


GIS Modeling of Sex Offender Travel Routes for the State of Maryland

Date: March 8th, 2013
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Presentation Agenda

- Introduction to MOMS
 - What is it for?
 - What does it do?
- SOR mapping proposal
 - Proposed solution and workflow
 - Data requirements
- Implemented solution
 - Developed workflow
 - Script architecture
 - Final results
- Model output and application
 - Sample scenario
 - Sample buffer search results

2



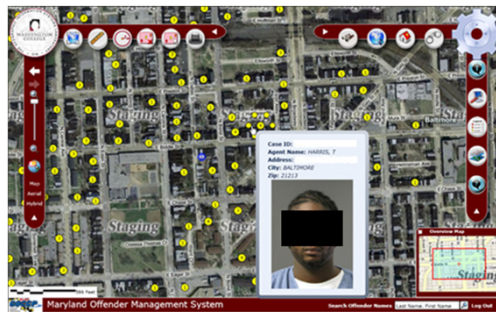
What is MOMS?

- In 2008, Washington College launched a state-wide web-GIS application called **Maryland Offender Management System (MOMS)**
- Application used by Maryland law enforcement agencies
- Initiative funded by Maryland Governor's Office of Crime Control and Prevention (GOCCP)

3



MOMS Application



[Demo](#)

4



SOR Mapping Proposal



Sex Offender Routes

- In 2012, a new analytical tool proposed to define potential sex offender travel routes (SOR)
- Needed efficient way to produce route feature class
- Data attached to these routes would include:
 - Mug shots
 - Summarized case reports
 - Offender descriptions
 - Starting and ending addresses
- Routes could be used to compile suspects list

6



Project Objectives

- Use geocoded address point feature classes
- Use network dataset built by Washington College to run Route Analysis
- Use Python scripting environment and arcpy to implement geoprocessing workflow
- Final goal: create a set of all possible to-from routes

7



Required Input

- Network dataset built in ArcGIS Desktop 10.0
- Geocoded address points separated by address type
 - Address points must be snapped to or in close proximity to network
- Valid output location

8



Proposed Workflow

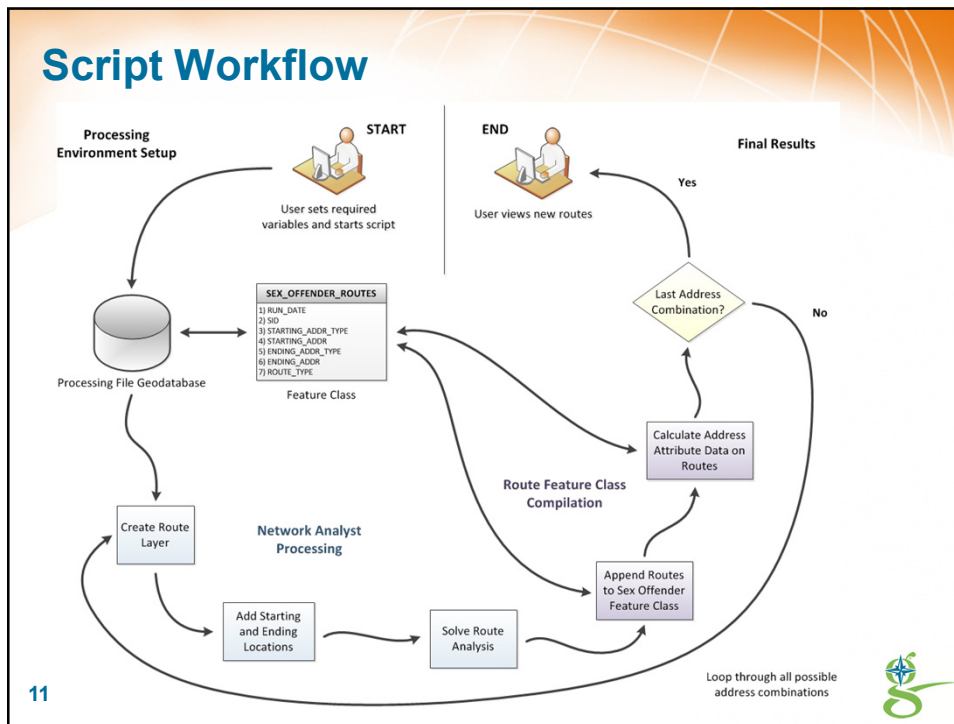
- Utilize ArcGIS Network Analyst tools and available Python modules
- Script inputs:
 - Four (4) address point feature classes
 - Network dataset
 - Data output location
- Store produced routes in file geodatabase
- Solve routes for each address combination
- Script will be run as-needed basis

