



Rachel Kornak

**Environmental Scientist  
and GIS Specialist**

# Table of Contents

## **Example 1:**

**GIS Interactive Mapping Application  
City of River Rouge, Michigan**

## **Example 2:**

**Database Design and GIS Analysis  
USGS Wetland Investigation**

## **Example 3:**

**Environmental Site Investigation  
Industrial Facilities**

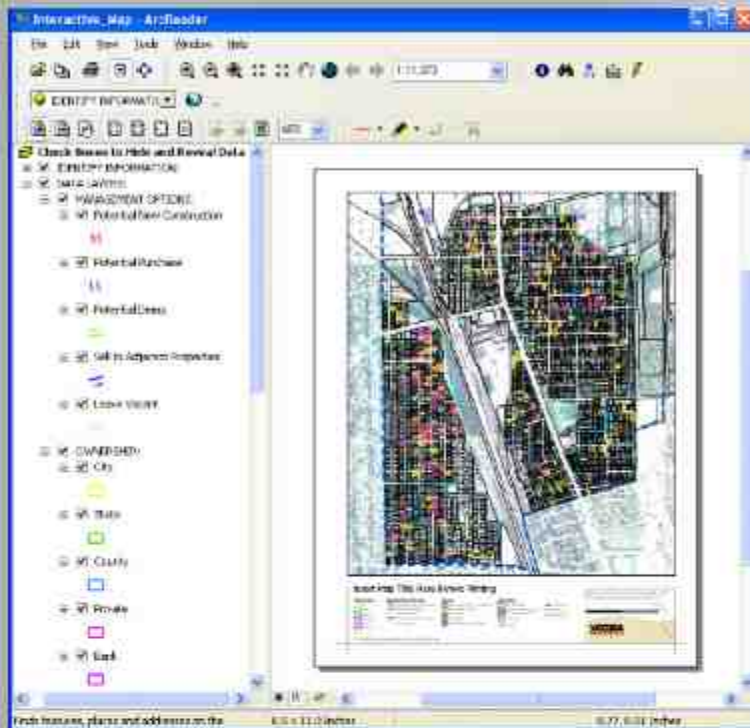
## **Example 4:**

**ArcIMS Interactive Mapping Website  
City of Novi, MI**

## **Example 5:**

**Tropical Rainforest Ecology Research  
Bocas del Toro, Panama**

# GIS Interactive Mapping Application City of River Rouge, Michigan



## Project Description:

The City of River Rouge found itself in possession of a large number of private lots that city leaders wanted to convert back into tax base. But scattered, disorganized, and inaccessible information made it impossible to identify the city-owned sites, let alone prioritize which would appeal to buyers.

Interactive map created using ArcPublisher and ArcReader software.

I designed a database, imported data from numerous sources, conducted a field survey, and produced a user-friendly GIS Interactive Mapping tool that put a wealth of information at the fingertips of decision-makers.

With the new tool in place, River Rouge leaders have instant access to an up-to-date inventory of their properties. They are now equipped to prioritize projects, manage limited resources, and track progress toward their goals.



Sample website showcasing a possible way to market sites to potential buyers.

## End Products:

- An Interactive Mapping Program with results of the field survey, assessor's data, and GIS base information.
- Comment sheets for each vacant residential parcel linked to the Interactive Mapping Program.
- A Quick Start Guide outlining how to use the Interactive Mapping Program.
- A live training session presented at City Hall on January 10, 2007.
- A sample handout and website showcasing possible ways to market the vacant sites to developers.

