Development of GIS Applications for Adult Probation Services

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Abstract
GIS can be a useful tool for probation officers when conducting field visits on assigned probationers whether by locating of an address, planning a route, pinpointing high risk offenders or analyzing crime patterns. Seminole County Probation uses non-spatial data from several distributed databases including CAFE from the Sheriff's Office to track the probationer's compliance with probation requirements for the duration of the court-ordered time period. The new application integrates these varied databases across multiple county agencies, and the field officers provide an up-to-the-moment status of the probationers. Developed using ArcGIS, the probation officer while on patrol can view all probationers in their immediate area, via a wireless laptop and ArcExplorer, and target their routes to interact with those probationers whose status may require attention to prevent potential new offenses.

Seminole County Government has over 200 internal GIS users, with several departments or divisions maintaining their own geographic databases within a central library. The range of use varies from looking up parcel information in the Customer Resource Center, to Building Inspectors routing their work day, maintenance of water and sewer networks in Environmental Services to ArcIMS applications for Engineering. The GIS Division actively coordinates between these internal users and other external agencies including the Property Appraiser's Office, the Cities, the Sheriff's Office and the Central Florida Regional Planning Council, not only as the keeper of the central GIS Library, but by conducting training, holding monthly User Group Meetings, etc.

It came as no surprise therefore when Adult Probation Services requested integration of their database to a GIS application, to look into its use in the field for Probation Officers and for crime analysis. This would basically involve geocoding the Adult Probation Offender addresses residing in the Sheriff Office's CAFE system, joining it to attribute fields residing both in CAFE and in a local probation database.

CAFE is written and developed in house by the Sheriff's Office. CAFE is an (outdated) acronym (that stood) for *Computer Aided Form Entry*. Today, it is used by almost all the Law Enforcement Agencies in Seminole County including the cities, to track many types of reports, people, offenses, vehicles, property and evidence. There are currently 1,259,203 entries in the main table, and millions of other records in related tables. This is a secure system accessible only to Law Enforcement Agencies mostly through a user interface. Access to the system, let alone the database tables is highly restricted.

Probation case tracking is in part a duplication of the records in the CAFE system. The Probation Office currently re-enters data faxed from the judges about probationers into a stand-alone database. The same information is already being entered or was previously entered in CAFE. Obvious inefficiencies include not only the duplication of effort, but also mismatches in the data, especially in case status updates.

A GIS application would not only require access to the restricted CAFE system but also to the most accurate or recent data from either database. The project for Adult Probation then became two-fold – revamping of the way Probation manages its data, and the development of a GIS application. In order to reduce or eliminate the double-entry, the current fields will be mapped to the corresponding fields in CAFE. Non-common fields will be handled outside of CAFE. The Probation Database application will provide a single interface for the creation of the probation agreements, file labels, and reporting.

The GIS project started with the introduction of the concept to the Probation Officers in October, 2004 including a demonstration of ArcExplorer. Access to the CAFE tables was granted to our Database Programmer in November. A preliminary look at the CAFE tables showed that the field names would have to be modified to suit the GIS environment; records would have to be filtered for probation cases and then for only probation cases within Seminole County. The initial shapefile for Probation with a data dump from

CAFE was created in November, 2004. This contained all the Adult Probation 'active' cases at that time but did not contain all the requested attribute fields. However, it was a good geocoding exercise and a tool to initiate Probation to GIS.

GIS Data

Data for Probation comes from several tables in CAFE; views from CAFE were built for the convenience of geocoding and to join to a *single* attribute table. All probation cases in CAFE are preceded by a "CP', active or open cases have a clearance value of "open" or "warrant issued".

