

2024: A Geospatial Odyssey Geocoding using Python and OTI's Geoclient API

AnEx Learning Summit Oct 2024

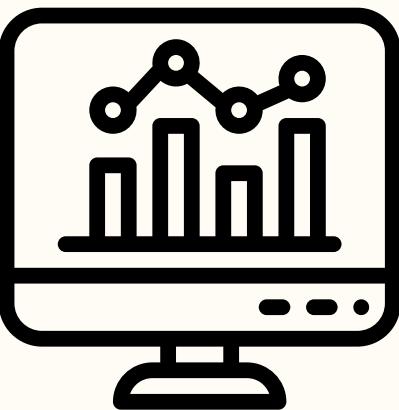
**Presented by Edgar Alfonseca
NYC Department of Housing Preservation & Development (HPD)**

About Me



EDGAR ALFONSECA

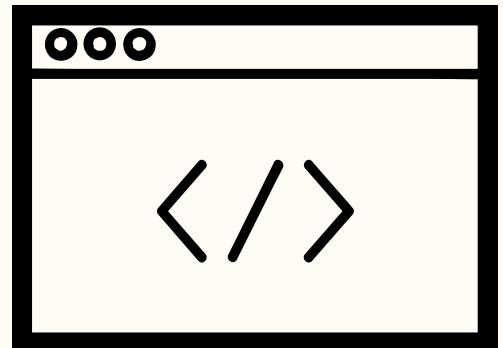
Director Analytics & Data Strategy
NYC HPD



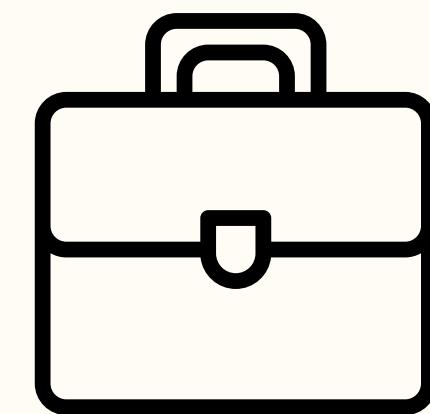
10 + years



10 years



10 + years



HPD

About HPD

Housing Preservation & Development (HPD)

NYC
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January 2024

ABCs of Housing ►

LEARN MORE

The new ABCs of Housing is now available. The ABCs of Housing is HPD's guide to housing rules and regulations for owners and tenants where you can learn about staying in your apartment safely, resources for new affordable housing, rental assistance, and more.

Space Matters

Spatial distribution of public space

What is
**Spatial
Equity NYC**

Spatial Equity NYC documents inequities in the ways that public space — including streets, sidewalks, and greenspaces — is designed, distributed, and accessed. [Browse citywide data](#) or [search community profiles](#) to learn how decisions about the use of public space lead to unequal outcomes and what you can do about it.

