

# THE IMPOSSIBLE TASK OF MAPPING THE FUTURE

Absent a crystal ball, the enormously complex region uses scenario planning tools to determine how it should grow.

By ROBERT LANE

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NEXT FALL, the Regional Plan Association will start to roll out its fourth regional plan in 100 years, a plan for the future of the largest metropolitan area in the U.S. Faced with an uncertain future, RPA staff created a series of scenarios for how the region, which includes parts of New York, New Jersey, and Connecticut, might grow, and then found an effective way to model the impacts of these alternatives. The sometimes surprising findings help to point the way forward. Other regions can learn from the successes—and the compromises—of this exercise as they ask themselves, “How do you map the future of a region?”

In the face of new challenges around climate change, technological innovation, and demographic shifts in a world where the pace of change is accelerating, the idea of creating a map for a place as big and complex as the New York metro region in 2040 seems like an exercise caught somewhere between folly and arrogance, especially for a nonprofit, non-governmental organization with a lot of *influence* but no *authority*.

But as the only organization that looks at the entire 13,000-square-mile region in a comprehensive way—with its three states, 31 counties, and 800 units of government and taxing entities—there was no escaping it: The RPA’s fourth regional plan would have to present a map of where the region should grow.

A vague vision just wouldn’t cut it. The plan, due later this year, will offer more than 70 specific recommendations to expand prosperity, promote equity, sustain our environment, and improve governance. We need to rely on research, advocacy, and—in this plan more than in any of the previous plans—a real commitment to direct engagement through partner community-based organizations and their extensive networks of grass-roots organizations. The scenario planning effort described here helps to direct the larger plan.

This map will sit squarely in the history of the previous three regional plans, a history that traces the devolution of regional-scale planning from the top-down authority of political and technical elites to the almost sacred principle of “home rule.”



1929: In the *First Regional Plan*, hand-rendered maps rich with textures of the built and natural landscape suggested preferred land uses for every square mile of the region.



1968: The *Second Regional Plan*, in keeping with the changing political climate of the time, offered a far more abstract and less prescriptive map that reveals a reluctance to get too close to the ground.



1996: With the *Third Regional Plan*, the signature map is also abstract, although it tries to recapture the qualities of the underlying landscape that would guide growth in an era of “sprawl busting.”

How detailed and prescriptive will the *Fourth Regional Plan* map be? As in the *First Regional Plan*, it could show how specific cities and towns may grow—or shrink. Alternatively, as in the *Third Regional Plan*, it could offer sweeping gestures of conservation and development viewed from a much higher altitude. For the plan to be meaningful, it must be specific about places. But if we get too close to the ground, our audience of decision makers and civic leaders will lose the forest for the trees.



## Other regions, other maps

Not surprisingly, different metros tackle regional mapping differently depending on their objectives. At one end of the spectrum is the *Boston Metro Plan*, which describes its region in terms of five broad land-use patterns and a few essential objectives for each. This plan, which covers more than 3,500 square miles and 4.5 million people but only takes up two pages, is a model of clarity and simplicity. But it was too broad for our purposes and would not satisfy our desire to model in quantitative terms several alternative futures.

At the other end of the spectrum are highly detailed regional scenario planning models, such as *Envision Tomorrow*, developed by Fregonese Associates. The suite of tools can model a broad range of impacts at the scale of neighborhood blocks. With its 490' x 490' grid, this is about as place-based and fine grained as it gets. However, the cost of the process, including staff time to collect the data to populate the model, was prohibitive for a civic planning process financed primarily with foundation grants.

Perhaps the closest model is *Louisiana Speaks*. Here, three maps are used to describe alternative futures, which are then compared across a set of performance indicators such as the amount of development in the floodplain, housing mix, and household expenses. Similar alternative-based exercises have been undertaken in Utah, Texas, and elsewhere.

## 'You know it when you see it'—or do you?

Early on, we understood the importance of describing an incredibly intricate landscape not just as a bunch of complex land use patterns but as types of places that people would recognize.

The *Fourth Regional Plan* will make detailed recommendations for a handful of particularly important places: The Far West Side, the last frontier of development in Manhattan and home to the Hudson Yards and a future Penn Station, is one of those places. So is the New Jersey Meadowlands, where natural systems, major transportation investments, and sea-level rise all intersect in ways we still have not resolved. But we are not going to design every square foot of the region. As a practical matter, we know we will have to tailor our recommendations to entire categories of places—such as large and small downtowns, commercial corridors, and rural areas.