INCKEY	CASENBR	CLEARANCE	HOMESTREET	HOMECITY	HOMEZIP
1250140	2005CP000276	Open	▮	GENEVA	32732

dbo.vwCPGeocode

INCKEY	CLEARANCE	FULLNAME	DOB	RACE	SEX	MARITAL	PCATEGORY	PSTATUS
1250140	Open	▮ JOHNN	3/14/1960	W	M		2	Active

POFFNAME	CHGDESCR	STATNBR	UCR	COUNTS
▮	DRVG UNDER INFLUENCE	316.193	5400	1

dbo.vwCPAttributesOff

The salient features of the data are:
- Each offender/offense gets a unique case number i.e. the same offender gets a unique case number for each offense
- INCKEY is incremental

Attributes of Probation Cases

INCKEY	CASENBR	FULLNAME	CHGDESCR	STATNBR	UCR	COUNTS
1112569	2004CP001647	▮ LEE ALLEN	DRVG UNDER INFLUENCE	316.193	9500	1
1112570	2004CP001648	▮ LEE ALLEN	POSS L 20 G CANNABIS	893.13	350A	1

This data structure has a great advantage in the GIS environment in that tables can be *joined* (one case number, one offense) instead of related (one case number, multiple offenses); the joined data can be thus be exported to an ArcExplorer project. Queries for the weekly updates to new cases are based on the incremental INCKEY number.

Probation offenders in the CAFE database are not necessarily restricted to a Seminole County address; a disadvantage is that there is no "county" field in the CAFE database to identify these thus necessitating a rather long query by city name and zip code to filter the county cases. Two cities/zip codes also straddle the county boundary and addresses within these are eliminated manually during address matching.

GIS Methodology

The first geocoding of the active probation cases was in November, 2004. It was decided that maintenance and updates to the cases would be from this date onwards and there would be no geocoding of any historical data. The cases would also be restricted to Seminole County addresses only. This initial mapping exercise returned an address match rate of 60%. The address entries were not standardized (apartment units before and at the end of, misspelled, abbreviated or incomplete street names, missing zip codes, and no addresses for the homeless). Seminole County does not maintain the addressing database for some of the municipalities within the county. While the GIS division makes every effort to procure these external addressing databases, they generally tend to be outdated. This does not however restrict the probation GIS custodians from chasing down these addresses, either by following the paper trail, or checking against the street centerline address range, or going so far as to call the probationer or their kin to ask for a location. So far, there have only been 2 cases where all ways to

contact them were exhausted and it turned out that the cases were "terminated unsuccessfully" (absconders).
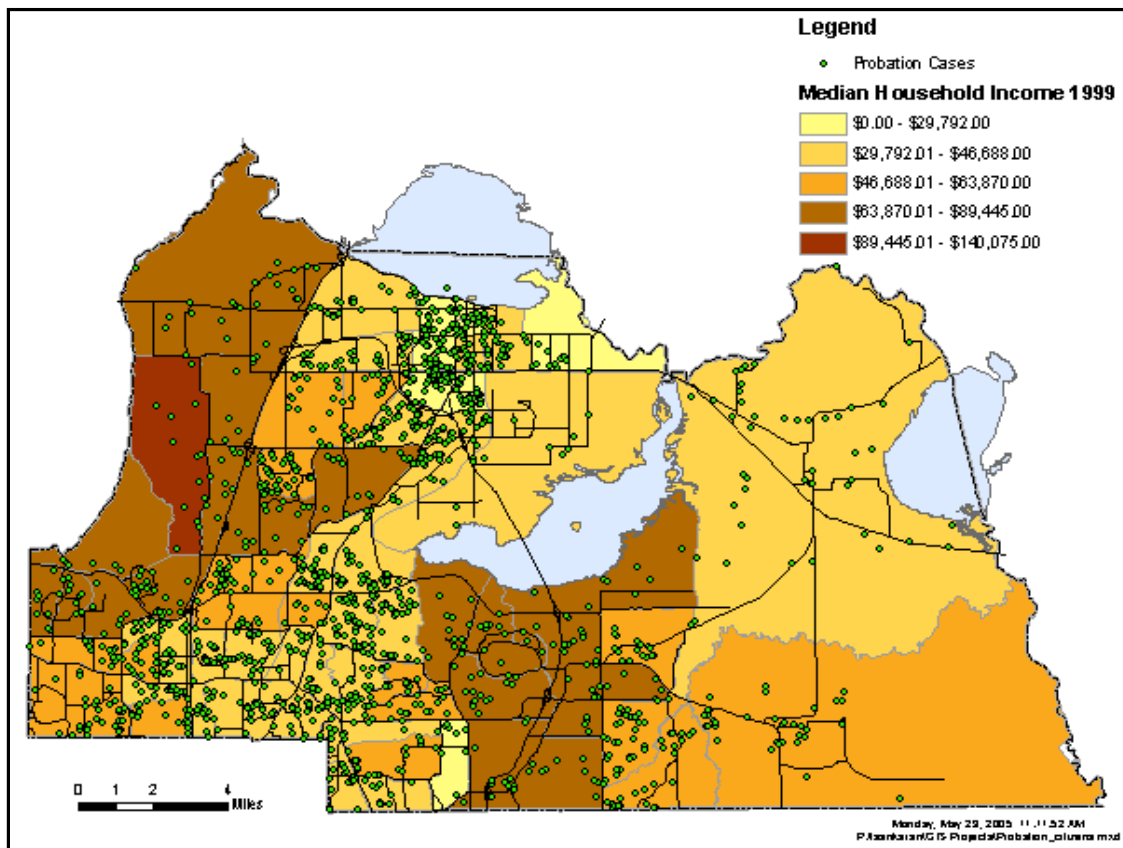
It is imperative that the entire GIS schema be kept simple to make it easy for personnel with no GIS background to handle the project - detailed documentation with screen shots, saved queries and one-to-one training sessions are some of the ways this is approached. Three ArcGIS (9.0) projects have been created for the three aspects of the project:

