

Evaluating the Practicality and Implications of Using the Open-Source Mapping Network as the Transportation Network for the NYBPM

Jessie Ya-Ting Ho

September 11th Memorial Program

September 13th , 2023

Objectives



Evaluate OpenStreetMap network as a tool to update the transportation network in the New York Best Practice Model (NYBPM)



Recommend enhancement or alternatives to the existing transportation network models

What is the New York Best Practice Model

- Analytical tool that uses mathematical formulas to estimate people's travel behavior in a specific region
- 28 counties and portions of 3 states: New York, New Jersey, Connecticut
- Requires a lot of inputs, including highway and transit networks & attribute values



NYBPM Estimates People's Travel Behavior

- Why (i.e., to shopping, work)
- When (i.e., morning rush hour, mid-afternoon)
- Where (i.e., midtown Manhattan)
- How (i.e., bus, subway, drive alone)
- Route/path taken (i.e., FDR Drive, Lexington Avenue subway)
- Traveler behavior is estimated using the NYBPM's transportation networks

NYBPM Networks for Traveler Analyses

Covers all major highway and transit modes

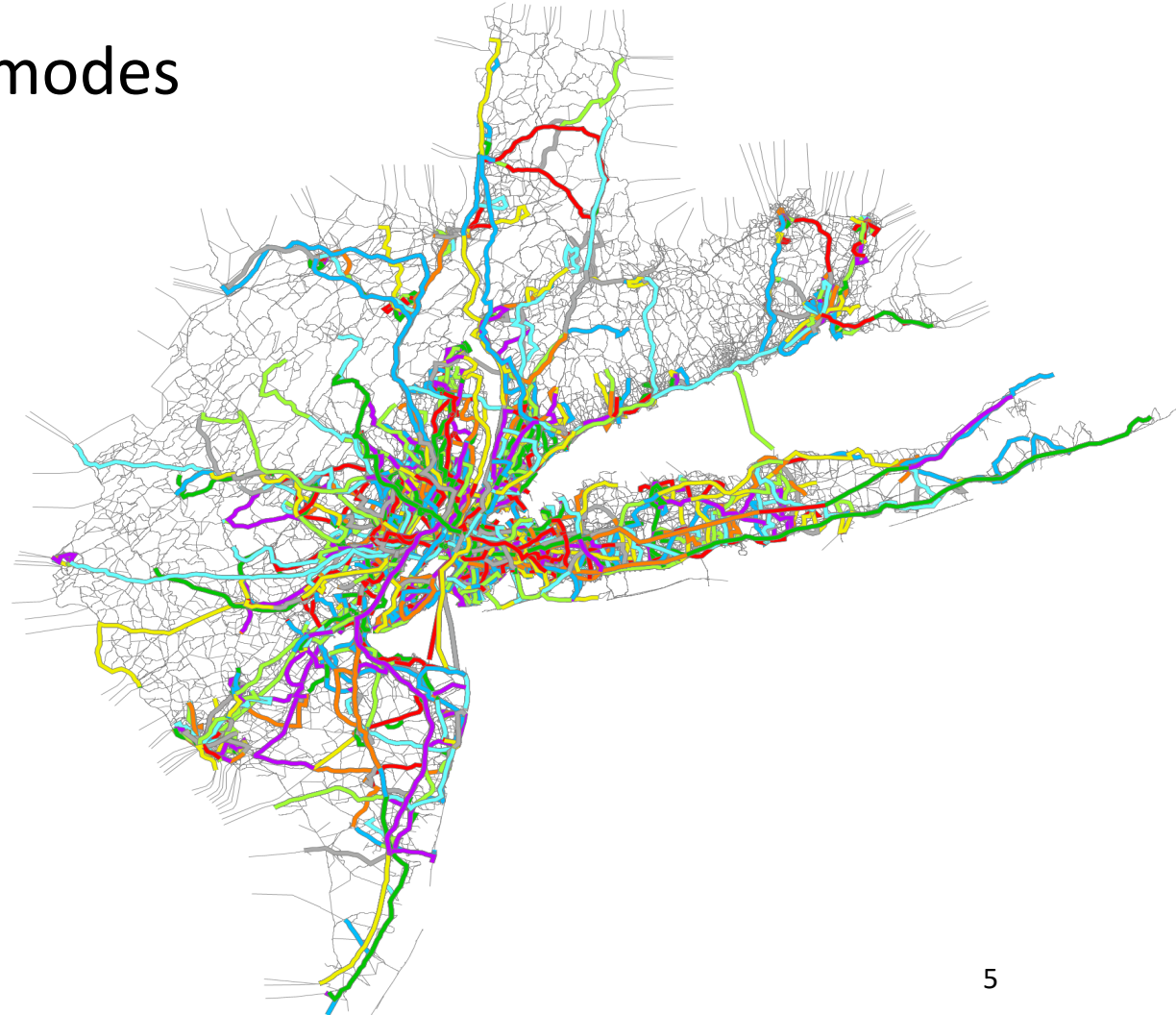
- ~67,000 roadway segments
- ~6,000 transit routes