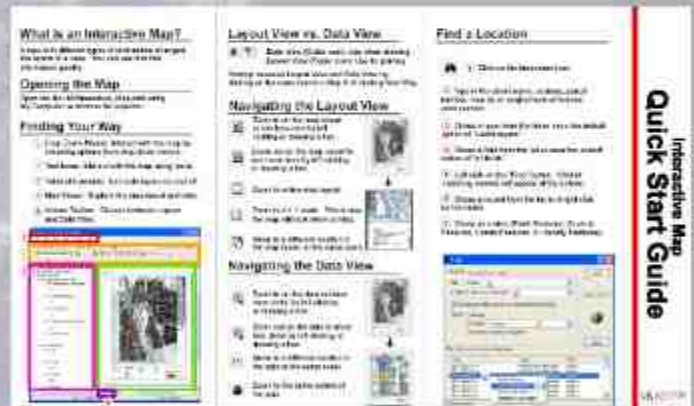
## Demonstrated Skills:

- Project Management
- GIS System Design
- Public Speaking
- Training Staff
- Web Design
- Mail Merge

## Software Utilized:

- ArcGIS
- Publisher Extension
- ArcReader
- Access
- Excel
- Word

**Winner of the 2007  
IMAGIN GIS for  
Everyone Award.**



Front (top) and back (bottom) of the Quick Start Guide explaining how to use the program.

# Database Design and GIS Analysis USGS Wetland Investigation



Map showing study area.

## Project Description:

The Crane Creek wetland area in northwest Ohio was hydraulically separated from Lake Erie by a series of man-made dikes. This disturbance significantly reduced the habitat for many plants and animals and opened the door to invasive species.



The USGS is currently testing methods of reestablishing native vegetation in the wetland and evaluating the potential to hydraulically reconnect Crane Creek and the surrounding wetlands to Lake Erie.

As a volunteer GIS Analyst, I used GIS, GPS, and aerial photography to analyze vegetation changes and patterns in the wetland between 1939 and 2005. Results of the study were published in a report to the Environmental Protection Agency.

A screenshot of a web browser displaying a website titled "Wetland Vegetation Study Ottawa National Wildlife Refuge, Ohio". The page has a blue header with a globe icon and a navigation menu on the left. The main content area is titled "Work Plan" and contains text describing the project goals and tasks. A list of years from 1939 to 2005 is visible on the right side of the page. The browser's address bar shows the URL: http://www.epa.gov/usgs/arkh/etla/wetland/index\_Res/2006003.htm.

Website describing project tasks and results.

## End Products:

- Geodatabase design specifications and topology rules.
- Feature classes of vegetation, dikes, and roads digitized from aerial photos of each study year.
- Georeferenced aerial photos for each study year.
- Analysis to determine changes in plant communities over time.
- Maps showing results of analyses, trends, and patterns.
- Website describing project results.



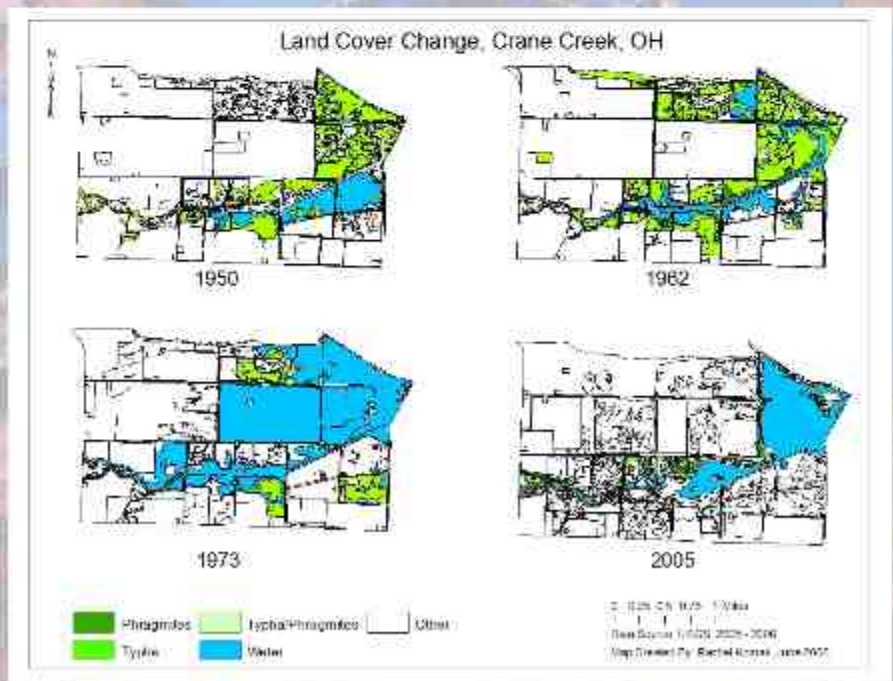
Screen shot showing database design in ArcCatalog.

