

Migrating to a Cadastral Geodatabase in Clay County, Iowa

Larry Rozeboom
Clay County, Iowa

Brent Mainzinger
The Sidwell Company



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Abstract

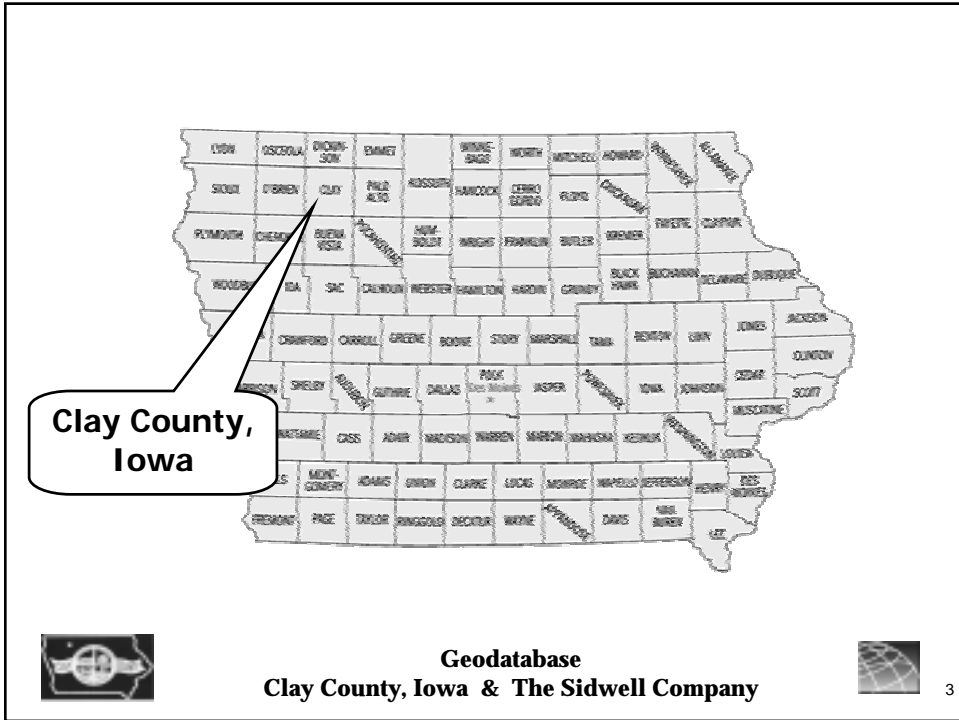
Clay County, Iowa is located in Northwest Iowa, encompassing approximately 18,000 parcels of land. For the past several years the county has maintained parcel maps within MicroStation. During the past year, the entire cadastral mapping database has been migrated to an ArcGIS geodatabase. All map maintenance is now being performed in ArcMap 8.3. The mapping data is now available to the public on an ArcIMS Web site where it is integrated with both tax cycle and appraisal data and being utilized by multiple county departments in support of analysis and assessment functions. This presentation will follow Clay County's migration path from CAD maps to an ArcGIS geodatabase.



