

Using GIS Pre- and Post Disaster: Case Studies from Northwest Missouri



North Central Regional Geospatial Symposium
North Central Missouri College
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Presented by: Tye Parsons, Executive Director
Northwest Missouri Regional Council of Governments



The Great Flood of 2011

- **Winter 2010 – 2011 - record snows to upper Rocky Mountains \approx 212% of normal snowpack**
- **Last half of May 2011 - nearly one year's worth of rain fell in the upper Missouri River Basin**
- **Official U.S. Army Corps of Engineers policy kept six upper Missouri River reservoirs at near-capacity through the winter**
- **All six Missouri River upstream dams released record amounts of water to prevent overtopping and dam destruction**

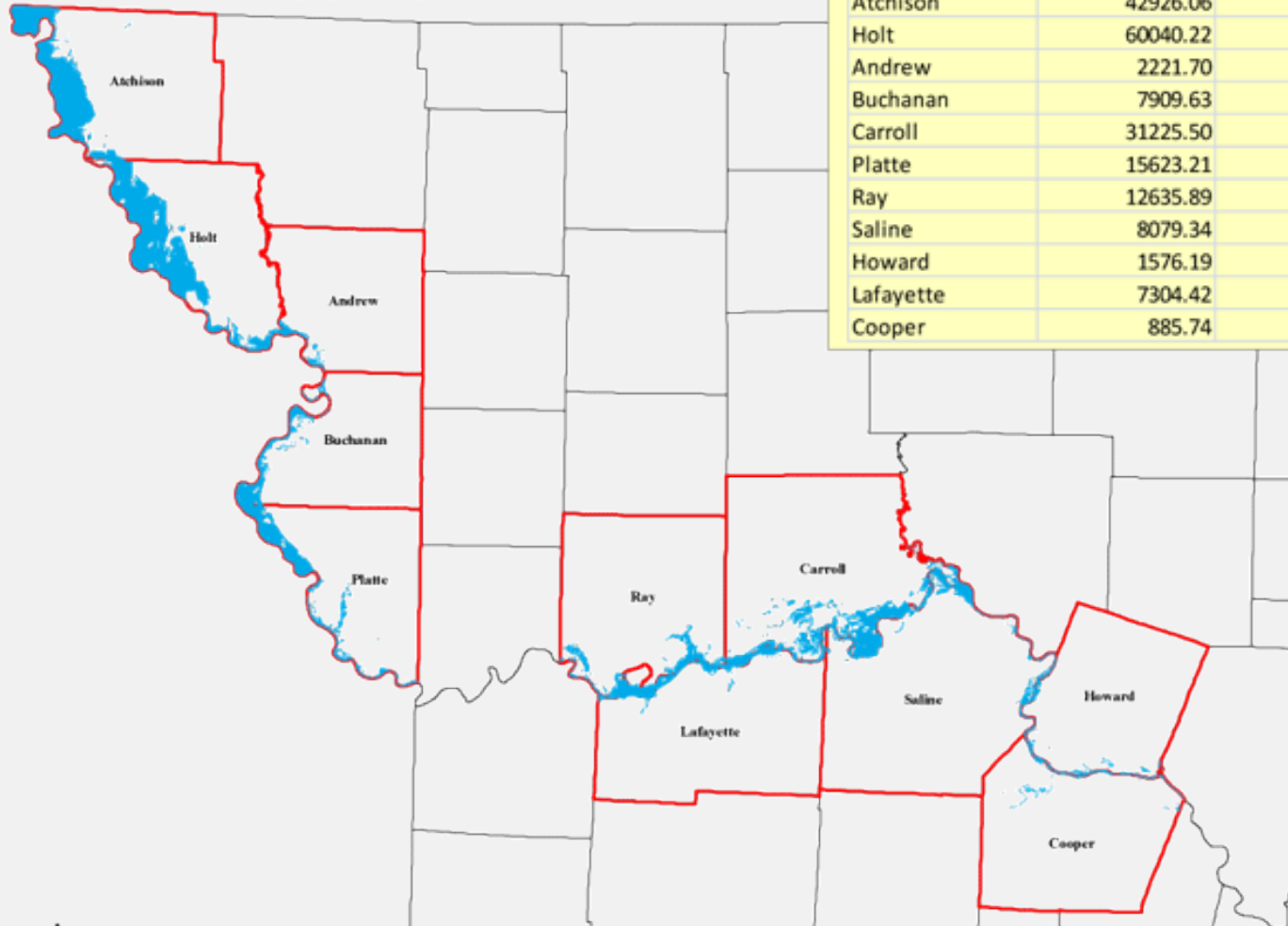
The Great Flood of 2011





The Great Flood of 2011

**Crop and Grassland within 2011 Flood Extent
FEMA 4012-DR Counties**

COUNTY	ACRES_crop	ACRES_grass	Total
Atchison	42926.06	3450.73	46376.79
Holt	60040.22	3633.61	63673.83
Andrew	2221.70	401.41	2623.11
Buchanan	7909.63	1411.91	9321.54
Carroll	31225.50	851.64	32077.14
Platte	15623.21	1893.14	17516.35
Ray	12635.89	406.06	13041.95
Saline	8079.34	760.97	8840.31
Howard	1576.19	176.68	1752.87
Lafayette	7304.42	470.38	7774.80
Cooper	885.74	112.36	998.10



Legend

-  2011 Flood Extent in 4012-DR Counties (excluding Easements and Public Land)
-  FEMA 4012-DR Disaster Counties

0 20 40 80 Miles



The Great Flood of 2011



2011 Flood Recovery

- Infrastructure Repair
- Disaster Recovery Jobs Program
- Holt County Substantial Damage Estimates
- Northwest Missouri Flood Recovery Program



2011 Flood Recovery

- **Infrastructure Repair**
 - Thirteen projects in Atchison and Holt Counties
 - \$12.7M in projects (\$4.1M in CDBG alone)
 - Levee repair, drainage repair, municipal water and sewer, community facilities, road repair



2011 Flood Recovery

- **Northwest Missouri Flood Recovery Program**

- Long-term flood recovery planning funded by EDA
- Will look at infrastructure inventory, land use, and economic environment