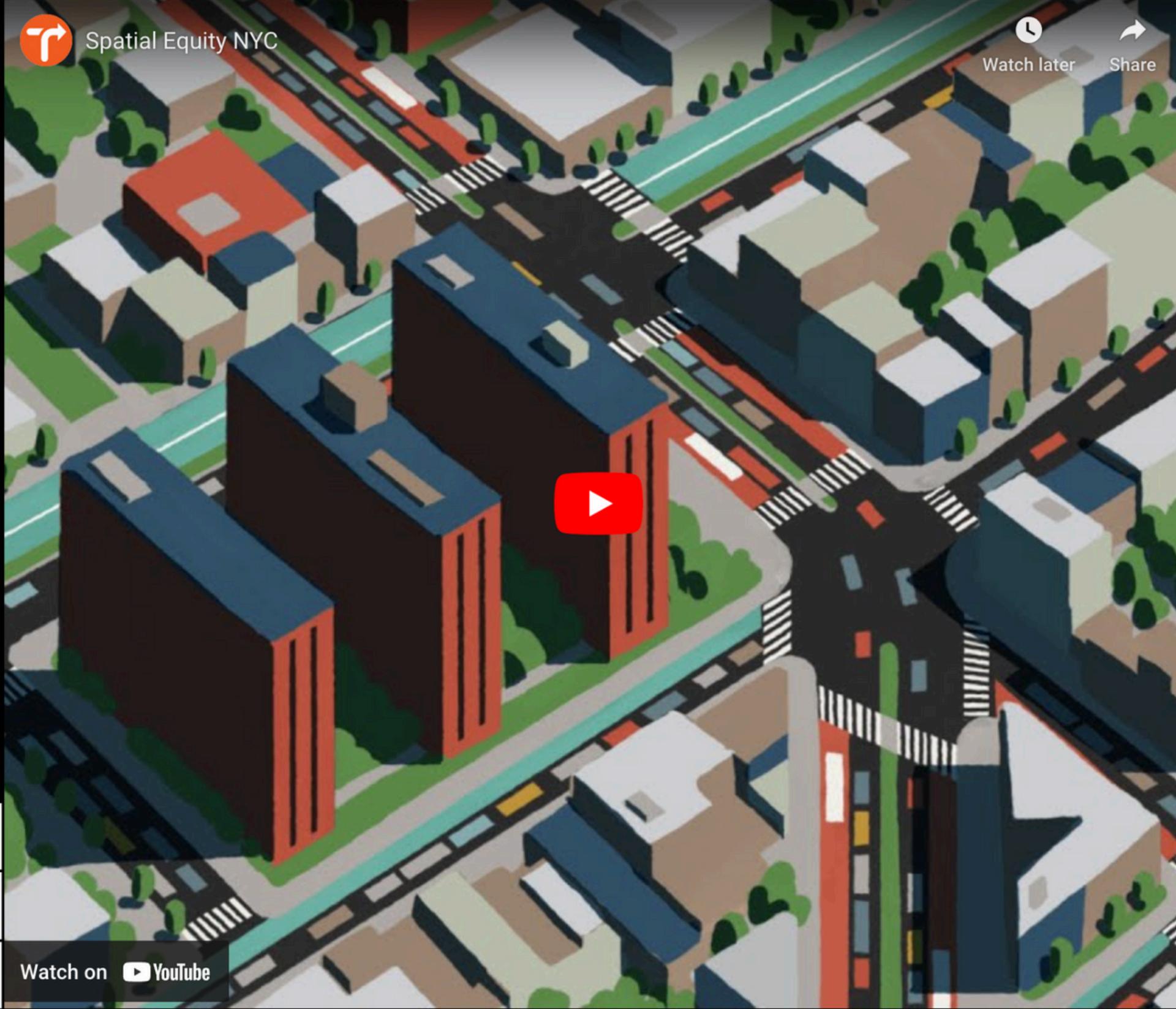
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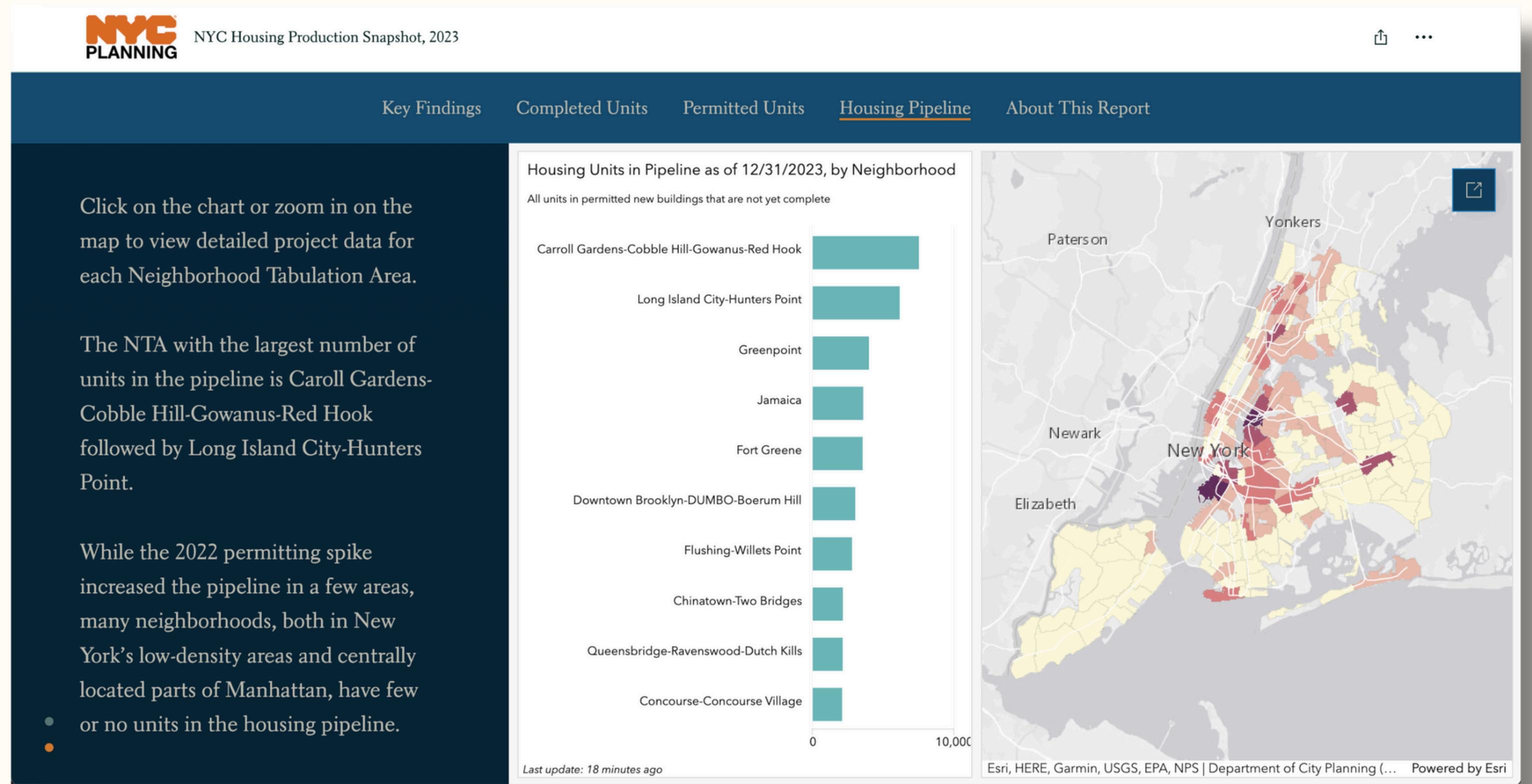
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Spatial distribution of housing production