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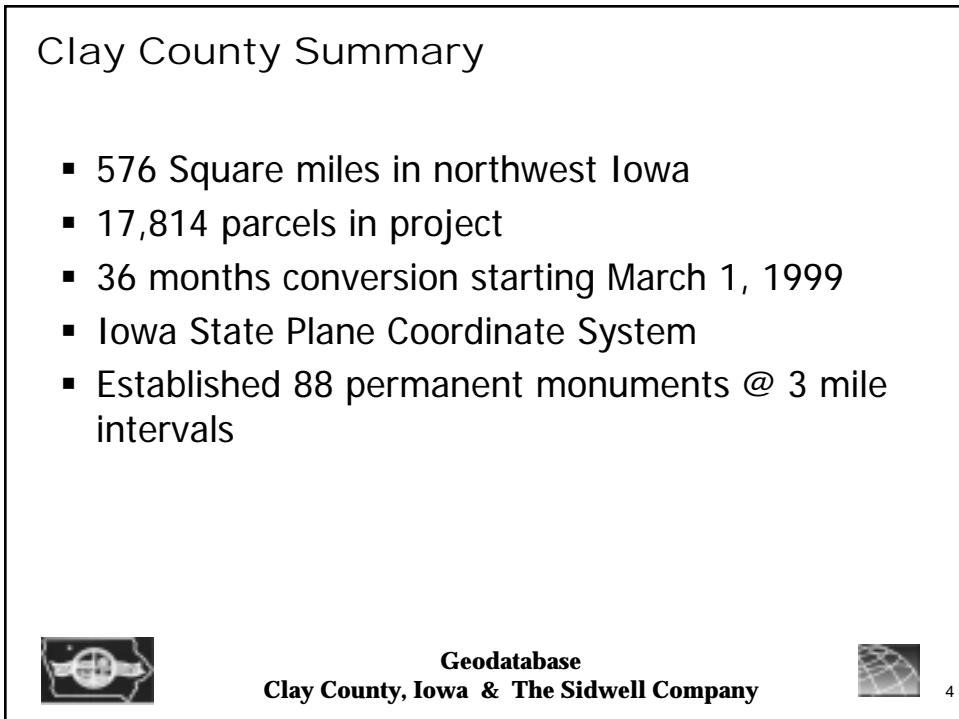


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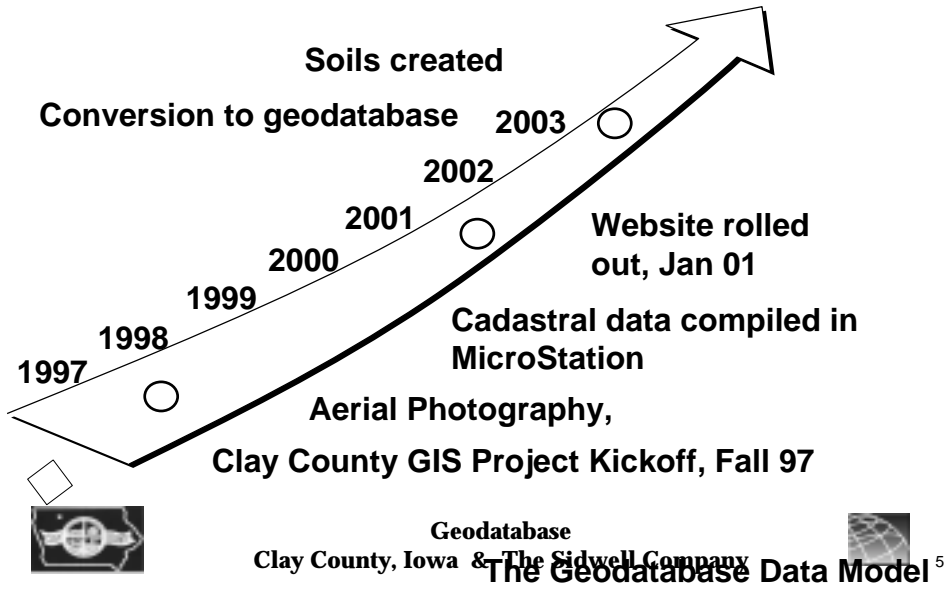


Clay County Summary

- 576 Square miles in northwest Iowa
- 17,814 parcels in project
- 36 months conversion starting March 1, 1999
- Iowa State Plane Coordinate System
- Established 88 permanent monuments @ 3 mile intervals



Timeline of key events



Database Content

- All monument control points
- Parcel boundary lines & assessed acreage anno
- Subdivision lot and boundary lines
- Lot, block, dimensions, and names
- County, township, corporate, and section lines
- Public streets, roads & highway ROW
- Rivers, streams, ponds, canals and lakes
- Parcel number identification
- Adjacent map references
- Map sale, title and page number



