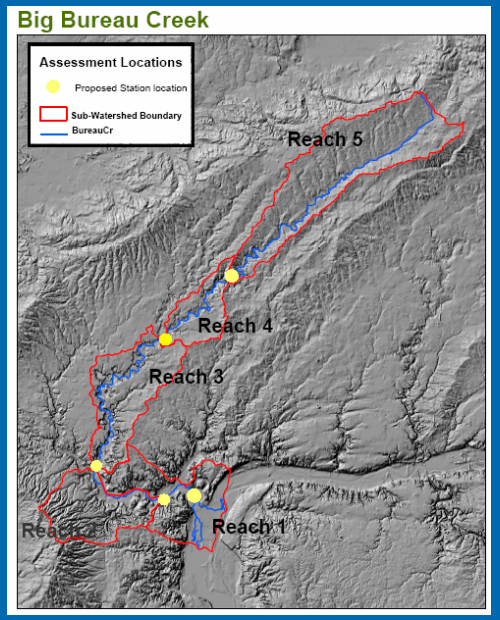
Data Collection and GIS Applications

Governor's Conference on the Management of the Illinois River System

Jeff "Jack of all Trades" Boeckler, IDNR

Introduction



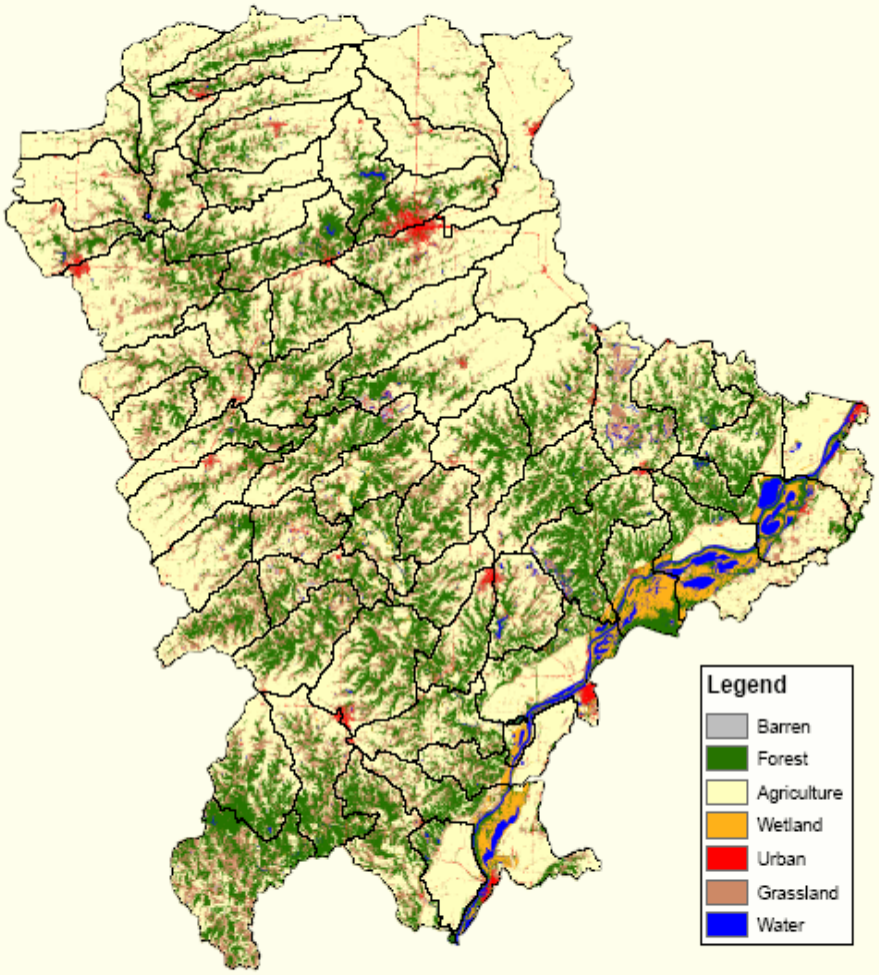
- Collecting available GIS data sets
- Creating GIS layers
- Data Analysis with GIS
  - An example of how to actually USE data
- Erosion Modeling with GIS

Conservation 2000

Collecting Available GIS Data

- Basic Information available
  - Landcover
  - Streams
  - Watershed Boundaries
  - Soils
  - Public Lands
  - High quality resources
  - Impaired Waters
  - Cultural Resources
  - Arial Photographs and Elevation Data
  - Other

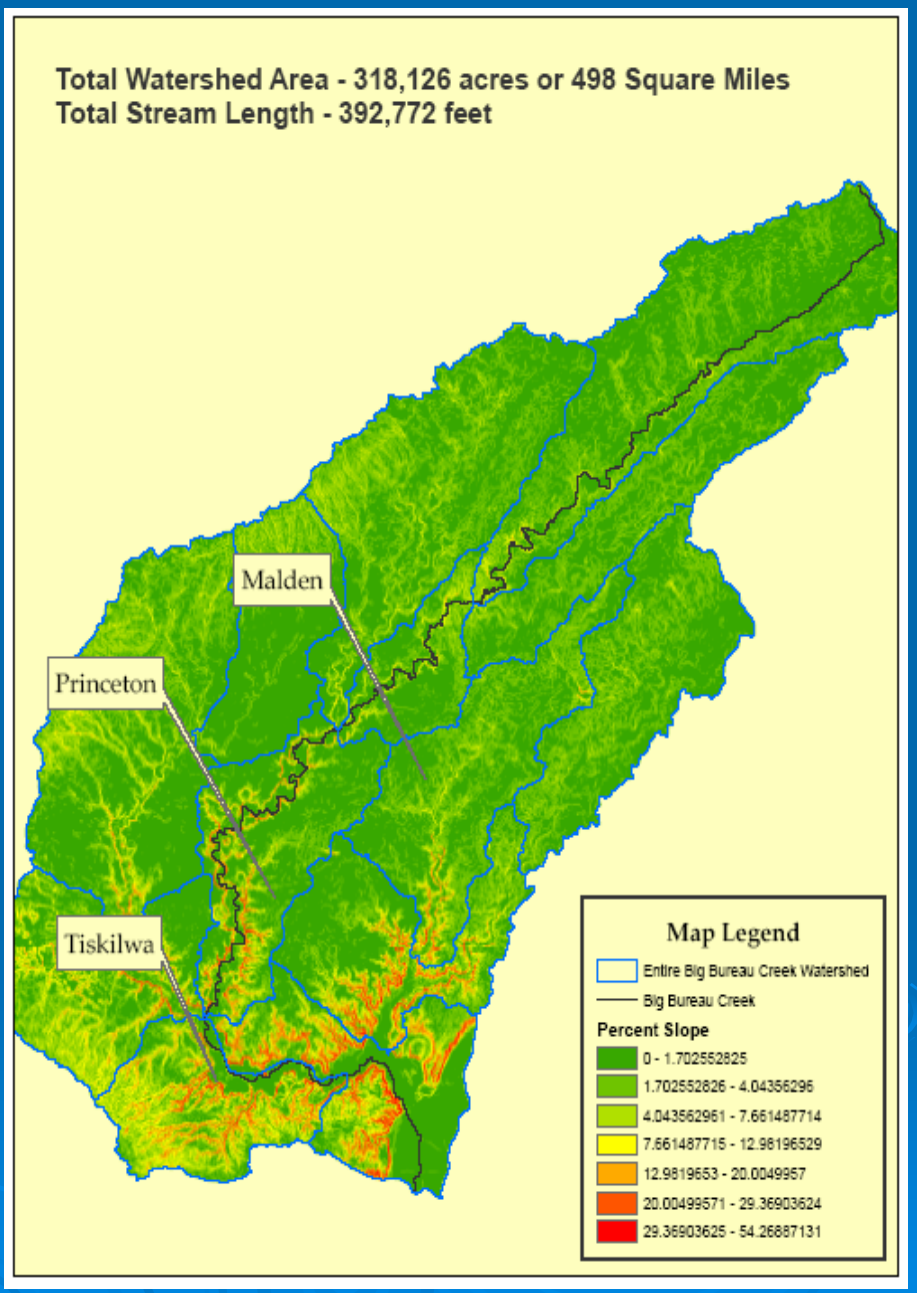
La Moine River Ecosystem Partnership
Current Landcover



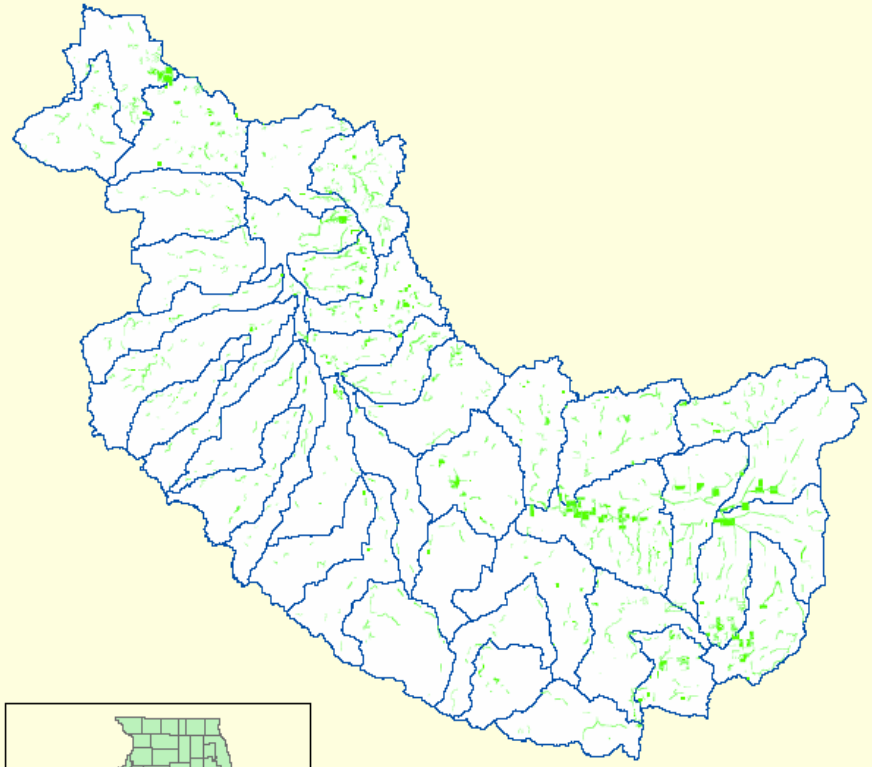
2005

Vermilion Watershed Taskforce
Landfills

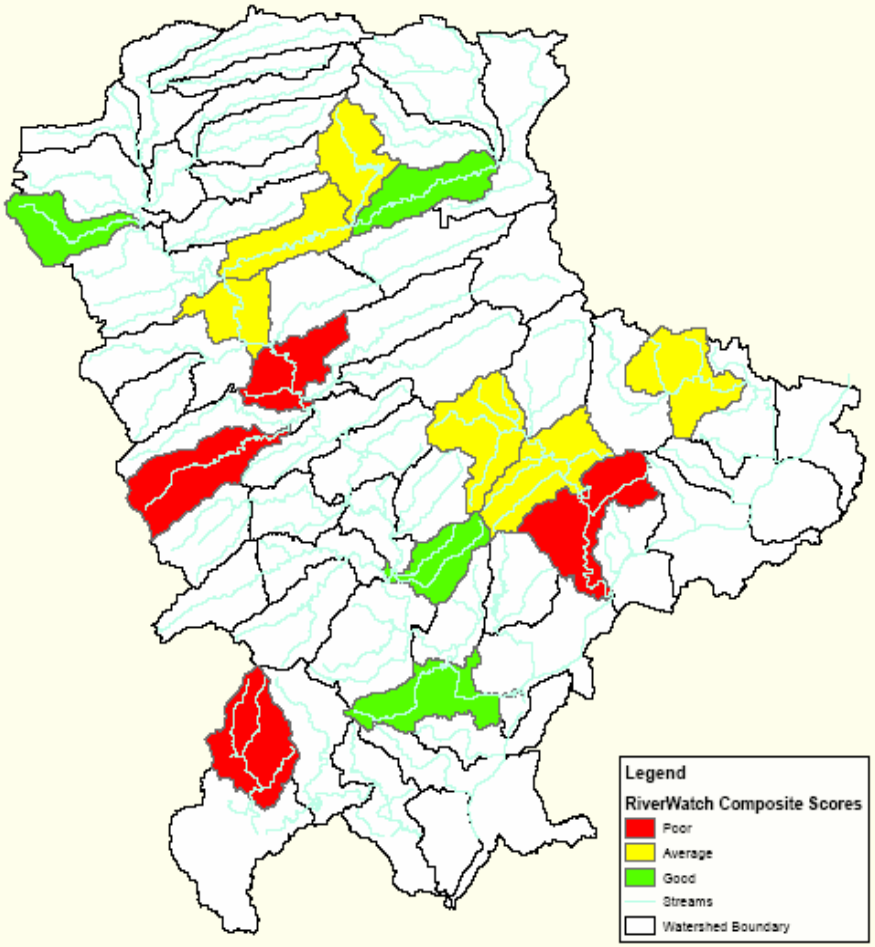
La Moine River
2004 IEPA Impaired Waters



