Using GIS for Tax Research:
Some Lessons Learned and an Application

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**District of Columbia
Office of the Chief Financial Officer**

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PART I:
Lessons Learned

Geocoding the Individual Income Tax Data

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Income Tax Return Structure

- The Office of Tax and Revenue (OTR) maintains a computerized tax database as part of the Integrated Tax System (ITS)

- Information in the ITS system is accessed through the SAND querying system

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Geocoding Process

- Reasons for geocoding were twofold:
  - Policymakers oftentimes make requests that require spatial analysis

    - ITS system has numerous inconsistencies, discrepancies and errors in the data especially with respect to names and addresses

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ID_Internal	2002	2003	2004
1234567	Jane Do	Doe, Jane	J. Doe

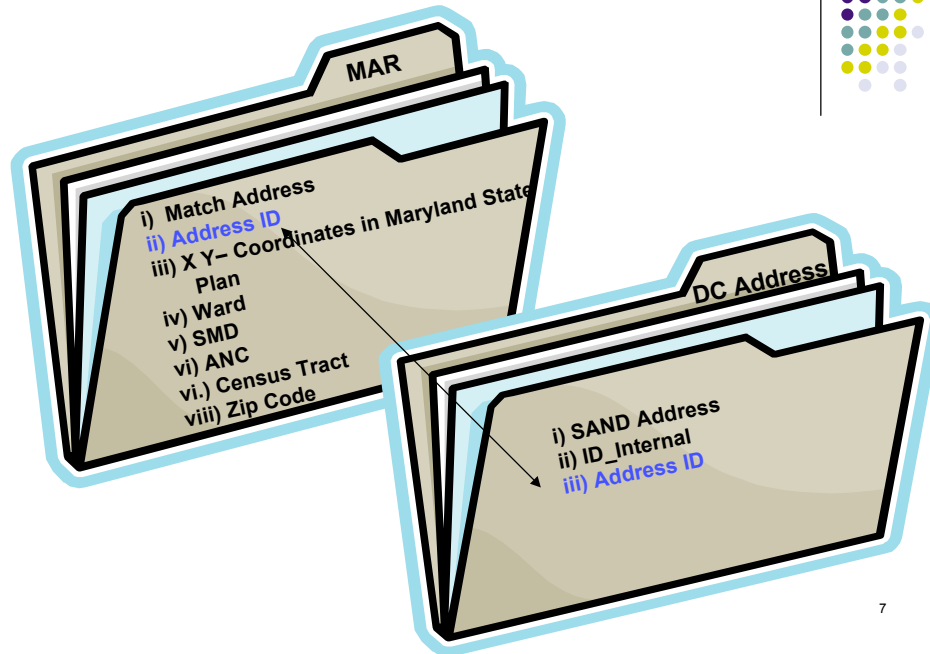| ID_Internal	2002	2003	2004
1234567	112 2nd Street, NE Washington DC 20000	11 22nd Street NE, Washington, DC 20000	112 2nd St, Washington, DC 20000

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Geocoding Process cont…

Geocoding allowed us to verify and correct the address data

Total Records:	646,856
Records in DC:	418,884
Total Records Geocoded:	399,736 (95.4%)
Records needing additional research: (MAR Team)	19,148 (4.6%)

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MAR

i) Match Address
ii) Address ID
iii) X Y– Coordinates in Maryland State Plan
iv) Ward
v) SMD
vi) ANC
vi.) Census Tract
viii) Zip Code

DC Address

i) SAND Address
ii) ID_Internal
iii) Address ID

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Data Joining and Linking Process

- ORA imported the MAR file (138,133) and All DC Records (418,884) file into SAS

- Joined *by Address ID* to get all geospatial data

- Joined resulting file with 2005 Individual Income Tax Return *by ID_INTERNAL* to get income tax data with geospatial data

