The Map Book

Kansas Association of Counties

Maximizing Your Use of GIS

Mapbook Data

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Table of Contents

Glossary

From ESRI's GIS Dictionary

ArcGIS– The suite of GIS software products produced by ESRI.

ArcSDE- Technology for managing geographic information in a relational database management system (RDBMS). ArcSDE is part of the ArcGIS platform, and is the data server between ArcGIS and relational databases. It is widely used to enable geographic information to be shared by many users across a network.

ESRI– Acronym for *Environmental Systems Research Institute*. This company produces computer software products that provide the ability to author, analyze, map, manage, share and publish geographic data.

Flowlines– Interconnected water pathways, typically starting from small creeks progressing to larger streams and rivers.

Geocoding- A GIS operation for converting street addresses into spatial data that can be displayed as features on a map.

Geodatabase- A database or file structure used primarily to store, query, and manipulate spatial data. Geodatabases store geometry, a spatial reference system, attributes, and behavioral rules for data.

GIS– Acronym for *geographic information systems*. An integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

LIDAR- Acronym for *light detection and ranging*. A remote-sensing technique that uses lasers to measure distances to reflective surfaces.

Line- On a map, a shape defined by a connected series of unique x,y coordinate pairs. A line may be straight or curved.

Point- A geometric element defined by a pair of x,y coordinates.

Polygon- On a map, a closed shape defined by a connected sequence of x,y coordinate pairs, where the first and last coordinate pair are the same and all other pairs are unique.

Raster- A spatial data model that defines space as an array of equally sized cells arranged in rows and columns, and composed of single or multiple bands. Each cell contains an attribute value and location coordinates.

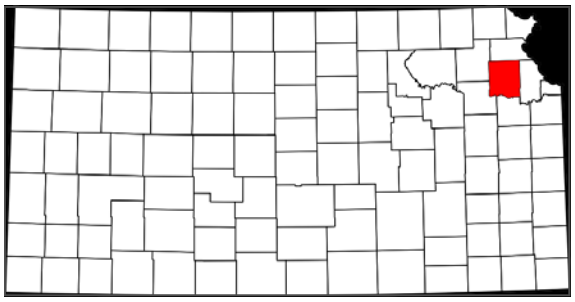
Spatial Reference– The coordinate system, tolerance, and resolution used to store a spatial dataset.

Symbology- The set of conventions, rules, or encoding systems that define how geographic features are represented with symbols on a map. A characteristic of a map feature may influence the size, color, and shape of the symbol used.

Vector- A coordinate-based data model that represents geographic features as points, lines, and polygons.

For additional definitions, please see http://support.esri.com/index.cfm?fa=knowledgebase.gisDictionary.gateway

Jefferson County Profile



Jefferson County is located in the northeast corner of Kansas, with Topeka and Lawrence within a half-hour drive and Kansas City within an hour drive.

Jefferson County

Population– 19,106

50 Mile radius includes 1,615,000 people

Population Dispersion

Eight incorporated cities, none of which have a population over 2,000.

67% of the population lives outside municipal boundaries.

Land Use

75% of the county is zoned as agricultural

Workforce

67.4% of the workers living in Jefferson County work outside of the county (approx. 5982 people)

40% of those working outside the county work in Shawnee County (approx. 2392 people)

Government

Jefferson County employees 223 people and operates under a County Unit System

Geographic Information Systems

How GIS Works– Layering

One analogy for seeing how GIS works probably comes from food.

Much like fancy cakes, sub sandwiches and baklava, all built from layering different ingredients, a GIS map is built by combining layers like aerial photography, roads, parcel lines and address points. Individually, the mapping layers provide limited information, but together, they create a complete picture of what is happening in a given area. This core set of layers combines to create a base map– a map containing geographic features used for locational reference.

Delayering the Neapolitan Cheesecake-

Vanilla
Raspberry
Fudge
Chocolate Cookie Crust

Delayering the Sandwich-

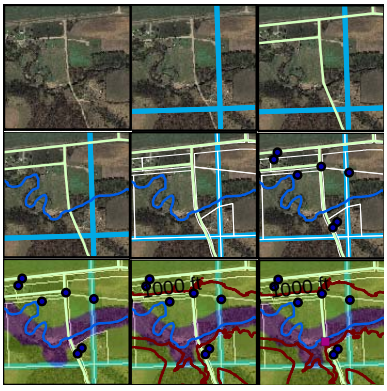
Top Bun
Mayo
Sprouts
Peppers
Onion
Tomato
Ham
Cheese
Turkey
Lettuce
Bottom Bun

Delayering the Taco Pizza-

Crust
Refried Beans
Spices
Sour Cream
Salsa
Cheese
Lettuce
Tomatoes
Olives

Photograph taken by Nicole King for http://www.forfood.rezimo.com/

Delayering the Map-



<u>Base Map Layers</u>
Aerials
Sections
Roads
Streams
Parcel Lines
Address Points

<u>Additional Layers</u>
Flood Plain
Contours
Bridges

GIS Database Functionality

Behind every GIS feature in a map (whether an address point, road section or parcel outline) exists a database entry containing specific information about that feature. With the information stored, the symbology (how it appears on the map) of the features can be changed to reflect specific attributes. By using the data about a feature to control how it appears, the map as a whole becomes easier to interpret.

Figure I– This shows a few of the new homes in Jefferson County

Figure II– The new homes are color-coded by the year they were built. Seeing this information provides a way to visually track housing trends in the county.

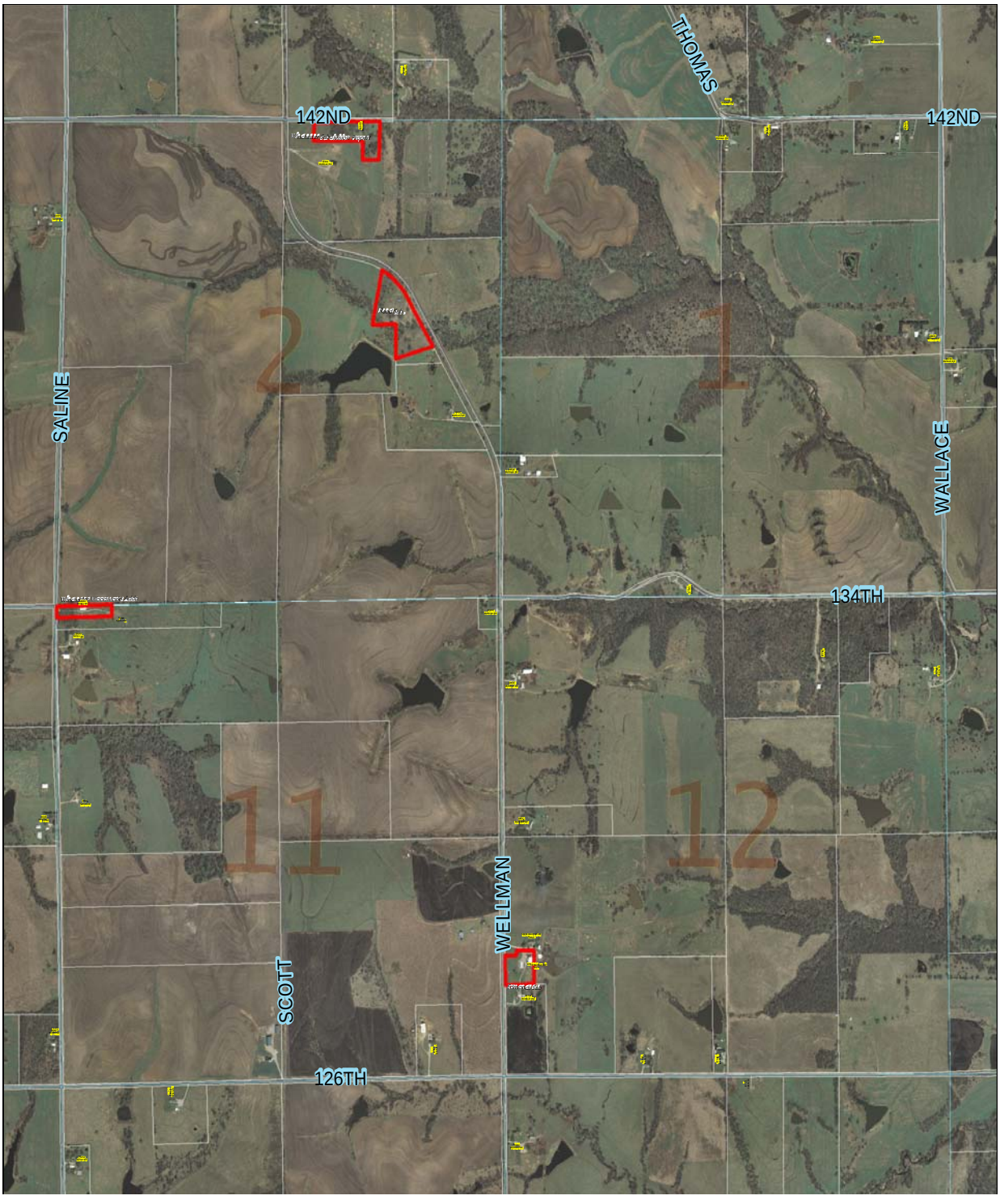
Attributes of Homes03_06point

NBHD	TAX	YRBLT	PROPERTY_A	ZIP_1	STYLE	PARCELID
0431	165	2003	2132 ADAMS ST	66429	18	2441901005004000
043	081	2004	7399 70TH ST	66512	6	1762300000003000
073	102	2005	6587 ANGEL LN	66066	2	1942000000002130
043	166	2003	4664 CLARK RD	66512	18	1783300000007010
023	061	2003	11895 FERGUSON RD	66070	2	1351600000013000
023	061	2005	10052 118TH ST	66070	2	1351600000012000
073	046	2004	15884 MOONEY CREEK RD	66097	17	1041900000007000
021	002	2006	428 PRAIRIE BEND DR	66512	2	1611201001009000
021	002	2005	426 PRAIRIE BEND DR	66512	2	1611201001008000
021	002	2005	424 PRAIRIE BEND DR	66512	2	1611201001007000
021	002	2005	422 PRAIRIE BEND DR	66512	2	1611201001006000
0831	056	2006	9254 VALLEY VIEW DR	66070	17	1392903004011000
043	071	2006	9602 VILLAGE GREENS RD	66512	17	1483400001039040
081	009	2004	509 THIRD ST	66097	2	0972603019014000

Record: 1 Show: All Selected Records (0 out of 405

Figure III- This information about the new homes exists in the database. Each point depicted on the map corresponds to a line of information in the database.

The Base Map


THOMAS
142ND
142ND
SALINE
WALLACE
134TH
WELLMAN
SCOTT
126TH
2
1
11
12
Subdivisions
Sections
Parcels
Roads

The Base Map

The Challenge-

Every GIS system needs a core set of layers that comprise their base map. Getting the necessary layers set up in the correct fashion can take years, but citizens and other departments want GIS maps right now. In addition to the spatial representations used in mapping, the information about the features stored in the database plays a critical role in its usability.

The Solution-

Why re-create data if it already exists? Use the resources provided at the Kansas Geospatial Commons (kansasgis.org) for basic data, then improve the data and begin creation on the more complex, customized data layers like parcels and address points. For customized data layers, creating the proper base map layers correctly for location and attribute information the first time makes edits, updates and geoprocessing much easier in the future.

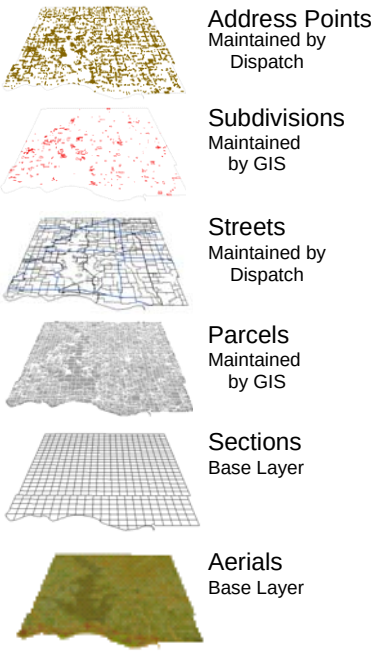
The goal of any GIS layer is to create spatial features tied to usable information that are easy to update and edit. The information about spatial data (point, line or polygon) gives it a level of "intelligence."

Benefits-

Organized Information

Departments no longer have to consult several different paper maps to find all the information they need. They can consult one GIS map which is a centralized, digital data storehouse. Having an organized information system decreases the workflow time in both customer service situations and internal projects.

Delayering the Map-



Base Layers

Aerial Photography

Base Layers

Aerial Photography

Aerial Photography-

Aerial photography provides a snapshot of "real-life" images. Over time, these images show how developments, structures, waterways and roads change.

Resolution-

The clarity of the aerials depends on the measurement of the pixel size of the image and the height at which the image was captured. Generally, if the image was taken at the correct altitude, the smaller the pixel, the sharper the image.

How the Data Can Be Obtained-

One meter aerials from the Farm Service Agency are available for free download from DASC at the Kansas Geospatial Commons (kansasgis.org). For a higher resolution or for specific times of the year (leaf-off), an entity would need to hire out the project. In order to fund aerials, many counties have asked for E-911 grant money since dispatch and emergency management use aerials extensively.

Margin of Error-

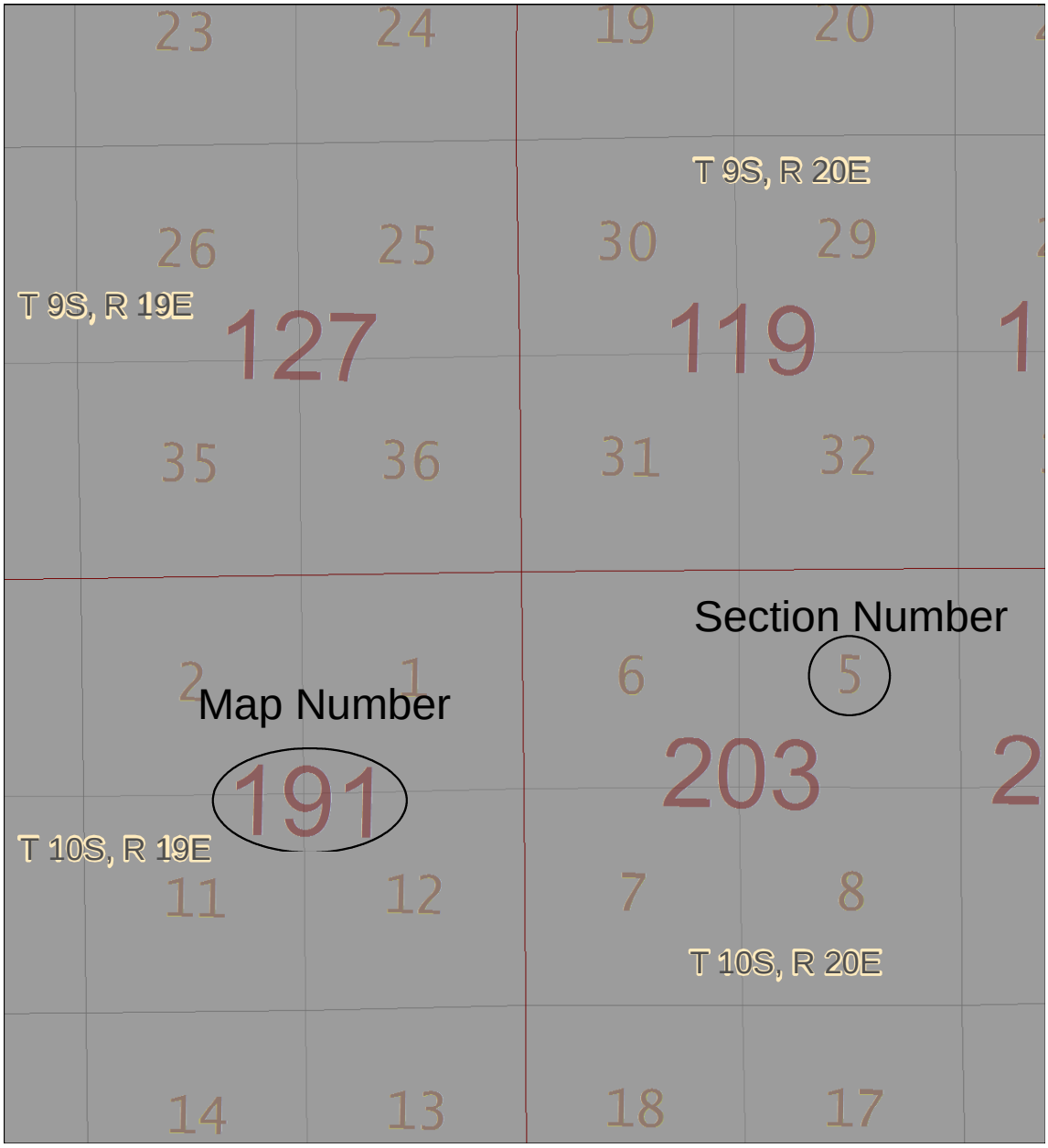
Sometimes, the aerial data will not match correctly with parcel or road data. Because parcel data is typically generated based on section corners, which may have varying degrees of accuracy, they will not always match exactly with aerial data which is adjusted based on latitude and longitude coordinates acquired before the flight. Neither layer is "right" or "wrong;" they are based on different points of reference with varying degrees of accuracy.