Vermilion Watershed Taskforce
Conservation Practices
CRP/CREP



La Moine River Ecosystem Partnership
RiverWatch Stream and Habitat Quality



2005

Collecting Available GIS Data

- Agency websites and locations of available GIS information
  - IDNR Geospatial data clearinghouse
  - IDOA – Landcover
  - IEPA Digital Mapping tool
  - NRCS Soils Data Mart and NRCS Digital Gateway
  - Other – USGS etc…
    - Endless supply of GIS data available on the web or just call and ask someone

SITE INDEX

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DNR Data
statewide
county
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Base Data and Imagery
usgs drgs
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des plaines
il historical

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Illinois Natural Resources Geospatial Data Clearinghouse

Download Illinois data files and documentation (metadata) for: USGS DOQQs, USGS DRGs, geology, land use, natural resources, political boundaries, roads, year 2000 Orthoimagery for the Des Plaines River Watershed, and Historical Aerial Photographs from 1938 to 1941.

Aerial Photography and Orthophotography

2005 Illinois Digital Orthophotography Collections NEW
2000 Orthophotography, Des Plaines River Watershed
1998 - 1999 Digital Orthophoto Quarter Quadrangles
1938 - 1941 Historical Aerial Photographs

Learn about Digital Orthophotography

Digital Topographic Maps

Digital Raster Graphic Files (DRG) Files
1:24,000, 1:100,000, and 1:250,000

Order a paper Topographic Map Index

Geologic Data and Maps

Illinois Geologic Quadrangle (IGQ) Data
ISGS Geologic Maps for Download

Project support provided by:

Illinois Department of Natural Resources
Illinois Geographic Information Council

This clearinghouse is maintained by the Illinois State Geological Survey.

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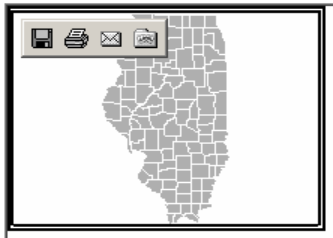
Illinois Water-Quality Information - Microsoft Internet Explorer

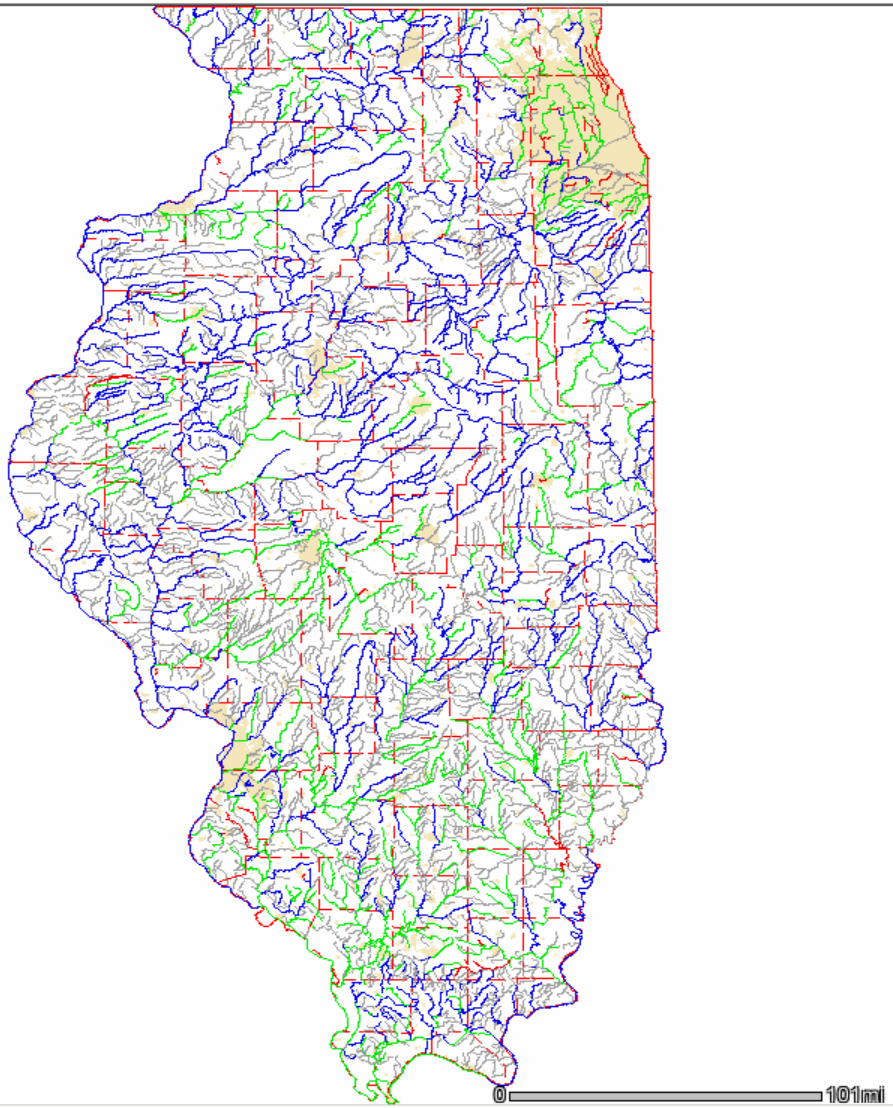
Illinois Environmental Protection Agency

www.epa.state.il.us

Rod R. Blagojevich, Governor

help | metadata | zoom in | zoom out | zoom last | full extent | pan | identify | query | measure | clear | use select | print | hyperlink | download | overview | legend/layer





Refresh Map

Select Active Layer:

IEPA 305(b) Assessed Streams

Available Layers:

- Water Quality
- Infrastructure
- Water Resources
- Admin/PLSS
- Background Images

Refresh Map

Agency Site Map | Privacy Information | Kids Privacy | Web Accessibility | Agency Webmaster

Map: 3565288.32 , 2333789.71 -- ScaleFactor: 2572.295025393767 -- Latitude/Longitude: 39.4174/-87.4882

Internet

Start | Novell Group... | C:\Document... | Microsoft Po... | C:\Document... | Water Qualit... | Illinois Wat... | 11:50 AM