## Demonstrated Skills:

- Database Design
- Quality Control
- Data Editing
- Web Design
- Team Work

## Software Utilized:

- GIS
- Microsoft Access
- Microsoft Publisher



Time series maps showing changes in wetland vegetation.

# Environmental Site Investigation Industrial Facilities



Screen shot showing field and lab data merging together.

## Project Description:

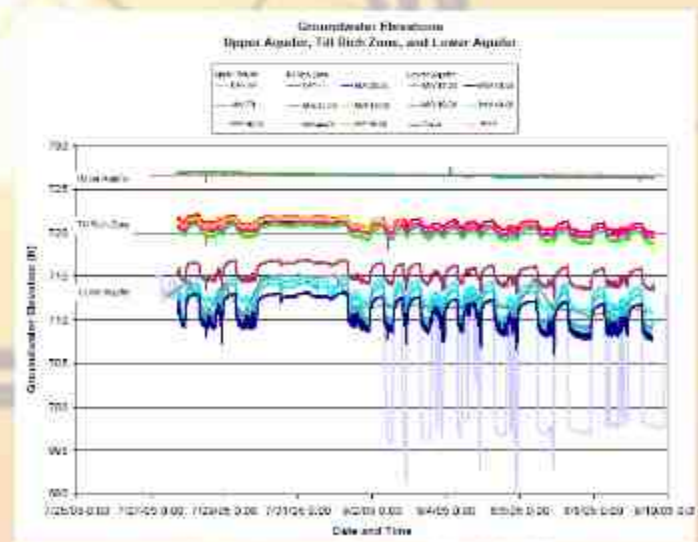
The government requires that environmental conditions are monitored and reported on at industrial facilities.

As a database manager/geologist for an environmental consulting company, I worked on many groundwater and soil investigations for leading auto suppliers.

I was involved in many different aspects of the investigation including data collection, data management, analysis, and report generation.

My role as database manager was to manage day to day operations of the database including security, data entry, quality control, data validation, merging lab and field data together, querying, and exporting data for analysis.

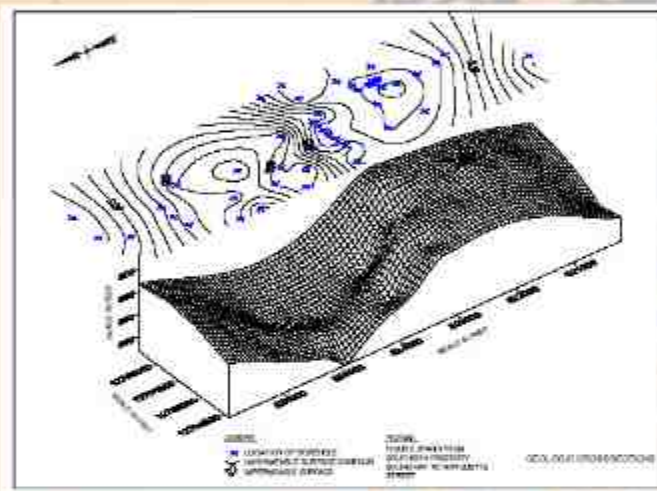
I used programs such as GIS, AutoCAD, Excel, gINT, MODFLOW, and Surfer to produce maps, graphs, and figures for reports to the Department of Natural Resources and the Environmental Protection Agency.



