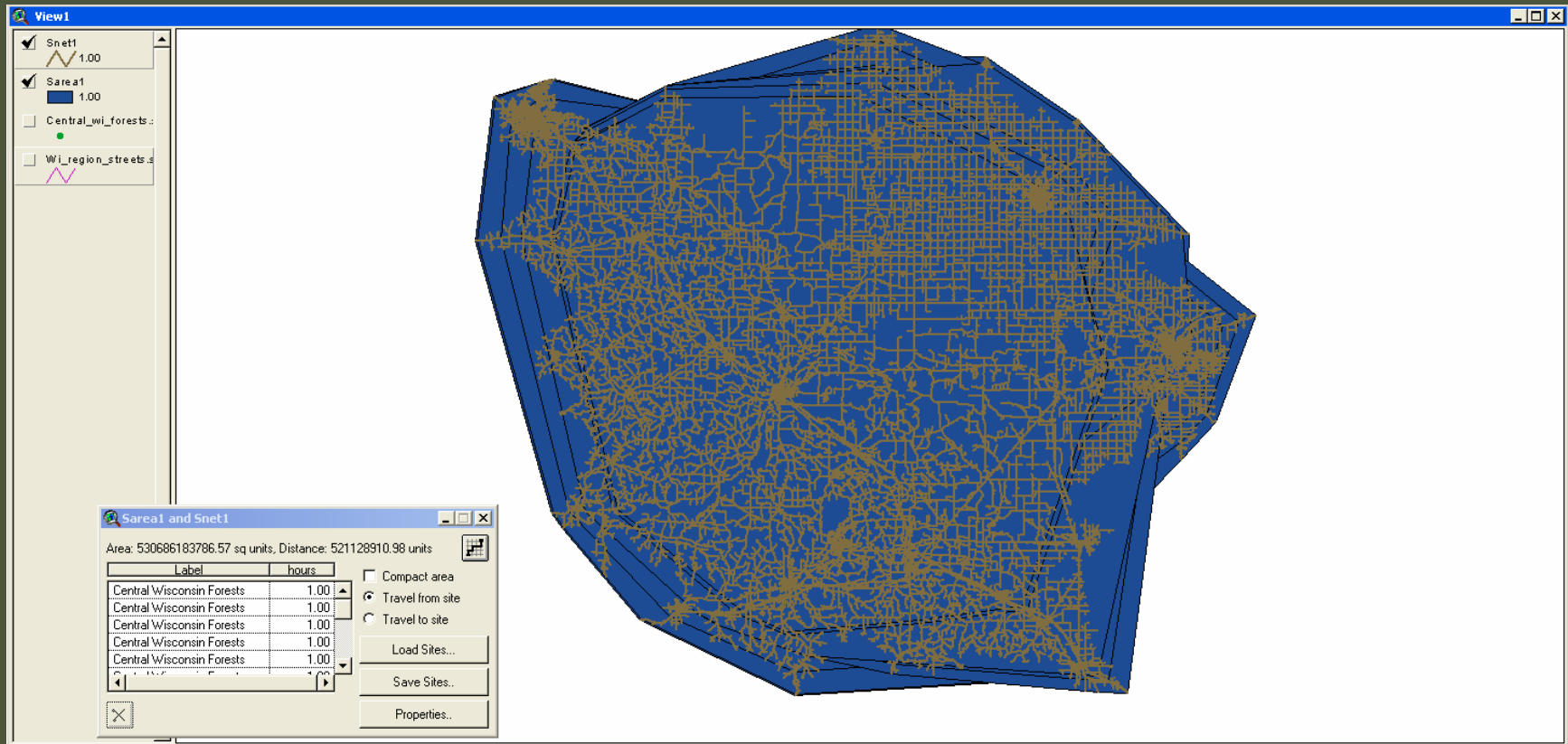
Line Theme: Wi_region_streets.shp
Cost field: Hours
Cost units: hours
Working units: hours
Round values at: d.dd
 Make default
OK Cancel

2

The screenshot shows the 'Sarea1 and Snet1' dialog box. It displays 'Area: 530686183786.57 sq units, Distance: 521128910.98 units'. Below this is a table with two columns: 'Label' and 'hours'. The table contains five rows, all with 'Central Wisconsin Forests' in the 'Label' column and '1.00' in the 'hours' column. To the right of the table are three radio buttons: 'Compact area' (unchecked), 'Travel from site' (checked), and 'Travel to site' (unchecked). Below the radio buttons are three buttons: 'Load Sites...', 'Save Sites.', and 'Properties..'. There is also a small grid icon in the top right corner.

Area: 530686183786.57 sq units, Distance: 521128910.98 units
Label hours
Central Wisconsin Forests 1.00
Central Wisconsin Forests 1.00
Central Wisconsin Forests 1.00
Central Wisconsin Forests 1.00
Central Wisconsin Forests 1.00
 Compact area
 Travel from site
 Travel to site
Load Sites..
Save Sites..
Properties..
Close

ArcView 3.3 Result

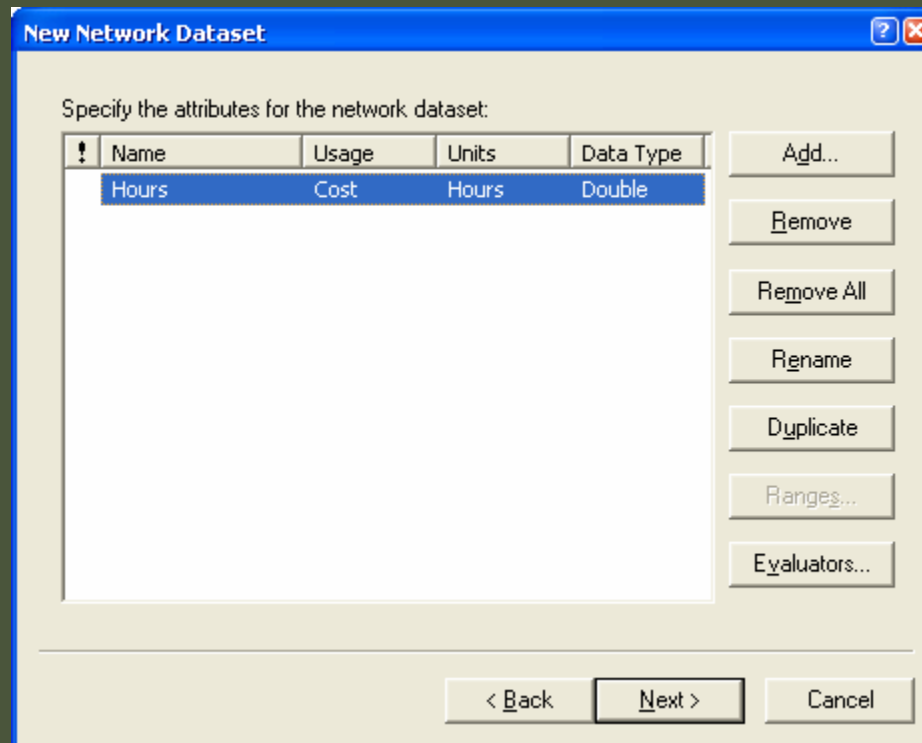


ArcGIS 9.1 Network Creation

The screenshot shows the ArcCatalog 9.1 interface. The main window displays a table of street data with columns: STATE_L, STATE_R, STATE, Length, and HOURS. A context menu is open over the table, with 'New Network Dataset...' selected. The menu also includes options like Copy, Delete, Rename, Create Layer..., Export, Review/Repatch Addresses..., and Properties... The background shows the ArcCatalog interface with various toolbars and a file tree on the left.