Collecting Available GIS Data

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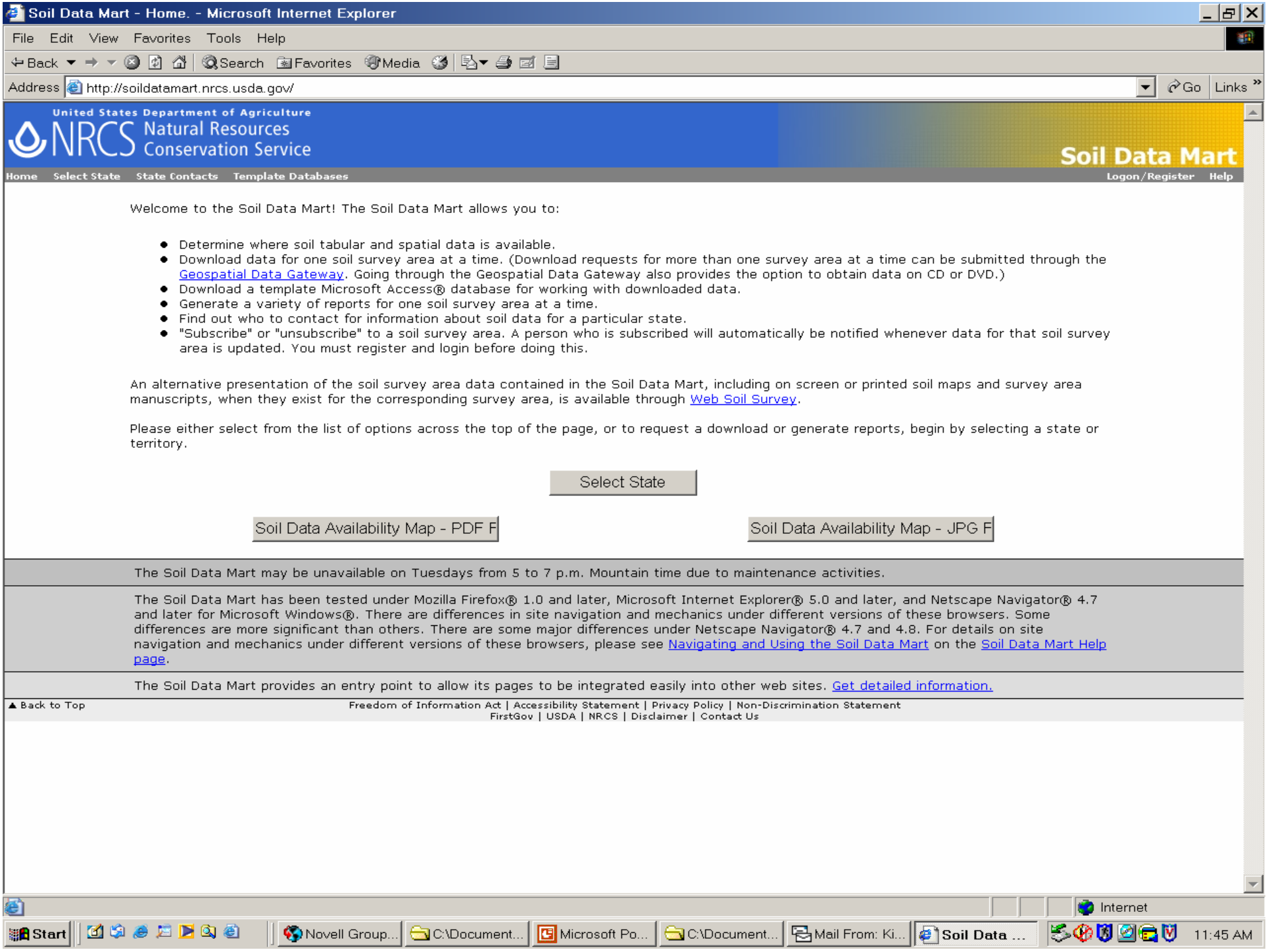
Soil Data Mart - Home. - Microsoft Internet Explorer
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Address http://soildatamart.nrcs.usda.gov/
Go Links
United States Department of Agriculture
NRCS Natural Resources Conservation Service
Soil Data Mart
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Welcome to the Soil Data Mart! The Soil Data Mart allows you to:
Determine where soil tabular and spatial data is available.
Download data for one soil survey area at a time. (Download requests for more than one survey area at a time can be submitted through the Geospatial Data Gateway. Going through the Geospatial Data Gateway also provides the option to obtain data on CD or DVD.)
Download a template Microsoft Access® database for working with downloaded data.
Generate a variety of reports for one soil survey area at a time.
Find out who to contact for information about soil data for a particular state.
"Subscribe" or "unsubscribe" to a soil survey area. A person who is subscribed will automatically be notified whenever data for that soil survey area is updated. You must register and login before doing this.
An alternative presentation of the soil survey area data contained in the Soil Data Mart, including on screen or printed soil maps and survey area manuscripts, when they exist for the corresponding survey area, is available through Web Soil Survey.
Please either select from the list of options across the top of the page, or to request a download or generate reports, begin by selecting a state or territory.
Select State
Soil Data Availability Map - PDF F
Soil Data Availability Map - JPG F
The Soil Data Mart may be unavailable on Tuesdays from 5 to 7 p.m. Mountain time due to maintenance activities.
The Soil Data Mart has been tested under Mozilla Firefox® 1.0 and later, Microsoft Internet Explorer® 5.0 and later, and Netscape Navigator® 4.7 and later for Microsoft Windows®. There are differences in site navigation and mechanics under different versions of these browsers. Some differences are more significant than others. There are some major differences under Netscape Navigator® 4.7 and 4.8. For details on site navigation and mechanics under different versions of these browsers, please see Navigating and Using the Soil Data Mart on the Soil Data Mart Help page.
The Soil Data Mart provides an entry point to allow its pages to be integrated easily into other web sites. Get detailed information.
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Start
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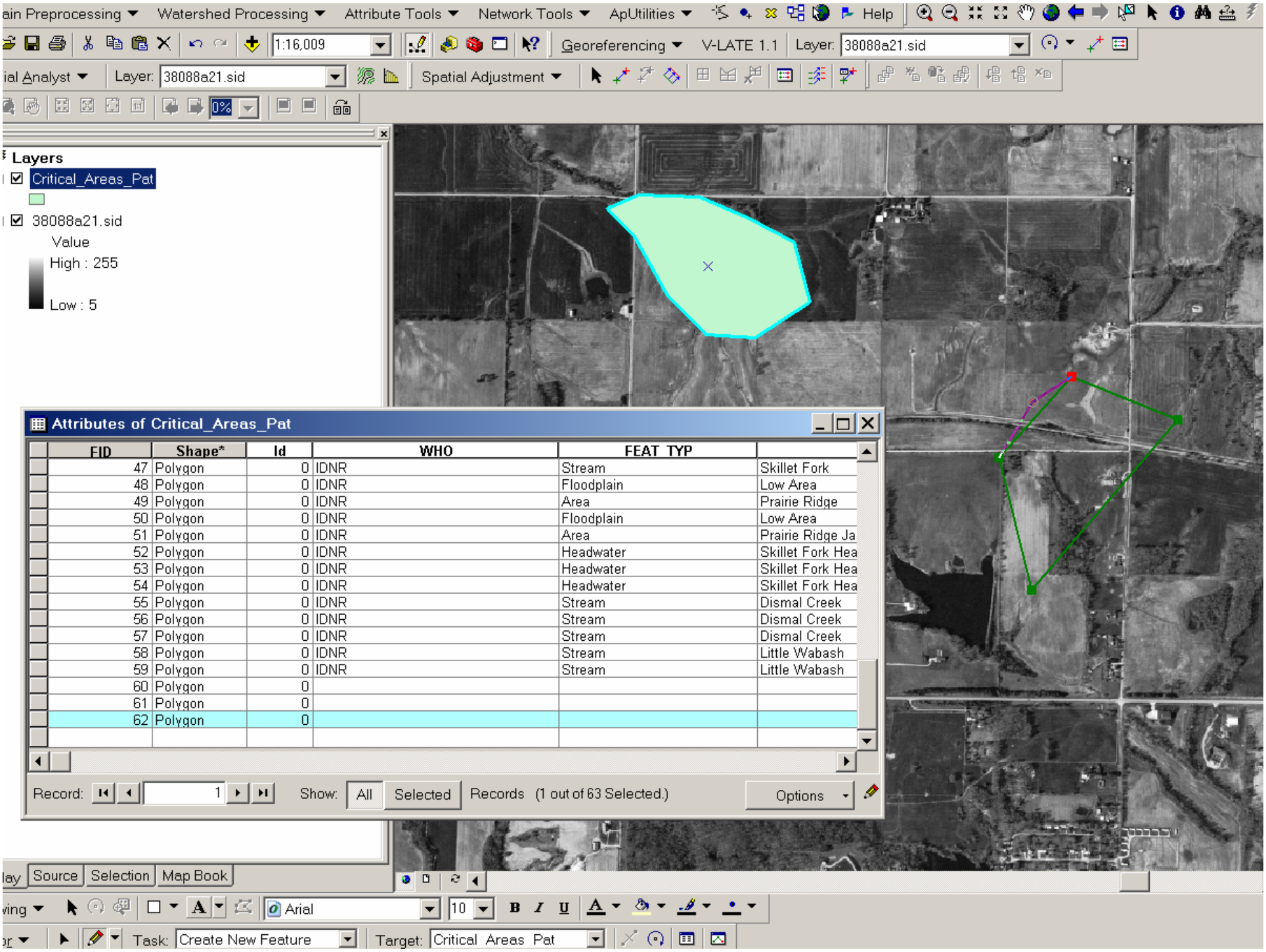
C:\Document...
Mail From: Ki...
Soil Data ...
11:45 AM

Creating GIS layers

- Digitizing Features using existing base maps
  - Location and extent of conservation practices (CRP/CREP)
  - Other significant features
- Input field survey data using GPS
  - Any information can be tied to a GPS point and displayed on a map
  - Significant features or sample sites
- Add descriptive information to an existing map layer
  - Edit existing layers to represent unique information for an area


Watershed Processing
Attribute Tools
Network Tools
ApUtilities
Help
Georeferencing
V-LATE 1.1
Layer: 38088a21.sid
Spatial Adjustment
Layers
Critical_Areas_Pat
38088a21.sid
Value
High : 255
Low : 5
Attributes of Critical_Areas_Pat
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48 | Polygon | 0 | IDNR | Floodplain | Low Area
49 | Polygon | 0 | IDNR | Area | Prairie Ridge
50 | Polygon | 0 | IDNR | Floodplain | Low Area
51 | Polygon | 0 | IDNR | Area | Prairie Ridge Ja
52 | Polygon | 0 | IDNR | Headwater | Skillet Fork Hea
53 | Polygon | 0 | IDNR | Headwater | Skillet Fork Hea
54 | Polygon | 0 | IDNR | Headwater | Skillet Fork Hea
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57 | Polygon | 0 | IDNR | Stream | Dismal Creek
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59 | Polygon | 0 | IDNR | Stream | Little Wabash
60 | Polygon | 0
61 | Polygon | 0
62 | Polygon | 0
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Show: All Selected
Records (1 out of 63 Selected.)
Options
Source
Selection
Map Book
Arial
Task: Create New Feature
Target: Critical_Areas_Pat

Creating GIS layers

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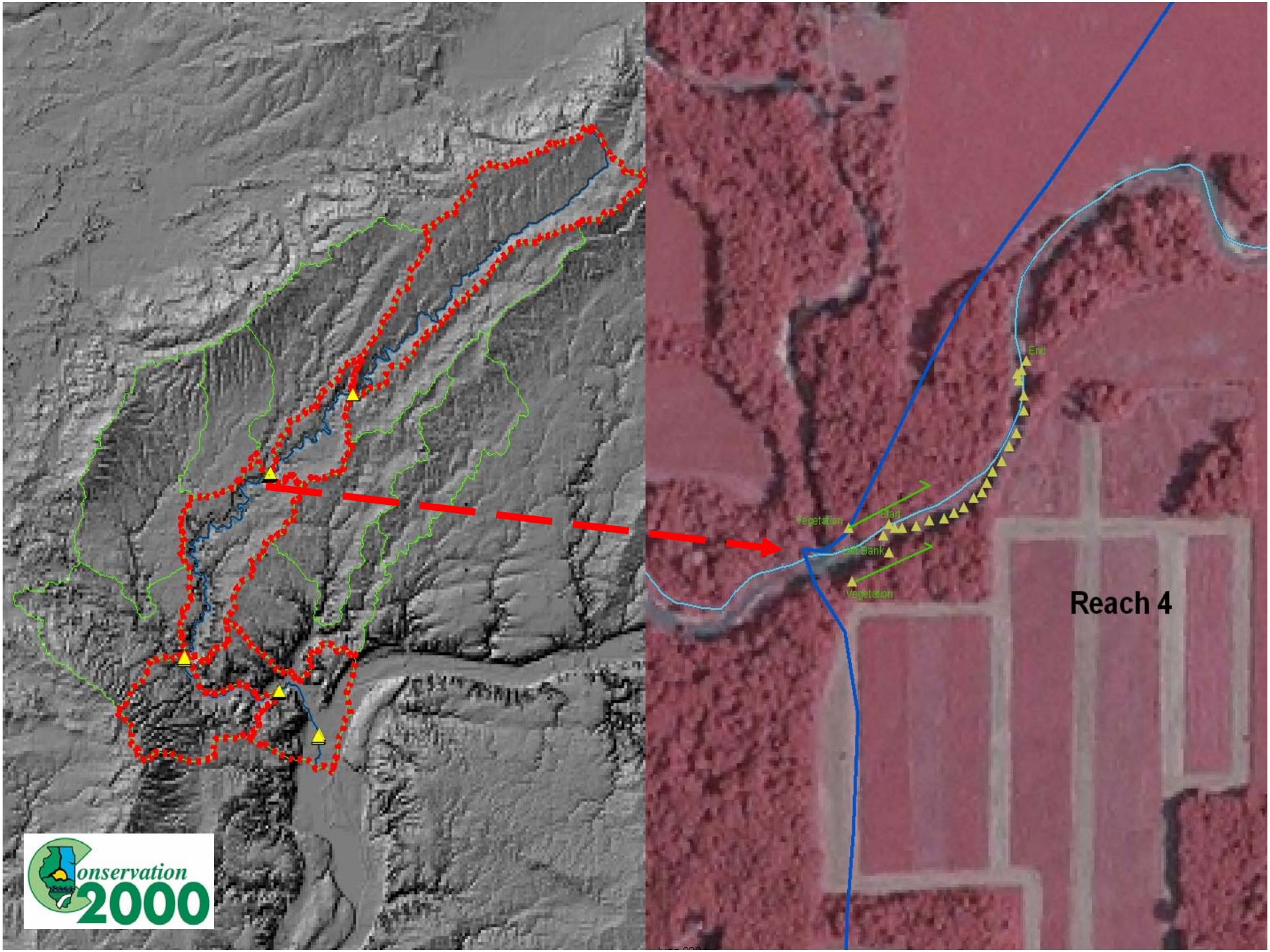
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Creating GIS layers

