

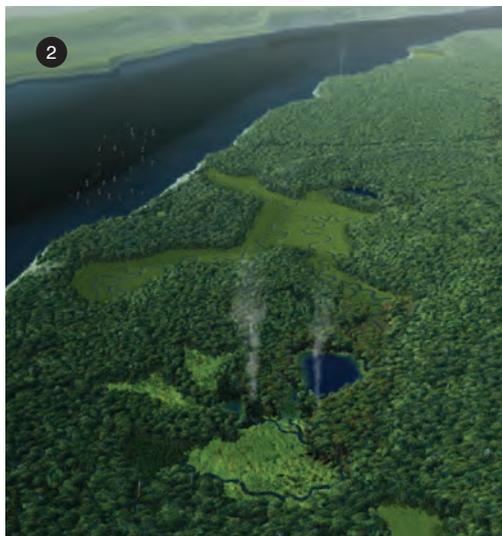
# A City in and through Time: The Mannahatta Project

Text and Images by Eric W. Sanderson  
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On September 12th, 1609, Henry Hudson guided a small wooden vessel up the mighty river that would one day be known by his name. On his right was a long, thin, wooded island, called by its inhabitants, Mannahatta. Four hundred years and some odd later, we know that same place as Manhattan. Today the island is densely filled with people and avenues as it was once with trees and streams. Where forests and wetlands once stood for millennia, skyscrapers and apartment buildings now pierce the sky. The screeching of tires and the wailing of sirens have replaced bird song and wolves howling at the moon. Extraordinary cultural diversity has replaced extraordinary biodiversity. In short, the transformation of Mannahatta into Manhattan typifies a global change of profound importance, the reworking of the Earth into cities made for men and women and the concomitant loss of memory about how truly glorious and abundant our world is.

Mannahatta had more ecological communities per acre than Yellowstone, more native plant species per acre than Yosemite, and more birds than the Great Smoky Mountains, all National Parks in the United States today. Mannahatta housed wolves, black bears, mountain lions, beavers, mink, and river otters; whales, porpoises, seals, and the occasional sea turtle visited its harbor. Millions of birds of more than a hundred and fifty different species flew over the island annually on transcontinental migratory pathways; millions of fish—shad, herring, trout, sturgeon, and eel—swam past the island up the Hudson River and in its streams during annual rites of spring. Sphagnum moss from the North and magnolia from the South met in New York City, in forests with over seventy kinds of trees, wetlands with



over two hundred kinds of plants. Thirty varieties of orchids once grew on Mannahatta. Oysters, clams, and mussels in the billions filtered the local water; the river and the sea exchanged their tonics in tidal runs and freshets fueled by a generous climate; and the entire scheme was powered by the moon and the sun, in ecosystems that reused and retained water, soil, and energy, in cycles established over millions of years.

These estimates about the past come from the Mannahatta Project, a decade long effort to understand the historical ecology of New York City. The Mannahatta Project is deliberately named, with tongue in cheek, after the Manhattan Project (to devise the atom bomb), which also started in New York. But whereas the Manhattan Project aimed to blow up cities, the goal of the Mannahatta Project is to explode the old idea that cities and nature are incompatible. The Mannahatta Project does not seek to remake Manhattan in its old form, as wonderful as that might be, but rather to inform the future of the city. Recreating Mannahatta with as much scientific and digital detail as we can, the project is designed to inspire New Yorkers to seek sustainability in everything they do and to preserve nature wherever they can in the city and in the world at large. The Mannahatta Project is about seeing the potential for “Mannahattas” everywhere.

The Mannahatta Project works because it integrates. We used historical resources, particularly maps, with scientific information and cutting-edge ecological models. In the case of Manhattan, we found a large-scale, detailed map of the 18th century island, created by British military cartographers during the American Revolution. We georeferenced

the map in a geographic information system, a kind of computer database for maps, so that we could overlay the numerous streams, hills, beaches, and wetlands shown on the map with the modern streets and buildings of Manhattan today. By stripping away the human modifications of the landscape – by the 18th century, Manhattan had largely been cleared for agriculture and war– and combining the British Headquarters Map with other information on the geology, topography, and archaeology of the island, we recreated the island as it might have been during Hudson’s time.