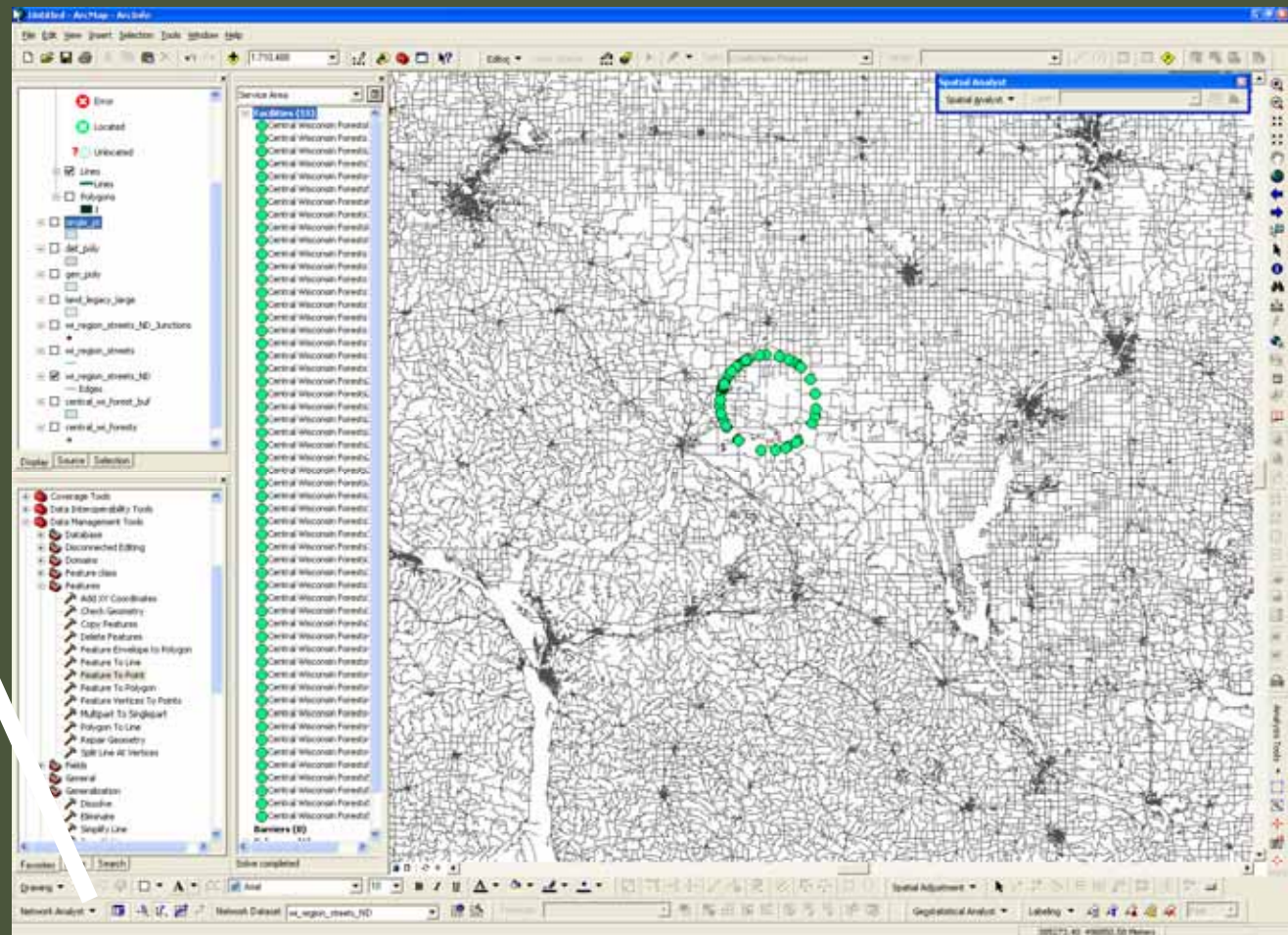
STATE_L	STATE_R	STATE	Length	HOURS
WI	WI	Wisconsin	72.652361127	0.00126983097815
WI	WI	Wisconsin	34.1649921374	0.000606546911117
WI	WI	Wisconsin	146.637796469	0.00364466007051
WI	WI	Wisconsin	155.527012059	0.00386580019485
WI	WI	Wisconsin	77.7625268704	0.00193277576058
WI	WI	Wisconsin	77.7700022439	0.001932290343211
WI	WI	Wisconsin	158.857360119	0.00394103754806
WI	WI	Wisconsin	148.855871027	0.00369979000065
WI	WI	Wisconsin	148.859132501	0.00369984620924
WI	WI	Wisconsin	127.456324731	0.00316790753704
WI	WI	Wisconsin	99.9607200131	0.0024850057657
WI	WI	Wisconsin	144.424733477	0.0035896547518
WI	WI	Wisconsin	111.098914767	0.00276134660395
WI	WI	Wisconsin	161.08403371	0.00400371912154
WI	WI	Wisconsin	159.965321304	0.00397591369509
WI	WI	Wisconsin	75.5379988881	0.00187748538111
WI	WI	Wisconsin	149.96595801	0.00372738104352
WI	WI	Wisconsin	143.314587875	0.00356206225196
WI	WI	Wisconsin	144.424665695	0.00358965306708
WI	WI	Wisconsin	275.503634419	0.00684760583974
WI	WI	Wisconsin	90.0784930298	0.0022388872235
WI	WI	Wisconsin	150.001369271	0.00372826118502
WI	WI	Wisconsin	210.001765156	0.00521956188548
WI	WI	Wisconsin	22.225600516	0.000552413915422
WI	WI	Wisconsin	191.117220725	0.00475018941014
WI	WI	Wisconsin	278.874320572	0.00693137875968
WI	WI	Wisconsin	66.6685324747	0.00165703621971
WI	WI	Wisconsin	155.558827063	0.00386639095193
WI	WI	Wisconsin	100.038521884	0.00248644222356
WI	WI	Wisconsin	296.62921822	0.0073726740363
WI	WI	Wisconsin	149.985712306	0.00372787203354
WI	WI	Wisconsin	231.085735844	0.00574360076542
WI	WI	Wisconsin	157.764076775	0.00392120209762
WI	WI	Wisconsin	84.4430085437	0.00209881811499
WI	WI	Wisconsin	102.218856732	0.0025406341141
WI	WI	Wisconsin	282.191145308	0.00701381793328

