Methodology

This investigation traced New York's use of wood from tropical rainforests back to forests in origin countries, estimating the number of trees New York's procurements cut down, the share of NYC agencies' procurements within total New York and U.S. imports of ekki and greenheart, and the impact of specific wood suppliers on forest ecosystems in Guyana and Cameroon.

Estimating the Number of Trees Cut to Fill New York Procurements

To track how New York has procured wood, I put in 17 Freedom of Information Law requests for tropical hardwood procurement records to nine different city and state agencies that could have potentially used hardwood. By the time of story completion, I received responses from the NYC Parks Department, NYC Department of Sanitation, Metropolitan Transportation Authority, and NYC Department of Citywide Administrative Services. From my reporting with an environmental group who led investigations into the city's use of tropical forest hardwood for decades, I understood that the DOT and MTA were the city's biggest current users, Sanitation was a minor user, and Parks was a significant past user. Although my DOT FOIL was estimated to be filled by December 2025 (long after my deadline), the contracts I received from DCAS were for multiyear dock-building contracts for the DOT, so I was able to use this information for DOT estimates. To ensure I could receive information in time, I requested information from DCAS, Sanitation and MTA only for the last decade (since 2014) and Parks department information since 2000. I also searched for key words on the city comptroller's Checkbook platform and found information on additional Parks' hardwood contracts, including ipe contracts for boardwalk repairs.

The information that agencies provided allowed me to make estimates of the number of trees felled to fill their procurements. Greenheart timber for the dockbuilding contracts (assumed used mainly for the Staten Island Ferry) and marine transfer stations was procured as lumber, specified in foot board meters, and pilings, specified in linear feet. I assumed one piling to equal one tree. To calculate the approximate number of trees cut to fill the lumber contracts, I converted foot board feet measurements to cubic meters (multiplying by 0.00236), calculated the number of logs by dividing by a typical sawmill recovery rate for sawn wood from logs (0.45), and divided the number of logs by an average of how much merchantable log volume typically comes from one greenheart tree (3.5 m^3/tree), according to various research by the International Tropical Timber Organization and the Guyana Forestry Commission.

To estimate the number of trees cut in previous years where I did not have contracts, I referred to the city's 2008 Tropical Hardwood Reduction Plan, which estimated the DOT spending about $400,000 per year on the Staten Island Ferry. My previously calculated estimate of 336.53 trees per year during the years in which I have contracts (2011-2022) matched with this estimated amount, so I multiplied 336.53 by 43 years, estimating that the department started specifying greenheart around 1982. The exact year was an educated guess based on information from Rainforest Relief that the department started buying greenheart in the early-mid 1980s, since the DOT did not answer my questions. For the Department of Sanitation, I estimated that two

full constructions had been done. The amount of timber procured in the 2016 contract provided through my FOIL request aligned with the amount of timber that could be bought for the specified initial value of the initial marine transfer station contracts, as listed in the 2008 Tropical Hardwood Reduction Plan.

I did not receive contracts for wood procured for the Brooklyn Bridge Promenade. However, using average dimensions of the promenade of 16 feet wide, 3,500 feet long, and 1.5 inches deep, I estimated the total FBM of greenheart lumber used to build the entire wooden section of the bridge. I estimated that three full walkway replacements have occurred since the 1980s, according to information from Rainforest Relief. To estimate additional wood used for annual maintenance, I referred to the 2008 Tropical Hardwood Reduction Plan, which noted that DOT used about $4,500 a year to maintain the Promenade. Using the price of greenheart lumber noted in the DOT dockbuilding contracts, where one FBM cost an average of $3.15 between 2011 and 2022, I used $3 per FBM as a general price estimate and divided the department's annual expenditure of $4,500 by $3 to get the total FBM procured. Using the same FBM-to-tree formula detailed above, I calculated the approximate number of trees cut for annual maintenance.

To calculate the number of trees cut to fulfill ekki contracts for MTA rail ties, I first calculated the approximate amount of lumber bought from information on total dollar value procured, which was the only quantitative information provided in the MTA's FOIL response. To estimate the total FBM procured in a priced shipment, I divided the total value by 15, an average estimated cost of one FBM of ekki on the international market. To calculate the approximate total number of trees, I divided this total FBM by 2,500 – an average board feet yield from a single ekki tree at a merchantable height of 30 meters. I estimated that the Subway started using tropical hardwood in 1911, based on information from Rainforest Relief, and multiplied the number of years by the average trees used per year between 2014-2024. This is most likely an undercount, considering the original calculation was already based on years when the MTA was already reducing its use of this hardwood, and did not include the subway's full conversion to hardwood, since I was unable to get this information.

I then calculated the total estimated additional trees harmed or cut by the selective cutting of each tropical tree. A 2024 study in Guyana found that harvesting one tree (majority greenheart) led to an average of 5.85 additional trees killed and 4.79 trees damaged. Adding these together, I multiplied the estimated number of trees cut by 10 to estimate the total collateral damage on other trees caused by DOT and DSNY greenheart procurements. This may undercount the actual collateral damage, since this study had been conducted in Guyana's only FSC-certified forest concession, which is required to harvest trees with reduced impact, monitored through annual international audits.