Creating Other Data-

Other data layers can be created or edited based on aerial images.

- Address Points
- Building Footprints
- Centerline Corrections
- Land Use
- Water Boundaries
- Rural Housing Access Points

For more information, see "Aerial Imagery Guidelines" and "Digital Color Orthoimagery Scope of Work" on the Kansas Collaborative website- http://www.thekansascollaborative.com/resource.html#anchor4


23
24
19
20
T 9S, R 20E
26
25
30
29
T 9S, R 19E
127
119
35
36
31
32
Section Number
Map Number
6
5
191
203
T 10S, R 19E
11
12
7
8
T 10S, R 20E
14
13
18
17

Base Layers

Cadastral Data

Cadastral Data-

This is the base for every property document in Kansas.

How the Data Can Be Obtained-

Section information with township and range (Public Land Survey System– PLSS) is available for free download from DASC at the Kansas Geospatial Commons (kansasgis.org). This data works well for appraisal information, but is not survey accurate.

What to Do With the Data-

This layer provides the point-of-reference for every property legal description and road right-of-way.

Creating Other Data-

Quarter (160 acre) and sixteenth section (40 acre) grids can be generated from the section layer. These grids can be used for various analysis purposes like building or population density calculations in a specific area.

Jefferson County uses a Map Number layer (based on the 400, 200 and 100 scale maps used in the Appraiser's Office) as an interface between old paper maps and digital data.

Base Layers

Parcel Data

Base Layers

Parcel Data

Parcel Data-

This data layer shows property ownership lines.

How the Data Can Be Obtained-

This data can be created either in-house from paper maps and legal descriptions or hired out to a vendor. Jefferson County did a combination of both by completing the 400 scale parcel maps and contracting the creation of the 100 and 200 scale maps.

What to Do With the Data-

Among other purposes, this layer determines taxing by attaching to CAMA (Computer Aided Mass Appraisal) and tax information and provides the boundaries for zoning.

Basic Information-

There might be several layers with parcel geometry which each contain different aspects of parcel information. Jefferson County uses four layers to hold various data pieces; due to database design, putting all the data in one layer is inefficient. Between multiple layers, each parcel should include the following information-

Parcel Number
Acreage
Boundary Dimensions
CAMA information- Owner, Owner Address
Subdivision information– Lot Number, Block Number, Subdivision ID, Book & Page
Tax Unit

Taking the Data to the Next Level-

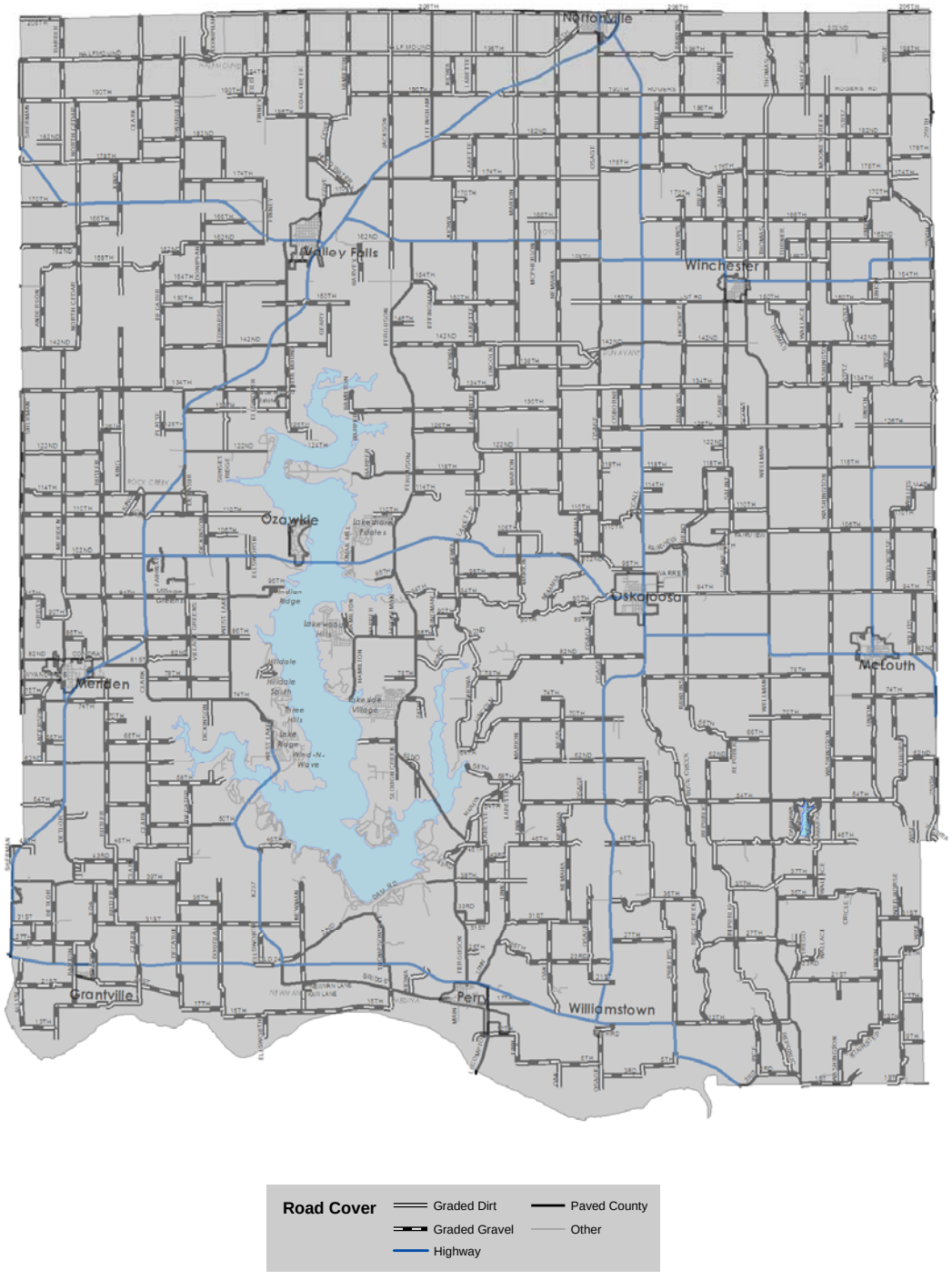
In customized layers, these types of data will provide extra insight into parcel information-

Zoning
Zoning Compliance Status
Tax Payment Information

Since taxing is based on the agricultural land use and soil types inside a parcel, the geometry of a parcel can be used as a "cookie-cutter" to generate a tax report from land use and soils layers inside the GIS system.

Base Layers

Street Centerline



Base Layers

Street Centerline

Centerline-

The road centerline file provides the base road map for the county and provides address ranges that can be used for geocoding (automatically placing points on the map by interpreting the physical address).

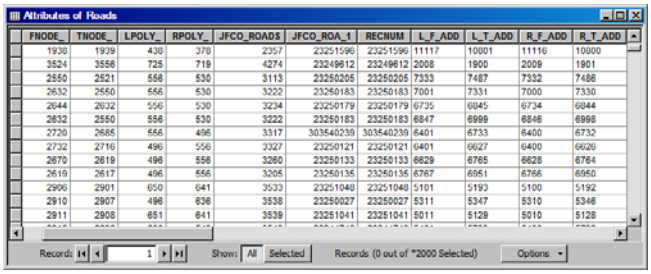
How the Data Can Be Obtained-

The Census Bureau TIGER centerline data is available for free download from the Data Access and Support Center (DASC) at the Kansas Geospatial Commons (kansasgis.org). After downloading the data, it can be customized and edited to increase accuracy and usability.

Basic Information-

Each section of road needs the following information-

Street Name
Street Type (sometimes called the suffix– street, road, lane, circle, drive, etc.)
Address Range Information



Address information can be quite complex. Please see http://www.kansasgis.org/docs/uploaded/2address.pdf for more information.

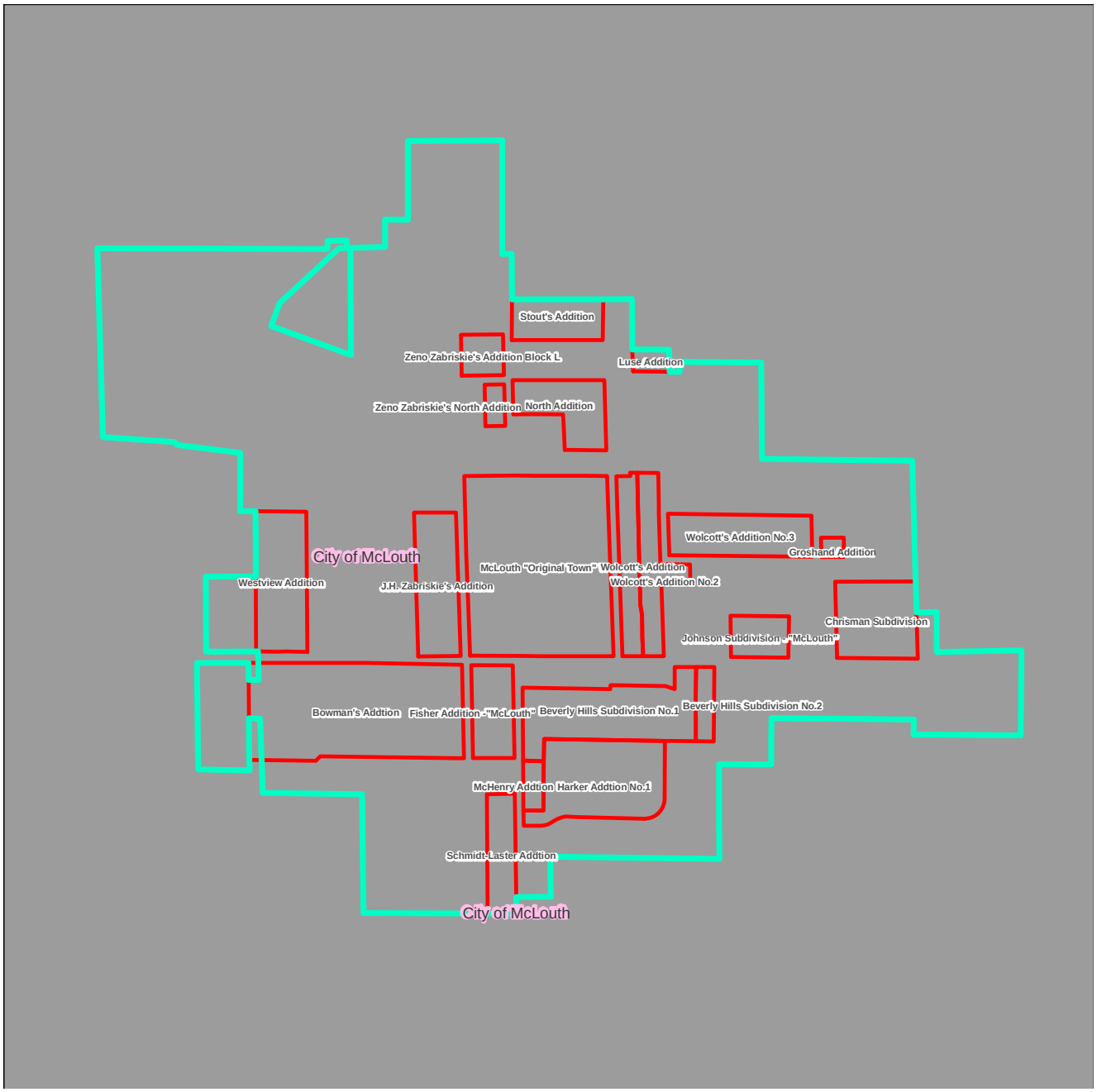
Taking the Data to the Next Level-

In customized layers, these types of data will provide extra insight into the road information-

Road Owner
Road Maintainer
Surface Type
Maintenance Record
Repair Status
Grader District
Traffic Count
Road Length (which can be automatically calculated)

Base Layers

Jurisdictional Boundaries



City Limits, Tax Units, Subdivisions, Fire Districts, Cemetery Districts, Rural Water Districts, Commissioner Districts, Utility Districts, Political Townships, etc.

Base Layers

Jurisdictional Boundaries

Boundary Data-

These layers show the exact area in which an entity has jurisdiction or influence.

How the Data Can Be Obtained-

This data can be generated in-house based on legal descriptions of boundaries.

What to Do With the Data-

Jurisdictional boundaries mainly provide a visual reference for citizens to determine their positioning inside the political schema.

Basic Information-

The data for boundaries only needs one type of information-

Specific Entity of Influence (i.e., Tax Unit 224, Johnson Fire District #4, Commissioner District #1)

Taking the Data to the Next Level-

Other details that could be included in the database-

Contact information
Entity Website
Legal Description/Plat Hyperlink

Base Layers

Address Points

Base Layers

Address Points

Address Points-

This data gives latitude and longitude coordinates for all structures in Jefferson County. In many cases, an address point is also placed at the driveway entrance to a house to give lat/long coordinates of the access to a structure.

How the Data Can Be Obtained-

Field collection of the data is not necessary. This data was generated in-house based on current aerial images.

What to Do With the Data-

The address points layer is one of the key layers for 911 Communications Dispatch Division. Other county departments use the data as a reference for how a piece of land can be described and found. This information can also assist the Census Bureau in address canvassing projects.

Basic Information-

The data for an address point should contain the following-

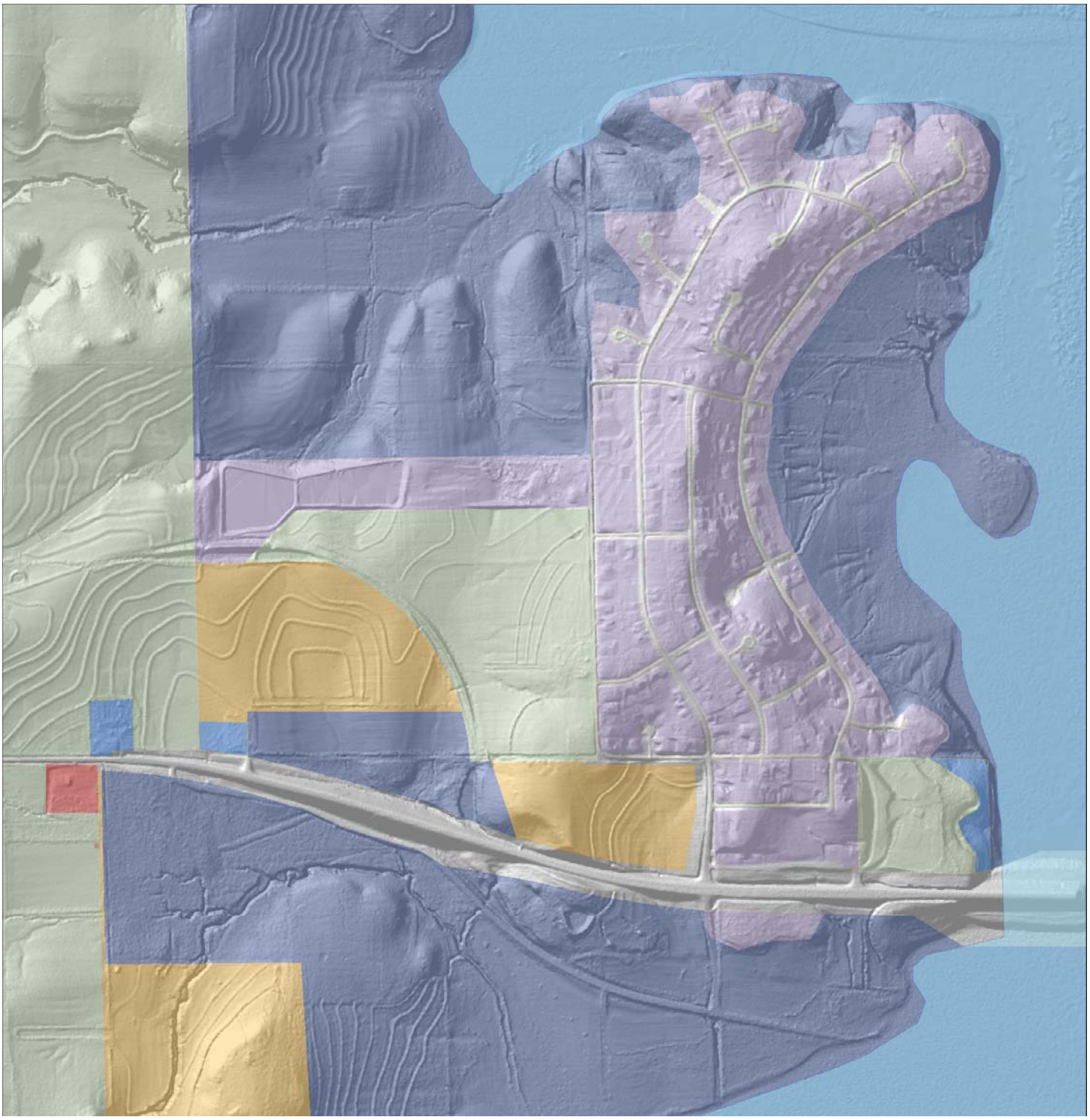
Address Number
Street Directional (N, S, E, W)
Street Name
Street Type
City
Zip Code
Latitude
Longitude