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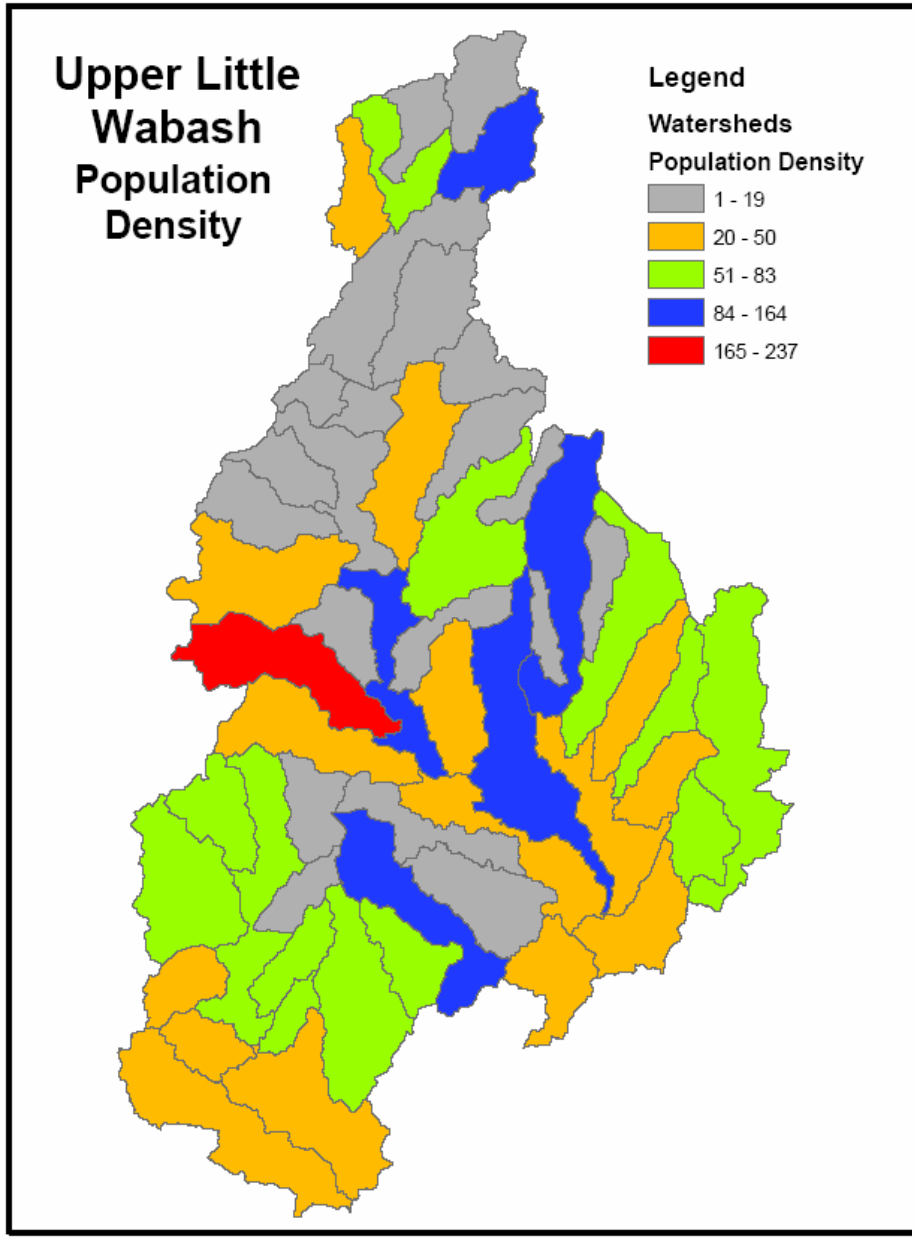
Creating GIS Layers: Representing Data in Map Format



Data Analysis Examples

- Acres of a particular landcover type
  - Forest, wetland, row crop
- Length of Impaired or high quality streams
- Percentage of streams buffered
- Stream Sinuosity
- Landscape fragmentation
  - Software extensions available
- Acres of eroding soils
- Area of land with sensitive groundwater resources

Using the Data
Example: Prioritization model

- Choose prioritization scenarios: How do you want to prioritize areas?
  - Based on major stakeholder concerns/interest
    - Water quality, erosion, habitat, recreation
  - Based on what type of activities will suit a particular area
    - Restoration Vs Protection
  - Scenario = Protection of Habitat or Restoration of habitat for water quality

Using the Data
Example: Prioritization model

- Determine what information impacts a particular scenario
  - Restoration of water quality would rely heavily on streams data for example
  - Protection of habitat may rely more heavily on information representing existing high quality habitat
- Tabulate Area or length or quality values for certain features within specified boundaries
  - % acres forest, number of TMDL watersheds, acres of eroding ground, quality of monitored forests
- Extrapolate missing information where possible
  - Build regression equations from other data sets to estimate values for areas with “no data”

Conservation 2000

Microsoft Excel - LaMoine_prioritize.xls

File Edit View Insert Format Tools Data Window Help

EV3 =SUM(ER3+ES3+ET3+EU3)*100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2	HUC 12	% Urban	Norm_B	% Row-Crop	Norm_D	% forest	Norm_F	%grassland	Norm_H	%wetland	Norm_J	% Wetland Hubs	Norm_L	% Forest Hubs 250	Norm_N	% 100 acres for hub	Norm_P
3	71300030701	1.5%	0.6655	54.6%	0.3778	16.2%	0.6800	22.8598%	0.0747	2.8%	0.5539	0.3%	0.6278	0.0%	0.8748	7.8%	
4	71300030702	0.5%	0.3028	57.0%	0.4349	28.9%	0.2403	12.6670%	0.6172	1.5%	0.6362	0.4%	0.6125	14.0%	0.3564	23.0%	
5	71300030703	0.4%	0.2816	54.6%	0.3784	34.5%	0.1106	9.7856%	0.7852	1.7%	0.6277	0.3%	0.6265	25.0%	0.0578	31.2%	
6	71300030902	2.5%	0.9135	71.9%	0.7746	9.1%	0.8714	7.4358%	0.8831	4.3%	0.4536	2.2%	0.4706	1.8%	0.8290	3.8%	
7	71300030903	1.0%	0.4776	38.7%	0.0990	27.3%	0.2892	9.9530%	0.7767	14.4%	0.0342	11.4%	0.0221	17.5%	0.2268	22.2%	
8	71300030904	0.5%	0.3015	45.3%	0.1885	19.2%	0.5775	7.6557%	0.8756	20.0%	0.0029	13.8%	0.0059	11.8%	0.4461	13.1%	
9	71300030905	0.4%	0.2863	22.3%	0.0108	37.8%	0.0636	5.4050%	0.9379	40.8%	0.0000	32.5%	0.0000	27.4%	0.0339	33.3%	
10	71300031001	0.6%	0.3373	65.5%	0.6406	19.8%	0.5546	12.9935%	0.5957	1.5%	0.6409	0.1%	0.6383	7.1%	0.6466	15.4%	
11	71300031002	0.8%	0.4032	58.2%	0.4654	27.8%	0.2734	12.2170%	0.6461	1.6%	0.6325	0.5%	0.6071	18.9%	0.1836	24.4%	
12	71300031003	0.6%	0.3275	47.7%	0.2312	38.5%	0.0552	12.7540%	0.6115	1.9%	0.6124	0.2%	0.6284	26.2%	0.0444	36.4%	
13	71300031004	1.1%	0.5253	36.2%	0.0745	47.2%	0.0082	11.7732%	0.6738	3.2%	0.5263	0.6%	0.6002	39.0%	0.0010	45.4%	
14	71300031101	1.9%	0.7951	53.6%	0.3550	20.4%	0.5335	20.0745%	0.1670	1.2%	0.6546	0.0%	0.6475	5.7%	0.7011	10.7%	
15	71300031102	3.2%	0.9770	51.3%	0.3034	18.1%	0.6163	8.0483%	0.8613	13.9%	0.0415	8.8%	0.0701	3.1%	0.7902	10.5%	
16	71300100101	0.3%	0.2443	82.2%	0.9176	8.1%	0.8888	9.3699%	0.8053	0.2%	0.7157	0.0%	0.6475	0.0%	0.8748	2.4%	
17	71300100102	0.9%	0.4420	71.0%	0.7574	13.4%	0.7683	12.9698%	0.5973	0.7%	0.6851	0.0%	0.6475	1.6%	0.8347	7.9%	
18	71300100103	0.0%	0.1778	76.7%	0.8531	12.1%	0.8037	11.2204%	0.7071	1.5%	0.6367	0.5%	0.6072	0.0%	0.8748	8.3%	
19	71300100104	0.3%	0.2566	62.0%	0.5575	17.4%	0.6394	19.5301%	0.1913	5.1%	0.4022	2.6%	0.4303	5.3%	0.7153	10.5%	
20	71300100201	1.7%	0.7196	71.1%	0.7595	13.0%	0.7780	10.9004%	0.7256	1.3%	0.6491	0.3%	0.6226	2.5%	0.8103	7.8%	
21	71300100202	0.1%	0.1959	77.0%	0.8578	13.8%	0.7561	8.8491%	0.8288	1.1%	0.6609	0.5%	0.6094	5.0%	0.7276	9.6%	
22	71300100203	0.5%	0.3253	79.4%	0.8877	10.3%	0.8450	9.1140%	0.8171	1.3%	0.6482	0.7%	0.5953	1.3%	0.8435	7.4%	
23	71300100204	0.3%	0.2416	83.3%	0.9271	7.0%	0.9074	9.3737%	0.8051	0.8%	0.6815	0.0%	0.6475	0.0%	0.8748	3.1%	
24	71300100205	2.3%	0.8850	69.0%	0.7180	13.0%	0.7794	13.0950%	0.5890	1.9%	0.6133	0.6%	0.6009	5.7%	0.7027	7.6%	
25	71300100206	0.9%	0.4467	80.2%	0.8966	6.8%	0.9102	11.7877%	0.6730	2.2%	0.5949	0.4%	0.6171	0.0%	0.8748	2.7%	
26	71300100301	1.0%	0.4923	90.7%	0.9721	2.3%	0.9610	5.3056%	0.9399	1.5%	0.6383	0.6%	0.6027	0.0%	0.8748	0.0%	
27	71300100302	0.4%	0.2784	91.2%	0.9739	2.5%	0.9587	5.7605%	0.9301	2.0%	0.6064	0.9%	0.5773	0.0%	0.8748	0.7%	
28	71300100303	1.5%	0.6608	94.5%	0.9840	0.7%	0.9717	2.4188%	0.9797	1.2%	0.6598	0.3%	0.6236	0.0%	0.8748	0.0%	
29	71300100304	6.3%	1.0000	49.7%	0.2699	24.4%	0.3864	11.4505%	0.6934	5.3%	0.3889	2.7%	0.4293	7.4%	0.6361	18.9%	
30	71300100305	0.4%	0.2833	66.8%	0.6707	20.6%	0.5241	9.1063%	0.8174	1.4%	0.6469	0.0%	0.6475	12.7%	0.4096	18.4%	
31	71300100306	1.1%	0.5275	42.3%	0.1436	36.0%	0.0870	17.8149%	0.2808	2.3%	0.5848	0.4%	0.6196	24.5%	0.0643	32.9%	
32	71300100401	0.5%	0.3082	62.0%	0.5591	17.0%	0.6541	20.3642%	0.1549	1.3%	0.6480	0.2%	0.6300	7.3%	0.6404	12.2%	
33	71300100402	0.9%	0.4574	66.2%	0.6565	12.1%	0.8016	19.7181%	0.1827	1.6%	0.6340	0.5%	0.6075	0.0%	0.8748	7.7%	
34	71300100501	4.9%	0.9998	66.0%	0.6533	11.5%	0.8174	13.6334%	0.5530	2.8%	0.5564	0.8%	0.5864	0.0%	0.8748	6.6%	
35	71300100502	0.8%	0.4100	55.1%	0.3903	25.7%	0.3419	17.1876%	0.3180	2.9%	0.5462	0.7%	0.5883	7.0%	0.6530	21.6%	
36	71300100601	0.6%	0.3536	96.0%	0.9874	0.5%	0.9730	2.7046%	0.9771	0.9%	0.6735	0.1%	0.6396	0.0%	0.8748	0.0%	
37	71300100602	0.6%	0.3536	73.5%	0.8038	14.3%	0.7421	9.7897%	0.7850	2.2%	0.5901	1.1%	0.5551	6.8%	0.6606	11.4%	
38	71300100603	0.2%	0.2242	71.0%	0.7577	15.7%	0.6968	12.5138%	0.6271	2.8%	0.5521	0.5%	0.6107	4.7%	0.7394	12.8%	
39	71300100701	0.1%	0.1879	67.9%	0.6944	19.6%	0.5623	12.5020%	0.6279	1.5%	0.6369	0.4%	0.6157	10.2%	0.5160	17.5%	
40	71300100702	1.8%	0.7658	61.3%	0.5404	16.4%	0.6735	19.0021%	0.2168	3.2%	0.5273	1.5%	0.5239	2.7%	0.8042	10.7%	
41	71300100703	0.5%	0.3216	60.1%	0.5107	21.1%	0.5089	16.7228%	0.3468	4.4%	0.4460	1.9%	0.4960	8.8%	0.5750	16.8%	
42	71300100704	0.2%	0.2150	57.1%	0.4371	23.0%	0.4367	18.2852%	0.2544	3.5%	0.5057	0.3%	0.6204	6.4%	0.6740	17.7%	