What we soon discovered was that there were significant differences in the way people understood certain terms like “suburban,” “corridor,” or “sprawl,” and that posed a challenge. The civic organizations partnering with us in the outreach effort provided a good plain English check of our slips into jargon.

On the one hand, it became clear that when someone asked, what is a “suburban neighborhood?” we couldn't just answer with, “You'll know it when you see it.” On the other, trying to define and describe place types in purely quantitative terms wasn't practical. For one thing—and particularly frustrating for an organization devoted to regional planning—is that none of the jurisdictions define land uses in the same way.

We needed some way of describing this complex landscape in quantitative terms within the constraints of time, resources, and whatever data we could realistically collect and analyze. In the end, we settled on five variables that we could reliably scale to a half-mile grid in a way that was still statistically valid:

- Population density
- Employment density
- Street intersection density
- Amount of impervious cover
- Degree of mixed use

We found that we could play with these five variables until we produced a map that people would recognize: an intense core, a legacy of density around a largely unchanged commuter rail network, sprawling urbanization at a variety of densities, and a still largely intact green bulwark against development in the form of the New Jersey Highlands (which extend into New York and Connecticut, too).

In so doing, we reduced this incredibly complex region to 16 “place types,” ranging from the most intensive “Manhattan Mix” to “Very Low Density” and “Open Space.” Each place type was associated with several representative oblique aerial photos and ground-level photos so that people would recognize what we were talking about.

## The prediction predicament

Now that we had our land-use and place-type map in hand—the first for the entire region since 1929—we needed to use it to get to a recommended future growth pattern. From there, we would use this to inform the overall plan—since the scenario planning effort represents just a part of that large endeavor.

We knew that predicting a single future for a region this large and complex was not realistic in a world with many variables. Predicting a single future would also limit our ability to contrast the costs and benefits of different policy choices. Instead, we made up four alternative futures for how the region might grow, each with a different set of underlying assumptions, and each accommodating our own aggressive benchmark of adding about four million people and two million jobs to the region. These are contrasted with a “business as usual” scenario in which present trends continue. Each of these



### DID YOU KNOW?

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**31** counties  
**800** municipalities  
**13,000** square miles  
**23 million** people  
 make up the New York metro region

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CM | 4.25

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## Place Types for the Fourth Plan

The Regional Plan Association reduced the diverse, three-state, 13,000-square-mile region into 16 place types (below), paired with representative oblique aerial photos and ground-level photos to help people recognize what each term means. Then they developed four alternate scenarios (also below), not specific predictions, to guide objectives and examine the implications of each. The final plan is due later this year.