Source: StreetMap USA

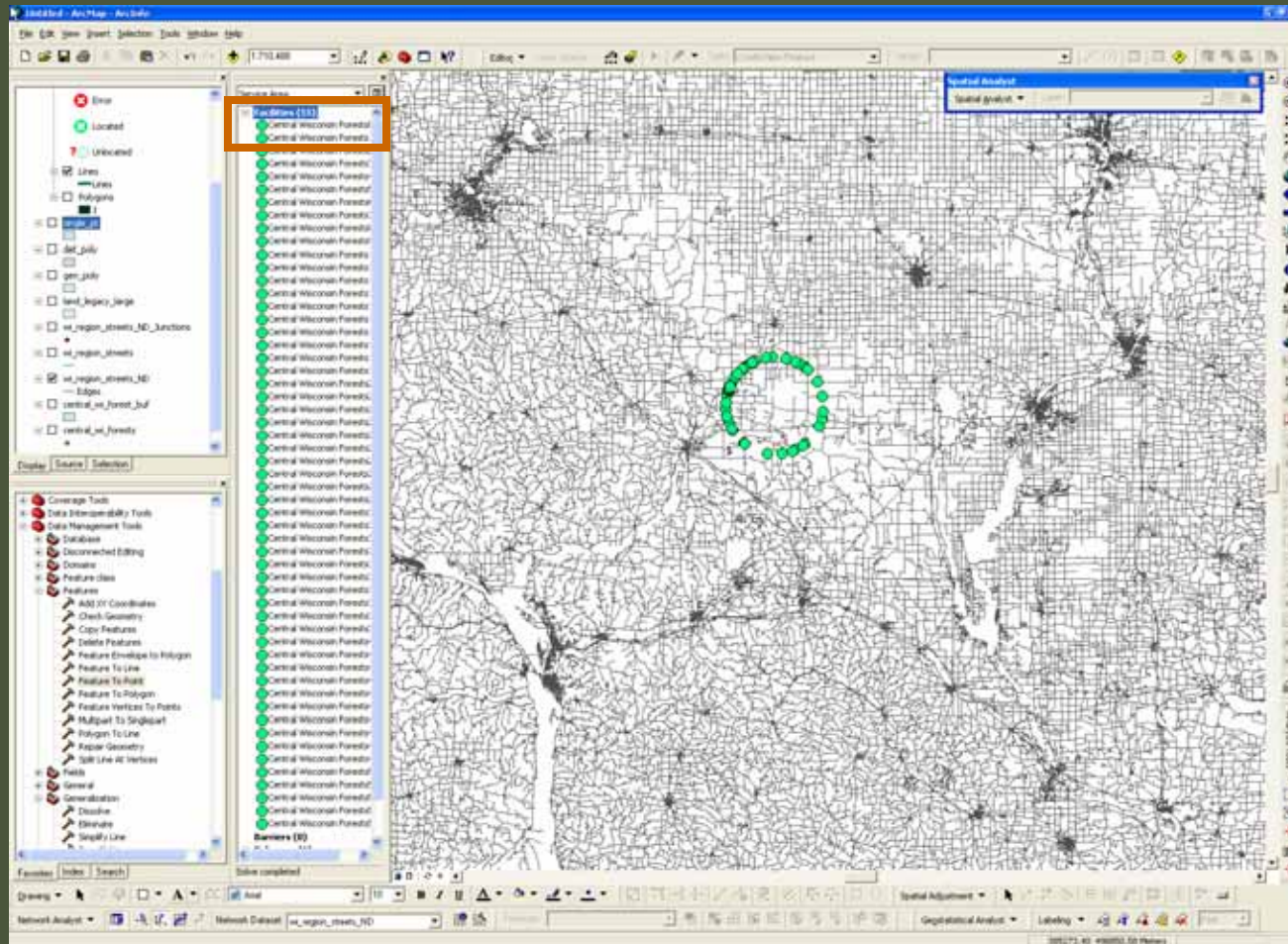


Starting Network Analyst

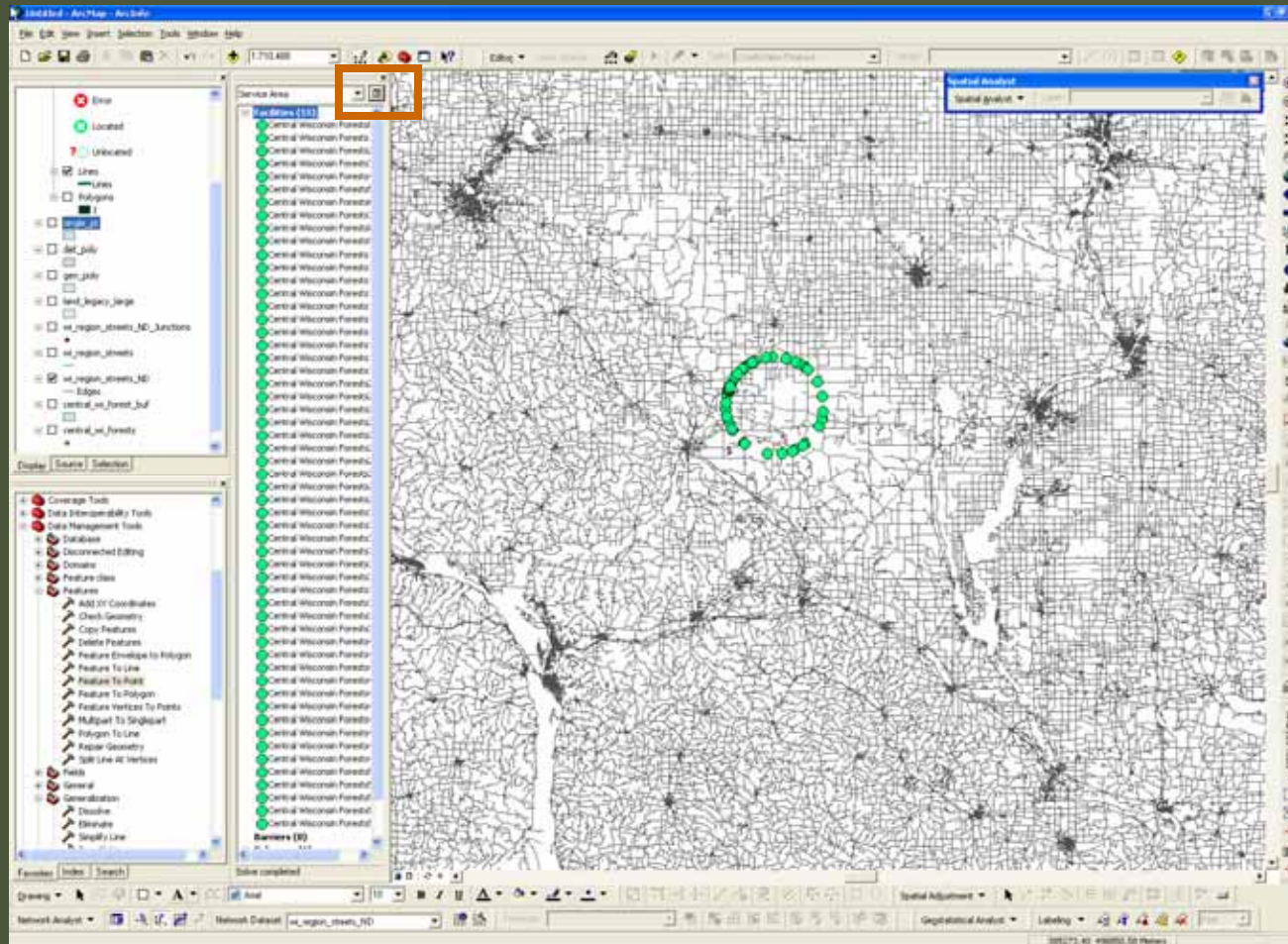
- New Route
- New Service Area
- New Closest Facility
- New OD Cost Matrix
- Options...



Loading Facilities



Network Properties



Settings

The image shows a screenshot of the "Layer Properties" dialog box, specifically the "Analysis Settings" tab. The dialog box has a blue title bar with a question mark and a close button. The tabs at the top are "General", "Source", "Analysis Settings", "Polygon Generation", "Line Generation", "Accumulation", and "Network Locations".

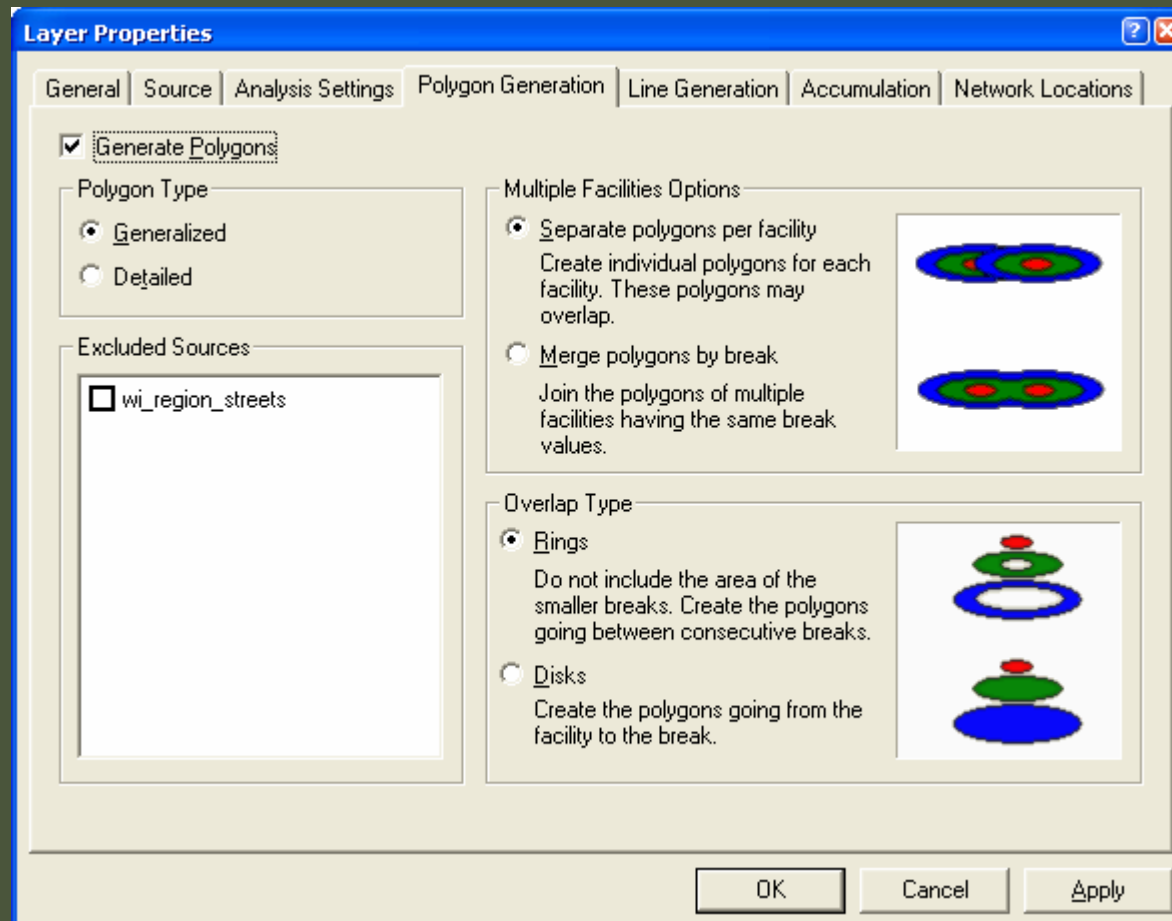
The "Settings" section on the left contains the following controls:

- Impedance:** A dropdown menu currently showing "Hours (Hours)".
- Default Breaks:** A text input field containing the number "1".
- Direction:** Two radio buttons: "Away From Facility" (selected) and "Towards Facility".
- Allow U-Turns:** A dropdown menu currently showing "Everywhere".
- Ignore Invalid Locations**

