

Case Studies

Educational Highlight: Simulated Flood Map of St Louis Bay Duluth, MN LP360



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Revision 1.0

Simulated Flood Map of St. Louis Bay – Duluth, MN

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GIS 451 - Advanced Geographic Information Systems

Project Background

- June 17-20, 2012 Duluth received 7.24 inches of rain \$100 million in flood damage
- 670 miles of paved highway impacted
- 760 miles of gravel roads impacted
- No deaths but many injuries

Project Goals

Primary: Recreate 2012 flood in St. Louis Bay using LIDAR data
Ancillary: Compare results to Federal maps of flood

Data Acquisition

- **Data Needed:**
 - Flood level data
 - LIDAR data
 - Ortho Photos
- **Tools Needed:**
 - LP360 from Qcoherent
 - Laz converter

Data Analysis and Processing

- Create mosaic dataset from orthophotos
- Create a filter to remove obscure LIDAR points
- Using mosaic dataset transfer RGB values into LP360
- After transfer, generate a 3D map using a GIS fusion view
- Using NOAA data create a flood breakline
- Determine elevation of flood
- Export Surface models with break line enforcement and elevation criteria
- Make map with exported data

Results (Images Below)

- View of flooded St. Louis Bay from directly above Hwy. 53 Bridge 3D
- View of flooded St. Louis Bay from Lake Superior Aerial shot 3D
- Final Map

Final Map (Image Below)

- Flooded St. Louis Bay / Duluth Harbor

Discussion Questions

- Could we apply these methods to the entire extent of a real flood event?
- Could we use these methods to predict flood damage?
- How can we improve these maps?

Works Cited

- http://www.youtube.com/watch?v=SP2Ns_zvsc
- http://blogs.citypages.com/blotter/2012/06/duluth_floods_top_10_jaw-dropping_images_photos.php?page=3
- http://www.nytimes.com/2012/06/23/us/millions-in-damage-from-duluth-flooding.html?_r=0
- http://www.crh.noaa.gov/dlh/?n=june2012_duluth_flood

Figures 1 - 4
Photos of 2012 Duluth Flood

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[Full Size View](#)

Henry Hansen is a senior at the University of Wisconsin-Stout majoring in environmental science and minoring in GIS and chemistry. Some of his previous work experiences include the Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service, and the National Park Service. Besides going to class, his primary work deals with the genetics, ecology, and local distributions of fishes. Currently he is supervising the survey of native fishes in Dunn County, Wisconsin through the American Fisheries Society Student Chapter at UW-Stout. He also serves as a chemistry teaching assistant and GIS tutor. His most recent GIS project is exploring the utility of ESRI virtual campus for developing applied GIS skills in relation to student led ecology, conservation, and natural resource management projects. He holds memberships with American Fisheries Society, North American Native Fish

- B LP360 Basic Edition
- S LP360 Standard Edition
- U LP360 sUAS Edition
- A LP360 Advanced Edition

- A ArcGIS
- W Windows
- G GeoCue

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Association, and Society for Conservation GIS. He is now in search of graduate positions or work related to fish and/or rivers and GIS applications, so if interested he can be reached at hansenh2092@uwstout.edu.