### PLACE TYPES

#### THE URBAN CORE

- 01 CENTRAL BUSINESS DISTRICTS
- 02 MANHATTAN MIX
- 03 VERY HIGH DENSITY URBAN MIX
- 04 HIGH DENSITY URBAN MIX

#### DOWNTOWNS & LOCAL CENTERS

- 05 REGIONAL DOWNTOWNS
- 06 LOCAL DOWNTOWNS
- 07 RETAIL CORRIDORS

#### COMMERCIAL & INDUSTRIAL

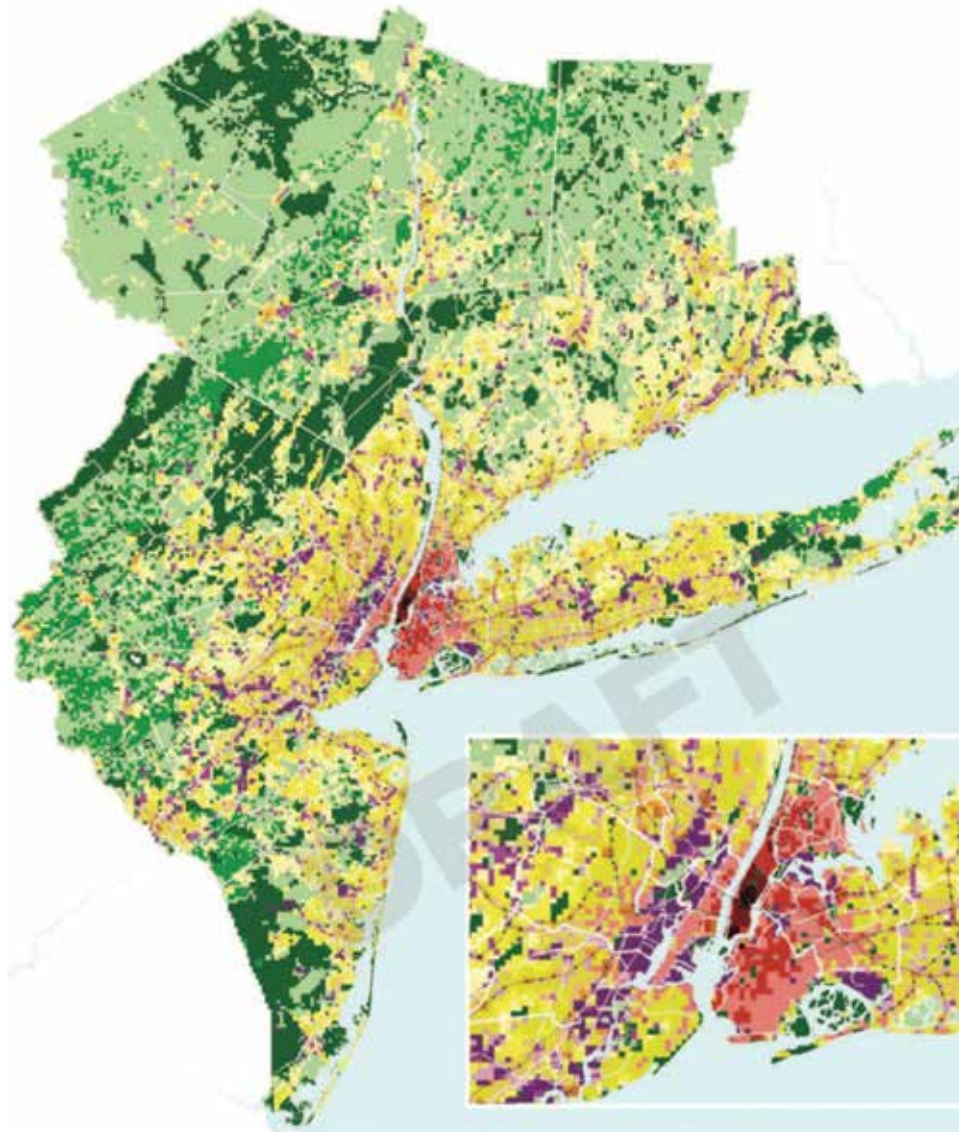
- 08 INDUSTRIAL, UTILITY, TRANSPORT
- 09 COMMERCIAL
- 10 SUBURBAN MULTIPLE USE

#### PRIMARILY RESIDENTIAL

- 11 MEDIUM DENSITY RESIDENTIAL
- 12 MODERATE DENSITY RESIDENTIAL
- 13 LOW DENSITY RESIDENTIAL

#### RURAL & OPEN SPACE

- 14 VERY LOW DENSITY AND OPEN SPACE
- 15 AGRICULTURE
- 16 PROTECTED OPEN SPACE



### SCENARIOS

#### GROW WITH NATURE

in which the region's settlement patterns are organized around natural systems.

#### REINFORCE THE CENTER

in which the primary objective is to create more room for growth in the region's urban core.

#### RESURGENT DOWNTOWNS

in which the largest number of people and jobs gravitate to the region's large, medium, and small centers outside of the core.

#### REINVENT THE SUBURBS

in which suburban centers and corridors are redesigned and retrofitted to make them more socially and environmentally sustainable.

SOURCE: RPA

scenarios (detailed at left) emphasizes an objective that should be part of any plan, but pushes the envelope on that objective to draw out its implications.

For each scenario, we assigned amounts of growth, which reflect our principles, to our half-mile square grid of different place types. For example, we favored grid cells near transit, either existing stations or where we expected to make investments as part of the Fourth Regional Plan, and we assigned a negative growth factor to grid cells in the floodplain. We also allocated growth to some 181 specific “places of interest”—for example, struggling centers like Newburg or Bridgeport—considering factors such as trends and future development capacity for “build-out.”