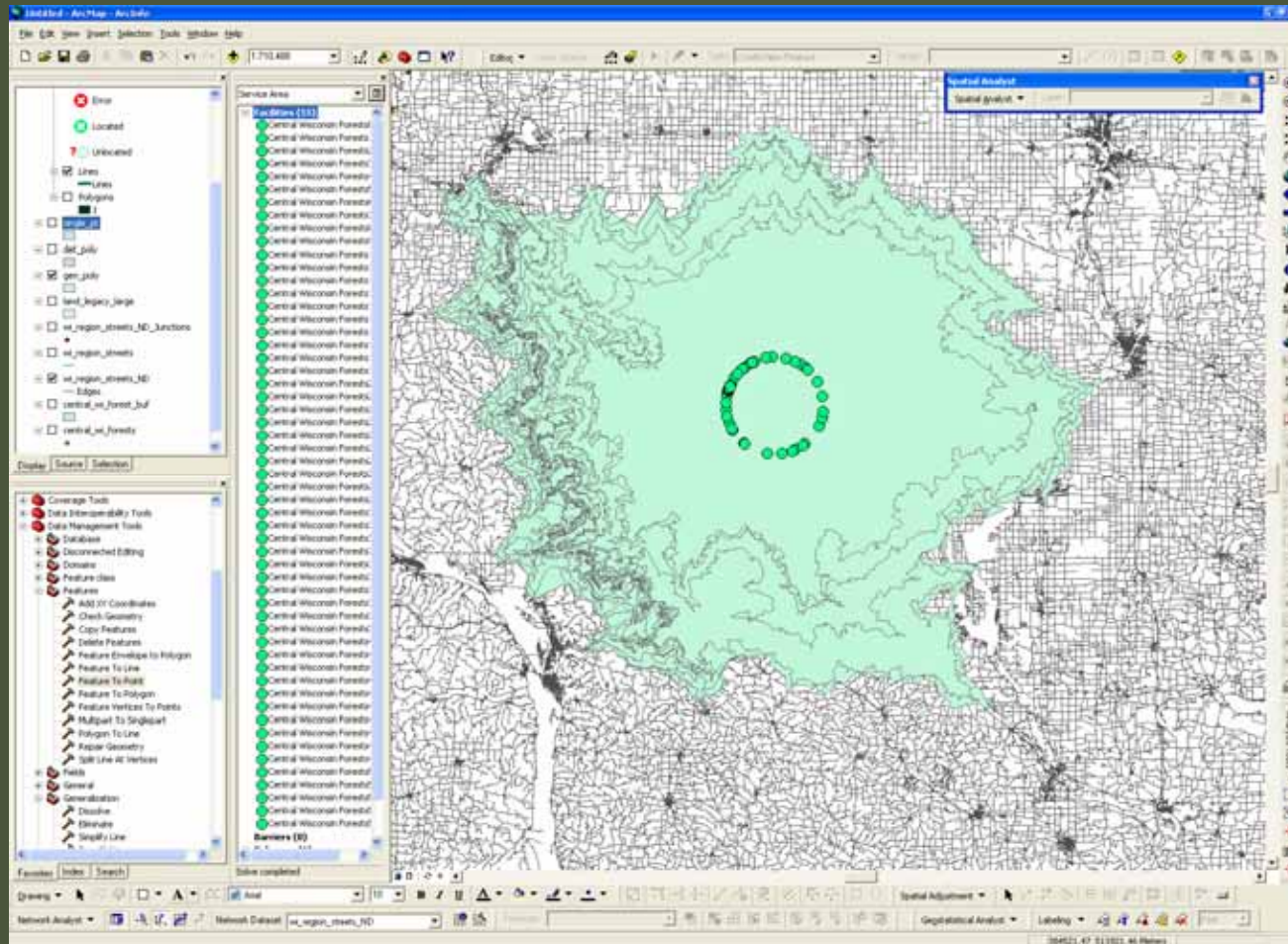
The "Restrictions" section on the right is an empty rectangular area.

At the bottom of the dialog box are three buttons: "OK", "Cancel", and "Apply".