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Ready Sum=12378

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Using the Data
Example: Prioritization model

- Determine what information is most/least important; positive or negative relationships
  - How should one piece of information be weighted compared to another?
  - Should high values receive high or low scores?
- Determine scoring/ranking system and calculate
  - Normal distribution of values for each watershed
    - Each score out of 100
- Sum all scores for each variable to come up with a final composite score for each watershed
- Review, adjust, and finalize watershed rankings within each scenario

Microsoft Excel - LaMoine_prioritize.xls

File Edit View Insert Format Tools Data Window Help

EV3 =SUM(ER3+ES3+ET3+EU3)*100

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1																	
2	HUC 12	% Urban	Norm_B	% Row-Crop	Norm_D	% forest	Norm_F	%grassland	Norm_H	%wetland	Norm_J	% Wetland Hubs	Norm_L	% Forest Hubs 250	Norm_N	% 100 acres for hub	Norm_P
3	71300030701	1.5%	0.6655	54.6%	0.3778	16.2%	0.6800	22.8598%	0.0747	2.8%	0.5539	0.3%	0.6278	0.0%	0.8748	7.8%	
4	71300030702	0.5%	0.3028	57.0%	0.4349	28.9%	0.2403	12.6670%	0.6172	1.5%	0.6362	0.4%	0.6125	14.0%	0.3564	23.0%	
5	71300030703	0.4%	0.2816	54.6%	0.3784	34.5%	0.1106	9.7856%	0.7852	1.7%	0.6277	0.3%	0.6265	25.0%	0.0578	31.2%	
6	71300030902	2.5%	0.9135	71.9%	0.7746	9.1%	0.8714	7.4358%	0.8831	4.3%	0.4536	2.2%	0.4706	1.8%	0.8290	3.8%	
7	71300030903	1.0%	0.4776	38.7%	0.0990	27.3%	0.2892	9.9530%	0.7767	14.4%	0.0342	11.4%	0.0221	17.5%	0.2268	22.2%	
8	71300030904	0.5%	0.3015	45.3%	0.1885	19.2%	0.5775	7.6557%	0.8756	20.0%	0.0029	13.8%	0.0059	11.8%	0.4461	13.1%	
9	71300030905	0.4%	0.2863	22.3%	0.0108	37.8%	0.0636	5.4050%	0.9379	40.8%	0.0000	32.5%	0.0000	27.4%	0.0339	33.3%	
10	71300031001	0.6%	0.3373	65.5%	0.6406	19.8%	0.5546	12.9935%	0.5957	1.5%	0.6409	0.1%	0.6383	7.1%	0.6466	15.4%	
11	71300031002	0.8%	0.4032	58.2%	0.4654	27.8%	0.2734	12.2170%	0.6461	1.6%	0.6325	0.5%	0.6071	18.9%	0.1836	24.4%	
12	71300031003	0.6%	0.3275	47.7%	0.2312	38.5%	0.0552	12.7540%	0.6115	1.9%	0.6124	0.2%	0.6284	26.2%	0.0444	36.4%	
13	71300031004	1.1%	0.5253	36.2%	0.0745	47.2%	0.0082	11.7732%	0.6738	3.2%	0.5263	0.6%	0.6002	39.0%	0.0010	45.4%	
14	71300031101	1.9%	0.7951	53.6%	0.3550	20.4%	0.5335	20.0745%	0.1670	1.2%	0.6546	0.0%	0.6475	5.7%	0.7011	10.7%	
15	71300031102	3.2%	0.9770	51.3%	0.3034	18.1%	0.6163	8.0483%	0.8613	13.9%	0.0415	8.8%	0.0701	3.1%	0.7902	10.5%	
16	71300100101	0.3%	0.2443	82.2%	0.9176	8.1%	0.8888	9.3699%	0.8053	0.2%	0.7157	0.0%	0.6475	0.0%	0.8748	2.4%	
17	71300100102	0.9%	0.4420	71.0%	0.7574	13.4%	0.7683	12.9698%	0.5973	0.7%	0.6851	0.0%	0.6475	1.6%	0.8347	7.9%	
18	71300100103	0.0%	0.1778	76.7%	0.8531	12.1%	0.8037	11.2204%	0.7071	1.5%	0.6367	0.5%	0.6072	0.0%	0.8748	8.3%	
19	71300100104	0.3%	0.2566	62.0%	0.5575	17.4%	0.6394	19.5301%	0.1913	5.1%	0.4022	2.6%	0.4303	5.3%	0.7153	10.5%	
20	71300100201	1.7%	0.7196	71.1%	0.7595	13.0%	0.7780	10.9004%	0.7256	1.3%	0.6491	0.3%	0.6226	2.5%	0.8103	7.8%	
21	71300100202	0.1%	0.1959	77.0%	0.8578	13.8%	0.7561	8.8491%	0.8288	1.1%	0.6609	0.5%	0.6094	5.0%	0.7276	9.6%	
22	71300100203	0.5%	0.3253	79.4%	0.8877	10.3%	0.8450	9.1140%	0.8171	1.3%	0.6482	0.7%	0.5953	1.3%	0.8435	7.4%	
23	71300100204	0.3%	0.2416	83.3%	0.9271	7.0%	0.9074	9.3737%	0.8051	0.8%	0.6815	0.0%	0.6475	0.0%	0.8748	3.1%	
24	71300100205	2.3%	0.8850	69.0%	0.7180	13.0%	0.7794	13.0950%	0.5890	1.9%	0.6133	0.6%	0.6009	5.7%	0.7027	7.6%	
25	71300100206	0.9%	0.4467	80.2%	0.8966	6.8%	0.9102	11.7877%	0.6730	2.2%	0.5949	0.4%	0.6171	0.0%	0.8748	2.7%	
26	71300100301	1.0%	0.4923	90.7%	0.9721	2.3%	0.9610	5.3056%	0.9399	1.5%	0.6383	0.6%	0.6027	0.0%	0.8748	0.0%	
27	71300100302	0.4%	0.2784	91.2%	0.9739	2.5%	0.9587	5.7605%	0.9301	2.0%	0.6064	0.9%	0.5773	0.0%	0.8748	0.7%	
28	71300100303	1.5%	0.6608	94.5%	0.9840	0.7%	0.9717	2.4188%	0.9797	1.2%	0.6598	0.3%	0.6236	0.0%	0.8748	0.0%	
29	71300100304	6.3%	1.0000	49.7%	0.2699	24.4%	0.3864	11.4505%	0.6934	5.3%	0.3889	2.7%	0.4293	7.4%	0.6361	18.9%	
30	71300100305	0.4%	0.2833	66.8%	0.6707	20.6%	0.5241	9.1063%	0.8174	1.4%	0.6469	0.0%	0.6475	12.7%	0.4096	18.4%	
31	71300100306	1.1%	0.5275	42.3%	0.1436	36.0%	0.0870	17.8149%	0.2808	2.3%	0.5848	0.4%	0.6196	24.5%	0.0643	32.9%	
32	71300100401	0.5%	0.3082	62.0%	0.5591	17.0%	0.6541	20.3642%	0.1549	1.3%	0.6480	0.2%	0.6300	7.3%	0.6404	12.2%	
33	71300100402	0.9%	0.4574	66.2%	0.6565	12.1%	0.8016	19.7181%	0.1827	1.6%	0.6340	0.5%	0.6075	0.0%	0.8748	7.7%	
34	71300100501	4.9%	0.9998	66.0%	0.6533	11.5%	0.8174	13.6334%	0.5530	2.8%	0.5564	0.8%	0.5864	0.0%	0.8748	6.6%	
35	71300100502	0.8%	0.4100	55.1%	0.3903	25.7%	0.3419	17.1876%	0.3180	2.9%	0.5462	0.7%	0.5883	7.0%	0.6530	21.6%	
36	71300100601	0.6%	0.3536	96.0%	0.9874	0.5%	0.9730	2.7046%	0.9771	0.9%	0.6735	0.1%	0.6396	0.0%	0.8748	0.0%	
37	71300100602	0.6%	0.3536	73.5%	0.8038	14.3%	0.7421	9.7897%	0.7850	2.2%	0.5901	1.1%	0.5551	6.8%	0.6606	11.4%	
38	71300100603	0.2%	0.2242	71.0%	0.7577	15.7%	0.6968	12.5138%	0.6271	2.8%	0.5521	0.5%	0.6107	4.7%	0.7394	12.8%	
39	71300100701	0.1%	0.1879	67.9%	0.6944	19.6%	0.5623	12.5020%	0.6279	1.5%	0.6369	0.4%	0.6157	10.2%	0.5160	17.5%	
40	71300100702	1.8%	0.7658	61.3%	0.5404	16.4%	0.6735	19.0021%	0.2168	3.2%	0.5273	1.5%	0.5239	2.7%	0.8042	10.7%	
41	71300100703	0.5%	0.3216	60.1%	0.5107	21.1%	0.5089	16.7228%	0.3468	4.4%	0.4460	1.9%	0.4960	8.8%	0.5750	16.8%	
42	71300100704	0.2%	0.2150	57.1%	0.4371	23.0%	0.4367	18.2852%	0.2544	3.5%	0.5057	0.3%	0.6204	6.4%	0.6740	17.7%	