Taking the Data to the Next Level-

When generating a correct address point layer, the following information is good to include-

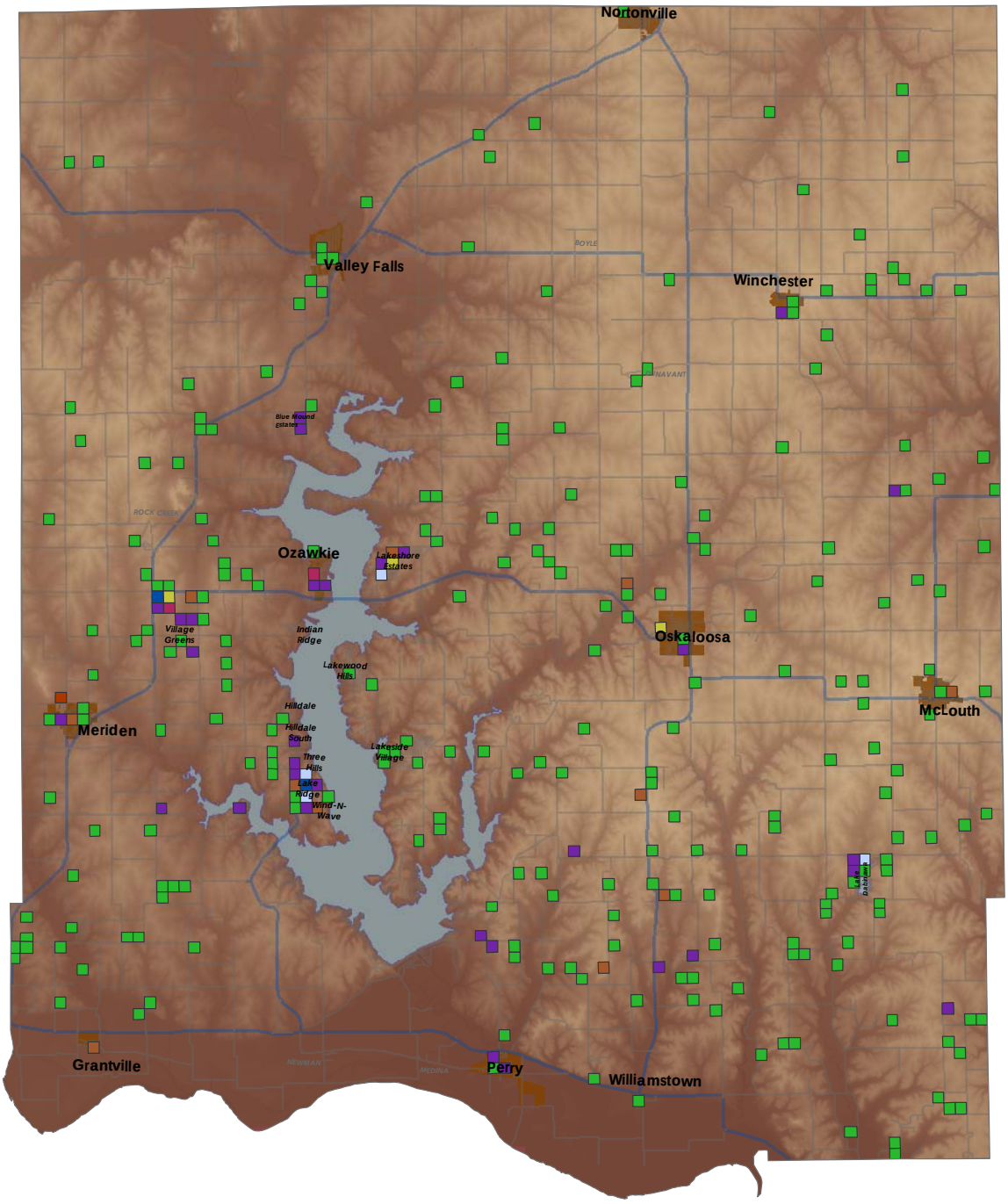
Point Type (home, lot, utility, commercial)
Parcel Number
Fire District

For more information on addressing standards, please see http://www.kansasgis.org/docs/uploaded/2address.pdf.



Economic Development

New Home Locations– 2003-2006



New Home Locations– 2003-2006

Economic Development

The Challenge-

New housing affects county infrastructure. However, a map of points of new homes is not easy to interpret on a county level. How do we display the new housing information in a way that shows the trends in an easily comprehendible way?

The Solution-

Using ArcMap's "Join by Spatial Location" functionality, we summed the number of new houses by one sixteenth of a section, 40 acre pieces.

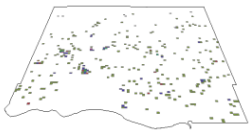
Benefits-

Easier Data Interpreting

The New Home Count gives a better picture of where individual houses have been built without having to interpret points.

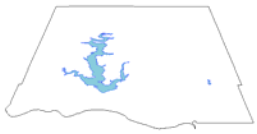
Delayering the Map-

New Home Count
Created by
GIS



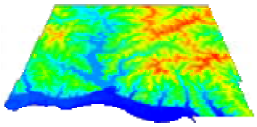
City Limits
Base Layer

Lakes
Base Layer

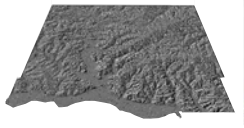


Streets
Maintained
By Dispatch

Elevation
Base Layer

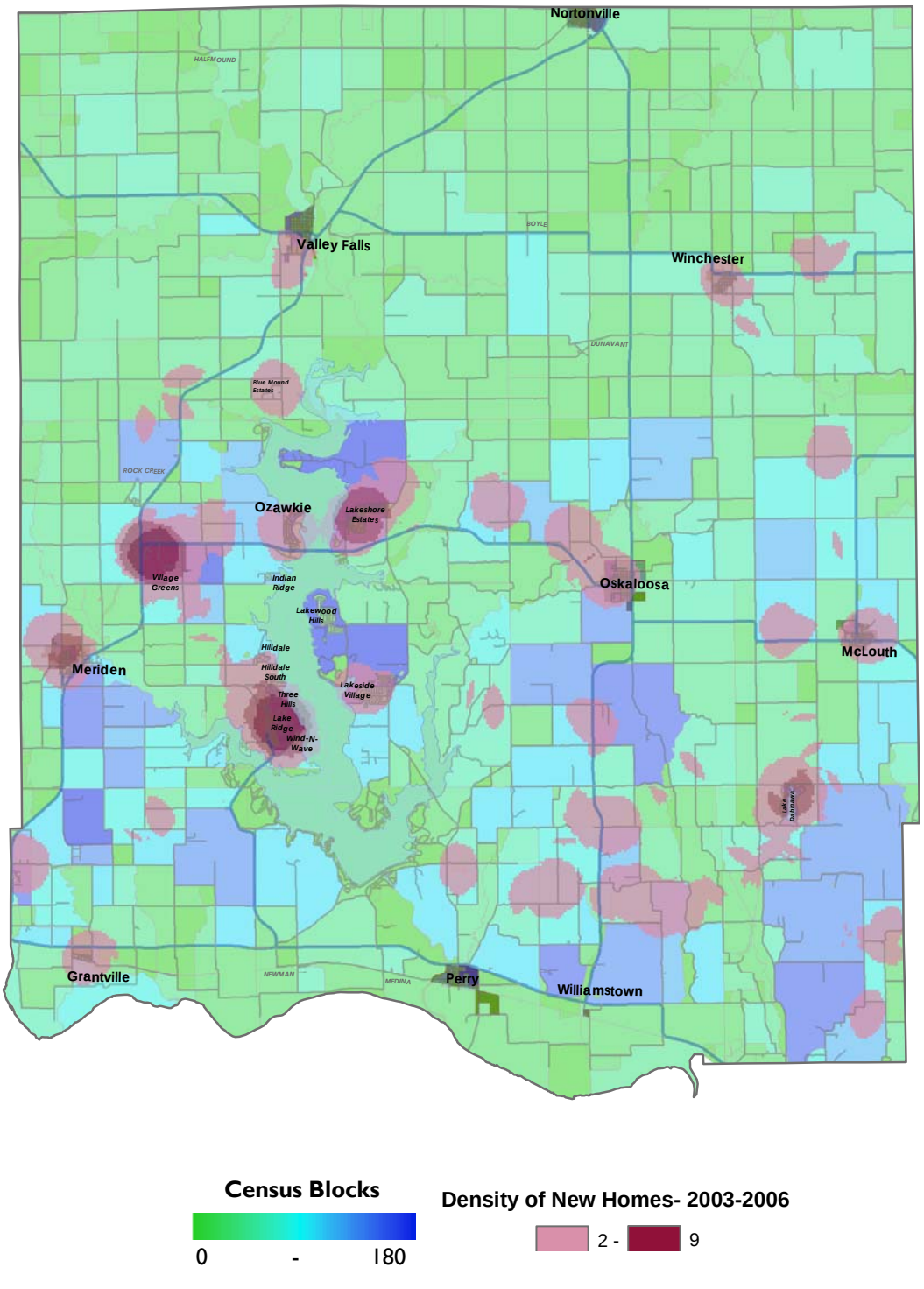


Hillshade
Base Layer



New Home Density– 2003-2006
With
2000 Census Data

Economic Development



New Home Density– 2003-2006 With 2000 Census Data

Economic Development

The Challenge-
Even though points and counts show exact locations, it is important to see the trends in relation to one another. Which areas of the county are experiencing the highest density of new homes? How do we use the new housing data to track changes in the county?

The Solution-
Using ESRI's Spatial Analyst, density analysis shows the concentrations of new homes in Jefferson County. This map then combines the new housing density with the 2000 population data. The combination shows where the existing population lived in 2000, then the new housing data shows where people are moving. For example, fewer houses are being built in cities and more are built in rural subdivisions, particularly those with easy access to the lake.

Benefits-

Easier Visual Analysis
Instead of trying to interpret dots on a map, Spatial Analyst provides a way to see how these dots relate to one another in terms of proximity. By looking at the map, you see instantly where the pockets of new housing growth are in Jefferson County.

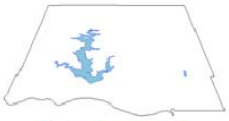
Better Analysis Capabilities for Decision Making
Instead of trying to track these types of data on a spreadsheet, the data can be displayed on a map. Trends become more apparent since other data, like road surfaces and water resources, can be added to further the visual analysis capabilities.

Delayering the Map-

New Home Density
Created by GIS

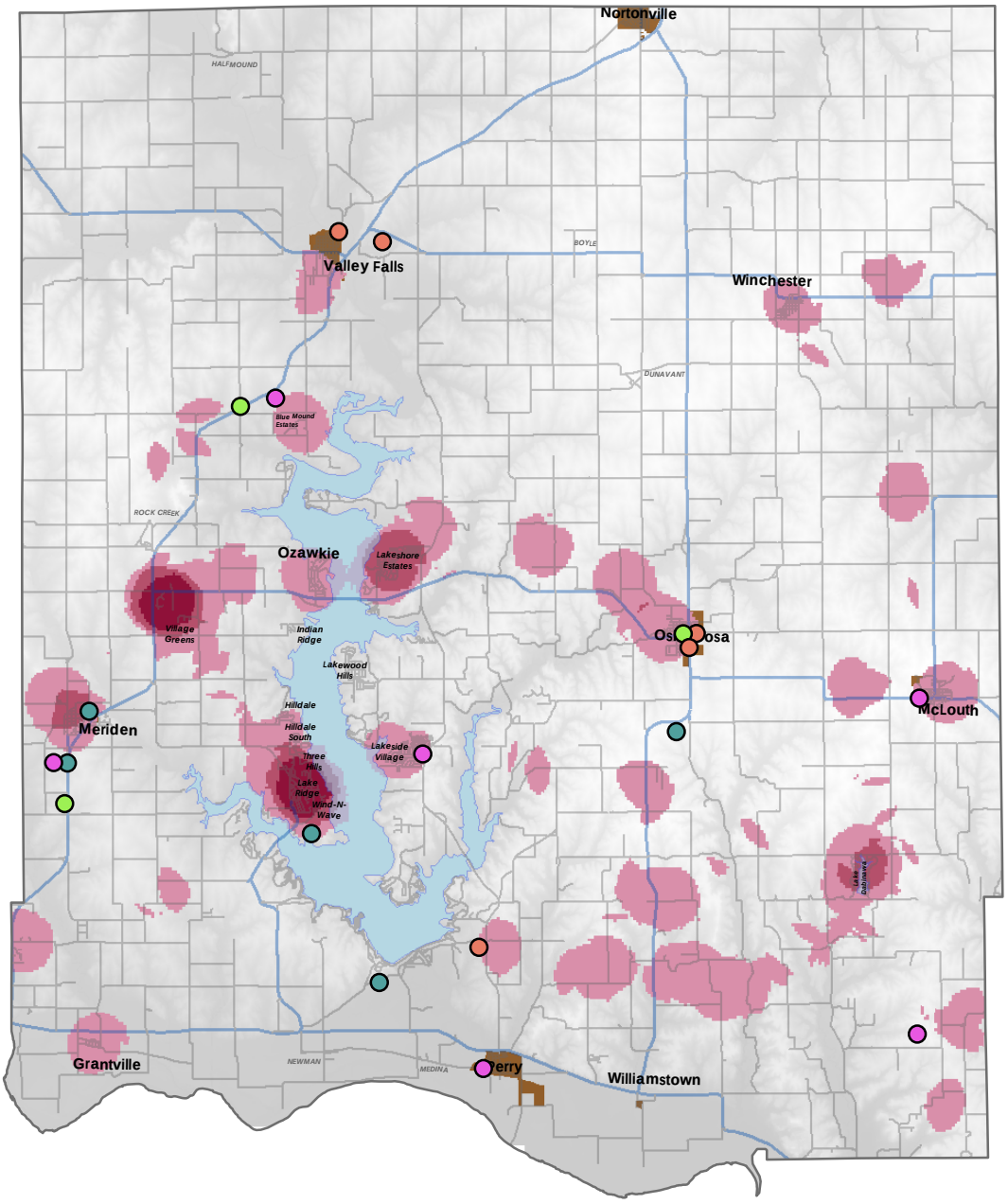
City Limits
Base Layer

Lakes
Base Layer



2000 Population
Census Bureau

New Home Density– 2003-2006
With
New Commercial Data



New Commercial Sites

YEAR BUILT

- 2003
- 2004
- 2005
- 2006

Density of New Homes- 2003-2006

2 - 9

New Home Density– 2003-2006 With New Commercial Data

Economic Development

The Challenge-

Forecasting sites for potential business development correlates to where the population relocates. Seeing where recent business have been built shows the economic growth centers in the county and also where new business sites could be located.

The Solution-

Comparing the new commercial sites with the new housing gives an analysis of how businesses are responding to population developments. For example, while a few of the businesses started within city limits, the majority are not, mirroring the new housing data. Also, most of the businesses are located within a half-mile of a major highway.

Benefits-

Better Analysis Capabilities for Decision Making

Visualizing the data provides a better format for analysis than trying to interpret the data based on a spreadsheet. Because of the analysis capabilities of the GIS system, Economic Development and Planning and Zoning can make better decisions about commercial planning and development strategies which benefit the county and its citizens.