Spatial distribution of tree canopies

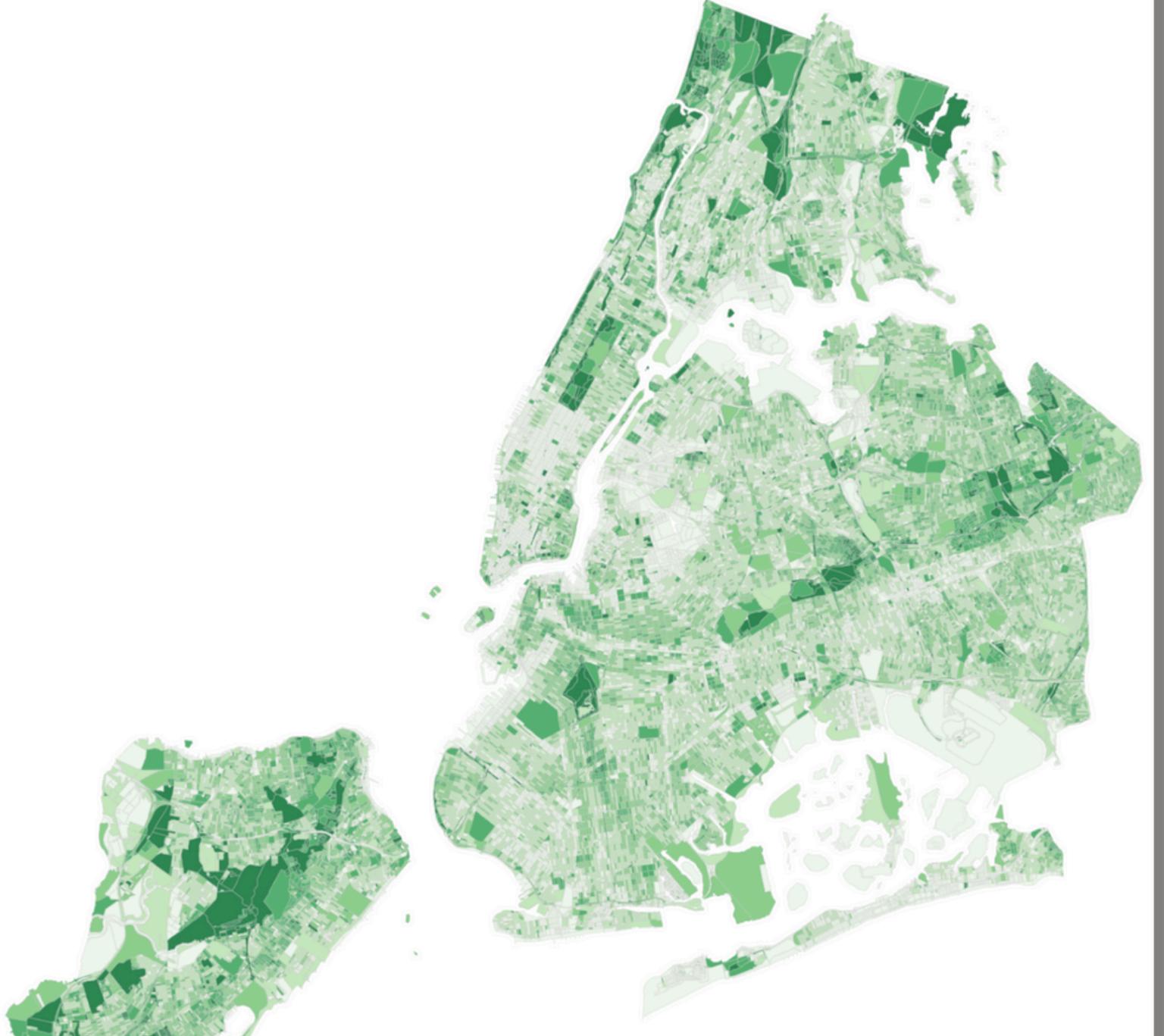
 Our Urban Forest ↑ ...