ProtectandRec | Restore | Wat_r | eros_r | Rank_sheet

Ready Sum=12378

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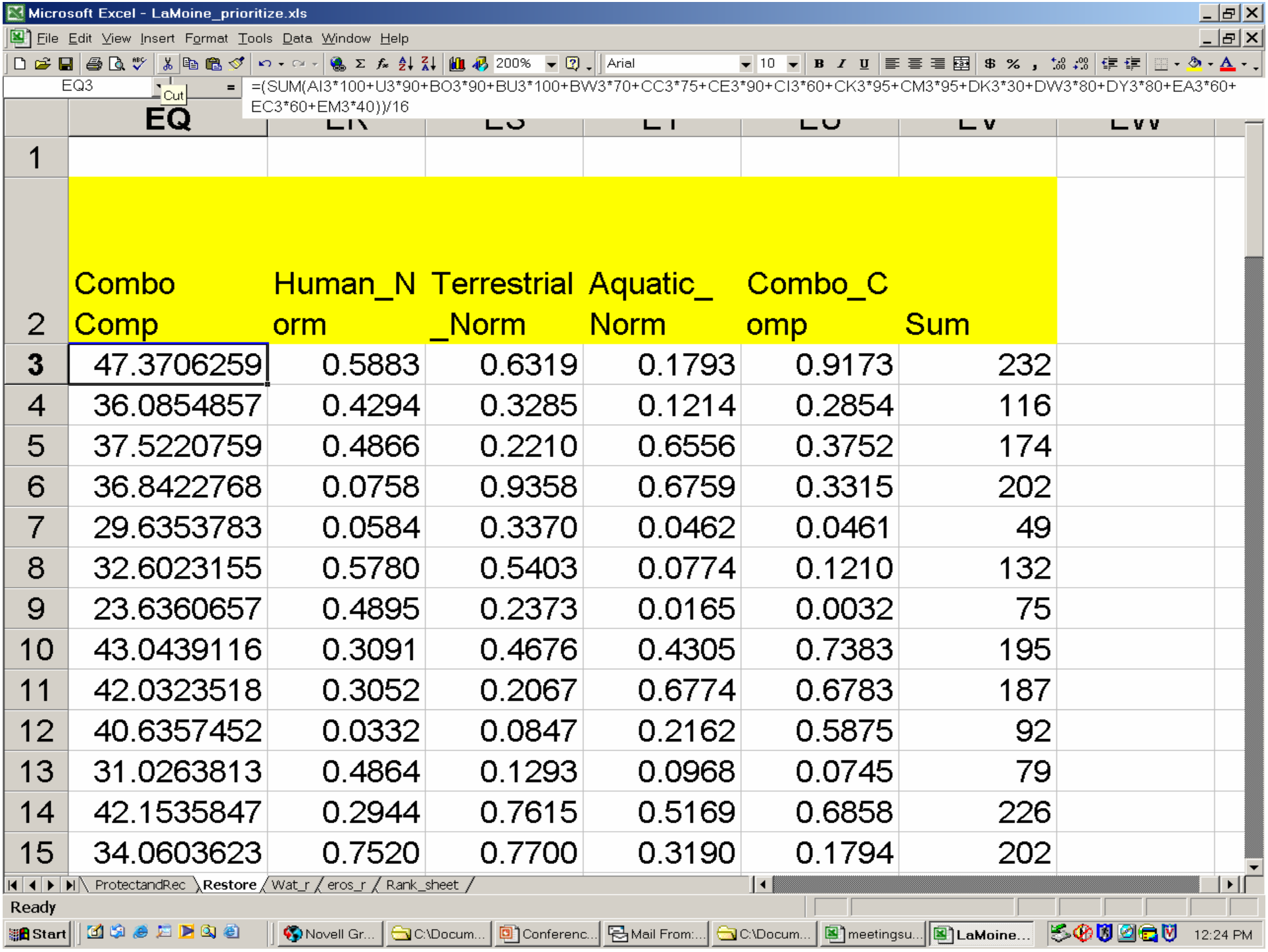
Using the Data
Example: Prioritization model

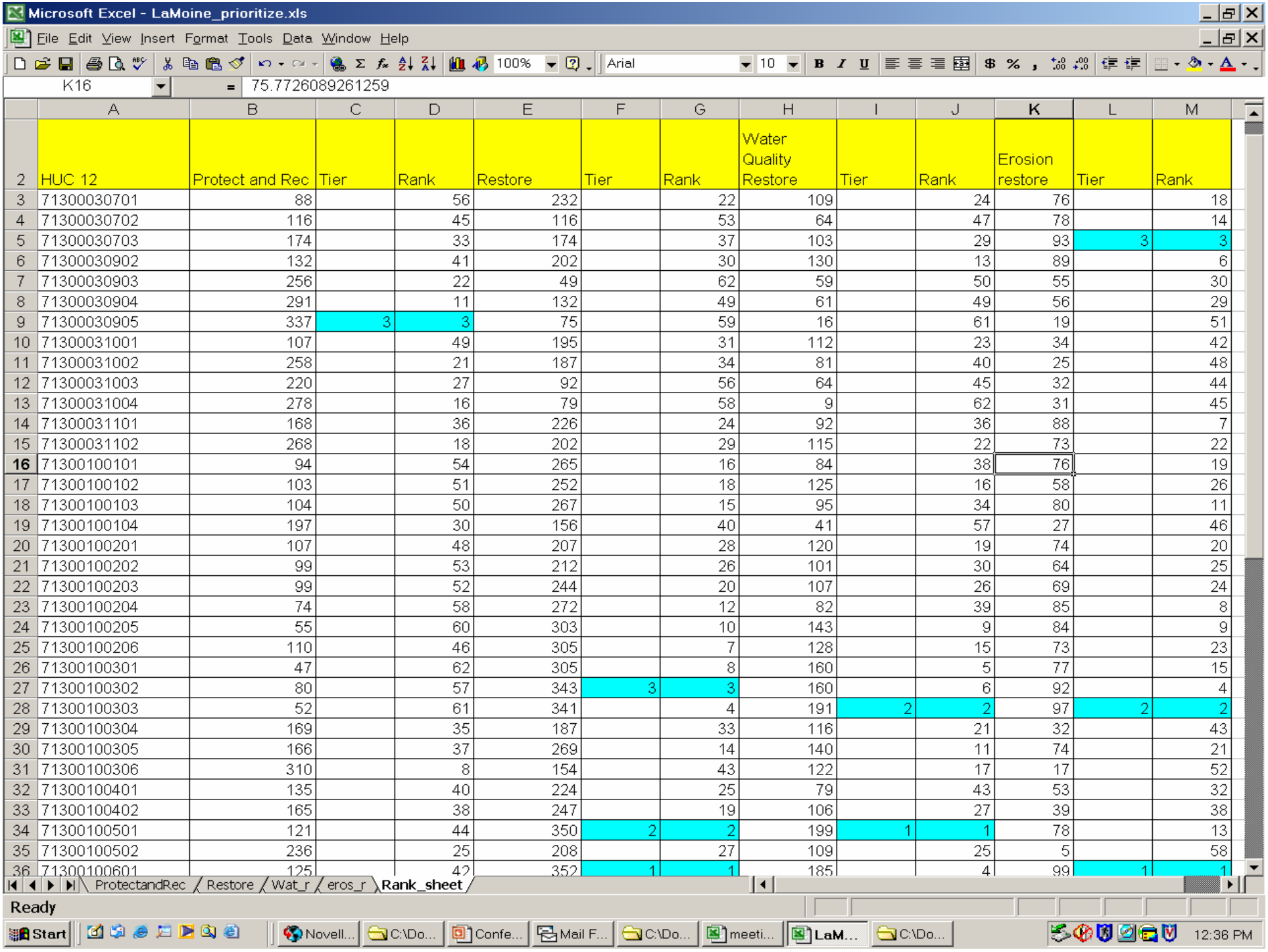
- Determine what information is most/least important; positive or negative relationships
  - How should one piece of information be weighted compared to another?
  - Should high values receive high or low scores?
- Determine scoring/ranking system and calculate
  - Normal distribution of values for each watershed
    - Each score out of 100
- Sum all scores for each variable to come up with a final composite score for each watershed
- Review, adjust, and finalize watershed rankings within each scenario



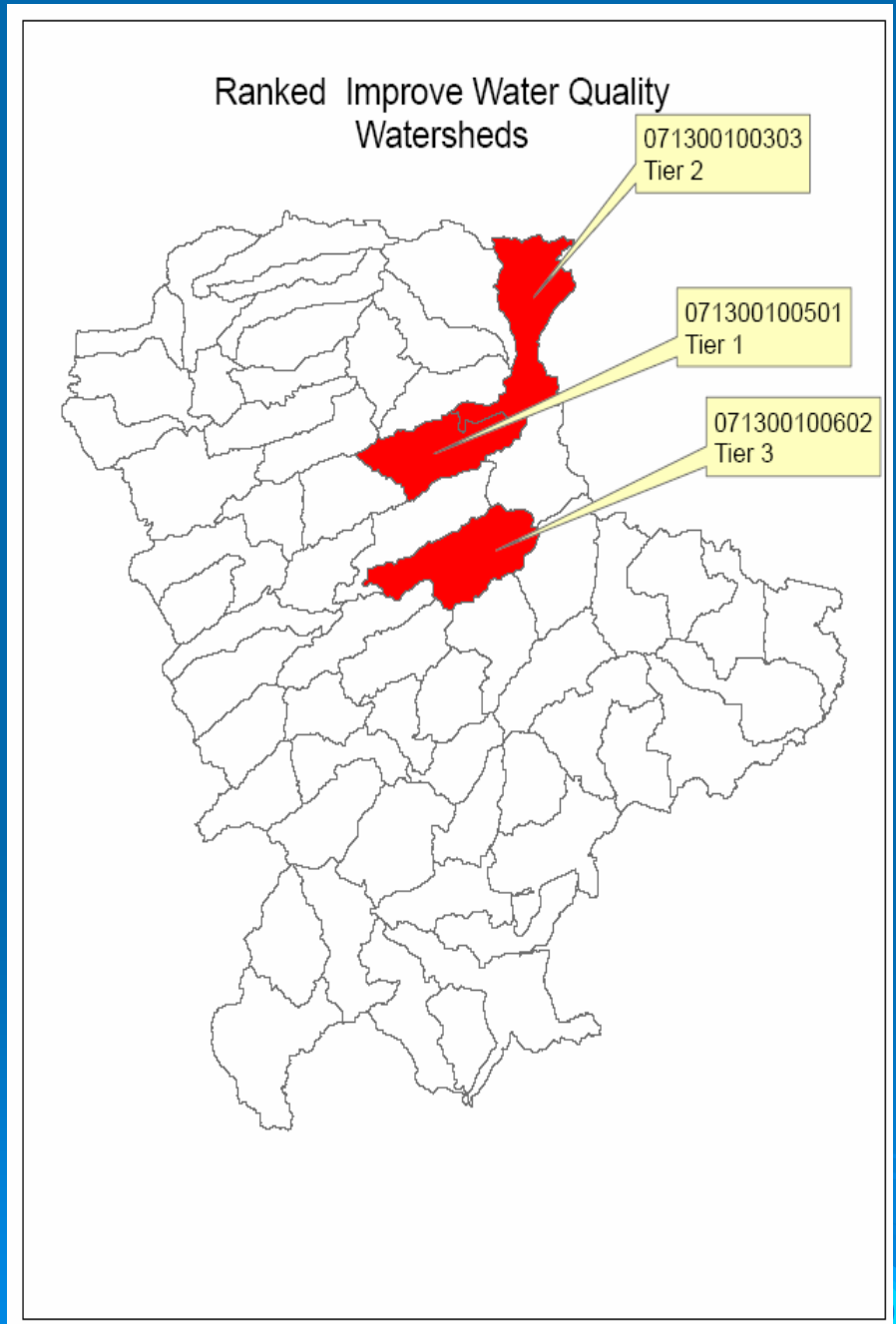
	EQ	ER	ES	ET	EU	EV	EW
1							
2	Combo Comp	Human_Norm	Terrestrial_Norm	Aquatic_Norm	Combo_Comp	Sum	
3	47.3706259	0.5883	0.6319	0.1793	0.9173	232	
4	36.0854857	0.4294	0.3285	0.1214	0.2854	116	
5	37.5220759	0.4866	0.2210	0.6556	0.3752	174	
6	36.8422768	0.0758	0.9358	0.6759	0.3315	202	
7	29.6353783	0.0584	0.3370	0.0462	0.0461	49	
8	32.6023155	0.5780	0.5403	0.0774	0.1210	132	
9	23.6360657	0.4895	0.2373	0.0165	0.0032	75	
10	43.0439116	0.3091	0.4676	0.4305	0.7383	195	
11	42.0323518	0.3052	0.2067	0.6774	0.6783	187	
12	40.6357452	0.0332	0.0847	0.2162	0.5875	92	
13	31.0263813	0.4864	0.1293	0.0968	0.0745	79	
14	42.1535847	0.2944	0.7615	0.5169	0.6858	226	
15	34.0603623	0.7520	0.7700	0.3190	0.1794	202	