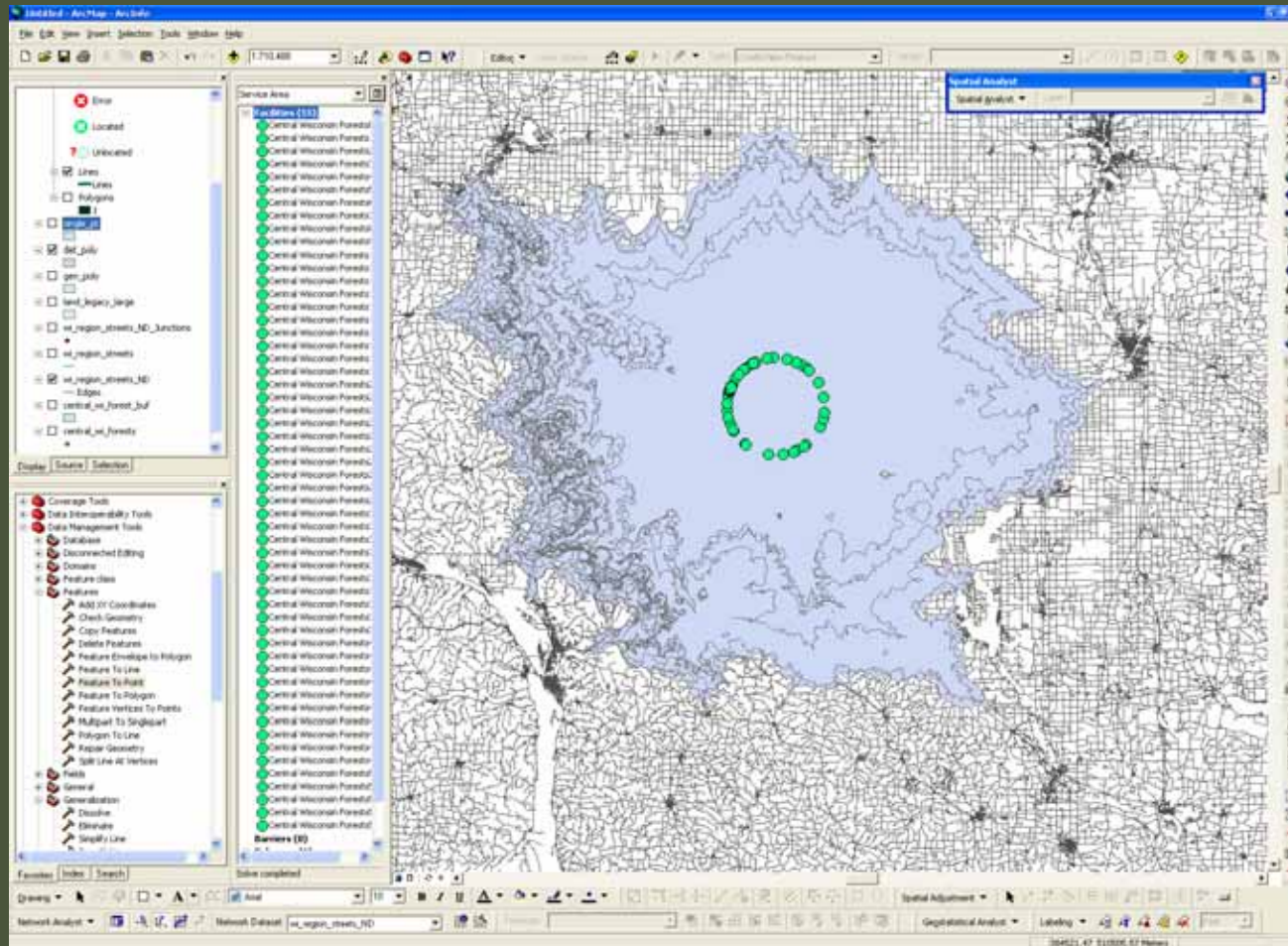
Settings



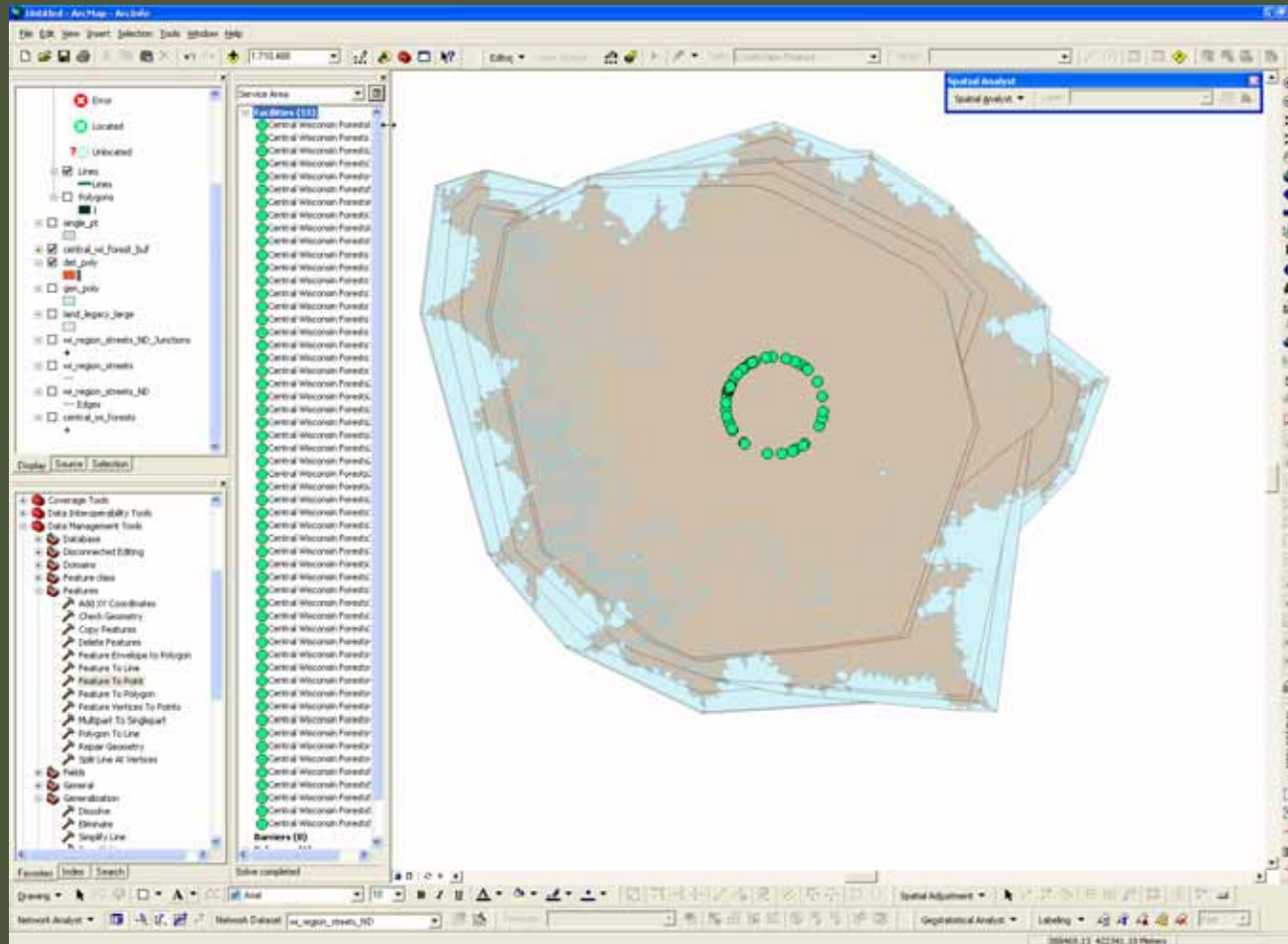
Generalized Results



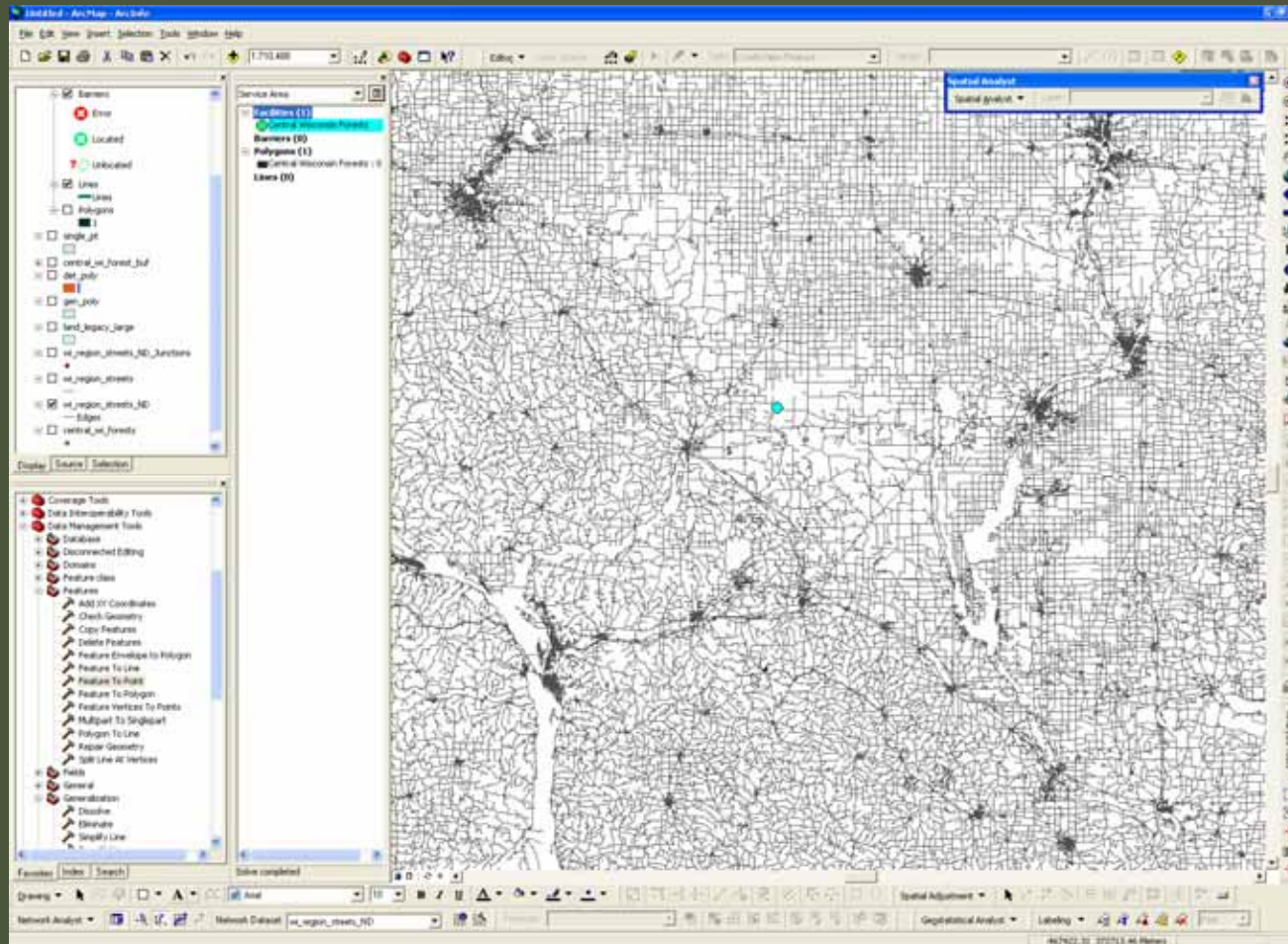
Detailed Results



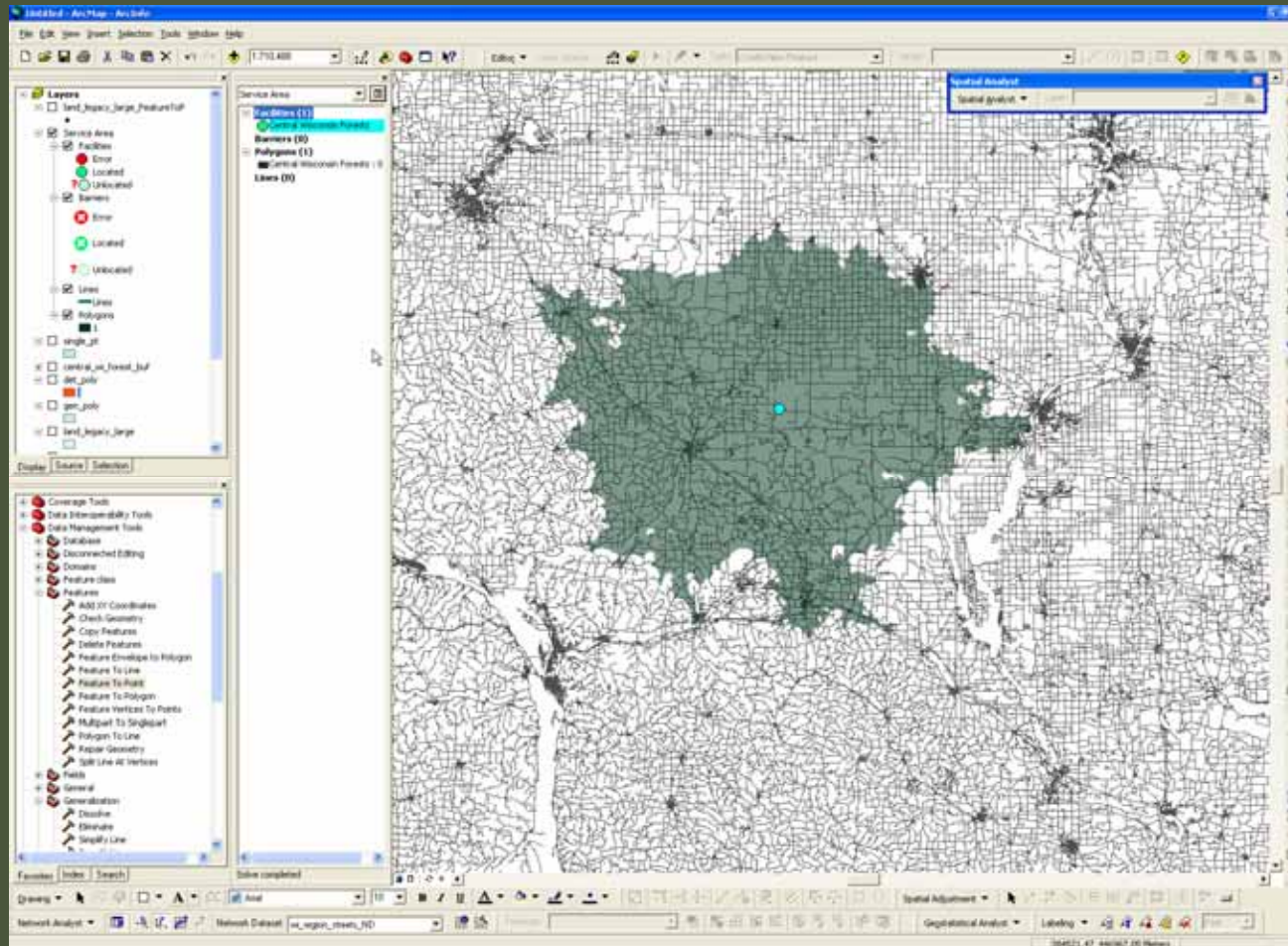
Buffer Comparison



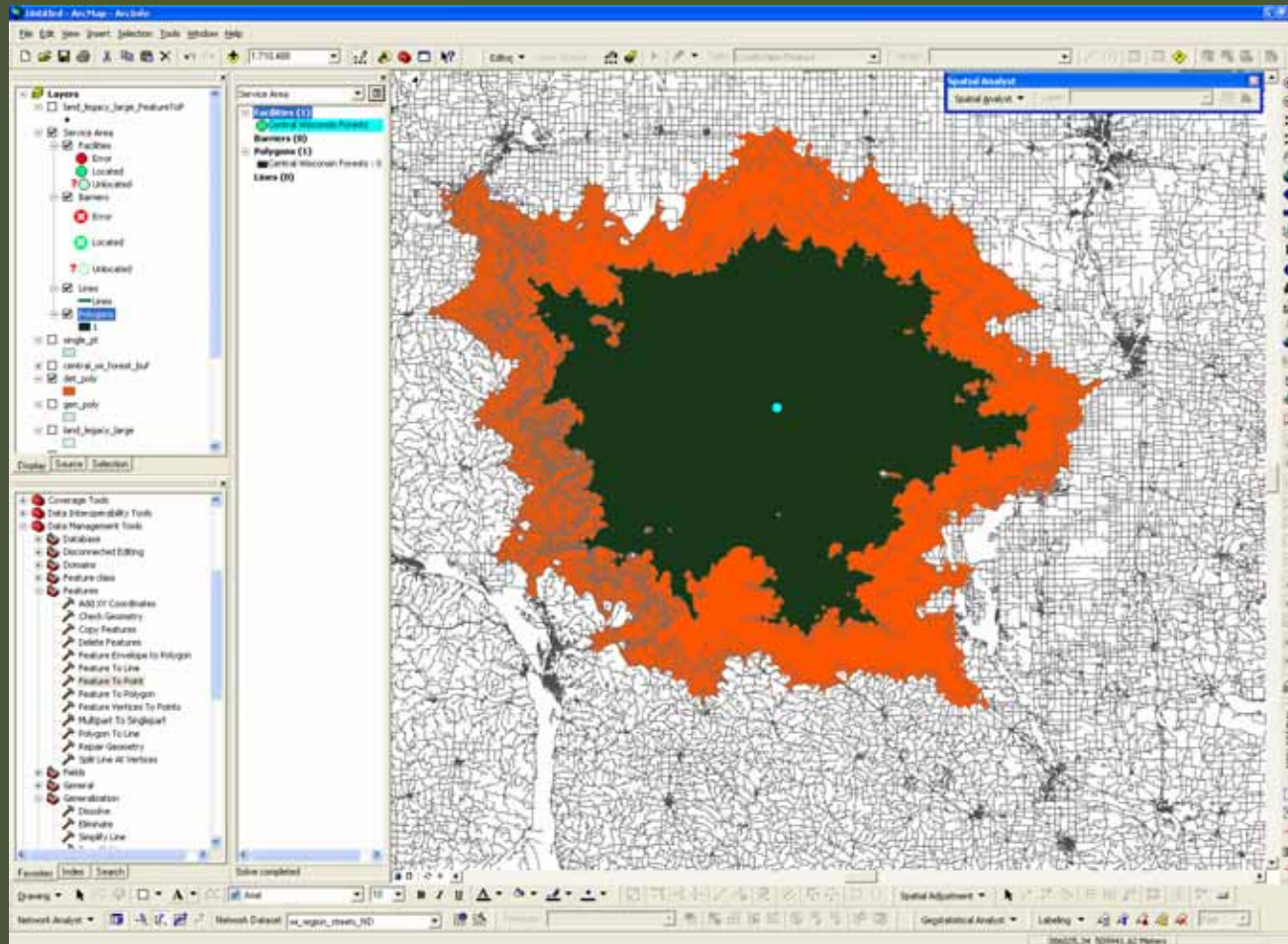
Single Point Buffer



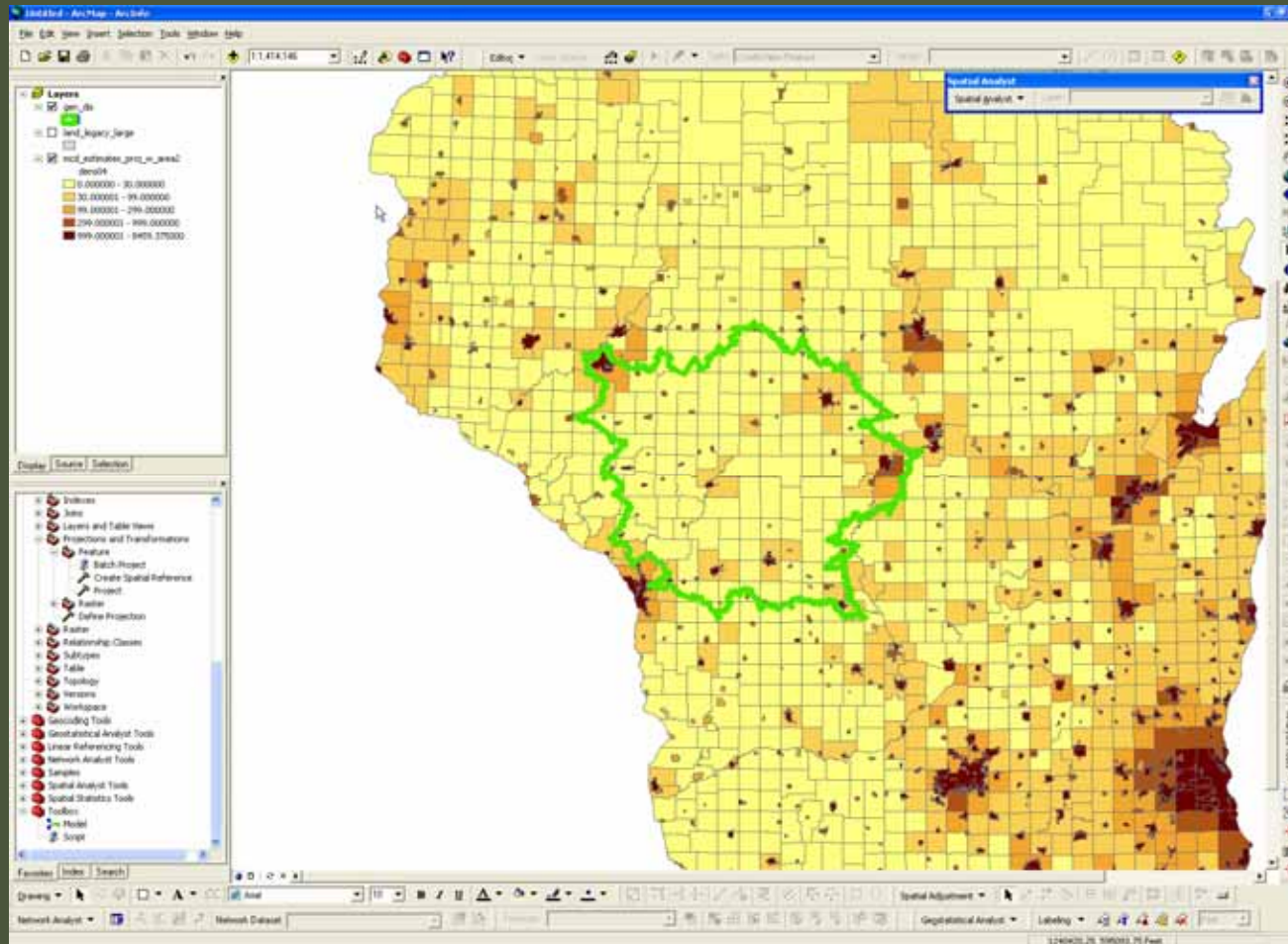
Single Point Results