Delayering the Map-

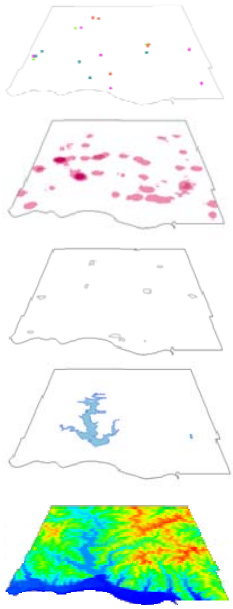
New Commercial
Created by GIS

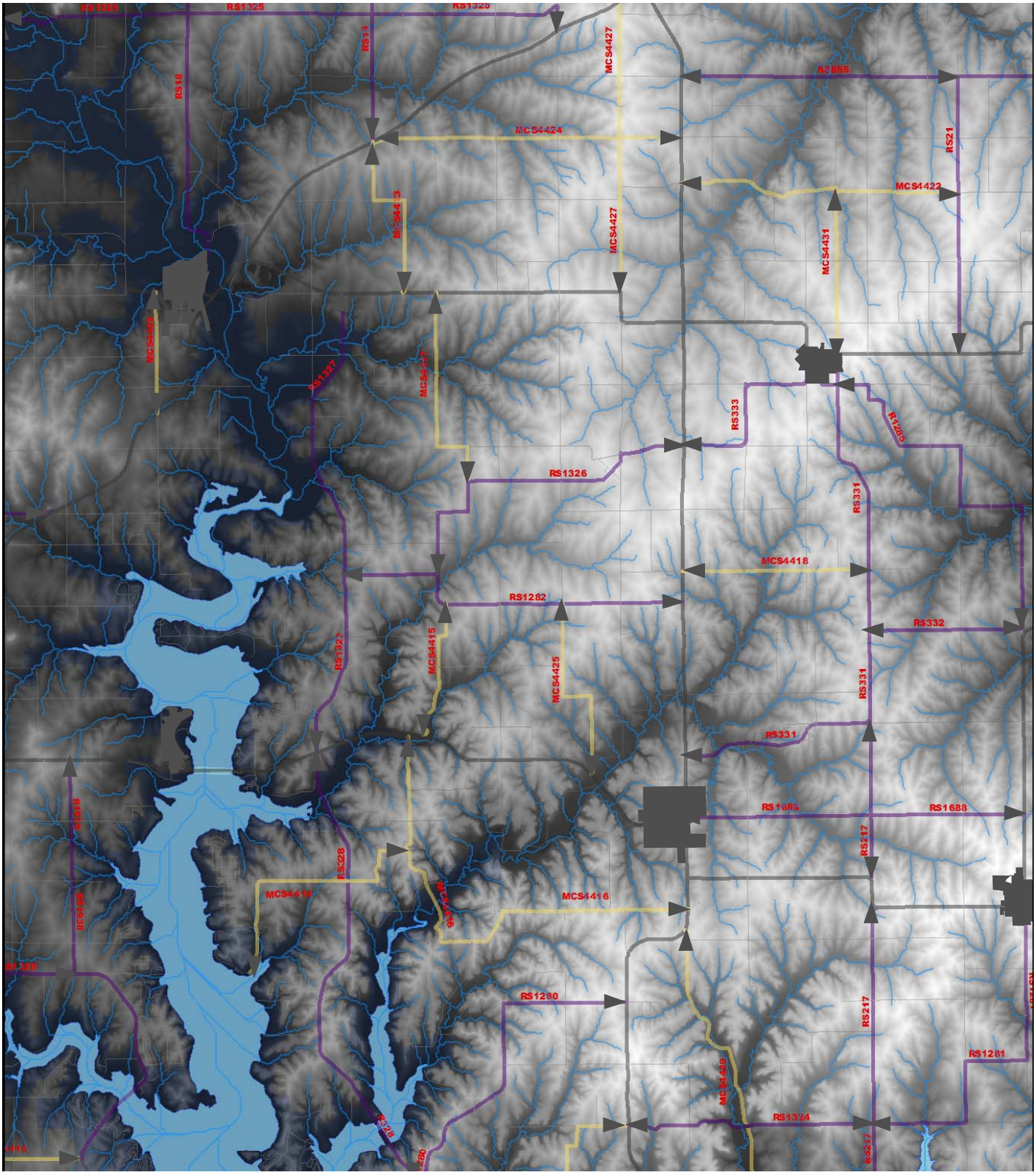
New Home Density
Created by GIS

City Limits
Base Layer

Lakes
Base Layer

Elevation
Base Layer

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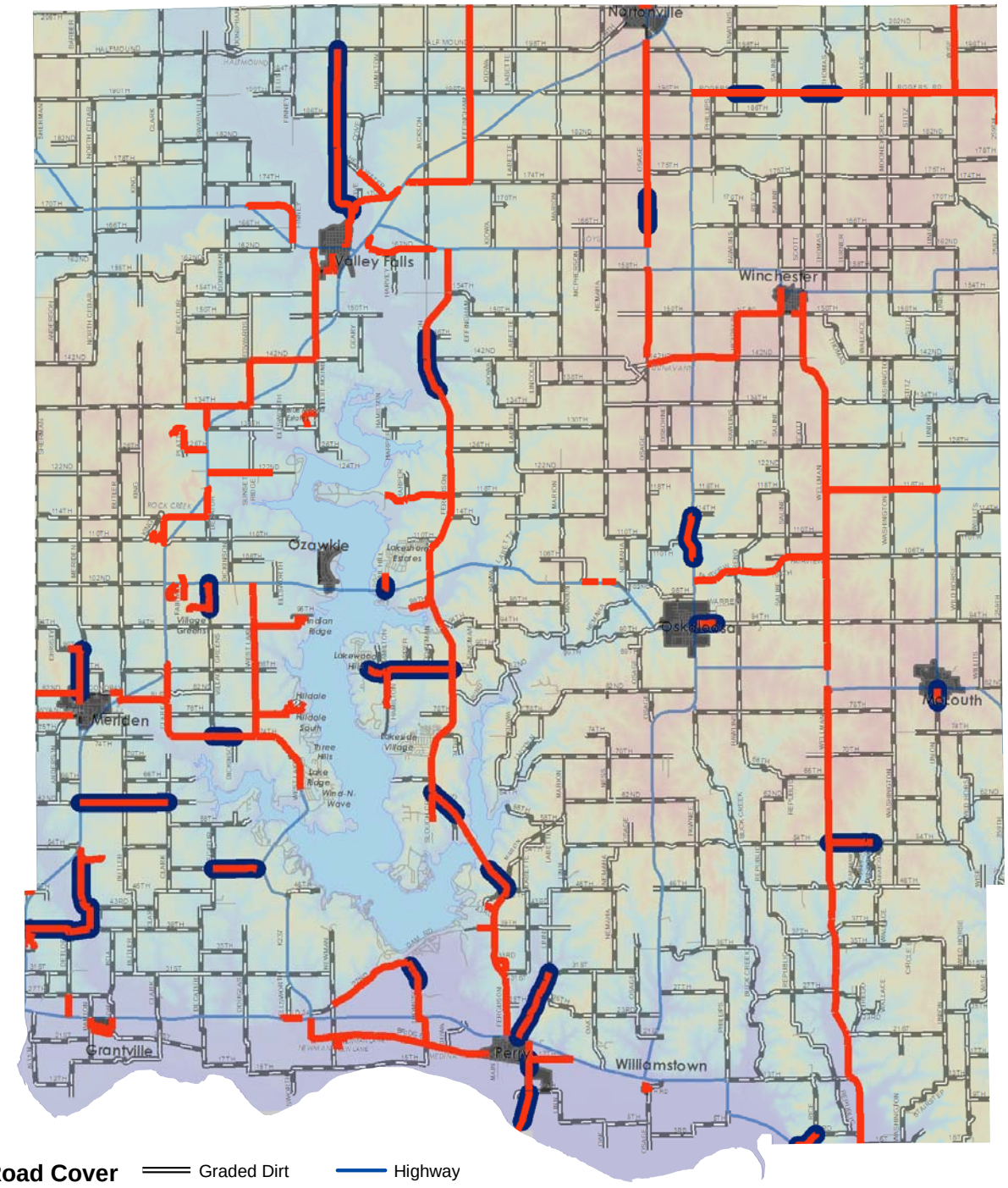
RS328

Road & Bridge



Road Cover

- Graded Dirt
- Graded Gravel
- Paved- County Owned
- Maintained in 2007
- Highway
- Other

Road Attributes

The Challenge-

There are 1225 miles of road in Jefferson County. Keeping track of these roads, their names, their surface types, who owns them, who maintains them, what needs to be improved and how much traffic travels the roads is a massive undertaking.

The Solution-

Since the Jefferson County GIS system exists in a database, all the information about a road piece can be viewed on the computer by clicking on the piece in the map. Queries can be used to highlight specific road attributes, such as county-owned paved roads.

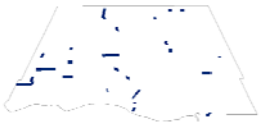
Benefits-

Consolidated Data

Storing the data in one place makes querying and analyzing road data much easier and more convenient. It also provides a multi-departmental opportunity to use and display road data.

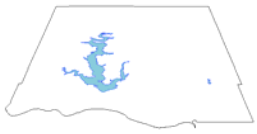
Delayering the Map-

Maintenance 2007
Created by
R&B



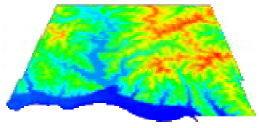
City Limits
Base Layer

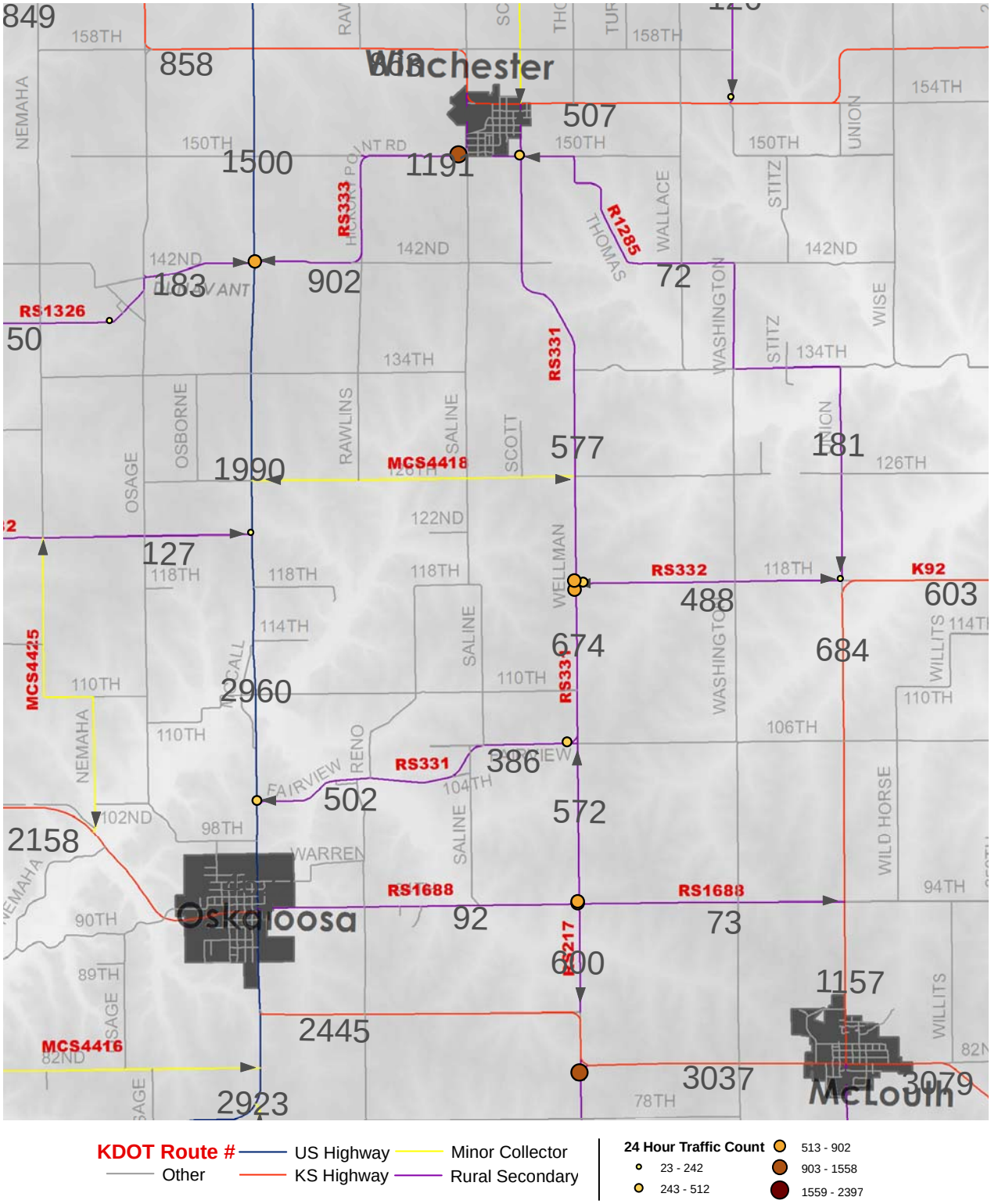
Lakes
Base Layer



Streets
Maintained
By Dispatch

Elevation
Base Layer




849
158TH
858
Winchester
507
154TH
NEMAHA
150TH
1500
1191
RS333
142ND
902
183
RS1326
50
R1285
THOMAS
WALLACE
72
STITZ
WASHINGTON
WISE
134TH
RS331
OSBORNE
RAWLINS
SALINE
SCOTT
577
181
126TH
OSAGE
1990
MCS4418
122ND
127
118TH
RS332
488
K92
603
MCS4425
114TH
674
684
WILLITS
110TH
2960
106TH
386
RS331
FAIRVIEW
RENO
502
572
104TH
102ND
98TH
2158
WARREN
RS1688
92
73
94TH
WILD HORSE
Oskaloosa
90TH
600
RS217
89TH
1157
MCS4416
82ND
2445
3037
3079
McLouth
2923
78TH
KDOT Route #
US Highway
Minor Collector
Other
KS Highway
Rural Secondary
24 Hour Traffic Count
23 - 242
243 - 512
513 - 902
903 - 1558
1559 - 2397

KDOT Data

The Challenge-
The Kansas and US highways are neither owned nor maintained by Jefferson County, yet because they are within the county boundaries, what happens with the highways impacts county-owned roads.

The Solution-
The Kansas Department of Transportation (KDOT) shares their road classifications and traffic count data with the Road and Bridge Department. Highway accident data is also available.

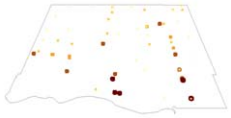
Benefits-

Better Decision Making
Knowing what is happening on the highways helps show where repairs or upgrades might be necessary on adjoining, county roads.

Supports Road and Bridge Goals
Even though the county does not own or maintain all of the roads inside the county, the Road and Bridge Department can still monitor what occurs on other roads. This cooperation with KDOT encourages the continuation of providing consistently safe and reliable transportation routes to Jefferson County citizens.

Delayering the Map-

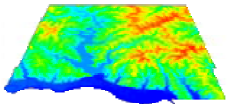
Traffic Counts
State of Kansas

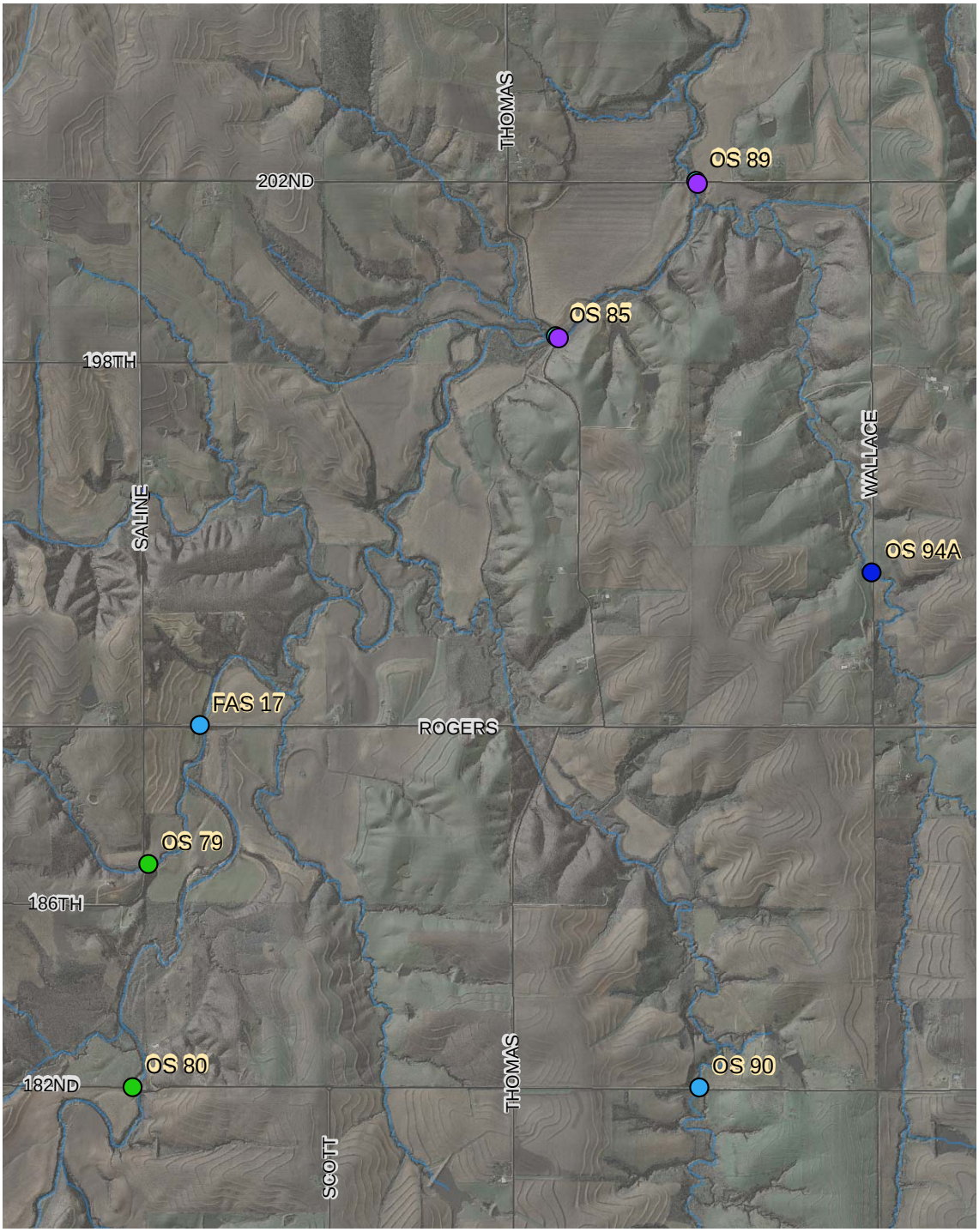


Road Classification
State of Kansas

City Limits
Base Layer

Elevation
Base Layer





Bridges-

Sufficiency Rating

0 - 25 | 26 - 50 | 51 - 75 | 76 - 100

Bridges

The Challenge-

Monitoring the condition of bridges is critical for public safety. Many factors impact the structural efficiency of a bridge including when it was built, what it is made from, previous maintenance, the daily traffic impact and the type of terrain crossed.