- A "editcopy" project, only for geocoding and address matching
- A "newcases" project to update the new cases every week
- A "fieldcopy" project to output the final shapefile to the Probation Officer including a model via the model builder to output a shapefile for each officer if needed.

Currently, new cases are being updated on a weekly basis and the GIS data is ready to be tested in the field. An ArcExplorer Project (AE 9.0) has been created and will be uploaded to each Officer's laptop. Training of the Officers in the use of ArcExplorer will follow and support will be provided as long as needed.

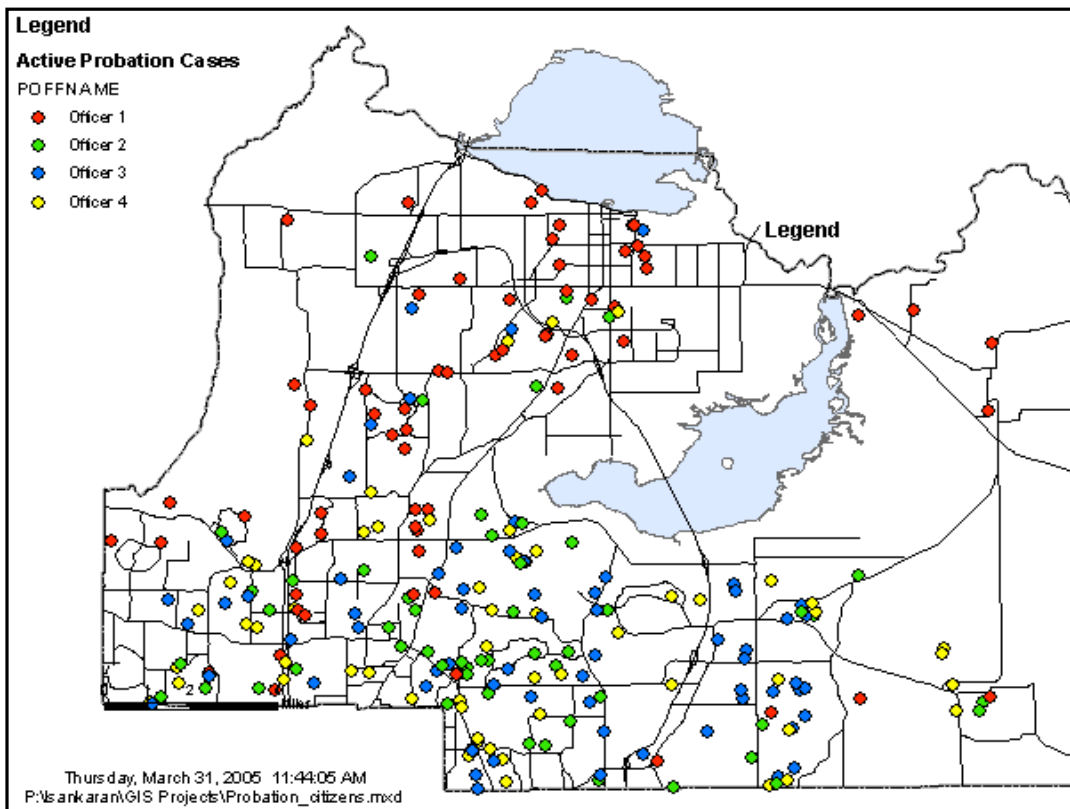**Results and lessons learnt**
The results have been multifold. A major improvement has been to the database itself, with a standardization of address entries, leading to an address match of over 80% as opposed to an initial match of 60%. Missing/incomplete records (rare) are traced and corrected both in the GIS database and in CAFE.