Reasons for changing to a geodatabase:

- Adopt mainstream GIS technology
- Standardization of storage formats
- Enhance Analytical capabilities
- Ease of integration with other databases
- Ease of serving maps to the internet
- Ease of sharing GIS data
- Ease of use and maintenance



Requirements of the Geodatabase Conversion

- Protect ability to produce high quality cadastral map output
- Provide an efficient map maintenance environment
- Provide data integration and web publication capability
- Control Costs



Where we Started: CAD based GIS

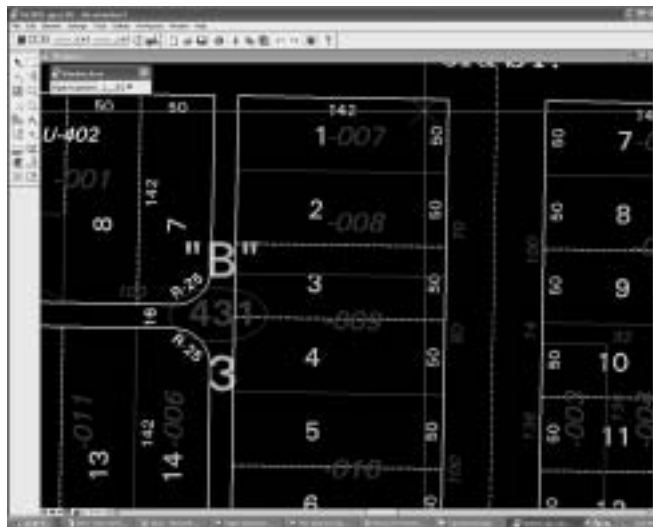


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Clay County Geographics Project

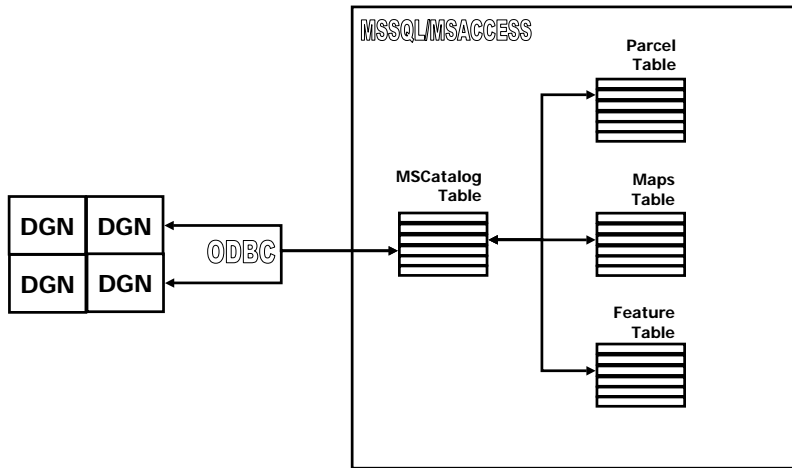


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Clay County Geographics Project



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Intelligent CAD: Pointer to attribute tables

**Multiple
Feature
Tagging:**

**One line to
multiple
definitions**



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Intelligent CAD: Pointer to attribute tables

**Intelligent
parcel shapes
and centroids**



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Steps to Conversion: 1

- **Verify health of source data**
 - Conversion will touch every element in every file
 - Unnoticed corruptions will be uncovered
 - Ran Orphan finding Scripts
 - Used validation tools in the source environment



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Steps to Conversion: 2

- Combine tiles as much as possible prior to conversion
 - 32 MB limit
 - Fewer files to process