Single Point v Multiple Point



MCD Population



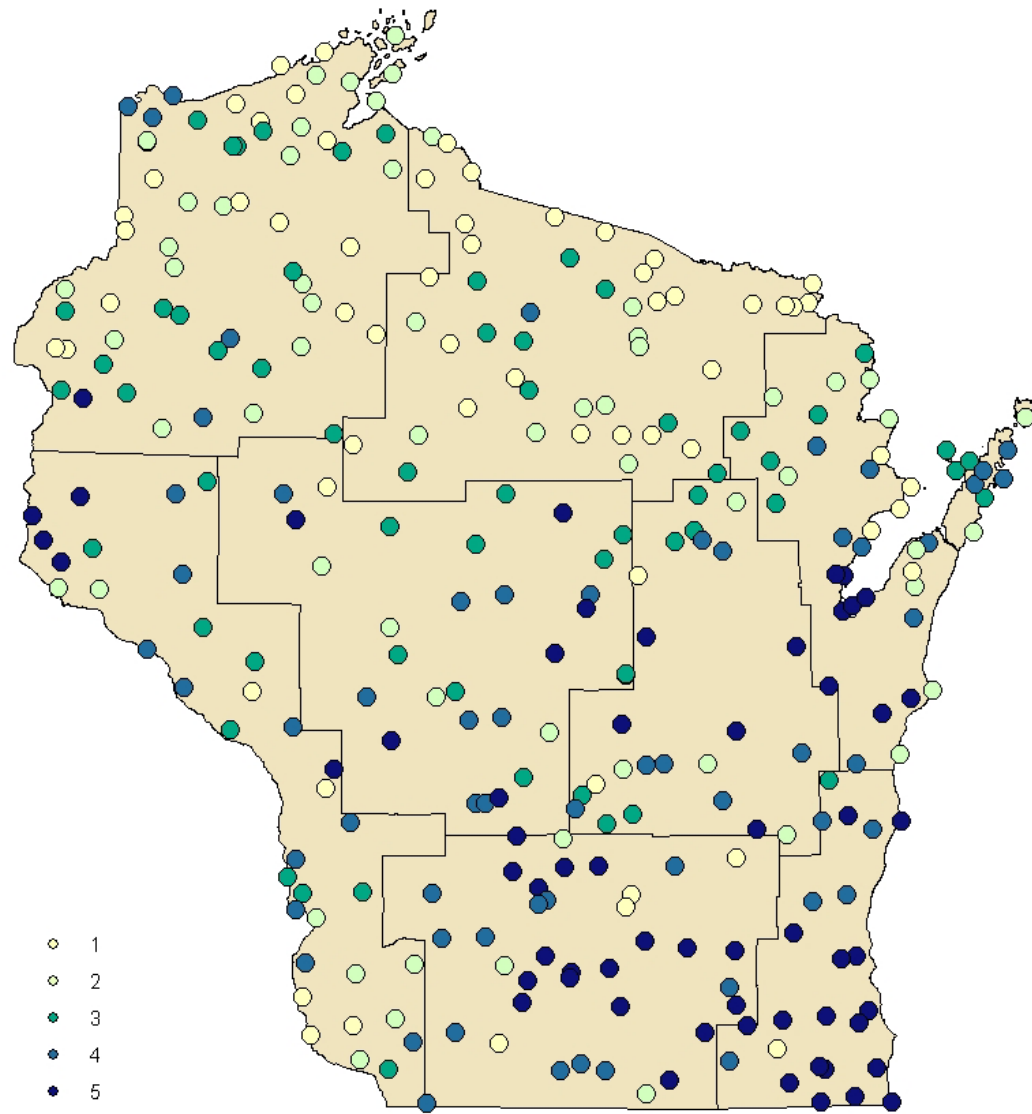
Time Comparison

- ❑ ArcView 3.3 Time – 7 min 48 sec
- ❑ Generalized ArcGIS 9.1 Time – 7 min 47 sec
- ❑ Detailed ArcGIS 9.1 Time – 21 min 48 sec

Features

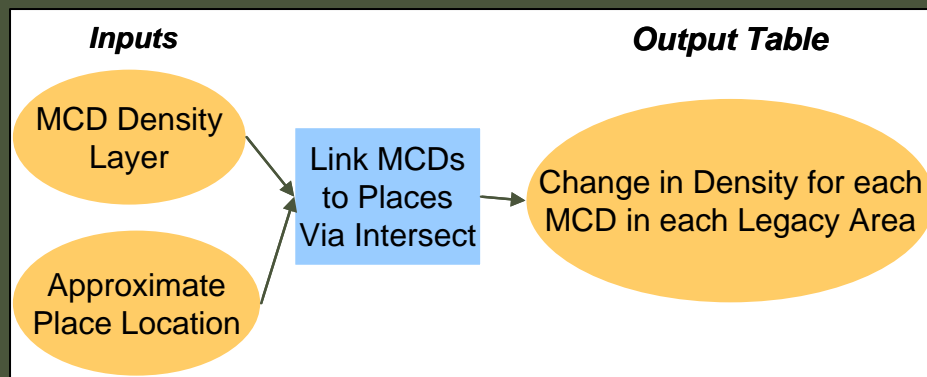
- Batch Run
- Bugs
- Bridges

Land Legacy Prioritization