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Data Aggregation Process

- Spatial Join between Census tract and income tax data with the following fields:
  - Taxes
  - Income
  - Filing Status
  - DC Earned Income Tax Credit (DCEITC)
  - Federal Earned Income Tax Credit (FEITC)

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Data Aggregation Process cont…
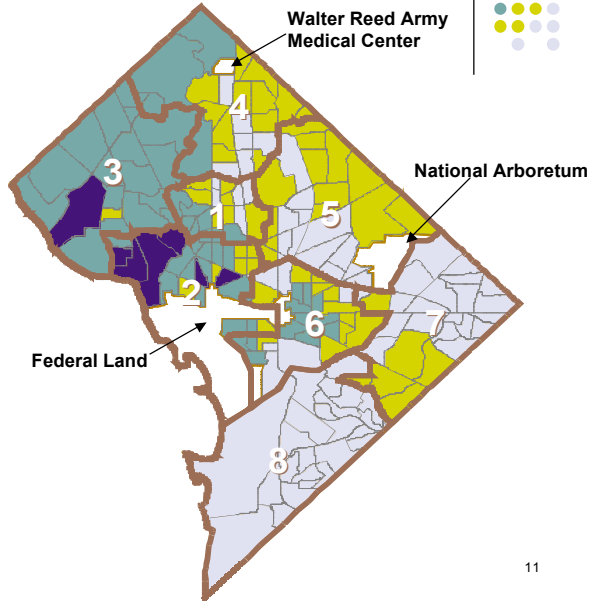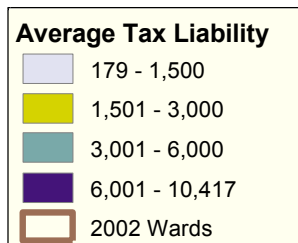
- Attributes were summarized by:
  - Minimum

  - Maximum

  - Sum

  - Average

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2005 Income Tax Data

Geocoded and aggregated
average D.C. individual
income tax liability displayed
by U.S. census tracts

Walter Reed Army Medical Center

National Arboretum

Federal Land

Average Tax Liability

☐	179 - 1,500
☐	1,501 - 3,000
☐	3,001 - 6,000
☐	6,001 - 10,417
☐	2002 Wards

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Data Availability

Income Tax Data	2007			
	Q1	Q2	Q3	Q4
2006				X
2005		**X**		
2004			X	
2003			X	
2002			X	
2001			X	

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Other Applications

- Examples
  - EITC can be used as proxy for low-income working families to target service delivery

  - Combine with crime, health, education and other statistics for planning purposes or general research

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PART II:
An Application

"Mapping" DC's Sales Tax

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The Downtown TIF Area

- **The District established the Downtown <u>T</u>ax <u>I</u>ncrement <u>F</u>inance area in 2001.**

- **The District's support for two major developments was backed in part by the real property and sales tax increments from that area.**

- **The increments from the Downtown TIF Area become significant only if the tax increments from the projects' "footprints" are inadequate.**

- **Real property tax increment calculations were straightforward, but sales tax increments were more challenging.**

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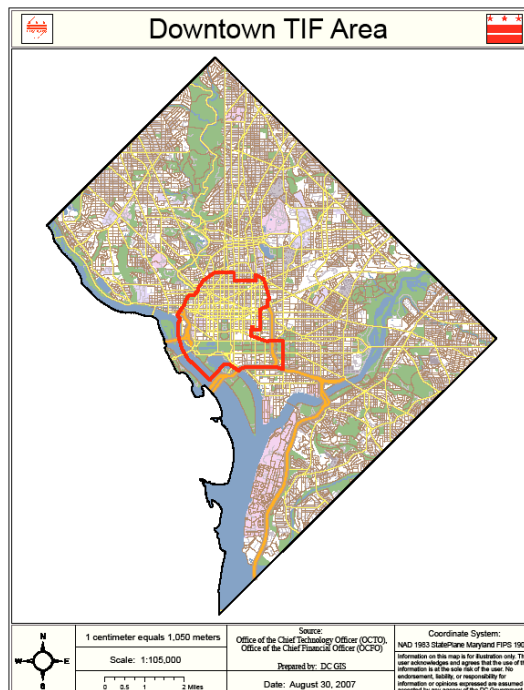
Downtown TIF Area