Why Trees Matter [Existing Tree Canopy](#) Tree Canopy Change Tree Counts Service Requests Inspections Work Orders Grow With Us About

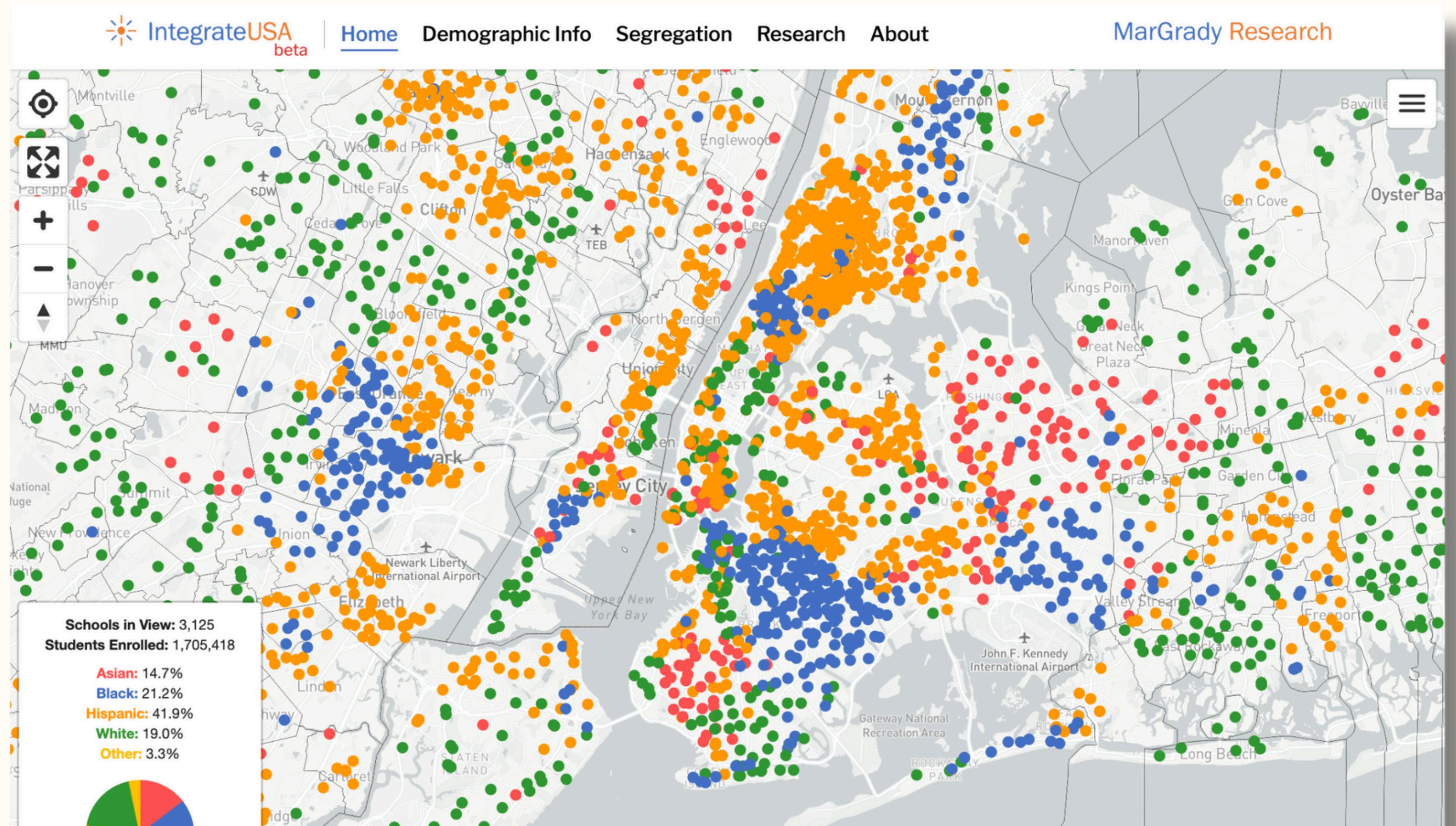
i **How much tree canopy is there in New York City and where does it grow?**