9



Solution





- ### Script Architecture
- Python modules and arcpy
 - Data Management tools
 - Network Analyst tools
 - User-defined, global variables
 - Try-except blocks and error trapping
 - Status and error logging to text file
- 12

Overall Results

- Reported by Washington College:
 - Processing time: ~65 minutes
 - » All 12 address combinations for one network route attribute
 - ~6,675 address points involved
 - ~10,320 routes produced for both fastest and shortest distance
- Note: not all sex offenders have four addresses
- Routes used in radius search functionality

13



Output and Application



Scenario

- Maryland State Police are investigating suspicious activity around a school in Baltimore
- The school gives a few eye-witness reports of a man sitting in his car near the school during recess hours once or twice a week
- To begin a preliminary investigation, they can turn to MOMS to get potential suspects by using the routes generated through the script

15



Address Search

Enter Address Information

Street Num Street Name Zip

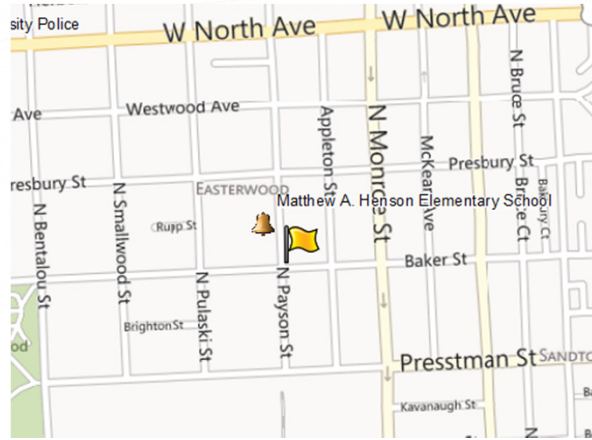
Find Address

Type in the address of the school...

16



Search Results



Search returns school location and pins it on the map...

17

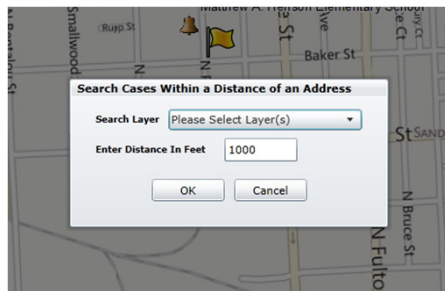


Radius Search



In the Results Window, choose the Search by Radius tool...

From the dialog box, choose "Sex Offender Travel Paths" as the search layer, and enter 1000 feet for the radius....

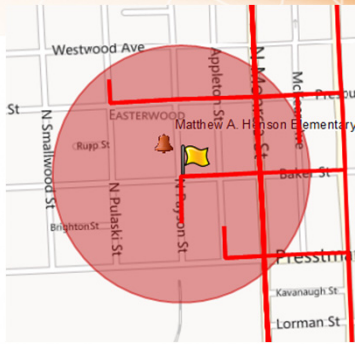


18



Radius Search Results


Radius search highlights search area around the school...



... and returns 29 results with attribute information in the Results window.

Zoom	Mug Shots	Case Report	Starting Address Type	Starting Address	Ending Address Type	Ending Address	Name	
			Work		Home			11
			Work		Home			11
			Work		Home			11
			Work		Home			2:

19



Summary

- MOMS is a versatile web mapping application used to assist in crime control and prevention
- Application was further extended to allow searching for potential transportation routes
- Able to model these routes using ArcGIS Network Analyst, geoprocessing tools, and the arcpy module in Python
- Results produced in a reasonable amount of time according to the size of the dataset

20