Potential Visitors

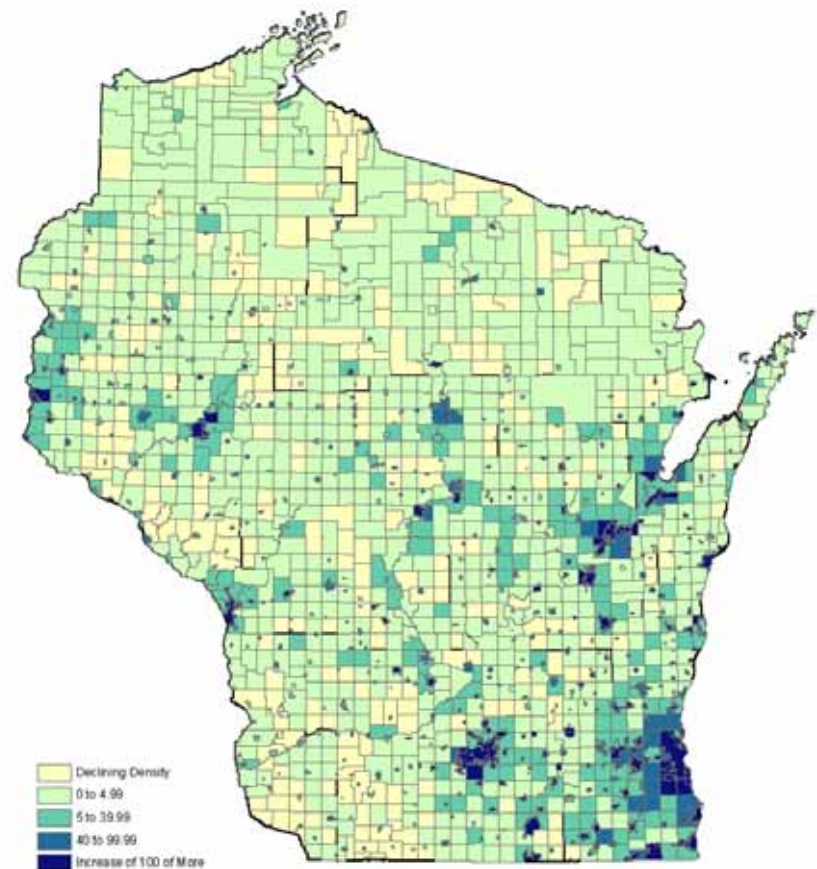


2- Population Pressure

- Projected population density change
Pden 2015 – Pden '04



Projected Population Density Change
Calculated at the Municipal Level



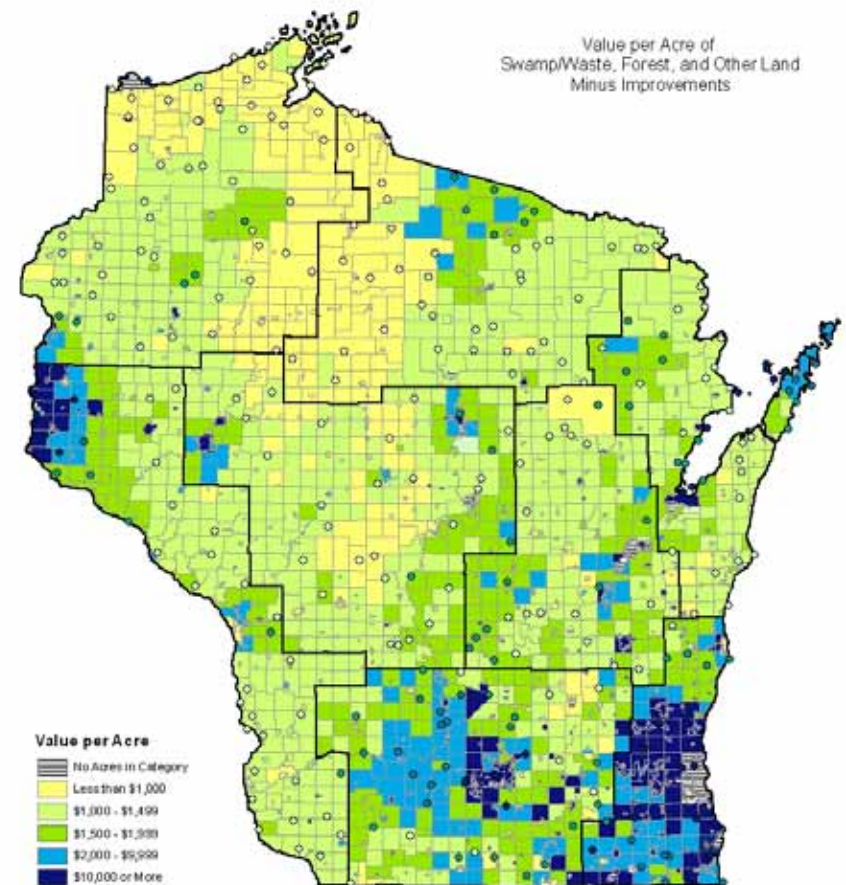
Sources: Wisconsin DOA 2005, TIGER 2003

3- Cost of Land

What is value per acre of undeveloped land?