The Solution-

First and foremost, knowing where all the bridges are is necessary, and then attaching the appropriate information to the individual bridges is important. To track safety issues, the sufficiency rating is an important attribute. The sufficiency rating of a bridge indicates its strength and condition. By incorporating these into the GIS system, these ratings can be compared with traffic counts and road assessments to specify bridges that need maintenance attention.

Benefits-

Increased Analysis Capabilities

Combining sufficiency ratings with traffic counts and road assessments provides the opportunity for extended analysis of safety risks.

Delayering the Map-

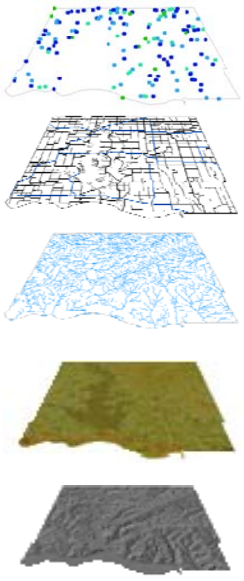
Bridges
Maintained by R&B

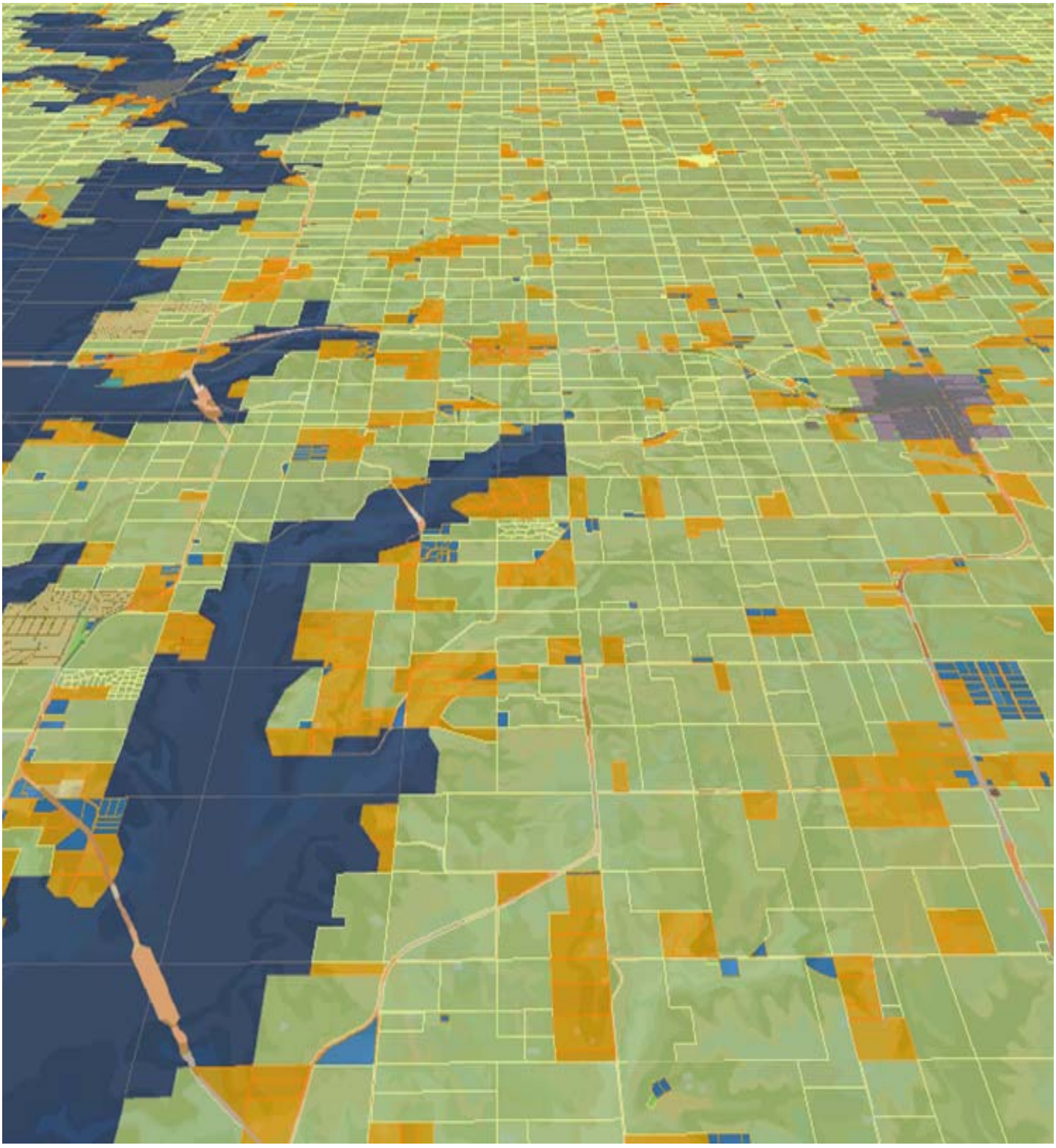
Streets
Maintained by Dispatch

Flowlines
Base Layer

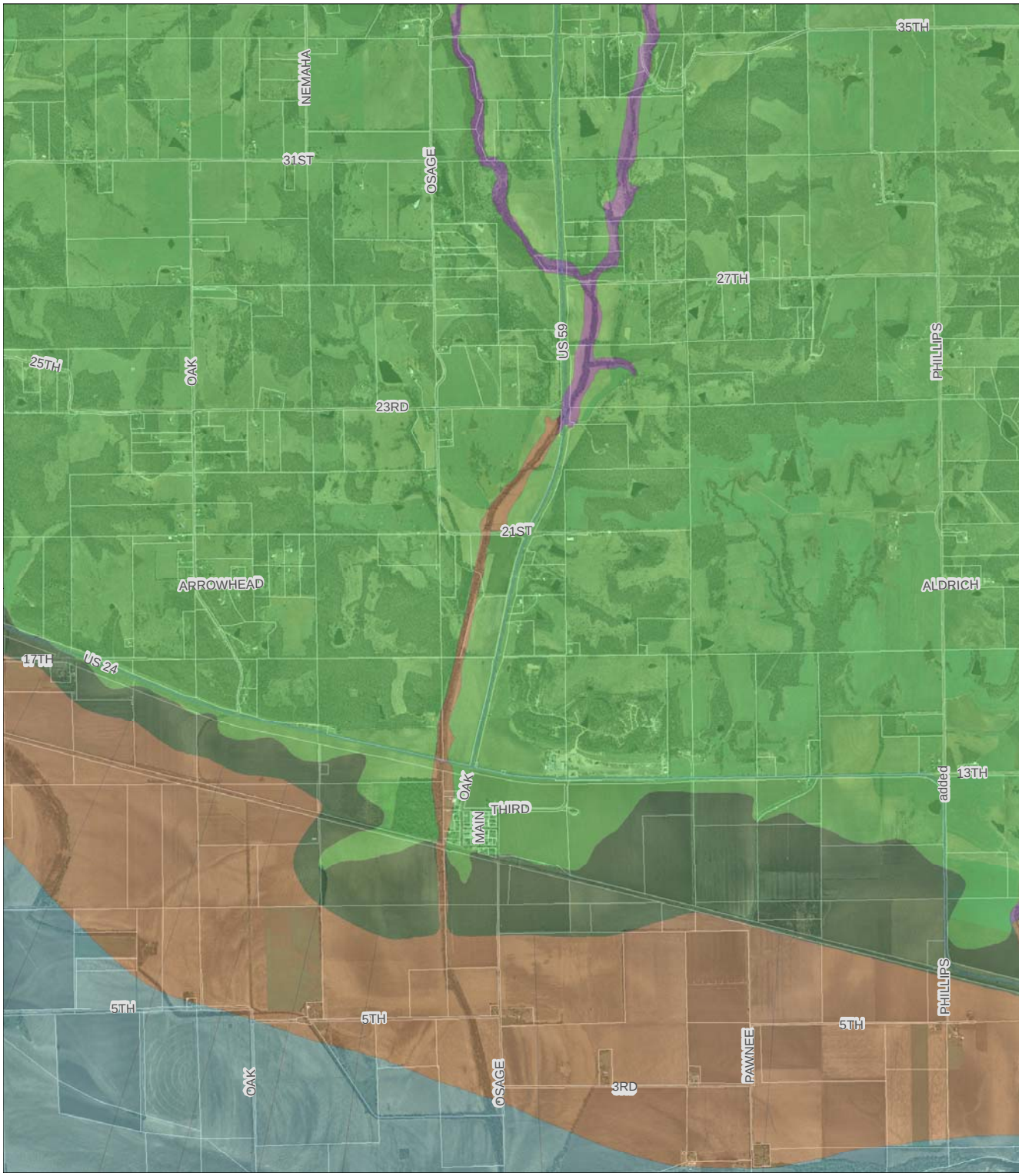
Aerials
Base Layer

Hillshade
Base Layer





Planning & Zoning


35TH
NEMAHA
31ST
OSAGE
27TH
US 59
PHILLIPS
25TH
OAK
23RD
21ST
ARROWHEAD
ALDRICH
17TH
US 24
13TH
added
OAK
THIRD
MAIN
PHILLIPS
5TH
5TH
5TH
OAK
OSAGE
3RD
PAWNEE
ZONE
A 100 yr
AE 100 yr
AE Floodway
X Flood Area
X Other Area

Flood Insurance Rate Maps

Planning & Zoning

The Challenge-

Planning and Zoning manages development in floodplains. Previously, employees consulted old property maps for setbacks and dimensions and then checked the Flood Insurance Rate Maps (FIRM) for flood zones. Unfortunately, the FIRM maps do not include property lines, thus making the determination of exact floodplain locations inside specific parcel boundaries extremely hard.

The Solution-

Using the GIS system, the property lines and FIRM images overlay one another on the same map, thus only one map needs to be consulted for accurate information. This data is a digitized representation of the hard copy FIRM maps.

Benefits-

Accuracy

Instead of dealing with multiple maps of differing scales, one map presents all the information in a scalable display– the entire map can be zoomed in and out. The GIS map shows property lines and flood areas accurately in relation to one another.

Faster Workflow

An employee references one map for all the needed information, thus decreasing the amount of time spent researching boundaries. Base flood elevation data is available on demand.

Delayering the Map-

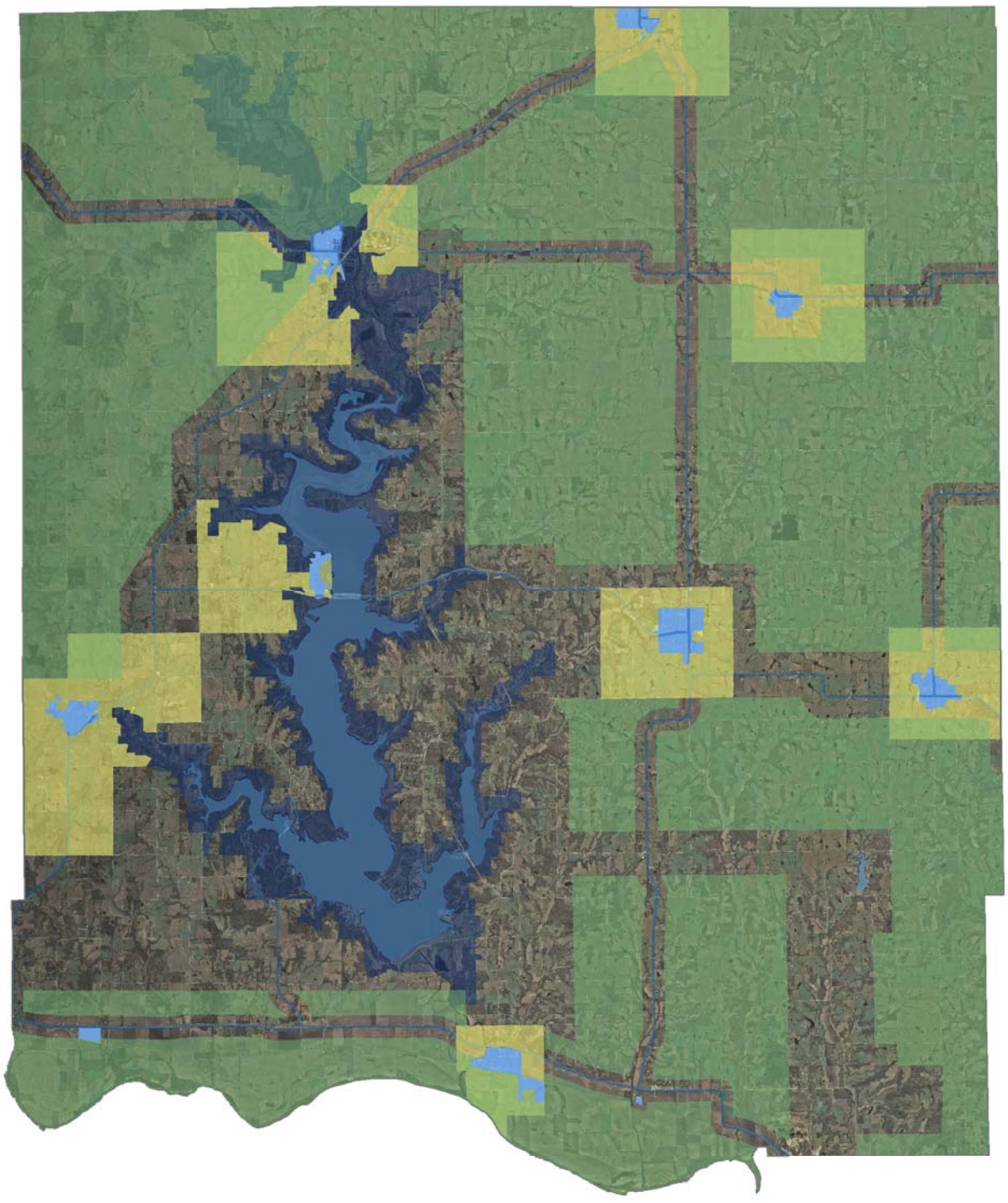
Streets
Maintained
By Dispatch

Parcels
Maintained
By GIS

FIRM Map
Digitized
By GIS

Aerials
Base Layer

Comprehensive Plan Boundaries



Notification Area Agricultural Enhancement City Limits Corps of Engineers

Comprehensive Plan Boundaries

The Challenge-
Zoning change requests are dealt with differently depending upon the location in the county. The Jefferson County Comprehensive Plan outlines several areas that have differing zoning goals, for example the agricultural enhancement areas affect land assessment scores (see page …… for more information). If a zoning change request occurs in a City Notification Area, the city is notified of the request and the city's zoning plan factors into the final decision.

The Solution-
By incorporating these areas into the GIS system, the Planning and Zoning office can see instantly if a zoning change request is occurring in one or both of these areas.

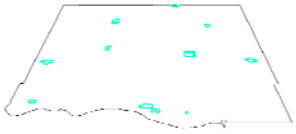
Benefits-

More Consistent Decision Making
Including the boundaries allows the Planning and Zoning Office and Planning Commission to easily see the trends of an area so that consistent decisions about zoning changes that support the Comprehensive Plan can be made.

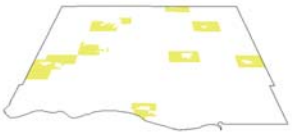
Faster Customer Service
When a landowner comes to the office inquiring about a potential zoning change, they can be informed quickly and accurately if their request should be referred to a city. The customer is also advised as to the proper procedure for the request depending on the agricultural enhancement areas.