Multiyear analyses use attributes

- On base year (current)
- To forecast future years (predictions)

Modeling/updating efforts and costs change over time

- So do networks and attributes



Data Requirements for NYBPM Updates

- Large and complex network
- Network attributes regularly updated, and new attributes added
- A lot of data required for estimating/updating the NYBPM
- OpenStreetMap (OSM) is a possible source for updating or adding unique data/attributes to the network



Data/Attributes in NYBPM Network

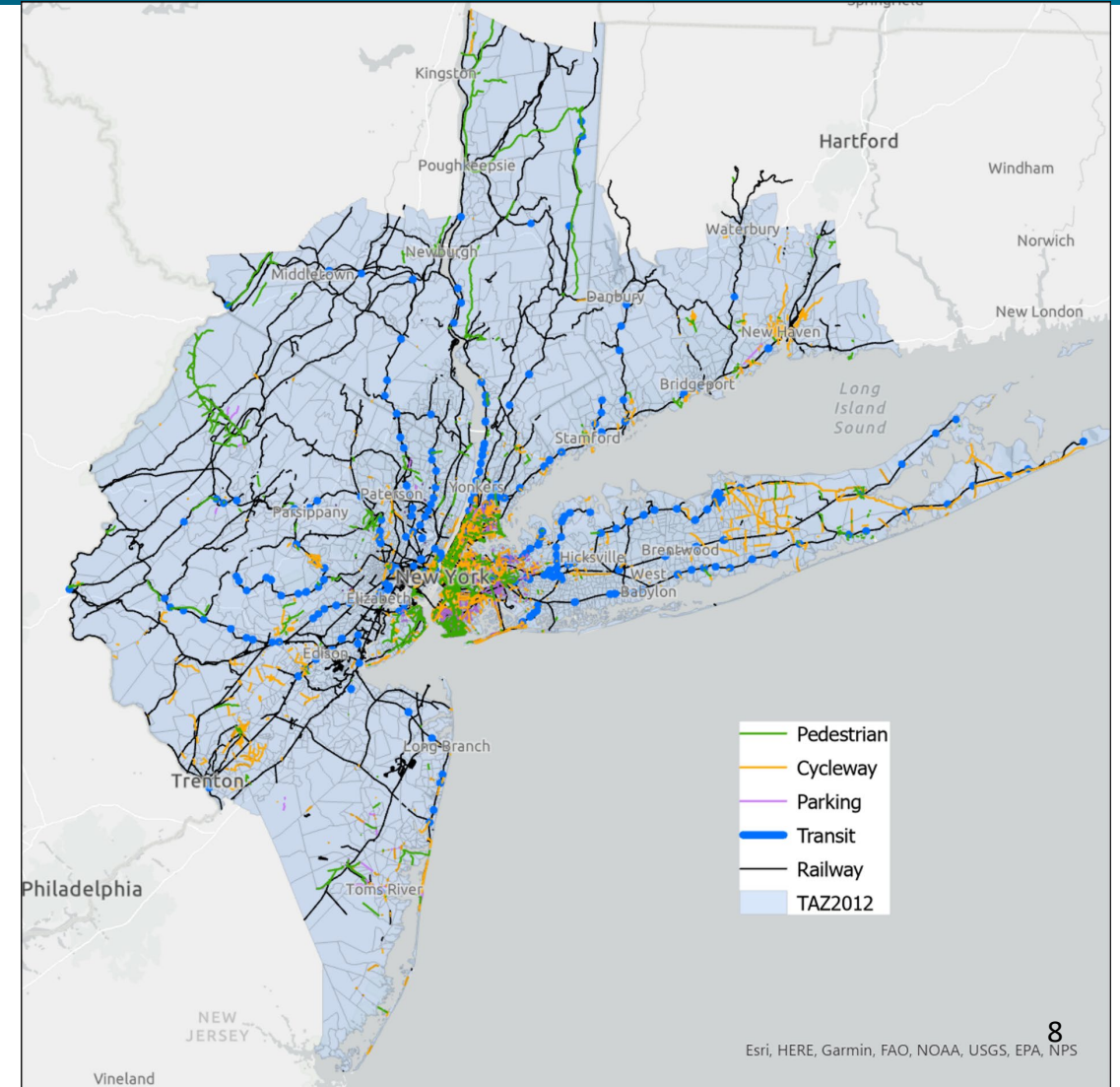
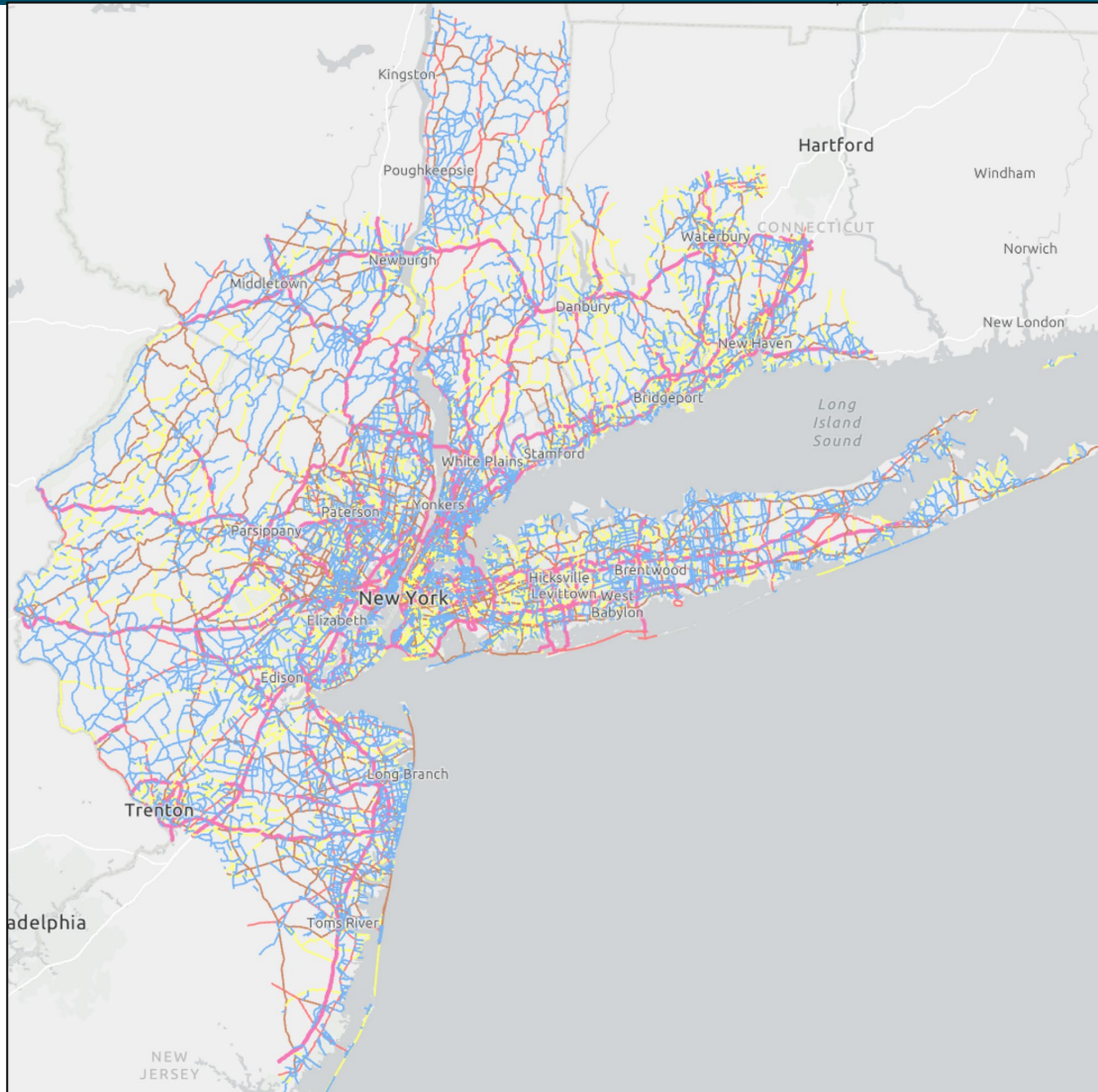
Highway Network