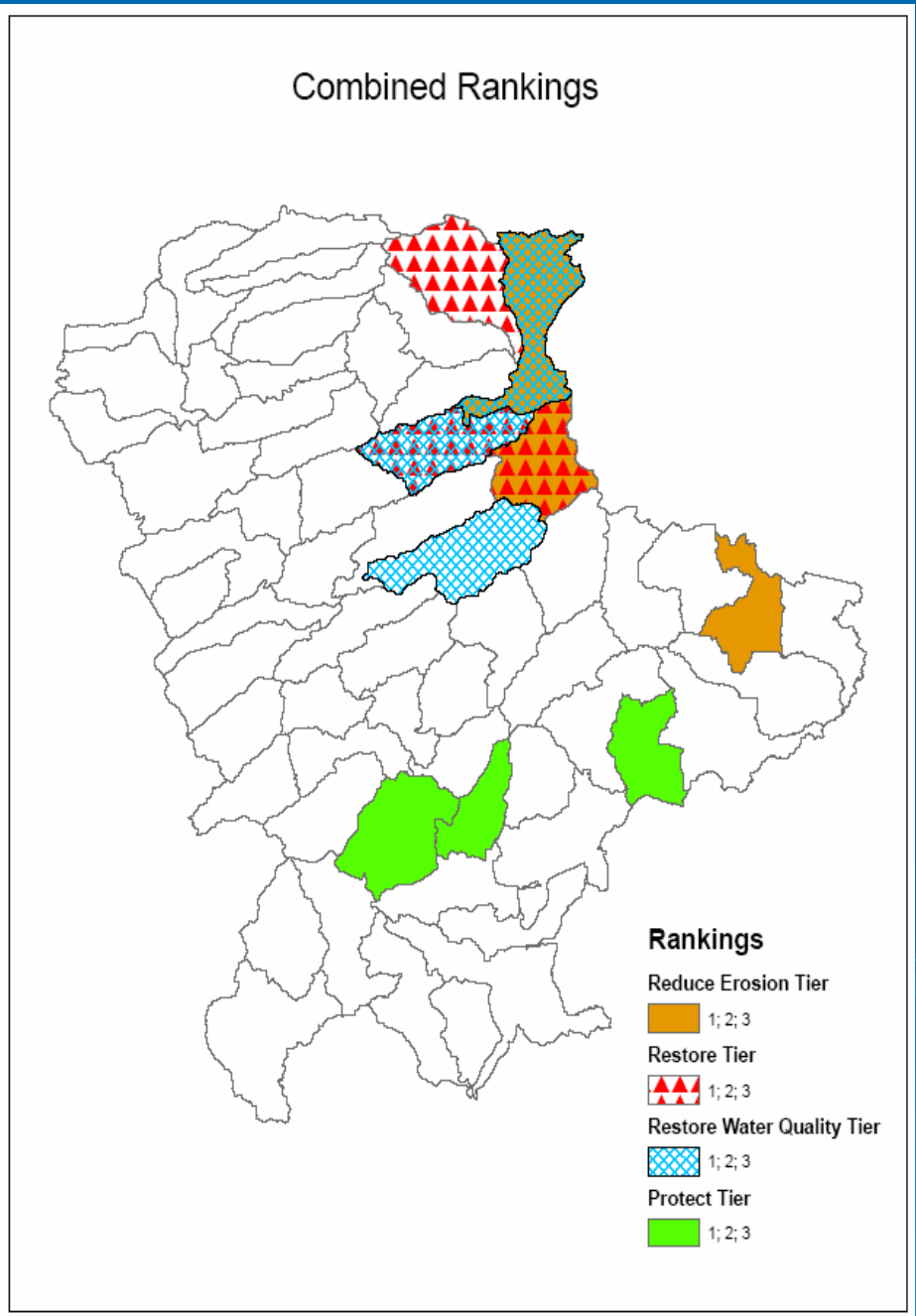
Using the Data
Example: Prioritization model

- Determine what information is most/least important; positive or negative relationships
  - How should one piece of information be weighted compared to another?
  - Should high values receive high or low scores?
- Determine scoring/ranking system and calculate
  - Normal distribution of values for each watershed
    - Scores out of 100
- Sum all scores for each variable to come up with a final composite score for each watershed
- Review, adjust, and finalize watershed rankings within each scenario



	A	B	C	D	E	F	G	H	I	J	K	L	M
2	HUC 12	Protect and Rec	Tier	Rank	Restore	Tier	Rank	Water Quality Restore	Tier	Rank	Erosion restore	Tier	Rank
3	71300030701	88		56	232		22	109		24	76		18
4	71300030702	116		45	116		53	64		47	78		14
5	71300030703	174		33	174		37	103		29	93	3	3
6	71300030902	132		41	202		30	130		13	89		6
7	71300030903	256		22	49		62	59		50	55		30
8	71300030904	291		11	132		49	61		49	56		29
9	71300030905	337	3	3	75		59	16		61	19		51
10	71300031001	107		49	195		31	112		23	34		42
11	71300031002	258		21	187		34	81		40	25		48
12	71300031003	220		27	92		56	64		45	32		44
13	71300031004	278		16	79		58	9		62	31		45
14	71300031101	168		36	226		24	92		36	88		7
15	71300031102	268		18	202		29	115		22	73		22
16	71300100101	94		54	265		16	84		38	76		19
17	71300100102	103		51	252		18	125		16	58		26
18	71300100103	104		50	267		15	95		34	80		11
19	71300100104	197		30	156		40	41		57	27		46
20	71300100201	107		48	207		28	120		19	74		20
21	71300100202	99		53	212		26	101		30	64		25
22	71300100203	99		52	244		20	107		26	69		24
23	71300100204	74		58	272		12	82		39	85		8
24	71300100205	55		60	303		10	143		9	84		9
25	71300100206	110		46	305		7	128		15	73		23
26	71300100301	47		62	305		8	160		5	77		15
27	71300100302	80		57	343	3	3	160		6	92		4
28	71300100303	52		61	341		4	191	2	2	97	2	2
29	71300100304	169		35	187		33	116		21	32		43
30	71300100305	166		37	269		14	140		11	74		21
31	71300100306	310		8	154		43	122		17	17		52
32	71300100401	135		40	224		25	79		43	53		32
33	71300100402	165		38	247		19	106		27	39		38
34	71300100501	121		44	350	2	2	199	1	1	78		13
35	71300100502	236		25	208		27	109		25	5		58
36	71300100601	125		42	352	1	1	185		4	99	1	1


Ranked Improve Water Quality Watersheds
071300100303
Tier 2
071300100501
Tier 1
071300100602
Tier 3


Combined Rankings
Rankings
Reduce Erosion Tier
1; 2; 3
Restore Tier
1; 2; 3
Restore Water Quality Tier
1; 2; 3
Protect Tier
1; 2; 3

Next Steps

- Collect missing data in prioritized watersheds
  - Information that cannot be extrapolated or gathered from existing data layers (IE location and rates of gully erosion)
- Adjust prioritization model if desired
- Compute load reductions for BMP's in selected watersheds
  - IEPA load reduction spreadsheets, RUSLE soil loss equation, and other modeling programs

H76 =

RUSLE	Before Treatment	After Treatment	**Before Treatment**	**After Treatment**
Rainfall-Runoff Erosivity Factor (R)			**120**	**120**
Soil Erodibility Factor (K)			**0.35**	**0.35**
Length-Slope Factor (LS)			**0.44**	**0.44**
Cover Management Factor (C)			**0.7**	**0.5**
Support Practice Factor (P)			**0.775**	**0.11**
Predicted Avg Annual Soil Loss (ton/acre/year)	0.00	0.00	**10.03**	**1.02**

	Example
Contributing Area (acres)	**14**

The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.

Please select a gross soil texture:

- ( ) Clay (clay, clay loam, and silt clay)
- ( ) Silt (silt, silty clay loam, loam, and silt loam)
- ( ) Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- (•) Peat

Estimated Load Reductions for Agricultural Field Practices

	Treated	**Example**
Sediment Load Reduction (ton/year)	#DIV/0!	**85**
Phosphorus Load Reduction (lb/year)	#DIV/0!	**100**
Nitrogen Load Reduction (lb/yr)	#DIV/0!	**200**

Estimated Additional Load Reductions through Filter Strips

	Filter Strips	**Example**
Sediment Load Reduction (ton/year)	#DIV/0!	**6**
Phosphorus Load Reduction (lb/year)	#DIV/0!	**14**
Nitrogen Load Reduction (lb/yr)	#DIV/0!	**27**

Total Estimated Load Reductions

	Total	**Example**
Sediment Load Reduction (ton/year)	#DIV/0!	**92**
Phosphorus Load Reduction (lb/year)	#DIV/0!	**114**
Nitrogen Load Reduction (lb/yr)	#DIV/0!	**227**

Next Steps

- Focus future activities in selected watersheds and apply for grants – IMPLEMENT!
  - “restore 1000 ft of riparian zone”
  - “Protect 10,000ac of high quality habitat”

Sheet and Rill Erosion Prediction Model

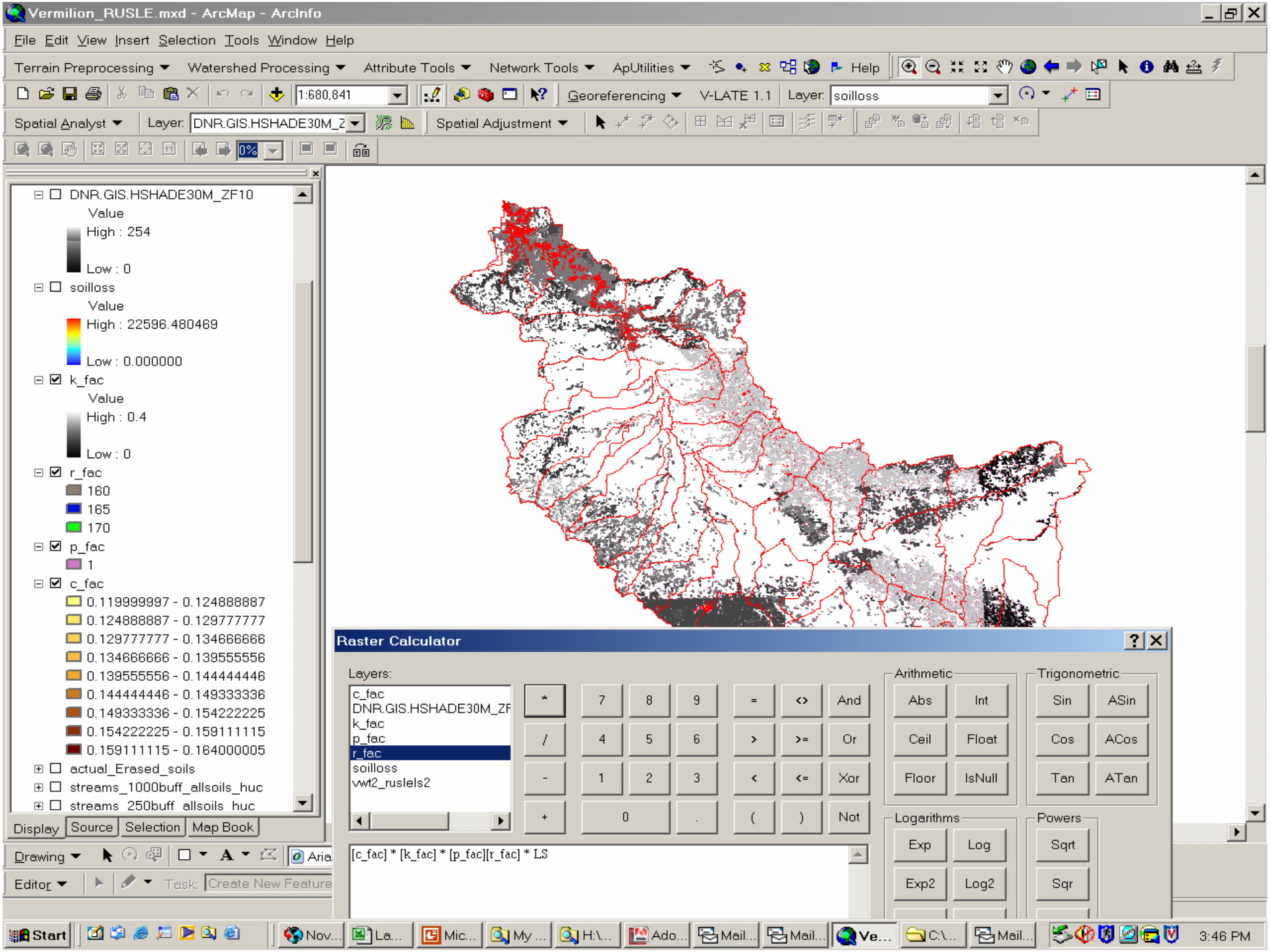
- Method for ESTIMATING erosion potential within a large watershed with limited staff and resources
  - Not exact but a good planning tool
- RUSLE Soil loss equation : E=RKLSCP
  - E = average soil loss
  - R = Rainfall intensity factor
  - K = Soil erodability factor
  - LS = Length slope factor
  - C = Cover factor
  - P = prevention practice factor