Delayering the Map-

City Limits
Base Layer



Notification Areas
Base Layer

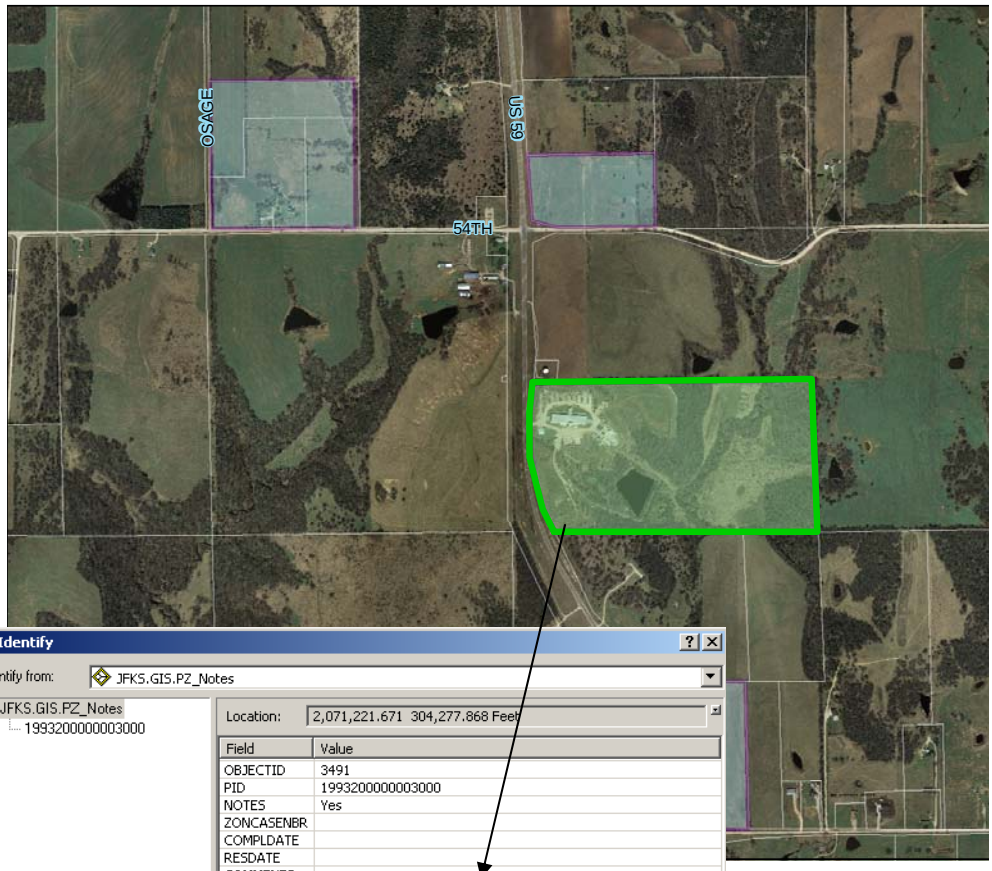


Agricultural Enhancement
Base Layer

Streets
Maintained
By Dispatch

Aerials
Base Layer

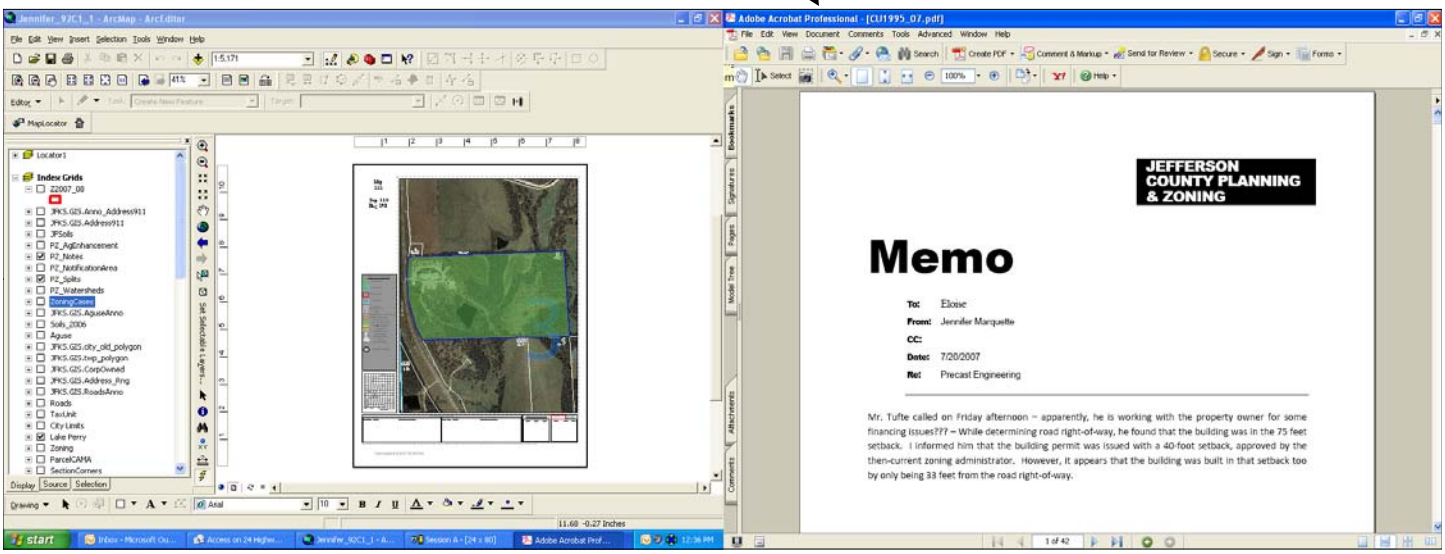
GIS Hyperlinks



A feature can contain a hyperlink inside its attribute table which points to a file containing documents and notes about that feature. When the hyperlink is clicked, the file opens. Jefferson County also uses the hyperlink capability for subdivision plats.

Hyperlinks can be created for any type of digital link-

- Websites
- Word Documents
- PDFs
- Pictures
- Audio Files



GIS Hyperlinks

Planning & Zoning

The Challenge-

Planning and Zoning stores files on every zoning change request, non-compliant parcels and complaints. These files were organized by zoning case number or parcel number, thus when a taxpayer requesting information only knew the address, finding the parcel number and zoning case number became an additional step to accessing the needed information. Also, receiving the request via a phone call creates an additional complication to the process.

The Solution-

For many parcels, a hyperlink attached to scanned, digital notes allows instant access to the paperwork relating to the parcel. Instead of spending time searching for paper files on a parcel, a simple click automatically brings up its history and documentation.

Benefits-

Reduced Research Time

The time saved by using the notes layer depends on the parcel and the amount of research needed; it could save anywhere from a few minutes to several hours.

Increased Organization

Knowing that all the information about a parcel is located directly inside that parcel makes life much easier.

Consistent Information

All of the Planning and Zoning employees access the same information through the hyperlink.

Delayering the Map-

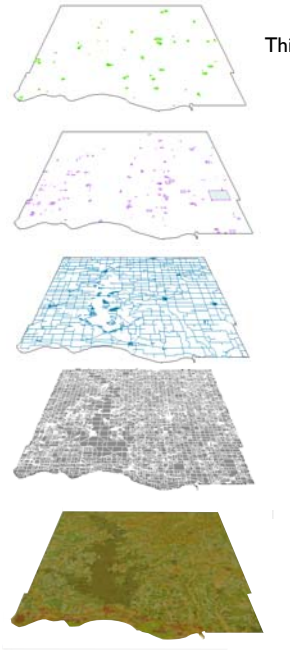
Zoning Notes
Maintained by P&Z

Zoning Cases
Maintained by P&Z

Streets
Maintained by Dispatch

Parcels
Maintained by GIS

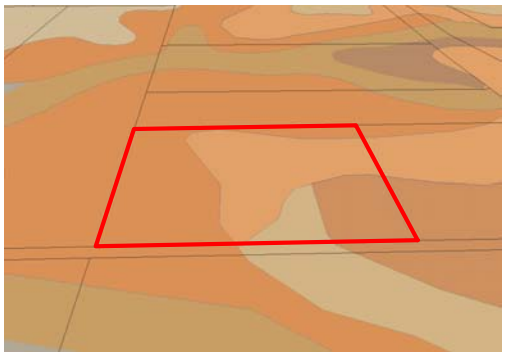
Aerials
Base Layer



This layer contains the notes hyperlink

Detailed Reports Generated Through LESA Analysis

Soil Layer Within Zoning Case

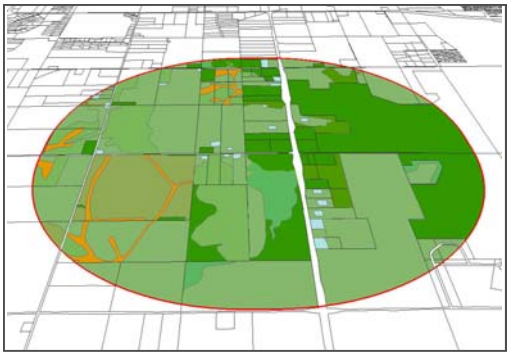


Soils	
Type	Acres
1	0.0
2	0.0
3	3.5
4	0.0
6	1.3
7	0.0
misc	0.0
Water	0.0
Waste	0.0
nodata	0.0
Total	4.8

Summary | Zoning_Summary | Aguse_Summary

Soil Type Breakdown Within Zoning Case

Agricultural Land Use With One Mile Buffer

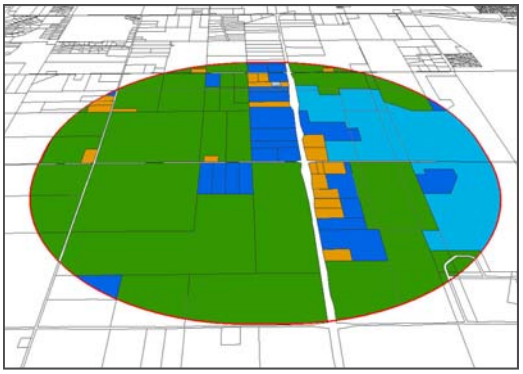


LESA_2007_6.xls [Compatibility Mode]

Aguse 1mi Buffer	Acres	Acres less parcel	Percent
nonAG	1767.2	1766.3	62.26%
AG	1074.7	1070.7	37.74%
UNMARKED	0.0	0.0	0.00%
TOTAL	2841.9	2837.1	100.00%
Parcel	223-07-0-00-00-008.01-0		

Ag Use Within One Mile Buffer of Zoning Case

Zoning With One Mile Buffer



LESA_2007_6.xls [Compatibility Mode]

ZONING 1mi Buffer	Acres	Acres less parcel	Percent
AG	780.1	775.2	27.94%
B-1	0.0	0.0	0.00%
B-2	0.0	0.0	0.00%
CEM	0.0	0.0	0.00%
CTY	0.0	0.0	0.00%
GOV	1238.9	1238.9	44.65%
I-2	0.0	0.0	0.00%
I-3	0.0	0.0	0.00%
NC	0.0	0.0	0.00%
R-1	357.9	357.9	12.90%
R-2	0.0	0.0	0.00%
RR	331.5	331.5	11.95%
RWD	0.0	0.0	0.00%
SD	12.4	12.4	0.45%
SR	58.4	58.4	2.10%
V-1	0.0	0.0	0.00%
xxx	0.0	0.0	0.00%
TOTAL	2779.2	2774.4	100.00%
Parcel	223-07-0-00-00-008.01-0		

Zoning Within One Mile Buffer of Zoning Case

LESA– Land Evaluation and Site Assessment

Planning & Zoning

The Challenge-

The Land Evaluation and Site Assessment is employed by the County to help determine zoning change issues and requires a detailed analysis of zoning, agricultural land use and soils assessment. This area includes the parcel and a one mile buffer around the parcel. To do this by hand is quite cumbersome and very time consuming.

The Solution-

The GIS system contains all the data layers needed to perform the LESA analysis. With a bit of customization of the GIS interface, the spatial portion of the LESA assessment can be done with the click of a button. The results will be sent to an Excel spreadsheet within seconds. The results are displayed in Planning Commission meetings during zoning change request hearings.

Benefits-

Decreased Workflow Time

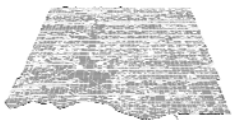
The time saved by completing the analysis digitally is between four hours and a week. Previously, the LESA process took a higher level GIS employee several days to complete and return to the administrative staff for analysis and recommendations to the Ruling Board. Now the administrative staff can complete the LESA proc ess in several seconds.

Consistent, Accurate Analysis

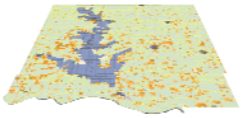
Each LESA report automatically runs the same analysis process for each case, thus decreasing the chance of potential analysis error.