- Direction?
- Number of lanes?
- Parking permitted?
- Highway tolled?
- Pedestrians and bicyclists allowed?

Transit Network

- Bus-only lanes?
- Where are route stops located?

OSM Highway and Transit Networks



OSM Attributes on Roadway Segments

pedestrian	# values
foot	7835
foot_left	21
foot_right	2
sidewalk	4580
sidewalk_both	216
sidewalk_both_bicycle	78
sidewalk_both_surface	207
sidewalk_left	391
sidewalk_left_bicycle	31
sidewalk_left_surface	33
sidewalk_right	798
sidewalk_right_bicycle	124
sidewalk_right_surface	183
sidewalk_surface	7

cyclist	# values
bicycle	11062
bicycle_backward	10
bicycle_forward	5
bicycle_lanes	9
bicycle_lanes_backward	2
cycle	4
cyclerating	74
cycleway	2844
cycleway_both	2096
cycleway_both_buffer	24
cycleway_both_lane	104
cycleway_both_seggregated	11
cycleway_both_width	0
cycleway_buffer	12
cycleway_foot	1
cycleway_left	1826
cycleway_left_buffer	77
cycleway_left_lane	25
cycleway_left_marking	4
cycleway_left_oneway	190
cycleway_left_seggregated	4
cycleway_left_surface	1
cycleway_left_width	8
cycleway_marking	3
cycleway_right	3621
cycleway_right_buffer	151
cycleway_right_lane	89
cycleway_right_oneway	236
cycleway_right_seggregated	2
cycleway_right_surface	3
cycleway_width	0
route	301

OSM Features

OSM LAYER	LINKS	LINK LENGTH (FT)	MILES	DATA SOURCE
HIGHWAY	102,189	117,093,432.3	22,176.8	OSM Tag highway
PEDESTRIAN	5,954	4,404,144.6	834.1	OSM Tag highway: pedestrian
CYCLEWAY	9,664	5,453,309.0	1,032.8	OSM Tag route: cycleway

- Has potential to add non-motorized modes into the NYBPM transportation planning framework
- Publicly available network/attribute/data fosters additional possibilities for travel demand forecasting
 - E.g.: current plans prepared for agencies in Portland, OR, and Atlanta, GA, have used OSM to assess regional/state networks for multimodal travel and investigate improvement opportunities

Beyond OSM Potentials

- Magic in transportation planning on both vehicle and infrastructure
 - Motor vehicles vs non-motorized modes
 - Highway vs slower traffic
 - Emission reduction vs zero emission
 - High initial/maintenance costs vs low costs
- Focus more on transportation equity
- OSM community volunteers record real-time temporal and spatial updates through the public database
- Adopting OSM could be a sustainable solution as the transportation network becomes more inclusive for multimodal road users

NYMTC Using OSM: Possible Next Steps

- OSM data adds value to potential NYBPM network extension:
 - Network coverage
 - Massive amount of available attributes
 - Multimodal information on micromobility (bike lanes, sidewalks, parking lanes, building footprints, entrance location access paths, and more)
- Evaluate if these controlled resources help with better estimates
- Streamline modeling process to leverage OSM's frequent updates
- Expand attributes with specific road users that may be updated in the NYBPM network

Acknowledgements

- Lynne Thisse
- Ali Afshar
- Munnes Patel



IN MEMORY OF
IGNATIUS ADANGA
CHARLES LESPERANCE
SEE WONG SHUM

Thank you!