Distribution by Median Household Income

A visual of the spatial distribution of the Adult Probationers for the first time, is of course, a major outcome of this project. Seminole County has over 125 layers of data in its GIS library allowing for a wide variety of spatial analysis whether by looking at proximity of daycare centers to offenders or finding a nearby agency to coordinate community service.

The ability to categorize cases by Officer revealed the disparate nature of the caseloads, both by number and geographic distribution. Probation is looking into assigning cases with a more efficient spatial distribution – perhaps by zoning the county to 'Officer Beat Areas'. This should allow for a more efficient travel route and more time spent on interaction with the cases themselves.

The Probation Office is also looking into working with the National Law Enforcement & Corrections Technology Center Crime Analysis Program and the Seminole County Sheriff's Office for geographical analysis. Live electronic monitoring of offenders is also being considered.

An interesting outcome has been the two spin off projects that it has created. The Community Assistance Division which provides a variety of emergency services to eligible residents of the County has mapped its clients and also the external agencies that provide some of these services. This application will be primarily used for analysis and reports. A member of the Florida Department of Juvenile Justice, who created a simple GIS project as a part of his course exercise at the local University, has sent a request to his peers to initiate a similar program for JJIS data.

Some data creases still need to be ironed out. When a probationer changes his/her address the Case Number/INCKEY *remains the same*. The case may remain active but will not show in weekly "newcases" (which are based on INCKEY incremental since the last update.) These cases need to be tagged and moved to their new location in GIS.

There are mismatches in the status of the Probation cases. In 29 out of 2642 cases as of May 5th, the status of the case in the "CLEARANCE" field in CAFE remained "open" but the Probation Office had declared the "PSTATUS" as "Terminated". This needs to be taken into consideration when an officer seeks his "active" cases. However these can be easily flagged and the corrections can appear in the next weekly update.

It certainly helps that the GIS custodians are primarily Probation staff, who understand their data and have direct access to their databases to make the changes and corrections as needed. As per suggestion from the probation GIS custodian, a list of street names within Seminole County in the two cities straddling the boundary will be used as a look up table and the external street addresses will be flagged with a Sheriff's District (fieldname CSA) value of '0', and the addresses will be filtered before an address match.

The choice of ArcExplorer 9.0 for the Officer's laptop, as opposed to AE 2.0 or an IMS application has been made after much thought. The deciding factor is the attribute functionality of AE 9.0, allowing for an officer to select his/her cases in an area and being able to view the information about them. The AE project can also be maintained and updated by the Probation GIS data custodian locally as opposed to an IMS site which would be created and maintained centrally by IT. ArcExplorer is moreover free adding to the cost savings.

Acknowledgements

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