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Real Property Tax Increment

- **The Downtown TIF Area is defined in the DC Code by a series of street names, intersections, rivers, and creeks that form a closed shape.**

- **The District's Office of Tax and Revenue, using ARC-GIS software, identified all lots located within that shape.**

- **The sum of the tax due for 1999 for all the taxable commercial and non-owner-occupied residential properties was the initial-year value.**

- **The same calculation for each subsequent year, minus the initial-year value, produces the series of real property tax increments.**

- **These increments, less a specified fraction reserved for DC's general obligation bonds, are available (up to $15 million) for debt service on the projects' bonds.**

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Sales Tax Increment

- **The District of Columbia sales tax is collected at five different rates on most consumer goods and on some services, including some services to business, notably gas and electricity.**

- **Generally, the District does not record sales tax payments for multiple-location businesses by location of the sale, except for tax remitted by Businesses operating in the "footprints" of TIF-supported projects.**

- **Since the District has many multiple-establishment businesses, sales tax obligations or receipts cannot be simply tabulated by area.**

- **So, the Office of Revenue Analysis (ORA) had to find another approach to calculating sales tax increments for the Downtown TIF Area.**

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Estimating Sales Tax Liabilities for DC's Downtown TIF Area

- Obtain a list of DC business locations that contains
  - NAICS or SIC codes
  - Annual sales
  - Geo-coded location
- Using mapping software, generate maps of
  - The District of Columbia
  - The Downtown TIF Area (following boundaries from DC Code)
- Map the taxable business locations to the maps of the District and the Downtown Tif Area
- Export two resulting lists to spreadsheet program

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Estimating Sales Tax Liabilities for DC's Downtown TIF Area II

- The mapping software ORA uses is ESRI ArcView.
- The business list we use is infoUSA, which is bundled with ArcView under the name Business Analyst.
- We compared the infoUSA list with a combination of telephone listings available online for hotels and grocery stores.
- The infoUSA list did not include a few businesses in the other lists, but it also contained a few not present in the other lists.
- ORA's results were reviewed and accepted in the report of the "Fiscal Consultant" for the Mandarin Hotel and Gallery Place bonds.

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Estimating Sales Tax Liabilities for DC's Downtown TIF Area III

- In spreadsheet, sort business locations by SIC code
- Insert appropriate DC sales tax rate in each line
- Calculate tax on each line (sales x tax rate)
- Sum Tax separately for Downtown TIF Area (Tiftax) and for the District as a whole (DCtax)
- Calculate TIF Area sales tax factor (Tiftax ÷ DCtax)
- Estimate FY2000 sales tax for Downtown TIF Area (sales tax factor) x (FY2000 actual sales tax receipts)

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Estimating Sales Tax <u>Increments</u> for DC's Downtown TIF Area

- Estimate FY2001 sales tax for Downtown TIF Area (sales tax factor) x (actual sales tax receipts)
- Subtract FY 2000 sales tax previously calculated
- Estimate FY2002 sales tax for Downtown TIF Area
- Subtract FY 2000 sales tax previously calculated
- etc.

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Real Property & Sales Tax Increments for DC's Downtown TIF Area

DC Downtown TIF Area: Tax Increments for FY 2001 - 2006						
	2001	2002	2003	2004	2005	2006
Sales Tax Increment	31,841,480	30,406,200	37,598,000	54,275,980	93,720,220	119,034,300
Property Tax Increment	16,250,718	50,424,860	128,097,609	140,128,787	171,977,051	176,438,941
Total	48,092,198	80,831,060	165,695,609	194,404,767	265,697,271	295,473,241

this big jump is partly due to the reduction in the GOB pledge.

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