Re-Mapping the Levees

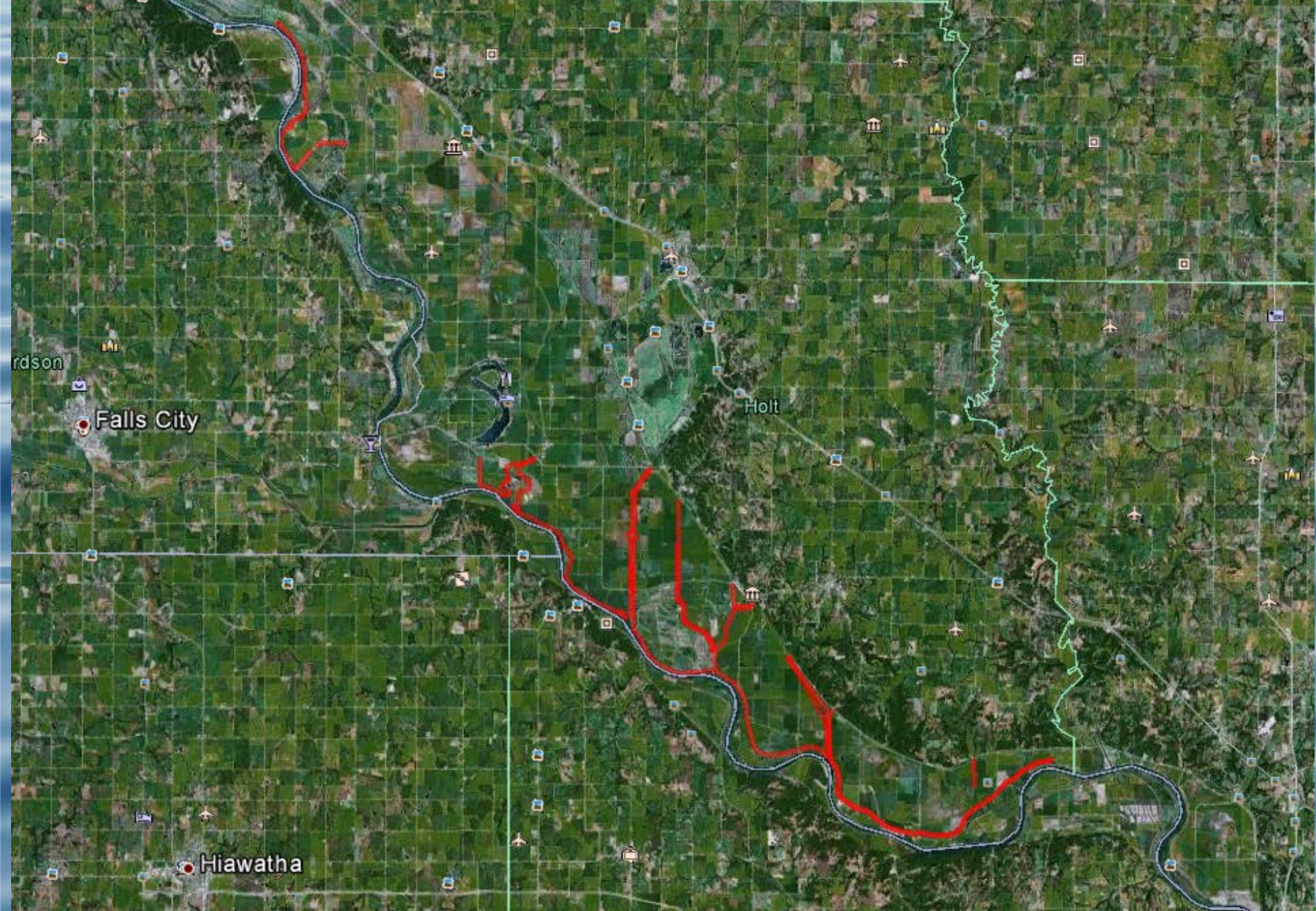
- **Atchison and Holt counties had levees mapped prior to 2011 flood**
 - USACE
 - GIS Contractors
- **Post-flood, many levee alignments changed**
- **RCOG staff assisting county with mapping new alignments**



Methodology

- Drove or walked levees
- Recorded waypoints with smartphone GPS and *GPS Essentials* app.
- Application creates “tracks” recognized by Google Earth **(and it's FREE!)**





Navigation controls: back, forward, home, and a progress bar showing 00:01. There are also icons for a refresh and a save function.