- Dept. of Revenue (2003)
- Undeveloped Land
- MCD average value
- Legacy Place average value

Land Value per Acre, 2003
Calculated at the Municipal Level



5 4 3 2 1
○ □ ● ● ●

Sources: Wisconsin DOR 2003, TIGER 2003

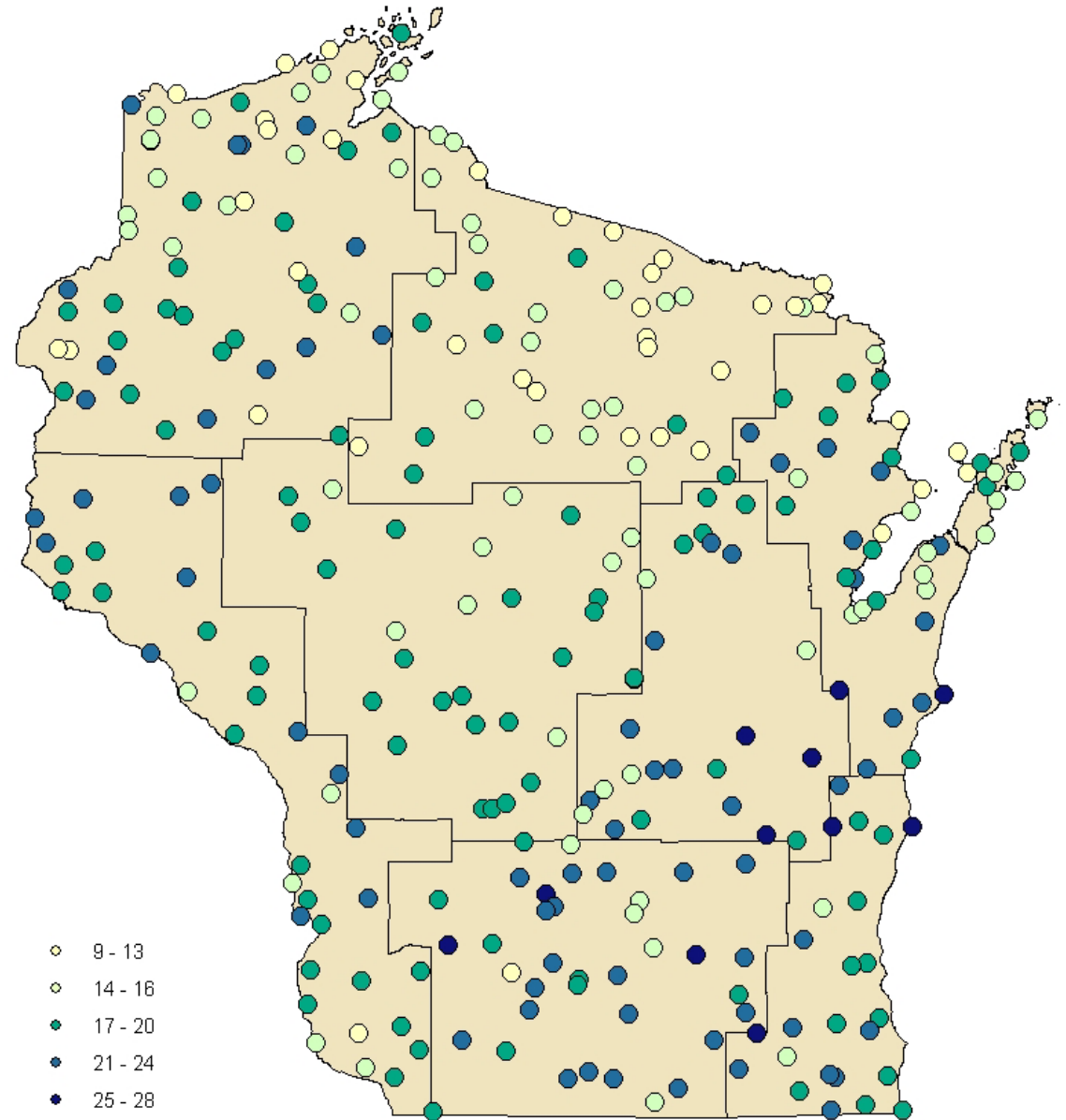
Components 4, 5, & 6: Conservation & Recreation

- Conservation Significance
- Recreation Potential
- Use-specific recreation
 - FS Survey
 - Evaluate each place for how they meet need

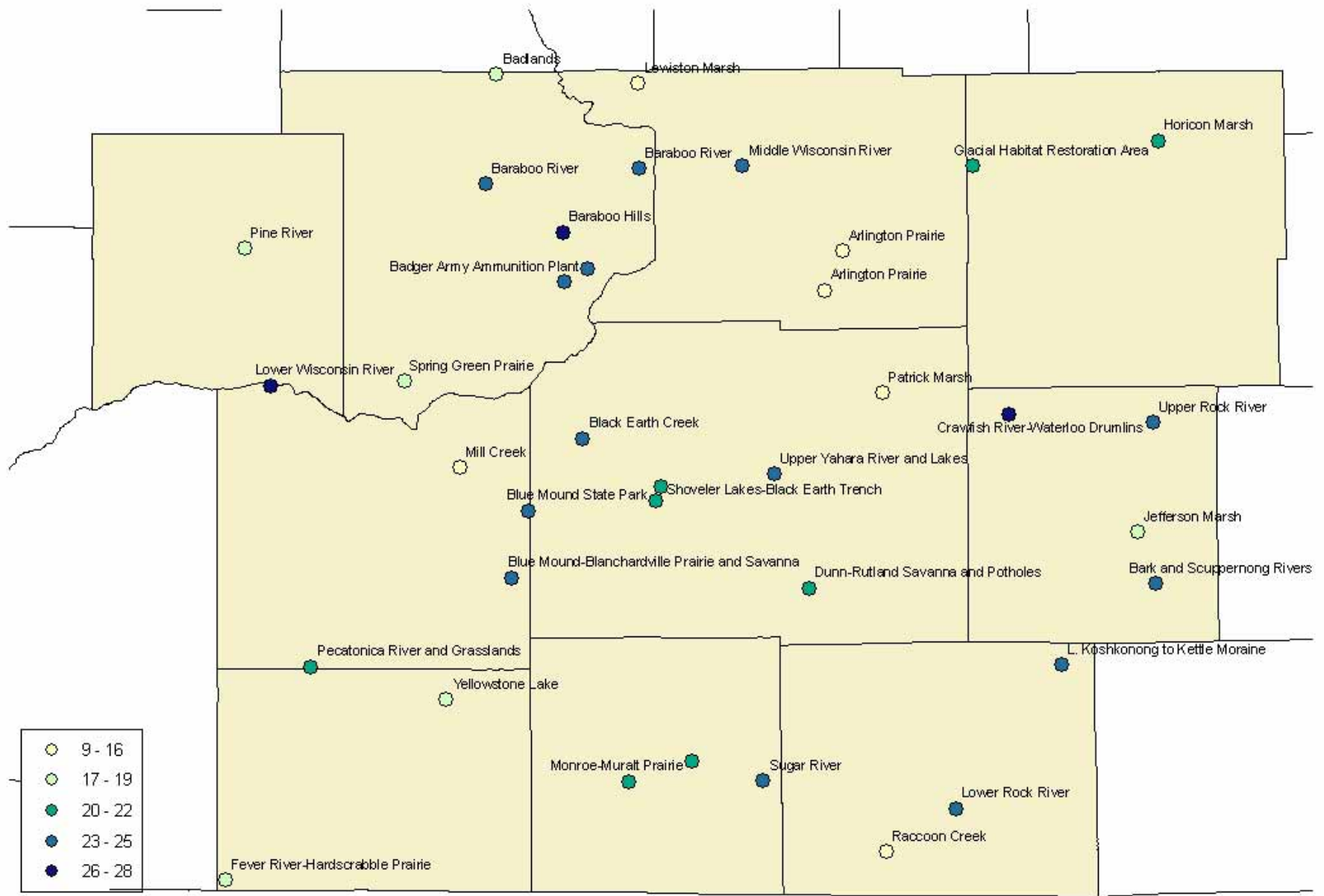
Results:

$$\begin{aligned} &\text{Potential Visitors} \\ &+ \\ &\text{Population Pressure} \\ &+ \\ &\text{Land Value} \\ &+ \\ &\text{Conservation Sig} \\ &+ \\ &\text{Recreation Potential} \\ &+ \\ &\text{Use-Specific Rec} \\ &= \\ &\text{Summary Score} \end{aligned}$$

Land Legacy Prioritization
Summary Scores



Draft-- Land Legacy Prioritization
 Summary Scores: SCORP Region 5



Impact of Study

- SCORP plan using results to promote places for further investigation into acquisition and development
 - Release scheduled for Fall 2006
- Only a building block:
 - Match with Supply
 - Funds
 - Qualitative evaluation of places
 - Public input
 - Local officials input