NYC's 42,654 acres of canopy is spread across the urban landscape, with particular concentrations in parks (28%) and along transportation corridors (25%). NYC's remaining canopy (47%) grows on mostly private (and some public) land parcels such as front and back yards, on campuses and other institutional parcels, and on public lands not managed by NYC Parks.

Canopy distribution also varies by borough. Queens, with its large land area and well established trees, contains almost one-third of New York City's tree canopy. Unsurprisingly NYC's smallest and most developed borough, Manhattan, has only 7% of the City's tree canopy.



Spatial distribution of students in public schools



Pinpointing the Truth: GeoSupport

Geosupport System

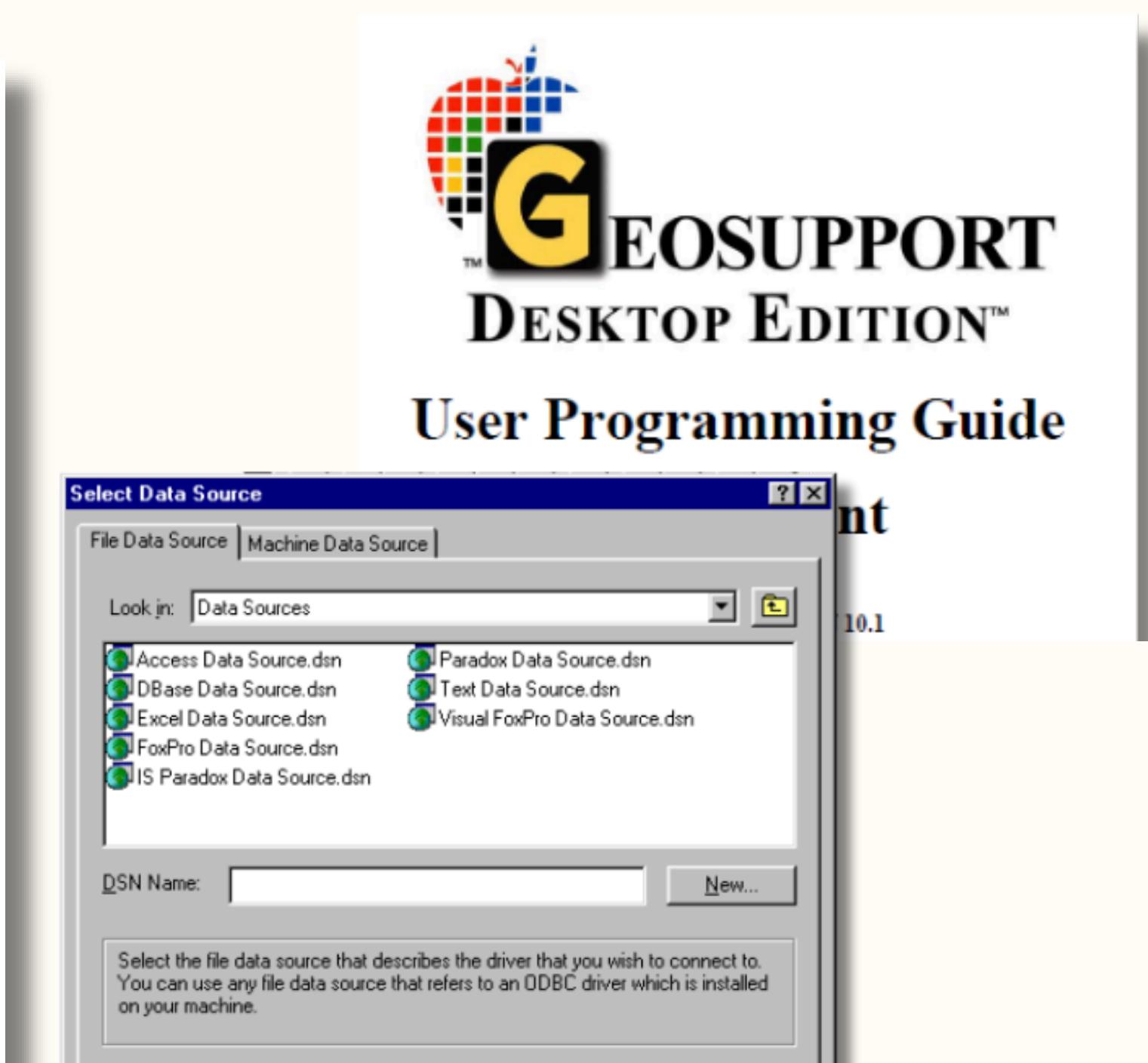
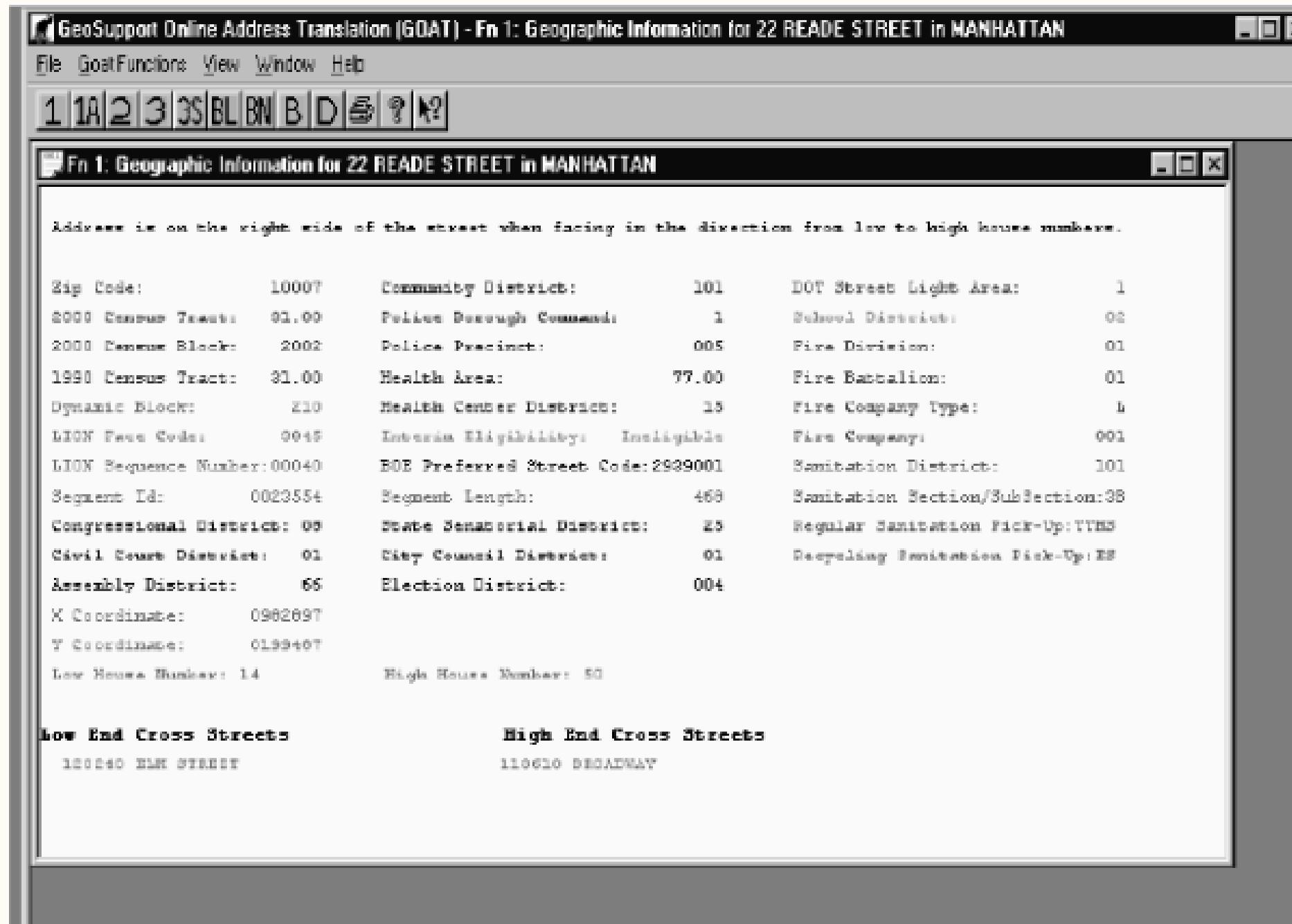
- Considered the definitive 'source of truth' for geocoding* NYC data
- Introduced in 1983
- Primarily maintained by NYC's Department of City Planning (DCP)
- Defined as an 'integrated system of software and data files that processes NYC geographic locations'
- Lives in IBM mainframe computers