Sheet and Rill Erosion Prediction Model: Steps

- Acquire digital soils (1:24,000 scale preferred)
- Begin to select appropriate soils and necessary values
  - Interview local SWCD/NRCS soil specialists to determine what soils are contributing sheet and rill erosion in their area, what are appropriate C and P factors
- Clean up digital soils
  - Select out “eroding” soils (ie B slopes or greater)
  - Clip out areas with existing vegetation or “sinks” for erosion
  - Apply K, P, C, and R values to selected soils

Sheet and Rill Erosion Prediction Model: Steps

- Compute LS factor
  - Run AML on Digital Elevation Model
  - Utilize NRCS planning LS factors by soil type
- Convert each equation component to a separate GRID file
- Multiply each grid file together and run statistics to sum values for your planning area
- Apply sediment delivery ratio and re-calculate
- Make pretty maps and get ready for some good and bad feedback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Terrain Preprocessing
Watershed Processing
Attribute Tools
Network Tools
ApUtilities
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Spatial Analyst
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Spatial Adjustment
DNR.GIS.HSHADE30M_ZF10
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Low : 0
soilloss
Value
High : 22596.480469
Low : 0.000000
k_fac
Value
High : 0.4
Low : 0
r_fac
160
165
170
p_fac
1
c_fac
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streams_1000buff_allsoils_huc
streams_250buff_allsoils_huc
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Editor
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Create New Feature
Raster Calculator
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k_fac
p_fac
r_fac
soilloss
vwt2_ruslels2
* 7 8 9 = <> And
/ 4 5 6 > >= Or
- 1 2 3 < <= Xor
+ 0 . ( ) Not
Arithmetic
Abs Int
Ceil Float
Floor IsNull
Trigonometric
Sin ASin
Cos ACos
Tan ATan
Logarithms
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Exp2 Log2
Powers
Sqrt
Sqr
[c_fac] * [k_fac] * [p_fac][r_fac] * LS
Start
3:46 PM

Sheet and Rill Erosion Prediction Model: Steps

- Compute LS factor
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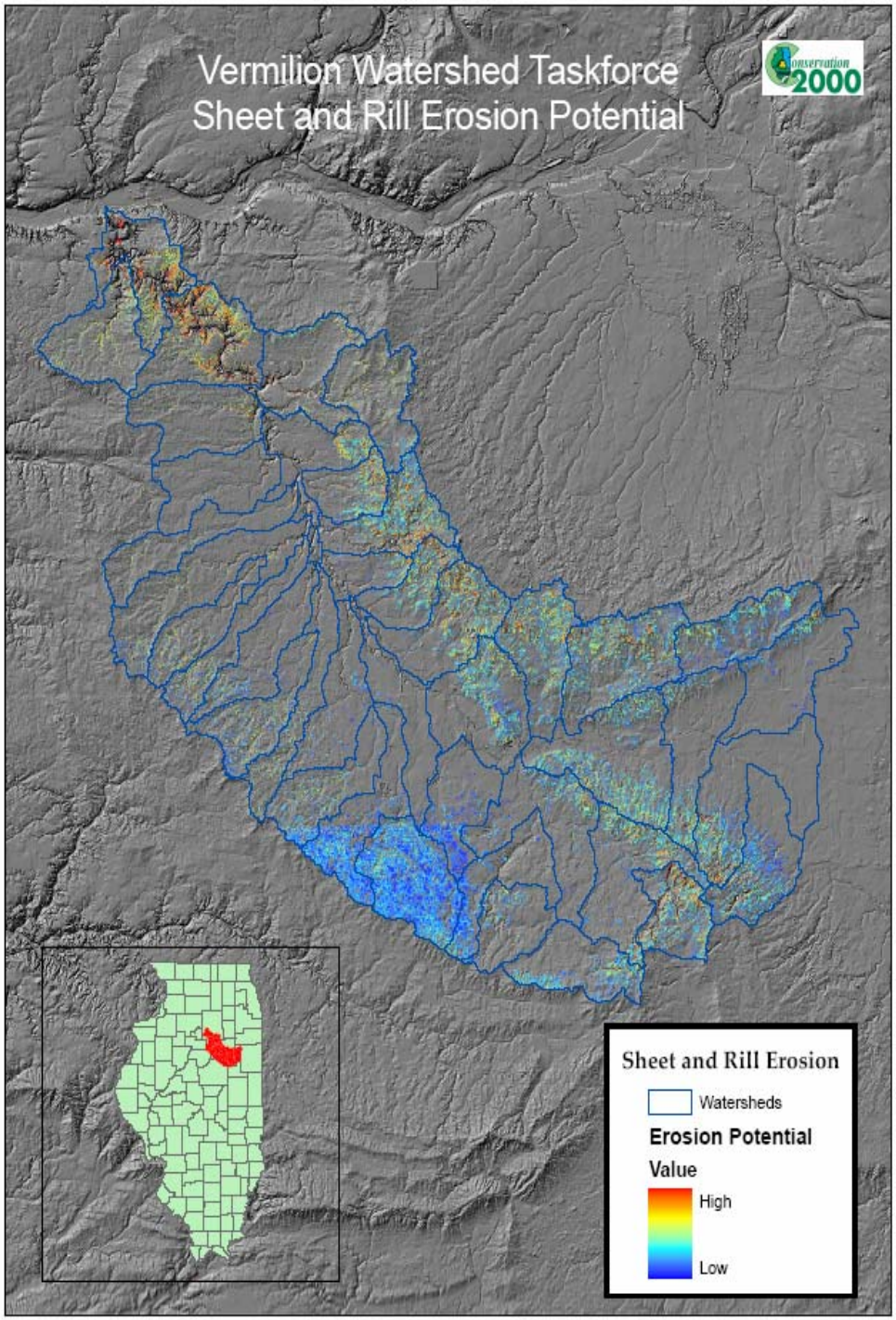
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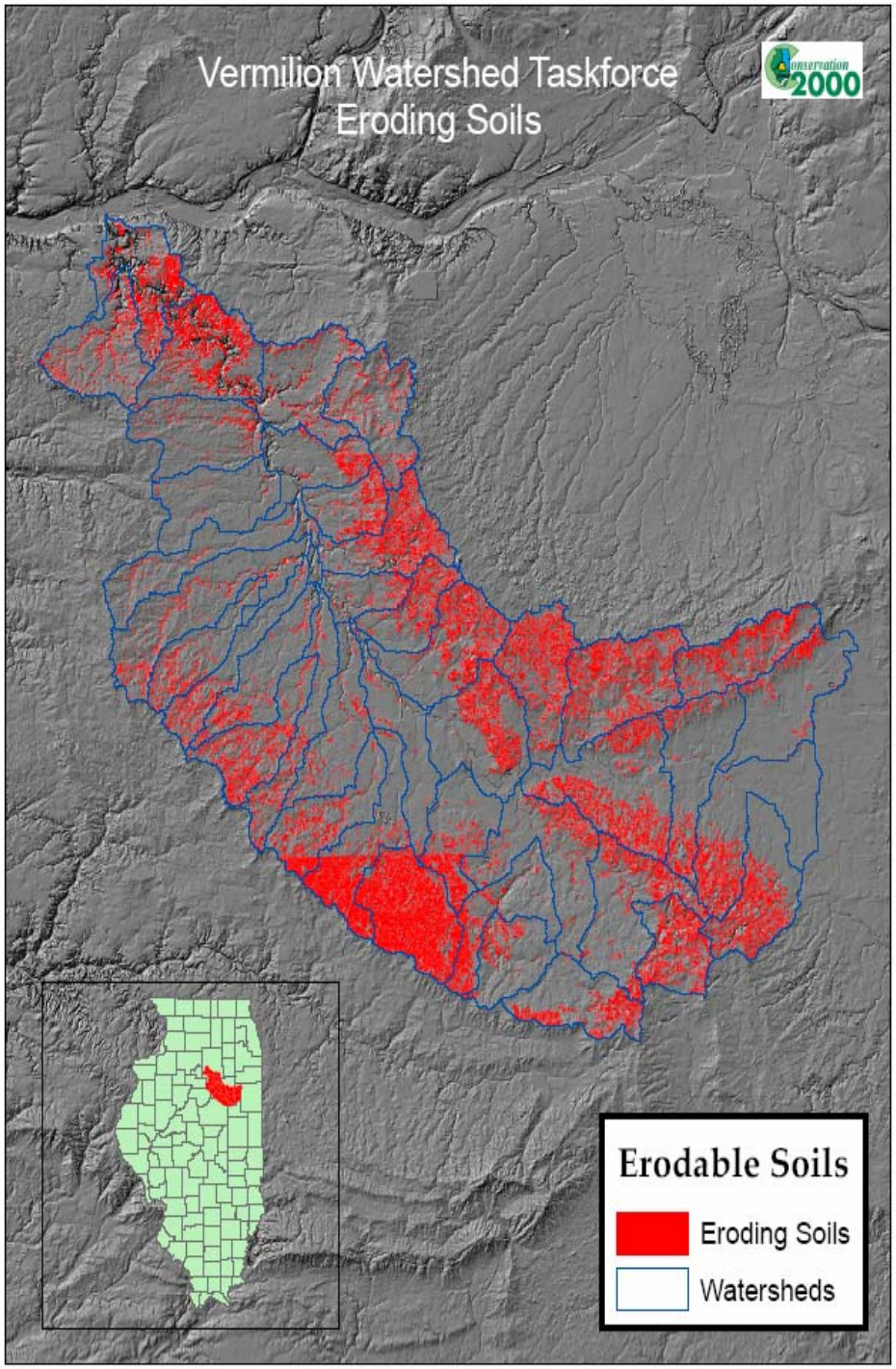
Sheet and Rill Erosion Potential
Sheet and Rill Erosion
Watersheds
Erosion Potential
Value
High
Low


Vermilion Watershed Taskforce
Eroding Soils
Erodable Soils
Eroding Soils
Watersheds

Questions / Comments?