Delayering the Map-

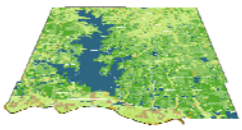
Parcels
Maintained by GIS



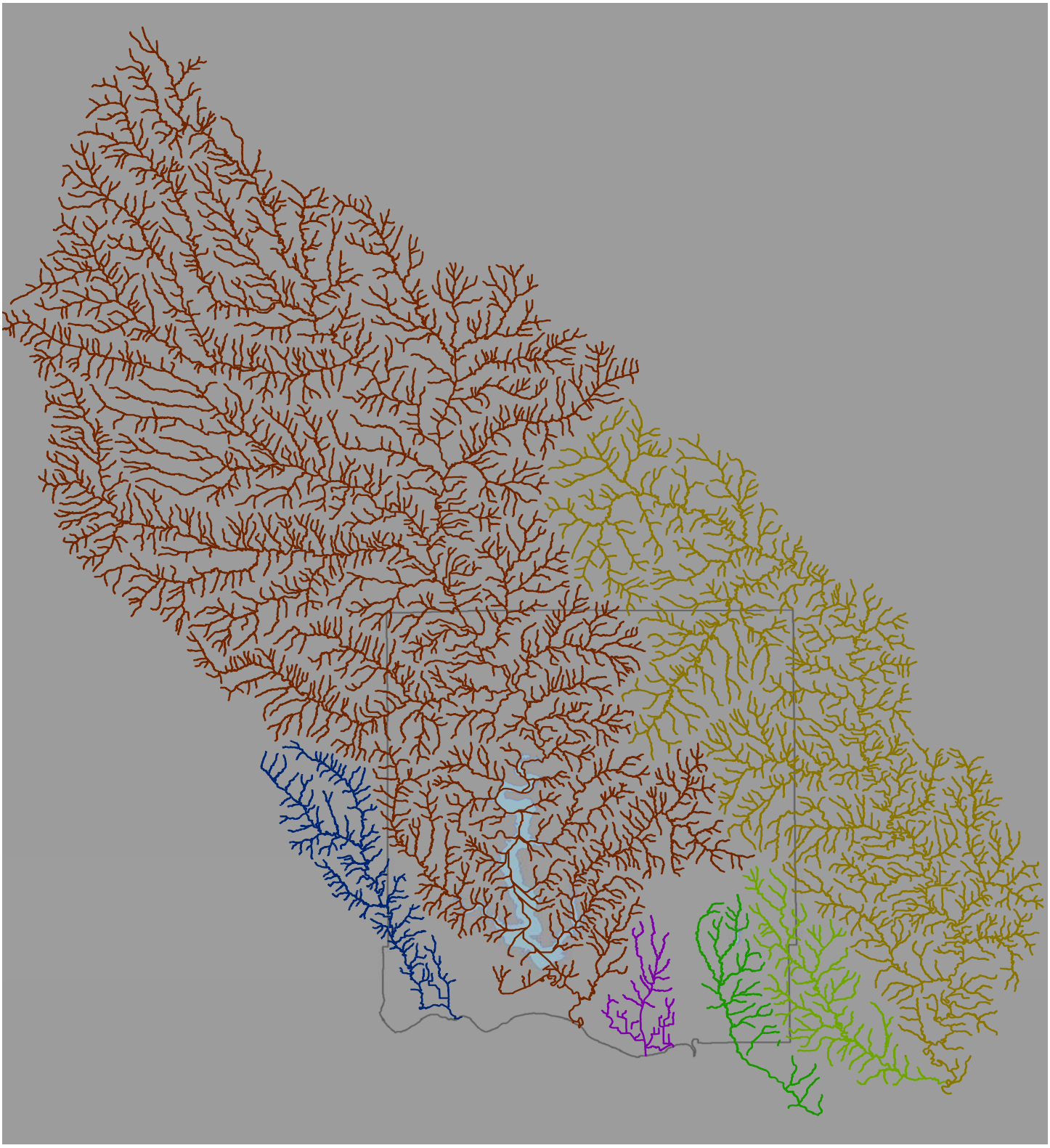
Zoning
Maintained by P&Z



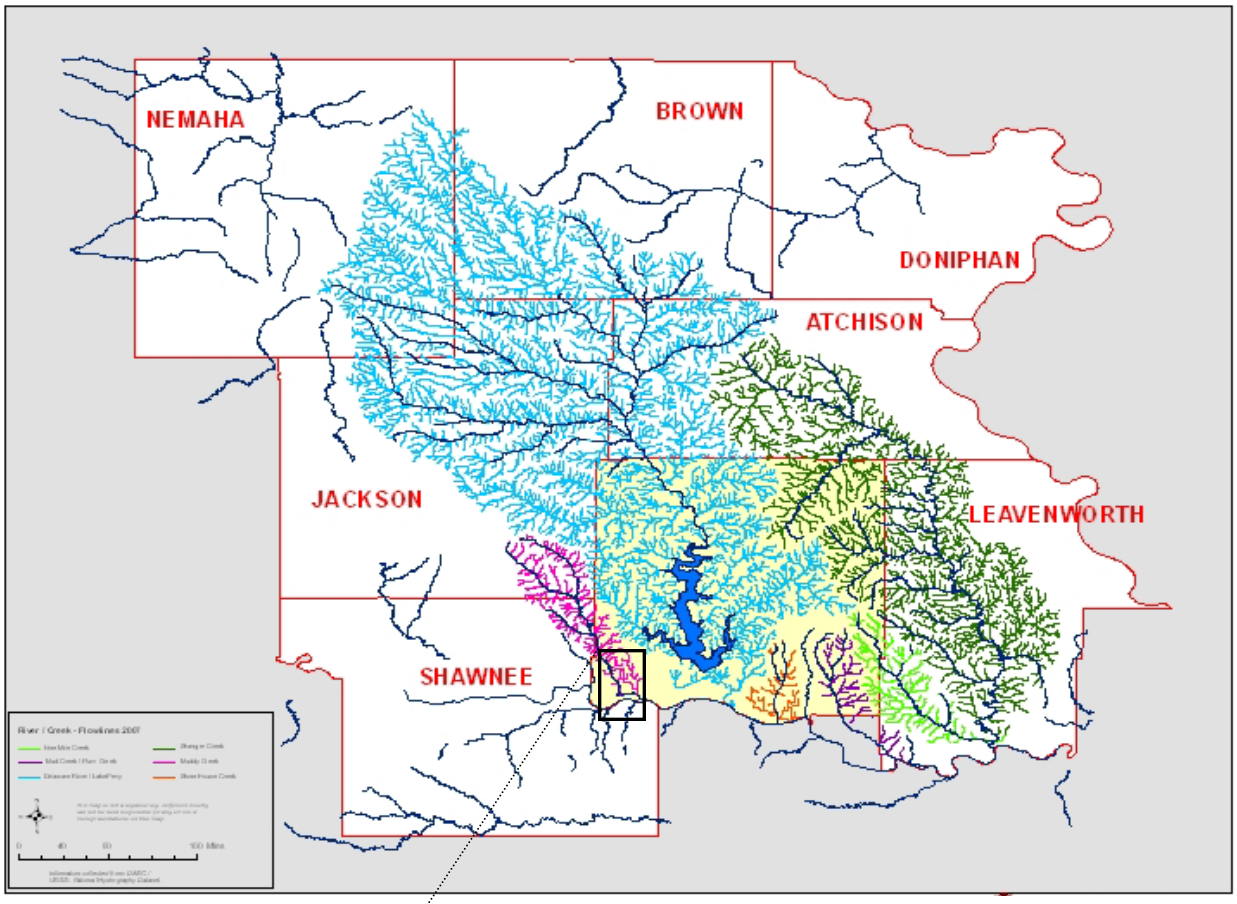
Ag Use
Maintained by Appraisers

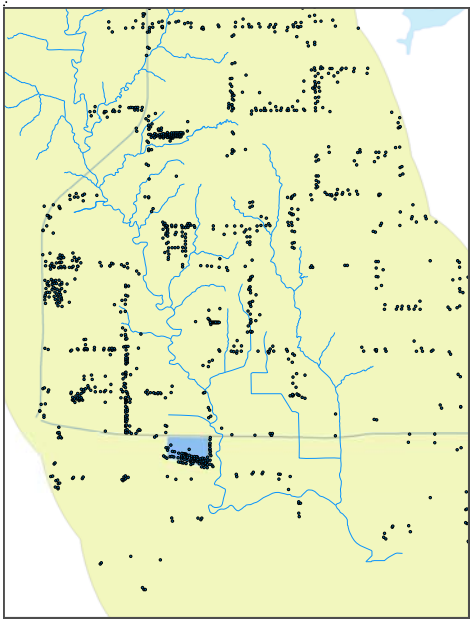


Soils
From State of Kansas



Emergency Services





Muddy Creek Flowlines

Muddy Creek 1.5 Mi Buffer

Muddy Creek Addresses

Flowlines

Emergency Services

The Challenge–

Even though Jefferson County has borders, floods don't start and stop at the edges. There are over 18,000 citizens in Jefferson County; knowing how many of those citizens will be affected by a flood and in what order to evacuate those affected could help save lives.

The Solution–

By combining county data with surrounding county data, this map shows the entire network of flowlines that might affect Jefferson County citizens. Based on these flowlines, buffer areas can be created and used to select addresses of homes that might be affected in a flood situation.

Benefits-

Improved Flood Mitigation

By studying all of the flowlines in the northeast region of Kansas, we can see all of the potential sources of flooding and can prepare accordingly. Using this data helps protect the citizens of Jefferson County and their property.

Delayering the Map-

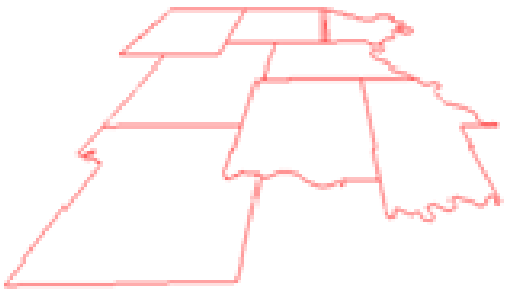
Address Points
Maintained By Dispatch

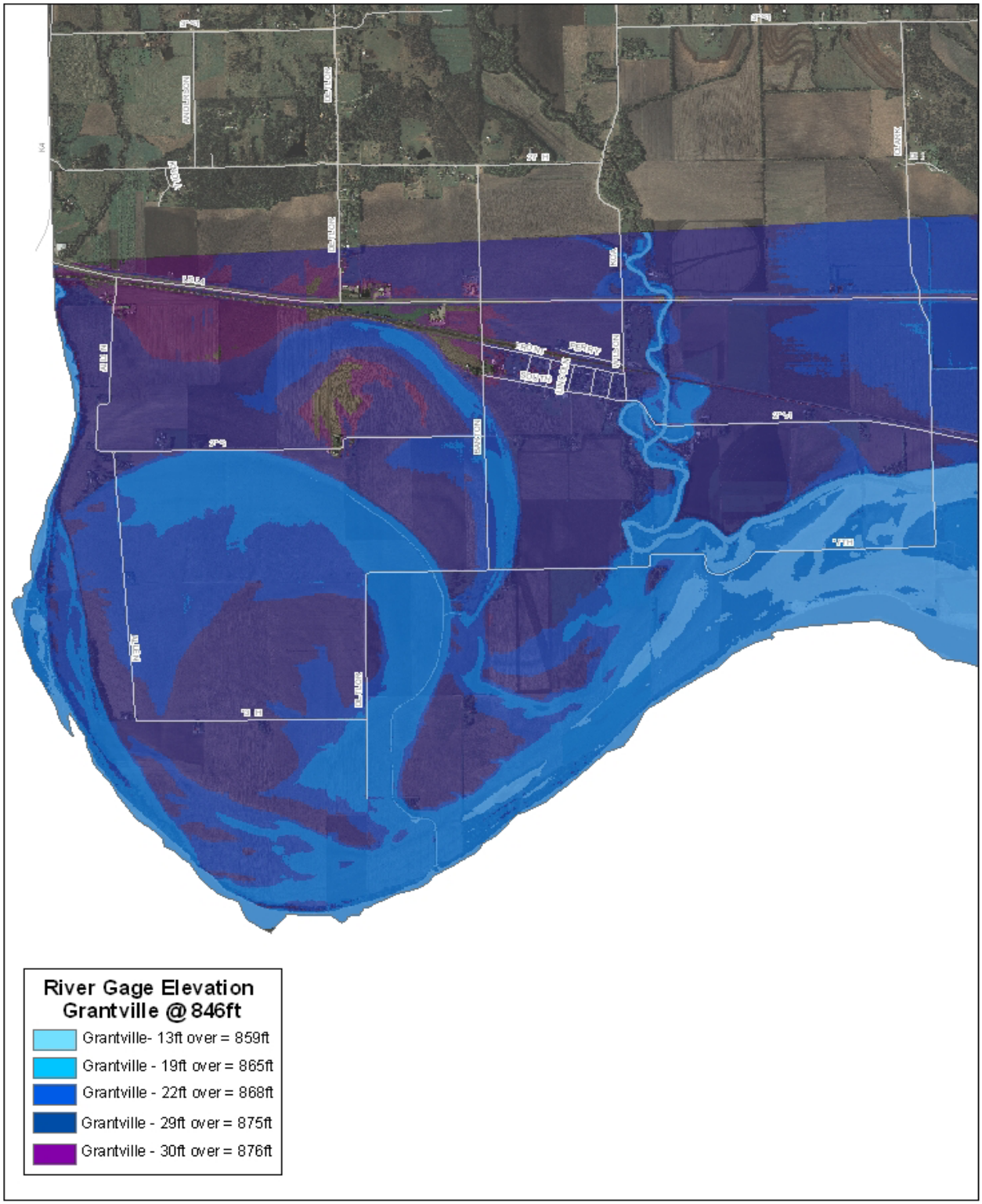
Flowlines
Downloaded from DASC

Rivers & Streams
Base Layer

Lake Perry
Base Layer

Surrounding County Boundaries
Downloaded from DASC




River Gage Elevation
Grantville @ 846ft
Grantville- 13ft over = 859ft
Grantville - 19ft over = 865ft
Grantville - 22ft over = 868ft
Grantville - 29ft over = 875ft
Grantville - 30ft over = 876ft

Flood Elevation Impact

Emergency Services

The Challenge–

For flood mitigation planning, buffers of flowlines identify which owners could be in a floodway, but predicting the actual areas that might be flooded presents a more complicated yet more beneficial view of what could happen in a flood situation.

The Solution–

Using the elevation data around the Kansas River, different overflow increments were mapped to see exactly which areas on the north shoreline could flood according to the increased water levels. Thus, based on the reported level of the river or expected increase due to rain, the potential area affected can be determined.

Benefits-

Ready Data

Un-analyzed data helps no one in a time of emergency. An elevation analysis can take sometimes take hours to complete, but by having this data already prepared, Emergency Management can instantly see where assistance might be needed during a flood event.

Additional Flood Mitigation Aid

Even though layers like FEMA FIRM maps and flowlines buffers exist, having additional elevation data increases the amount of information available about a given area, thus increasing emergency personnel's ability to analyze flooding trends and determine better mitigation strategies.

Delayering the Map-

Centerline

Maintained By Dispatch

Elevation

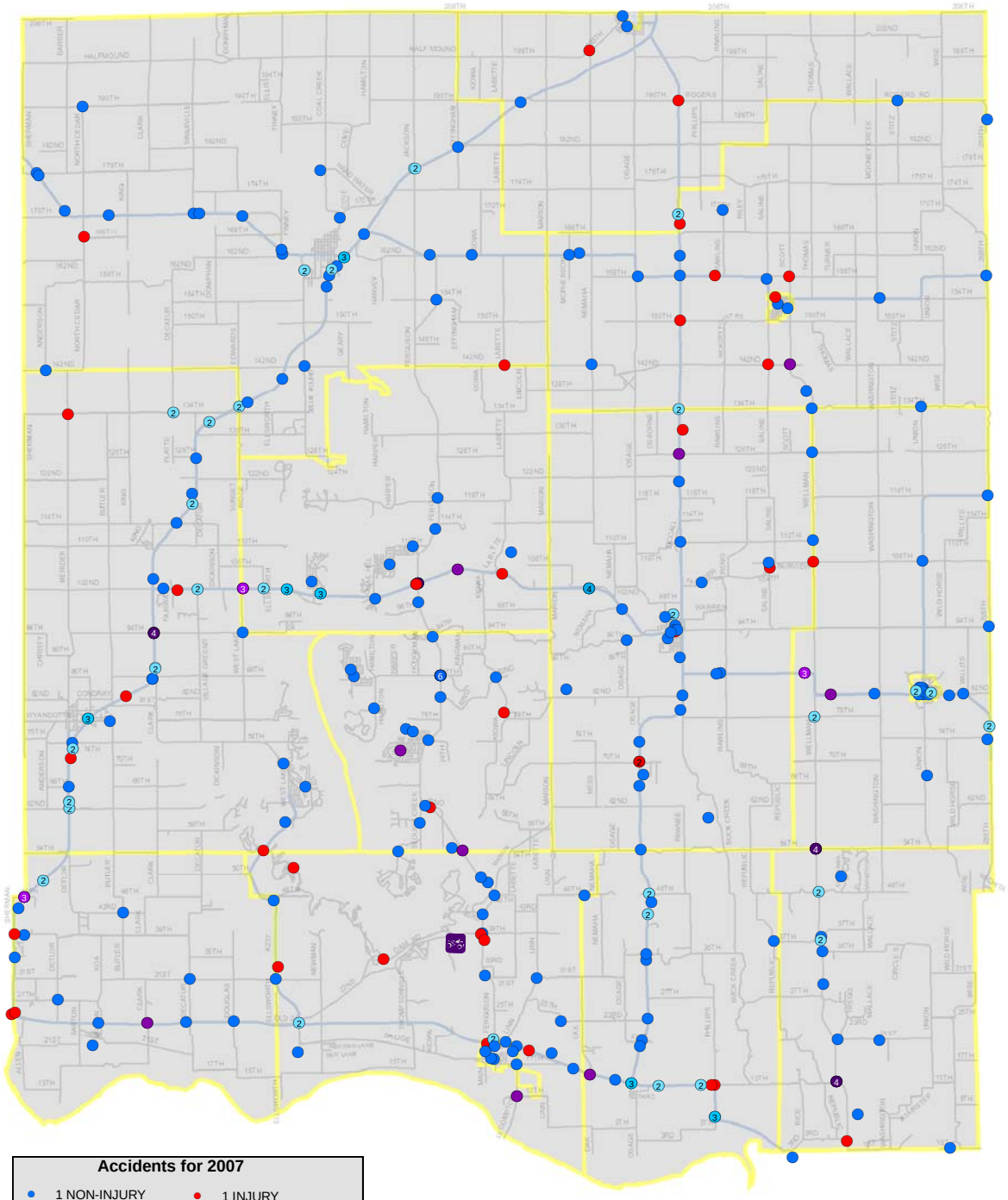
Base Layer

Aerials

Base Layer

Pin Mapping

Emergency Services



Accidents for 2007 as of 7/16/2007

Total Accidents: 342

Pin Mapping

Emergency Services

The Challenge–

Traffic accidents claim the lives of many people and cost hundreds of thousands of dollars in damage. Minimizing the number of accidents and increasing the rate of response can help save lives and reduce resources used for accident recovery.

The Solution–

This map translates the ever-popular "push-pin" wall map into GIS data by placing a point at the site of accidents. Many different pieces of information can be gleaned from a map like this one.

Accident Cause

Although negligent driving can play a part in causing accidents, sometimes other factors, such as road and weather conditions, can contribute. The Road and Bridge Department uses this map to check for potential issues with painted road lines, adequate clearance and road surface damage.

Emergency Response

By studying locations of accidents, emergency services may increase the number of deputy patrols in certain areas. Also, by associating the accident locations with fire districts (the first responders), different fire districts can be trained on the particular needs of their areas or accident hot-spots.

Benefits-

Improved Multi-Departmental Road Monitoring

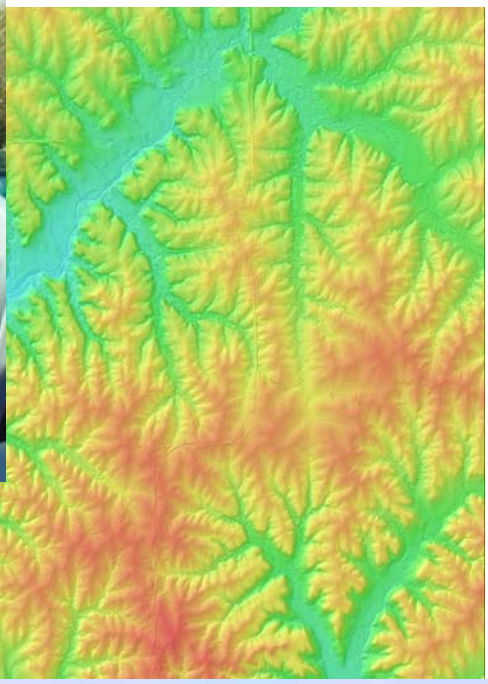
Traffic accidents affect Road and Bridge, fire districts and the Sheriff's Department. All of these entities have a different angle of interpreting accident data, and based on the differing viewpoints, each can enhance accident avoidance and recovery.