*Geocoding is the process of transforming a description of a location, such as an address or place name, into geographic coordinates

Geocoding tools

Geosupport Desktop Edition

Local Windows applications (GOAT and GBAT)



GOAT

Publicly available website built on top of GeoSupport system

The screenshot shows the GOAT website interface. On the left, there's a sidebar with various functions: WELCOME, ADDRESS FUNCTIONS, INTERSECTION FUNCTION 2, STREET SEGMENT FUNCTION 3, STREET STRETCH FUNCTION 3S, BLOCK & LOT FUNCTION BL, BIN FUNCTION BN, STREET NAME/CODE FUNCTIONS, and NORMALIZE INPUTS. The main content area has a title 'Display Property Information by Address' and fields for 'Select a Borough' (Manhattan), 'Address Number' (100), and 'Street or Place Name' (GOLD STREET). Below these are 'Unit' and 'Function Options' buttons. To the right, there's a large table titled 'Property Level Information' showing details for 100 GOLD STREET in MANHATTAN. The table includes columns for Tax Block, RPAD SCC, Tax Lot, RPAD Building Class, BBL, RPAD Interior Lot, Block Faces, RPAD Irreg. Shaped Lot, Sanborn Boro/Vol/Page, RPAD Condo Number, X,Y Coordinate, RPAD Co-op Number, Latitude, Longitude, Condo Lot, Vacant Lot, Tax Map/ Section/ Volume, Structures, DCP Zoning Map, Condo Billing BBL, Condo Base BBL, Low BBL of Condo, High BBL of Condo, BIN, BIN Status, TPAD BIN, TPAD BIN Status, and Corner Code. The table rows alternate in color.

Property Level Information		Address Range	Map	Send Feedback	Useful Resources
Property Level Information for 100 GOLD STREET in MANHATTAN					
Tax Block:	94	RPAD SCC:	0		
Tax Lot:	25	RPAD Building Class:	O3		
BBL:	1000940025	RPAD Interior Lot:	Not Interior Lot		
Block Faces:	2	RPAD Irreg. Shaped Lot:	Not Irregular Lot		
Sanborn Boro/Vol/Page:	1 / 01S / 023	RPAD Condo Number:	N/A		
X,Y Coordinate:	983351, 197986	RPAD Co-op Number:	N/A		
Latitude, Longitude:	40.710103, -74.003243	Condo Lot:	Non-Condo		
Vacant Lot:	Not Vacant	Tax Map/ Section/ Volume:	1 / 01 / 03		
Structures:	1	DCP Zoning Map:	12B		
Condo Billing BBL:	N/A	Condo Base BBL:	N/A		
Low BBL of Condo:	N/A	High BBL of Condo:	N/A		
BIN:	1001289	BIN Status:	No activity		
TPAD BIN:		TPAD BIN Status:	No activity		
Corner Code:	YES	TPAD Conflict Flag:	1		

Geoservice API

RESTful web service interface for Geosupport system

The screenshot shows the NYC Geoservice API documentation page. The top navigation bar includes the NYC Planning logo, Version 1.0, Geosupport Version 24C, and a link to the User Programming Guide. The left sidebar lists various functions: Home, Register, Function 1A, Function 1B, Function 1E, Function AP, Function 2, Function 3, Function 3S, Function BBL, Function BIN, and Function 1N. The main content area features a section titled "Geoservice API" which describes the service as a RESTful interface to the Geosupport system. It includes a "How to use Geoservice API" section with examples and a "Example Calls" table.

Geoservice API

The Geoservice API is a RESTful web service interface to the NYC Department of City Planning's core Geosupport system. Geosupport is a geocoding system used by NYC government agencies to provide coordinate and geographic attributes for supported input locations (address, intersection, blockface, BIN, BBL). Geoservice exposes all the Geosupport functionality in a simple and easy to use REST representations.

How to use Geoservice API

Each URL accepts some parameters; for example, `Borough={Borough}` where `Borough` is the name of the parameter and values

```
Borough=1  
Borough=mn  
Borough=manhattan
```

For the complete accepted parameters, refer to each function page, and to assign proper values to each parameter, refer to the User Programming Guide.