Steps to Conversion: 3

- Pre-Process CAD files prior to Conversion
- Simplify Element Types
- Move Text Origin to Justification Point
- Drop Symbols to Text
- Drop Patterns

| ID | Type | Level |
|----|-------------------|----------------|
| 24 | (T) TEXT | (T) Level = 32 |
| 25 | BOX CELL (COUNTY) | Level = 0 |
| 26 | (N) LINE STRING | (T) Level = 32 |
| 27 | (T) TEXT | (T) Level = 32 |
| 28 | BOX CELL (COUNTY) | Level = 0 |
| 29 | (N) LINE STRING | (T) Level = 32 |
| 30 | (T) TEXT | (T) Level = 32 |
| 31 | BOX CELL (COUNTY) | Level = 0 |
| 32 | (N) LINE STRING | (T) Level = 32 |
| 33 | (T) TEXT | (T) Level = 32 |
| 34 | BOX CELL (COUNTY) | Level = 0 |



Steps to Conversion: 4

- **Converted to coverages as interim format**
 - Direct CAD import made too many assumptions
 - Ran AML scripts to re-associate multiple attributes to each feature
 - Further combined tiles



Steps to Conversion: 5

- **Initial Geodatabase Conversion**
 - Converted lines, and points to a geodatabase
 - Edge-matched between original tiles
 - Created Tagged Data Model for Parcel Editor
 - Created polygons
 - Validated Topology



Steps to Conversion: 5

- **Annotation Geodatabase Conversion**
 - Referenced Annotation to ArcMap
 - Resymbolized in ArcMap
 - Imported from ArcMap



Steps to Conversion: 6

- **Quality Control of Final Geodatabase**
 - Database model QC
 - Database Integrity Checking
 - Testing against Parcel Editor
 - Visual QC



Steps to Conversion: 7

- Implemented Parcel Editor for cadastral map maintenance within a geodatabase
- Implemented Sidwell's FARMS software to perform productivity based assessment of agricultural property



Steps to Conversion: 8

- Created GIS website utilizing ArcIMS and the Geodatabase
- Established integration with tax and appraisal systems



Current Clay County GIS Project

- Personal Geodatabase
- Parcel Editor Tagged Data Model
- ArcGIS 8.3
- ArcIMS Website hosted at Sidwell

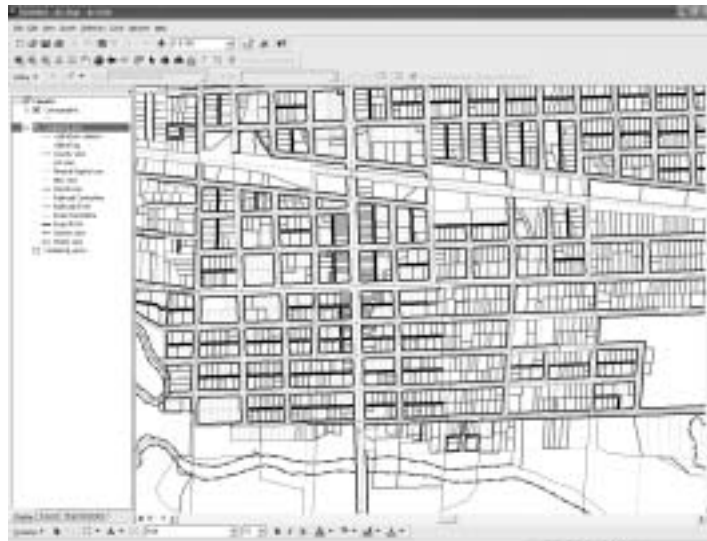


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Clay County Geodatabase in ArcMap