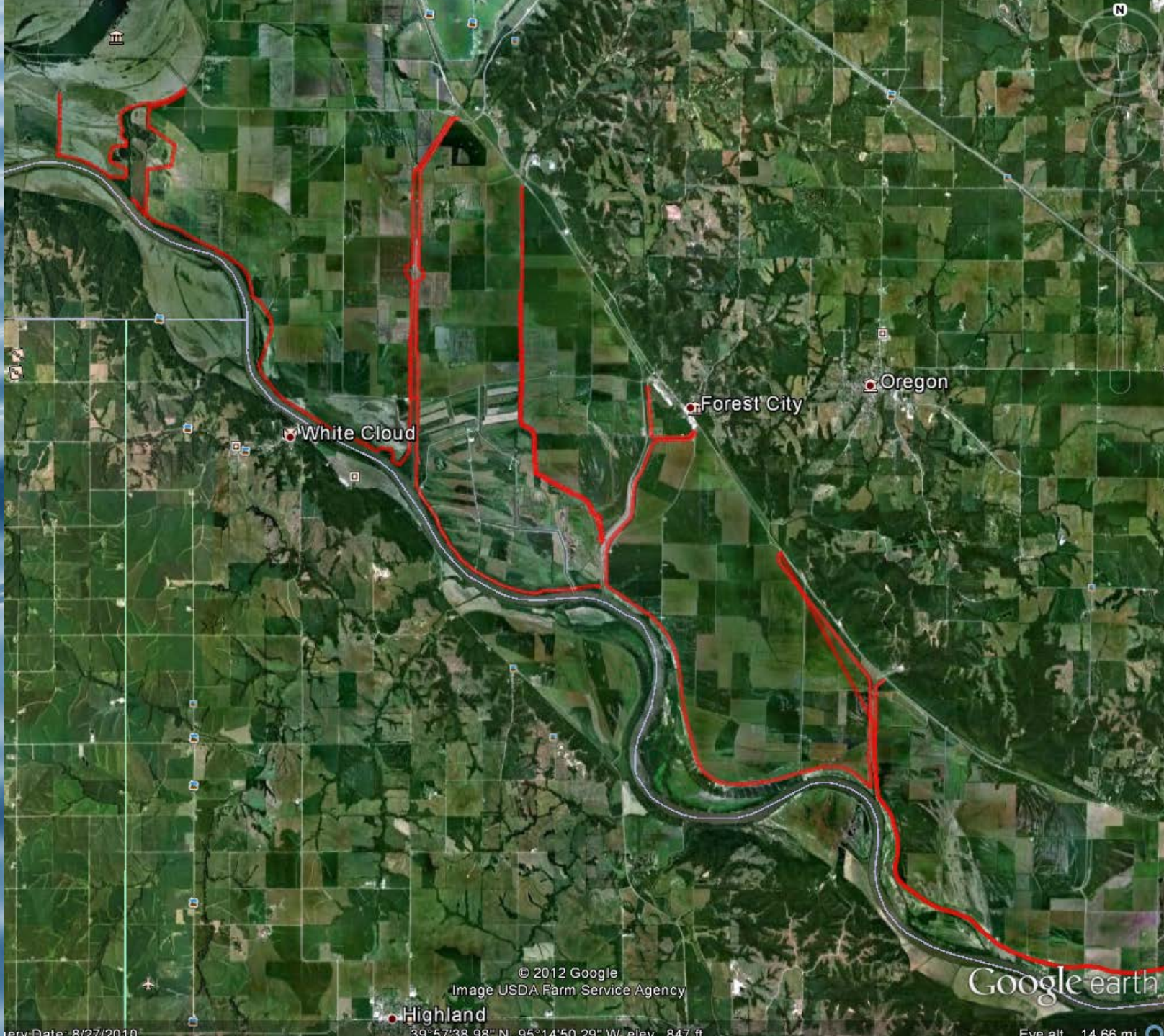
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Image USDA Farm Service Agency
Image © 2012 TerraMetrics



Copyright: Date: 8/27/2010

40°07'48.47" N, 95°07'45.12" W, elev: 1065 ft

Export...





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Google earth

agery Date: 8/27/2010

1991

39°58'21.99" N 95°16'10.92" W elev 852 ft

Eye alt 5054 ft





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40°00'35.68" N 95°15'55.24" W elev 852 ft

Eye alt 3425 ft





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imagery Date: 8/19/2010



1993

40°01'57.81" N 95°20'08.65" W elev 852 ft

Eye alt 7775 ft





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Image USDA Farm Service Agency

Google earth

Imagery Date: 8/27/2010



1991

39°59'49.55" N 95°18'06.18" W elev 850 ft

Eye alt 7146 ft



Next Steps

- **Levee re-mapping approximately 50% complete in Holt County**
- **Orthoimagery flight Fall 2012 of the flood zone**
 - New imagery will be provided to Atchison and Holt Counties, and used in-house for long range planning
- **Structures Inventory Project in partnership with MSDIS / University of Missouri**



Lessons Learned

- **Local Partnership is Critical**
 - County
 - Levee Districts
 - Land Owners
- **Useful, quality data can be acquired using relatively inexpensive, low-tech solutions**
- **Presentation of data using Google Earth platform lowers the entry barrier for end users (and will become even more useful with new orthoimagery)**



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Thank You!

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