

THE ROUGE RIVER PROJECT
A WORLD CLASS EFFORT



BRINGING OUR RIVER BACK TO LIFE

GIS/Public Awareness Project City of Novi, MI

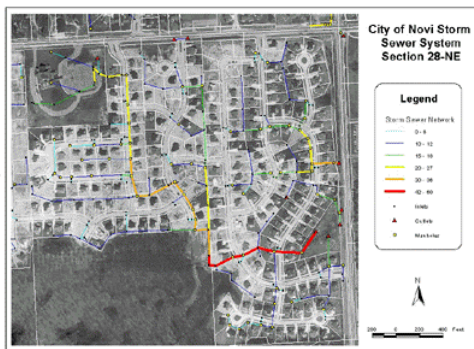
A publication of the Wayne County Rouge River National Wet Weather Demonstration Project
Information Date: December 2001

Objective

The objective of the City of Novi Rouge River GIS/Public Awareness Project was to demonstrate how Geographic Information Systems (GIS) and related technology can be used to model the movement of a chemical spill through the city storm drainage system. This information assists emergency response personnel in responding to an incident and in reducing degradation of the Rouge River.

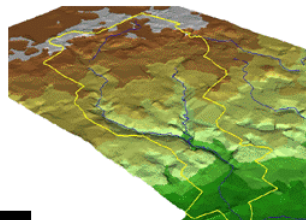
Infrastructure Validation

A portion of the storm sewer network is color coded to verify conduit pipe diameter

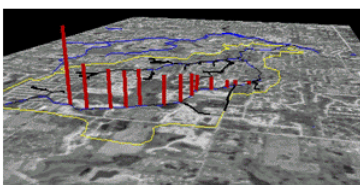


Drainage Determination

Drainage for the modeling area is viewed in three dimensions to help determine subcatchment drainage



Model Result Analysis



Contaminant plume concentrations (Indicated as red bars) are viewed in 3D to help verify and analyze model output

Owner

City of Novi, Michigan

Location

The pilot area studied was in the western portion of Novi.

Dates

The project report was completed in August 2001.

Total Project Cost

\$202,968

Demonstration Aspects

- Demonstrated that with the use of storm water modeling and GIS technology, multiple chemical spill scenarios can be traced through the storm drainage network of the City.
- Demonstrated limitations of the technology to determine time of travel in the storm drainage system. An example is the difficulty in modeling a spill that occurs during dry weather.
- Demonstrates the use of a website to make this information available to the general public and how a plume of pollution would move through the City storm drainage system.

Project Highlights

A computer database was developed to track and estimate the time of travel of a chemical into the storm drainage system in a pilot area of the City of Novi. The model evaluates the movement and concentration of different quantities of chemicals under different weather scenarios and different locations in the City. The technology used includes a GIS database and the SWMM model.

The information will enhance emergency personnel responding to a pollutant spill. Results of the project were made available on the internet, cable television and in kiosks. Movies can be seen on the web page that correspond to various conditions. The movie displays the movement of a pollutant through the storm sewer system.

The esg.erim-int.com web page listed at the end of this project profile has a more complete description of the project and provides an interactive program to allow choices of various rainfall and pollutant quantities to be displayed in the pilot area.

Major Elements

- A pilot area of the city was selected to apply the technology.
- A GIS database was developed to describe existing surface conditions of the model area.
- The EPA Storm Water Management Model (SWMM) was used with the GIS database to predict movement of chemical spills.
- Several weather scenarios were used: drought, dry weather, small rainfall and large rainfall events.
- The surface features used included: the location and elevation of pipes, culverts, manholes, inlets, outlets and ponds; along with detailed soil and impervious surface data.

- Two spills were simulated; one was a 6,000 gallon tanker discharging its waste in 30 minutes under different weather conditions, the other was a 12,000 gallon tanker spilling its entire contents in six hours under different weather conditions.
- An interactive web page describes the information developed in this project in more detail and allows a user to input rainfall and pollutant information to demonstrate the movement of a plume of pollution in the storm drainage system.

Project Results

- A pilot area of the City was selected to apply the technology.
- The City of Novi SWMM model was adequate for developing predictions of potential spill dispersions and travel times. A limitation was that for the scenario of a spill during a dry day, the model did not show flow.
- The model identified the travel times for a spill to reach various locations in the pilot area during 6 different rainfall events. It also showed that the further the spill was from the river the longer it took to get to the river.
- Using the 6 different rainfall events, peak travel times were developed for each spill possibility. A discharge of 6,000 gallons would move through an area within 1.6 to 4.8 hours during a one-hour storm. Under dry conditions it would take 2 to 12 hours. On average the city has 6 to 18 hours to contain a spill before it would reach the river. A pollutant discharge during a rain event would require a shorter time for containment.
- The web page that displays the information and data and movie is: <http://esg.erim-int.com/website/novi/webpages>.

To obtain further information on the Rouge Project, including documents, maps and general information, visit us at.

<http://www.rougeriver.com>

Acknowledgements

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