Hydrographs of three aquifers created in Excel using data exported from Access.

## End Products:

- Guidelines for data collection and naming conventions.
- Quality control measures to ensure data integrity.
- Queries to generate tables for analysis and reports.
- Maps, graphs, and tables.



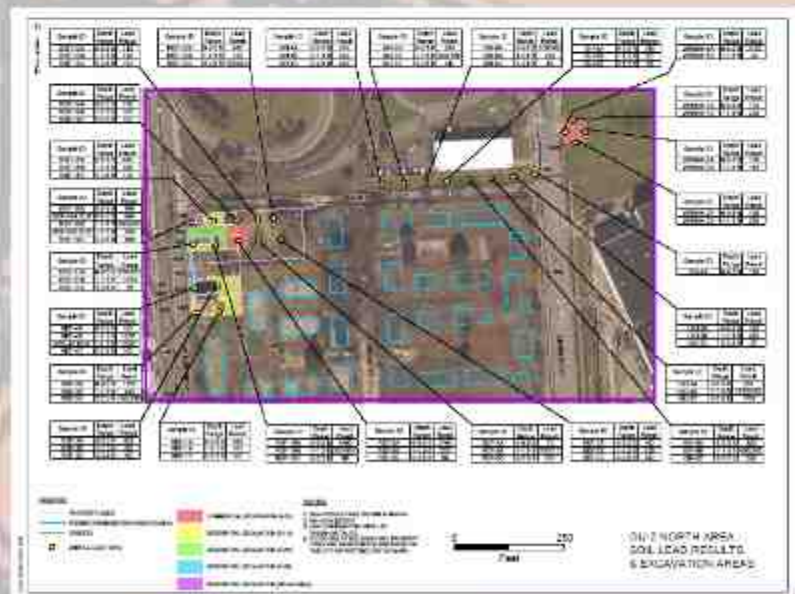
3D model of bedrock surface overlaid with 2D groundwater contours created using Surfer.

## Demonstrated Skills:

- Database Management
- Quality Control
- Data Validation
- Data Export
- Data Analysis
- Map Generation

## Software Utilized:

- Access
- EQUIS
- Excel
- GIS
- AutoCAD
- MODFLOW
- Surfer
- gINT



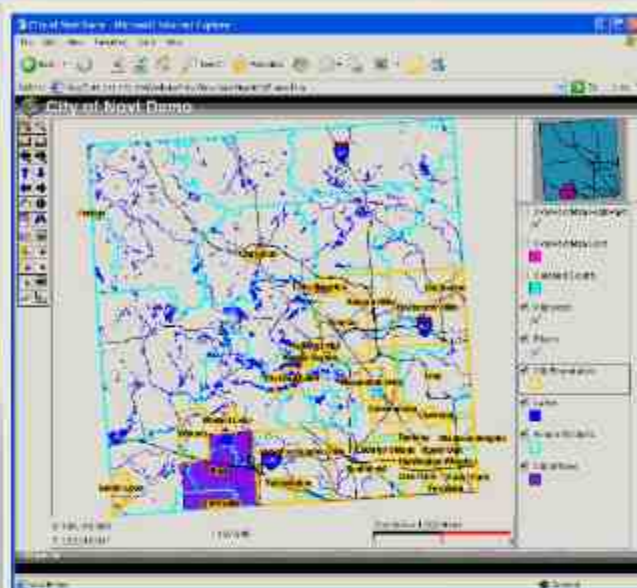
GIS map showing chemical concentrations in groundwater and proposed soil excavations.



# ArcIMS Interactive Mapping Website City of Novi, MI

## Project Description :

In spring of 2005, the City of Novi posted a job opening for a GIS Manager. The position description requested experience with ArcIMS software. Although I had experience using ArcInfo, I had never used ArcIMS.



Interactive Mapping Website created using ArcIMS.