Subsequently we have used this work, and its expansion to the rest of the city through the Welikia Project ([welikia.org](http://welikia.org)), to inform environmental education efforts, inspire art, music and theatre, help Native Americans understand the landscape where they lived for thousands of years before Europeans showed up, and encourage New Yorkers to see and plan for the on-going transformation of the island. A tall task, but one eagerly taken up by many who see nature as essential to, not a contradiction of, nature. We created a free, online platform, called [Visionmaker.nyc](http://Visionmaker.nyc), to allow any New Yorker to see the historical ecology of their neighborhood, compare it to the current ecology, and create and share their own ideas for the future ecology of the place we called home.

I was recently invited by the National Parks Board of Singapore to visit and give a public talk and workshop on these themes. But the not-so official agenda of my visit was to investigate whether such a project could be accomplished for Singa-pura.

In my mind, the moment when Stamford Raffles came to Singapore in 1819 might be a “Mannahatta” moment. But the more I learned about the history of

1. The Mannahatta Project revealed the remarkable transformation of Manhattan Island over the last 400 years. A long, thin wooded island, home to more than a 1000 species and over 50 ecosystem types, has been remade into the social and financial center of New York City. How can the modern city be made as sustainable as the forests and wetlands that came before? What can the modern city give back to the forests and wetlands that exist today? Credit: Reconstructed view: Markely Boyer, based on data from The Mannahatta Project / Wildlife Conservation Society. Modern view: Yann-Arthus Bertrand / CORBIS.]

2, 3. Red-maple hardwood swamps, shallow freshwater wetlands, and several beaver ponds once nestled beneath among the low hills and valleys of Manhattan. Credit: Reconstructed view: Markely Boyer, based on data from The Mannahatta Project / Wildlife Conservation Society. Modern view: Stephen Amiaga / [www.amiaga.com](http://www.amiaga.com)



... To allow any New Yorker to see the historical ecology of his neighborhood, compare it to the current ecology, and to create and share ideas for the future ecology of one's home.

**MANNAHATTA HAD**



**MORE ECOLOGICAL COMMUNITIES**  
per acres than Yellowstone



**MORE NATIVE PLANTS SPECIES**  
per acres than Yosemite



**MORE BIRDS**  
than the Great Smoky Mountains

the island, the more I came to appreciate the long-history of occupation. As archeological investigations by Dr. John Miksic of the National University of Singapore and colleagues have shown on Fort Canning Hill, a sizeable town once existed on the island in the 14th – 16th century. This early trading city was unfortunately abandoned after being burned down by unknown parties in 1611. (Recall Manhattan at this time was still largely a wilderness.)

Because the goal of historical ecology projects is to find a time when people were living in amanner compatible with the long-term sustainability of nature, a possibility is to try 1299.

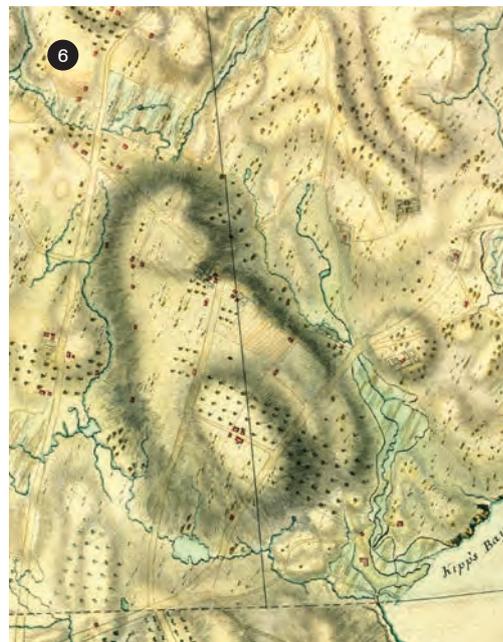
The Sejarah Melayu records that the city of Singapore began with a legendary hunting trip. Seven centuries ago, Sri Tri Buana, also known as Sang Nila Utama, a Srivijaya prince based at Palembang, was hunting for deer on Bintan Island. He spotted a large deer and started chasing it up a small hill but, when he reached the top, the animal had vanished. He came to a very large rock and decided to climb up. When he stood on top of the rock, he looked across the sea and saw another island with a sandy beach which had the appearance of a lovely, white sheet of cloth.