Example Calls

Function	Example
1A	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_1A?</code> <code>Borough=1&AddressNo=120&StreetName=bwy&Key=Key</code>
1B	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_1B?</code> <code>Borough=1&AddressNo=120&StreetName=bwy&Key=Key</code>
1E	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_1E?</code> <code>Borough=1&AddressNo=120&StreetName=bwy&Key=Key</code>
AP	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_AP?</code> <code>Borough=1&AddressNo=120&StreetName=bwy&Key=Key</code>
2	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_2?</code> <code>Borough1=1&Street1=bwy&Borough2=1&Street2=cedar&key=Key</code> <code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_2_NodeID?</code> <code>nodeID=9035568&DisplayFormat=false&Key=Key</code>
3	<code>https://geoservice.planning.nyc.gov/geoservice/geoservice.svc/Function_3?</code> <code>Borough1=1&OnStreet=bwy&SecondCrossStreet=cedar&Borough2=1&FirstCrossStreet=thames&Borough3=1&key=Key</code>

Geoclient API

RESTful web service interface for Geosuport system

Geoclient

Geosupport Documentation

[↓ UPG PDF](#)

[↓ UPG Updates](#)

[Home](#)

[Geoclient Version](#)

[Geosupport Version](#)

Geoclient API v1

The Geoclient application is a cloud based web service which exposes select function calls to the New York City Department of City Planning's **Geosupport** application. At the current time, there are six types of location requests that the Geoclient service provides:

Type	Description	Geosupport Function
Address	Given a valid address, provides blockface-level, property-level, and political information.	1B
BBL	Given a valid borough, block, and lot provides property-level information.	BL
BIN	Given a valid building identification number provides property-level information.	BN
Blockface	Given a valid borough, "on street" and cross streets provides blockface-level information.	3
Intersection	Given a valid borough and cross streets returns information for the point defined by the two streets.	2
Place	Same as 'Address' above using well-known NYC place	1B

Example Requests:

```
/v1/address.json?houseNumber=314&street=west 100 st&borough=manhattan&app_id=abc1234567890
/v1/address.xml?houseNumber=109-20&street=71st rd&borough=queens&app_id=abc1234567890
```

Example JSON response

```
{
  "address": {
    "assemblyDistrict": "69",
    "bb1": "1018887502",
    "bb1BoroughCode": "1",
    "bb1TaxBlock": "01888",
    "bb1TaxLot": "7502",
    "boeLgcPointer": "1",
    "boePreferredStreetName": "WEST 100 STREET",
    "boePreferredStreetCode": "13577001",
    "boroughCode1In": "1",
    "buildingIdentificationNumber": "1057093",
    "censusBlock2000": "6000",
    "censusBlock2010": "2000",
    "censusTract1990": "187",
    "censusTract2000": "187",
    "censusTract2010": "187",
    "cityCouncilDistrict": "09",
    "civilCourtDistrict": "05",
    "coincidenceSegmentCount": "1",
    "crossStreet": "71ST AVENUE",
    "crossStreetCode": "13577001",
    "houseNumber": "109-20",
    "interiorBlock": "1018887502",
    "interiorBlockLabel": "1018887502",
    "interiorLot": "7502",
    "interiorLotLabel": "7502",
    "interiorTaxBlock": "01888",
    "interiorTaxBlockLabel": "01888",
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    "interiorTaxLotLabel": "7502",
    "interiorTaxParcel": "1018887502-01888-7502",
    "interiorTaxParcelLabel": "1018887502-01888-7502",
    "interiorTaxParcelType": "BBL",
    "interiorTaxParcelTypeLabel": "BBL",
    "interiorTaxParcelTypeShort": "BL",
    "interiorTaxParcelTypeShortLabel": "BL",
    "interiorTaxParcelTypeShort2": "1B",
    "interiorTaxParcelTypeShort2Label": "1B",
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    "interiorTaxParcelTypeShort11": "13577001",
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    "interiorTaxParcelTypeShort12Label": "09",
    "interiorTaxParcelTypeShort13": "05",
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    "interiorTaxParcelTypeShort14": "1",
    "interiorTaxParcelTypeShort14Label": "1",
    "interiorTaxParcelTypeShort15": "6000",
    "interiorTaxParcelTypeShort15Label": "6000",
    "interiorTaxParcelTypeShort16": "2000",
    "interiorTaxParcelTypeShort16Label": "2000",
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    "interiorTaxParcelTypeShort25": "1018887502-01888-7502-7502-1018887502",
    "interiorTaxParcelTypeShort25Label": "1018887502-01888-7502-7502-1018887502"
  }
}
```

Let's Demo!

Thank you!

Resources

- NYC DCP BYTES of the BIG APPLE website
- NYC GOAT website
- NYC Geoclient 1.0 website
- Me!  in
 - My GitHub
 - My LinkedIn