To make myself more marketable for the position, I taught myself how to use the program in three days using two of ESRI's virtual campus courses: "Introduction to ArcIMS" and "Learning ArcIMS."

I created a fully functional GIS website for the City of Novi using data from the Michigan Center for Geographic Information and the United States Geological Survey. The website featured scale dependent symbology, spatial and attribute queries, and buffers.

Select, Buffer, and Identify Tools

Select a Road Using the Select by Square Tool

Query Builder

You Can Look for Good Offices in Oakland County That Are Greater Than a Certain Size or School Districts That Have a Certain Name

After You Execute the Query, the Selected Features Are Highlighted in a Light Orange Color

Zooming In and Out

Notice That Labels And Features Change As You Zoom In

More Detailed Labels Appear As You Zoom In Closer

Quick Start Guide explaining how to use website.

## End Products:

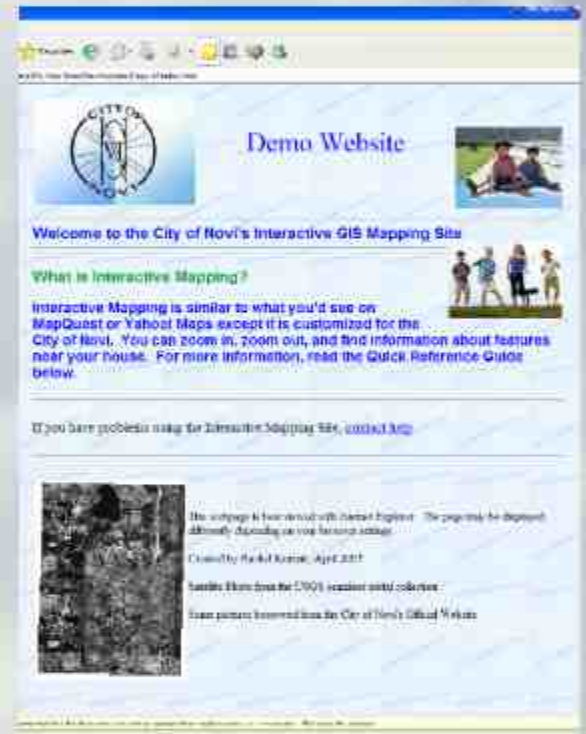
- Interactive Mapping Program
- Quick Start Guide for new users
- Website to host Interactive Mapping Program

## Demonstrated Skills:

- Efficient mastery of software in a limited time period
- Web Design
- Data Acquisition

## Software Utilized:

- ArcIMS
- Microsoft Frontpage
- Microsoft PowerPoint



Website used to host the Interactive Mapping Website.



Available tools within the website.

# Tropical Rainforest Ecology Research Bocas del Toro, Panama



## Project Description:

The Institute for Tropical Ecology and Conservation has a research station located on the island of Isla Colon along the northwest coast of Panama. Isla Colon is surrounded by numerous other islands which are often referred to as the "Galapagos of Central America" because, after having been isolated for 10,000 years by geologic activity, each of the islands has evolved its own unique biota.



Map showing Isla Colon in relation to mainland Panama.

I attended a one month long field research course entitled, "Ecología y Conservación," which means Conservation Ecology. The field methods course was taught in Spanish and was geared toward Latin American students.



The "watch dog" of the research facility.

The majority of our time was spent collecting scientific data about local fauna including poison dart frogs, bell birds, parrots, leaf-cutter ants, and primates. The data was used to support multiple research projects lead by the Institute faculty.



Variety of poison-dart frog coloration on Isla Colon and surrounding islands.



## End Products:

- Written and oral report of research project in Spanish.
- Raw data about local species.

## Demonstrated Skills:

- Field Data Collection Methods
- Spanish Proficiency

## Technology Utilized:

- GPS
- Compass



A caimin we captured in a nearby wetland.



Fresh from the sea.



Marking birds for a population study.