The four scenarios are not inherently good or bad. Each has its own advantages and disadvantages. And while people might prefer one over the other, we need to constantly remind our different audiences—the civic partners, elected officials, and agency heads—that the idea is not to pick a winner, but to always have these scenarios at hand to guide us when confronted by actual events.

If this seems a bit arbitrary and willful, well, to some degree it is. This is what is known in the world of long-term planning as a “sketch model”: There is no massive set of simultaneous equations or complex algorithms predicting growth. But because we are presenting alternative futures, we really don’t need to be right; we just need to make it plausible.

### Be careful what you wish for

The next step was to evaluate and compare the scenarios. Many of the comparisons were straightforward quantitative analyses, such as for transportation where origin and destination models were used to estimate the different kinds of trips generated by the different growth patterns. Likewise, greenfield consumption could also be measured directly. In other cases, we used quantitative measurements, such as the amount of new affordable housing in high-performing school districts, as proxies for goals like improving access to opportunity. Some of the outcomes were obvious because they were built into our growth assignments to begin with.

For example, all of the scenarios are transit-oriented to some degree because that is where we favored growth. But there were also surprises:

- Grow With Nature succeeds in limiting greenfield development and reducing the population vulnerable to sea-level rise but puts so much development into urban centers that they would be fundamentally altered.
- Reinforce the Center puts almost nine in 10 residents within reach of transit but also exposes many more people to urban heat island and storm surge, requiring expensive hardening measures.
- Resurgent Downtowns puts a lot of people in reach of transit and one in seven jobs in high-poverty areas, but it requires the most ambitious initiatives around tax reform, brown field remediation, and infrastructure investments and represents the biggest change from the status quo.
- Reinvent the Suburbs reclaims underutilized places and puts the most people within range of high-performing school districts but also results in the highest number of transit-challenged trips.

### Adjusting the zoom

*In that empire, the art of cartography attained such perfection that the map of a single province occupied the entirety of a city, and the map of the empire, the entirety of a province. In time, those unconscionable maps no longer satisfied, and the cartographers guilds struck a map of the empire whose size was that of the empire, and which coincided point for point with it.*

—JORGE LUIS BORGES, *ON EXACTITUDE IN SCIENCE*

This vignette, from a short story not much longer than this quote, captures perfectly the essential dilemma facing anyone who sets out to map the long-term future of a region: Where does precision end and “truthiness” begin?

From 30,000 feet our map is unmistakably the New York region. At that altitude, the half-mile square grid is fine-grained enough. But as you zoom in and get closer and closer to the ground, a particular place may start to look questionable: Part of a small downtown might have a grid cell that has been assigned one of the Open Space typologies even though there are buildings there because the model identified just over half of the cell as park space and assigned the entire cell that place type.

For a map to be useful, it accurate it must be accurate and suited to its purpose and its circumstances. For RPA, this meant creating a map that could be used to test alternative futures for an enormously complex region and help inform our plan. For the *Fourth Regional Plan*, it has been an invaluable tool. Using what we learned from the four scenarios, RPA was able to meet the expectation that we promote a preferred vision for how the region might grow.

We used our model to suggest how that aspirational scenario performs, and set benchmarks for success in Charting a New Course, a vision for the region that is guiding our development of key investments and policies to enable it. By importing the map into other interactive platforms such as CARTO, we can collaborate with others who can aggregate the data in the cells of the grid and perform their own analyses.

Unlike the planners of 1929, planners today have access to more data, more analytic tools, and more mapping platforms than ever before. But before collecting all that data and making all those maps, it’s probably smart to start by asking, “What are the stories I want to tell?” ■

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### RESOURCES

#### ONLINE

The *Fourth Regional Plan* process: [rpa.org/fourth-plan](http://rpa.org/fourth-plan) and [library.rpa.org/pdf/RPA-Charting-a-New-Course.pdf](http://library.rpa.org/pdf/RPA-Charting-a-New-Course.pdf).

*Identification and Classification of Urban Development Place Types for the New York Metropolitan Region*, Proceedings of the 1st International ACM SIGSPATIAL Workshop on Smart Cities and Urban Analytics: [dl.acm.org/citation.cfm?id=283509](https://dl.acm.org/citation.cfm?id=283509).

*Opening Access to Scenario Planning Tools*, Lincoln Institute of Land Policy: [tinyurl.com/jba8bzq](https://tinyurl.com/jba8bzq).