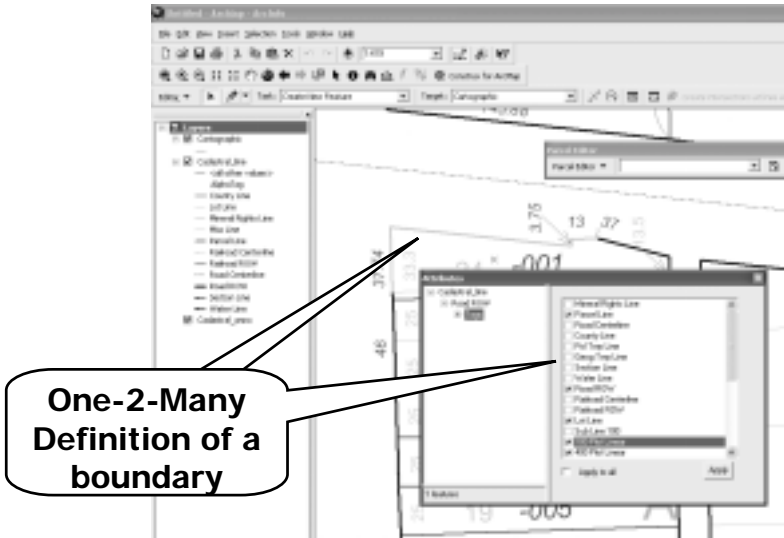


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Clay County Map Maintenance Environment



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Multiple Feature Tagging in Clay County

| COLLECTED | Shape | AlphaTag | SuccessTag | Shape_Length |
|-----------|--------------------------|----------|------------|---------------|
| 1528 | arg binary data Road ROW | Row | Let Line | 154.272553842 |
| 1529 | arg binary data Road ROW | Row | Let Line | 89.0208123813 |
| 1530 | arg binary data Road ROW | Row | Let Line | 153.721366006 |
| 1531 | arg binary data Road ROW | Row | Let Line | 125.200543204 |
| 1532 | arg binary data Road ROW | Row | Let Line | 81.686208330 |
| 1533 | arg binary data Road ROW | Row | Let Line | 58.1398685217 |
| 1534 | arg binary data Road ROW | Row | Let Line | 59.1813084294 |

| OBJECTID | TagValue | TagColor |
|----------|----------|----------|
| 4907 | 305 | 1029 |
| 4908 | 305 | 1029 |
| 4909 | 305 | 1029 |
| 4910 | 305 | 1029 |
| 4911 | 305 | 1029 |
| 4912 | 305 | 1029 |
| 4913 | 305 | 1029 |
| 4914 | 305 | 1029 |
| 4915 | 305 | 1029 |
| 4916 | 305 | 1029 |
| 4917 | 305 | 1029 |
| 4918 | 305 | 1029 |
| 4919 | 305 | 1029 |
| 4920 | 305 | 1029 |

| Name | OriginClassID | DestClassID | ForwardLabel | BackwardLabel | Cardinal | MinRoute | MaxRoute | Subsets | OriginPersephID | DestPrimaryKey | Class |
|-------------|---------------|-------------|--------------|---------------|----------|----------|----------|---------|-----------------|----------------|----------|
| AutoToTag | 60 | 72 | TagArea | Annotation | 2 | 1 | 1 | 0 | OBJECTID | OBJECTID | TagArea |
| LineToFence | 72 | 74 | Fence | TagArea | 2 | 2 | 1 | 0 | OBJECTID | OBJECTID | Fence |
| CertsToTags | 74 | 76 | TagCerts | Certs | 2 | 2 | 1 | 0 | OBJECTID | OBJECTID | TagCerts |



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Clay County Geodatabase Model

Maintenance
Feature
classes

Published
Feature
Classes



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Clay County, Iowa, GIS Website



ArcIMS
ArcMap
Server
MSSQL



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Clay County, Iowa, GIS Website



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Clay County Future Plans Include...

- **Implementation of ArcSDE on MSSQL**
- **Migration to ArcGIS 9.0**
- **Migration to Parcel Builder**
- **Enhanced Integration with Tax and Appraisal Data**



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Author Information

Larry Rozeboom

County Assessor, Clay County, Iowa
712-262-1986
300 West Fourth Street
Spencer, Iowa 51301
lrozeboom@co.clay.ia.us

Brent Mainzinger

Director, GIS Applications
The Sidwell Company
549 Sidwell Court
St. Charles, Illinois 60174
630-549-1000
BMainzinger@SidwellCo.com



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