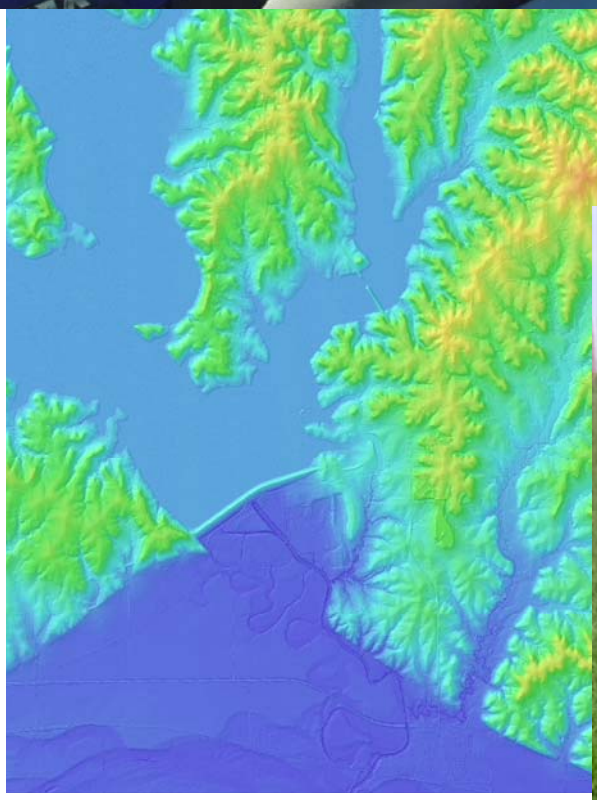
Delayering the Map-

Accident Data
Maintained
By Dispatch

Centerline
Maintained
By Dispatch

Fire Districts
Base Layer



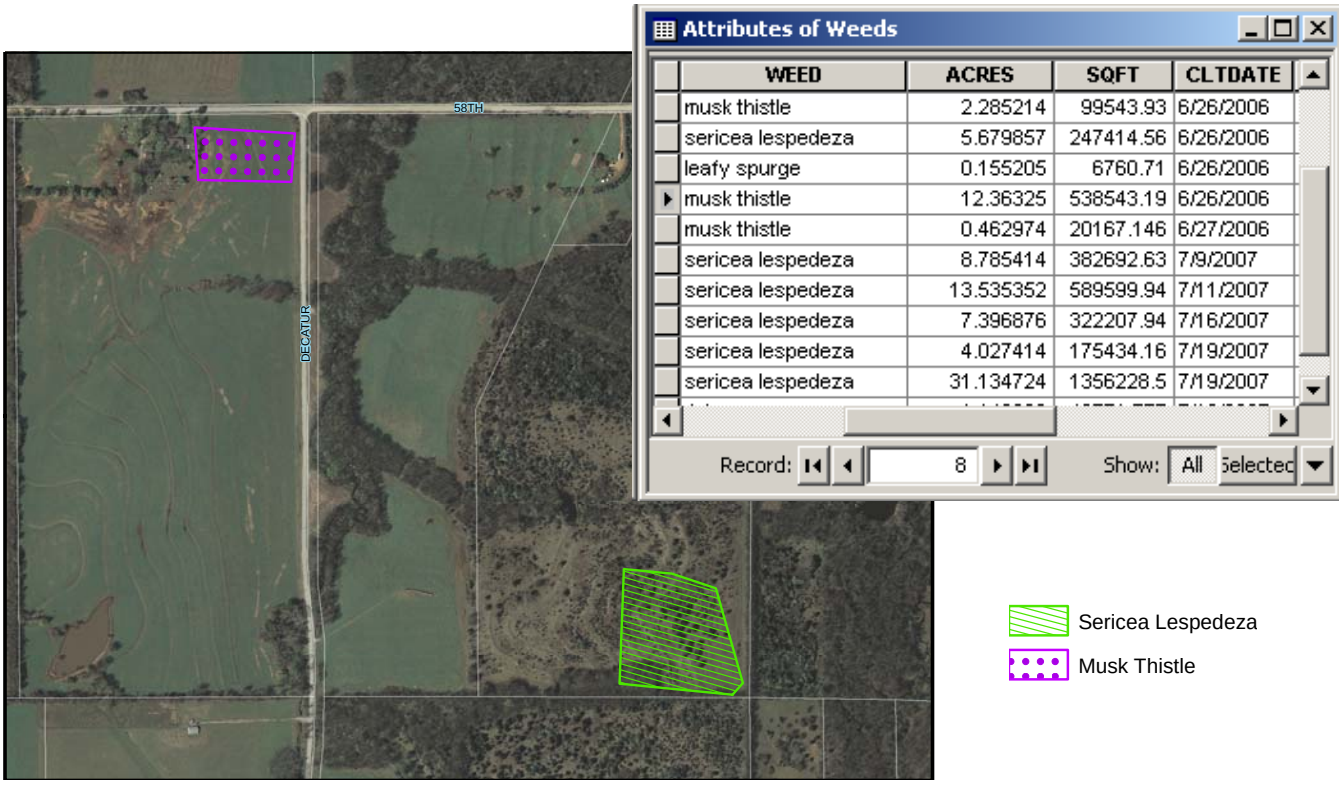


Additional GIS Projects

Trimble Juno ST

After the weeds are sprayed, the data is documented again

Weeds are documented and landowners notified



Noxious Weed

Auxiliary Services

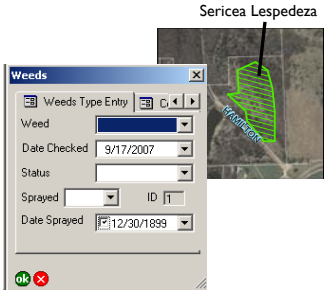
The Challenge-

Jefferson County contains 567 square miles, any of which could be home to one of several species of noxious weeds. Auxiliary Services needed a dynamic way to document types, acreages and status of noxious weeds inside the County to monitor spraying, dissemination patterns and landowner information.

The Solution-

Weed Collection

Auxiliary Services decided to purchase a Trimble Juno ST- a GPS data collection device. Areas of weed problems are entered using GPS technology, then the information about the weeds is completed in a customized form.

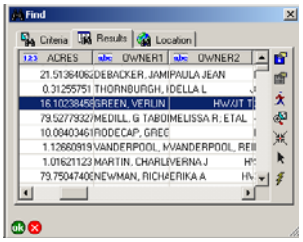


Landowner Identification

Many times, landowners are willing to take care of their own weed problems, but they don't know that noxious weeds are on their property. Using the owner information and GPS positioning, a landowner can be identified while in the field and then the appropriate notification papers sent out from the office.

Parcel owner information displayed on the Trimble Juno ST unit

Before using the GPS unit, contacting landowners was a guessing game using a old property ownership map and a phone book. Now, accurate names and addresses are provided in one click. This has become very useful, especially for smaller land pieces that do not show up well on a county-wide ownership map.



ArcPad can search by property owner and address.

Benefits-

Better Data Storage

Storing weed data geographically provides a way to keep track of any weed trends in many ways including location, landowner and weed type.

Ability to Assess Future Weeds

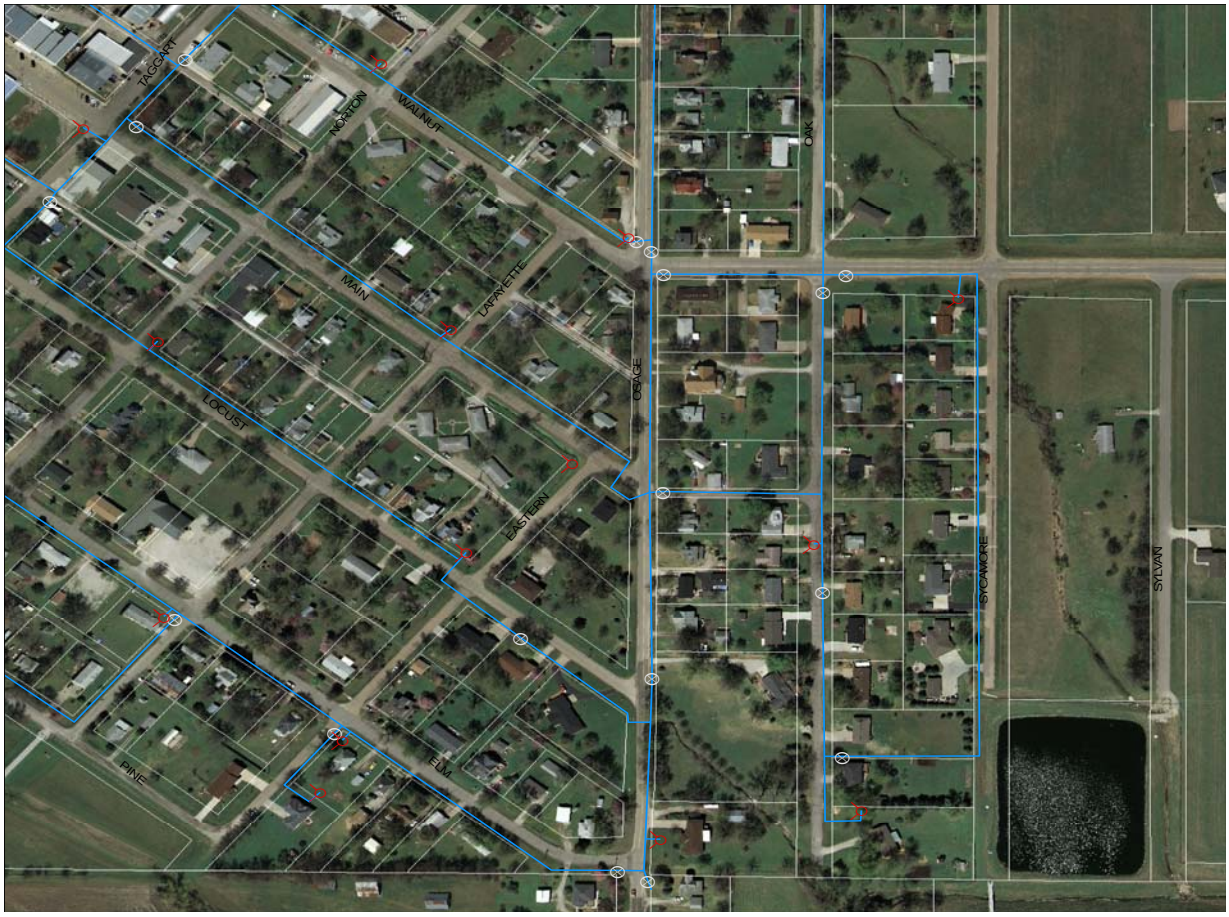
By keeping track of the locations of weeds year by year, future problem areas can be predicted and then monitored.

Accurate Landowner Identification

Landowners are more easily and accurately notified of weed problems. Auxiliary Services no longer has to spend extra time trying to track down who owns a piece of property.

Greensburg, Kansas

Trimble GeoXH



For preliminary planning, the City of Nortonville's water line maps were scanned and digitized into the GIS system. This methodology, however, only provides a general idea of location and not exact X,Y coordinates.

Water Infrastructure Data Collection

KRWA

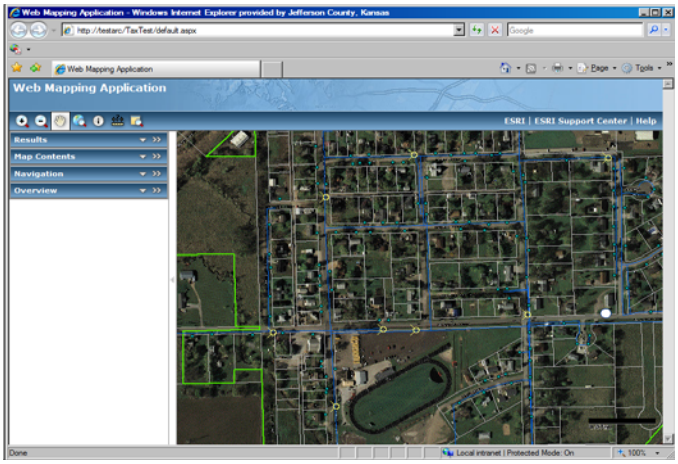
The Challenge-
How do you collect the water infrastructure data in small cities? How could a city of less than 2000 people afford GPS data collection costs? How do you provide the city clerks and utility workers with a way to easily access the data?

After the destruction of Greensburg, it became clear that Jefferson County needed to organize the water infrastructure data collection of its eight cities or else the data might not be collected.

The Solution-
The Kansas Rural Water Association (KRWA) provides GPS water infrastructure data collection for cities and rural water districts using a Trimble GeoXH GPS unit at an extremely reasonable price. However, this price was still a bit high for a small city.

The Jefferson County GIS Department decided to have the cities' data collected together, and as an incentive for the cities to participate, offered to pay for the travel, lodging and meal costs associated with KRWA data collection. In order to make the data accessible to the cities, the GIS Department will publish the data over a secure ArcGIS Server website.

In this situation, everybody wins. The cities have their data collected at a reduced price and can view their data over the internet, the county gains important information about critical infrastructure and KRWA gets paid.



The cities will be able to view their data on a website much like this

Benefits-

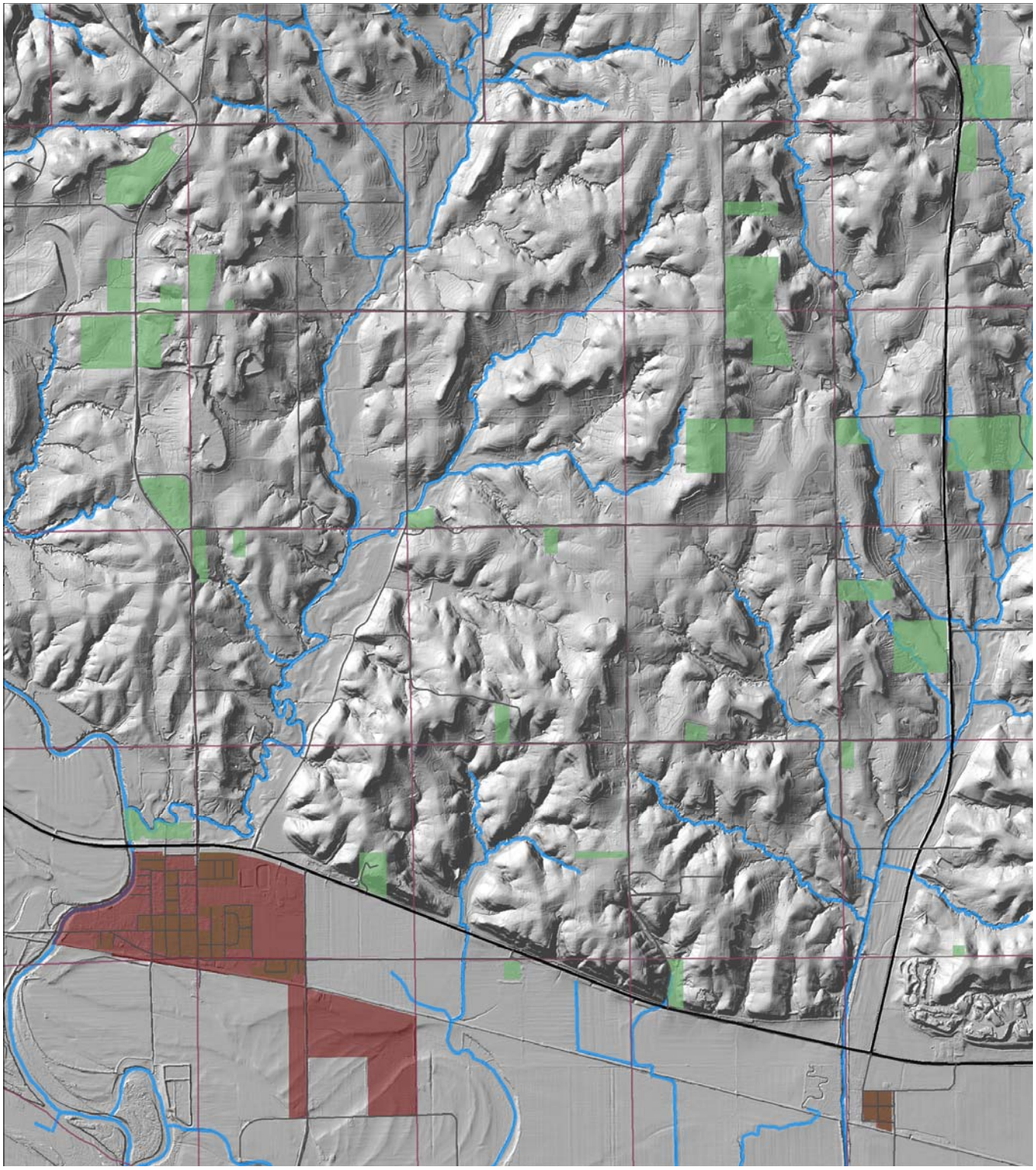
Collecting Critical Infrastructure Data
This data is vital for the daily work in the cities and can quickly become important for other agencies assisting the cities in an emergency.

Cooperation Between Entities
Instead of duplicating data between the cities and county, the data is collected once by KRWA and everyone benefits.

Saves the Costs of Mistakes
Since accurate GPS locations are known, errors due to unknown infrastructure are minimized, thus decreasing the time of accident recovery and the costs associated with recovery.

Elevation

Jefferson County



Elevation

Jefferson County

The Challenge-

As GIS began to spread across the Jefferson County Departments, more people began asking for a data layer that could show elevation changes. Landowners wanted to see their land contours, Emergency Management wanted to be able to predict flood areas, Road and Bridge wanted to do flow calculations to determine culvert sizes for runoff areas.

The Solution-

Through the United States Geological Survey (USGS), Jefferson County flew LIDAR data which was then interpreted to become a solid elevation layer. With this layer and ESRI's Spatial Analyst, the GIS Department was able to create a hill-shade layer, slope calculations and ten foot contour lines for the entire county. The elevation layer was sent to FEMA for Flood Insurance Rate Map (FIRM) review, thus providing Jefferson County with the opportunity for highly accurate flood mitigation analysis.

Benefits-

Creating a New Base Layer

Elevation is a generally static layer upon which calculations and other layers can be derived. This creates a base from which more projects can be built.

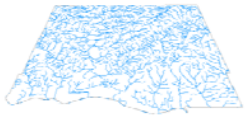
Delayering the Map-

Streets
Maintained
By Dispatch

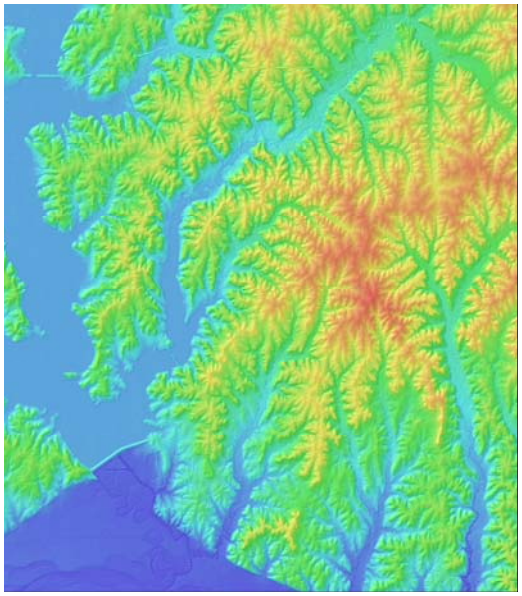
Subdivisions
Maintained
By GIS

City Limits
Base Layer

Streams/Rivers
Base Laye



Hillshade
Base Layer



Delayering the Map-