Asking his chief minister what land that was, he was told he glimpsed the island of Temasek, meaning the place by the sea. He then decided to visit the island. While his ship was crossing, a great storm erupted and the ship was tossed about in the huge waves, taking in water. To prevent it from sinking, his men threw all the heavy things into the sea so as to lighten the ship. But still water kept coming over the side. On the advice of the ship's captain, the prince threw his crown overboard as a gift to placate the sea. At once, the storm died down, and the ship reached Temasek safely.

The prince and his party landed safely on the beach, then went to hunt wild animals near the mouth of the river, striding across a patch of open ground, probably the Padang. With a start, the prince saw a strange animal with a red body, black head and a white breast across the way. It was a fine-looking animal and moved with great speed as it disappeared into the deep, dark forest. He asked his chief minister what animal it was and was told that it was a lion. He was pleased with this omen—a sign of good fortune. Thus, he decided to build his new city on Temasek called Singa-pura, which in Sanskrit means “Lion City”. Ever since, the lion has been the symbol of Singapore.

No one today knows for sure whether Sang Nila Utama was a living person or just a legend, or whether the animal he might have seen was a lion or (more likely) a tiger. But what we can say for certain is that there was a time when the island of Singapore, now one of the great cities of Southeast Asia, was a place of abundant and diverse nature – a tropical wilderness replete with species and home to a fascinating, nomadic sea people, who lived at the island's edge, the Orang Laut, tigers, elephants, and monkeys walked the forests; coral reefs with resplendent displays of fish garnished the shores. Singa-pura had a life millions of years in the making before Raffles showed up. The Singa-pura project could bring that early experience back to life again in the imaginations of Singapore's thriving millions.

Singapore today is famously a place where the government and the people invest in the ecological security of the city. Who knows how far that will go? The Singa-pura Project could be an opportunity to experience wildness again, to see tropical diversity in its full splendor, and to give Singaporeans a chance to celebrate a shared heritage of natural abundance for their tropical paradise. 



4. The black bear was abundant in the forests and meadows of Mannahatta in 1609. One was shot in the vicinity of Maiden Lane, in Lower Manhattan, in 1630. This painting by John James Audubon dates from the nineteenth century, but could easily have been from Mannahatta two hundred years before. [Credit: From: Audubon JJ, Bachman J, Audubon JW. 1851. The quadrupeds of North America. New York, V.G. Audubon. Image from Wildlife Conservation Society.]

5. Beavers are a characteristic species of Mannahatta. They were once so abundant in New York that the Dutch placed them on the city seal. Today they are making a come back in the Bronx River, which has been transformed from a sewage ditch back into the city's only freshwater river. Credit: From: Audubon JJ, Bachman J, Audubon JW. 1851. The quadrupeds of North America. New York, V.G. Audubon. Image from Wildlife Conservation Society.

6. This detail from the British Headquarters Map, now in the National Archives at Kew in the United Kingdom, shows Murray Hill, when it was a hill and not only a neighborhood. Historical maps such as this one are key to historical ecology research efforts for cities.

7. Muir webs can be used to compose habitat maps of species. Maps of (a) distance from water, (b) distribution of alders, and (c) distribution of aspens are required to create (d) Mannahatta's distribution of beavers in the vicinity of today's Times Square.