Estimating the Number of Trees Cut to Fill U.S. Imports of Greenheart and Ekki

Along with calculating New York agencies' procurements, I also assessed the estimated number of trees cut to fill all imports that came through U.S. ports between Nov. 1, 2006 and July 29,

2025 (for products with “ekki” and/or “azobe” in the production description) and between Nov. 1, 2006 and May 19, 2025 (for products with “greenheart” in the production description). I used the shipments’ weight (in kg) and available information in the product descriptions to assess the number of trees used to fill these shipments. First, I calculated an estimated weight of a greenheart piling using the average of a sample of seven shipments from various importers that contained shipment measurements (specifically, linear feet of the entire shipment and length of each piling). I also calculated an estimated weight of each board meter of ekki using the average of a sample of three shipments listed in board meter measurements.

If a greenheart pilings listing included the number of pieces, I used the number of pieces as the number of pilings. If the listing included total linear feet and a height range of pilings, I took the average of the height range and divided the linear feet by the average piling height to determine the number of pilings. For all others that just listed “greenheart pilings” or similar in the product description, I divided the total kg by 803.63 (the average of the seven sample listings). If the product description included multiple species or other items without measurements, I divided its total weight by 803.63 and halved it (to estimate greenheart’s contribution to the whole order). If FBM or board feet were included, I noted this board foot measurement. If no measurement was included but the product description listed “greenheart lumber” or similar, I divided this number by 3.57 to estimate the total board feet. Finally, I converted the listings in board feet to the estimated number of trees logged through the calculation described in the above section of this methodology. Pilings were assumed to equal the same number of trees. This allowed me to then estimate the share of New York City agencies’ annual estimated procurements (calculated through the process described in section 1) within all procurements that came through New York-area ports.

For the ekki imports data, I calculated the weight of one FBM of ekki by using a general estimate from Boro Sawmill, one of the city’s contractors, of ekki weight in cubic feet (65 pounds per cubic foot), converting weight in cubic feet to board feet (65/12 board feet) and converting pounds to kilograms. Through this calculation, I estimated each FBM of ekki lumber weighed 2.45kg. This allowed me to divide each import shipment by 2.45 to estimate the total FBM of the shipment. I removed shipments unrelated to ekki lumber or that included multiple species, which were few in comparison to the greenheart data. Since I had already calculated the estimated FBM procured through each MTA purchase from 2014-2024, I was able to compare MTA’s actual procurements in each year to the total FBM imported in those years through ports in 1) the New York-area ports and 2) the whole of the U.S.

Calculating Forest Degradation Linked to New York Imports

To estimate the area affected by forest degradation from selective logging, I used the area of the entire forest concessions rented to companies that supplied city contractors. This was based on guidance from Cyril Kormos, an international expert in forest ecology, who noted that the impact of harvesting even just a few old-growth hardwood trees from tropical rainforests can change the ecology and structure of the forest over vast areas. Skid trails to drag the log from its

harvest location and logging roads to enter previously untouched forest also open the forest to additional sunlight and access by other humans, which can exacerbate degradation. In Guyana, where many suppliers did not have their own concessions, CJS also estimated the entire area of the country's logging concessions.

Tracking New York Wood Suppliers

I identified the names of city contractors that supplied hardwood through the purchase records received through FOIL as well as additional contracts listed on the city comptroller's Checkbook platform after searching for key words including "hardwood" and "lumber." I downloaded import records for each city contractor from the trade data platform ImportGenius between 11/1/2006 and May-July 2025 (the specific end date varied based on the date I downloaded the data for each company). I identified the companies' suppliers by filtering for the type of wood (greenheart or ekki/azobe) in the product description and identifying the shippers and their addresses. Two specific suppliers were also listed in recent DOT and DSNY contracts. I then downloaded export data for each of the 17 identified greenheart suppliers. ImportGenius limits this search only to exports to the U.S., so I was not able to analyze the companies' exports to other countries.

From the product description in import records, I was able to identify the various types of species traded by both Guyana/Cameroon-based suppliers and city contractors. I used IUCN's current conservation status for each species, as of June 2025, to estimate each company's imports/exports of threatened tropical species.

For ekki, after identifying the main shippers for MTA contractors, I was not able to download their exports between Cameroon and the U.S. from ImportGenius because exports were listed as originating from the Netherlands, a country not included on this trade platform. From my reporting, I determined that the companies (mainly Hupkes Wijma) were exporting ekki from West Africa, primarily Cameroon, to the Netherlands, and re-exporting them to the U.S. However, I accessed annual export reports between 2009 and 2021, excluding 2019, from Cameroon's Ministry of Forestry and Wildlife, which are not public, from international trade analyst James Hewitt. Scraping these reports provided data on each exporter's exports of both sawn wood and logs per year, which included Wijma and its Cameroonian subsidiaries. I multiplied sawn wood by 1.82 to estimate the equivalent number of logs, based on Hewitt's advice.

Identifying Suppliers' Forest Concessions

To identify where companies were procuring their wood, I accessed data on current forest concession allocations in both Guyana and Cameroon. I scraped the Guyana Forestry Commission Allocation map using a hidden API and was able to download shapefiles on forest concessions from the Cameroon Forest Atlas. Searching for the identified suppliers or their known forest concession IDs, I created separate shapefiles including concessions rented by these suppliers.

Estimating Degradation Within Suppliers' Forest Concessions

I uploaded these concession shapefiles to the Global Forest Watch (GFW) geospatial analysis platform to analyze forest loss and fires in the areas of interest. GFW contains a layer for tree height, which I was interested in as a proxy for degradation, but it is not downloadable from the GFW platform. Instead, I accessed this information from the Global Land Cover and Land Use Change, 2000-2020 raster dataset from the University of Maryland's Global Land Analysis and Discovery (GLAD) laboratory. I downloaded the layers 'Forest height, 2000', 'Forest height, 2020' and '2000-2020 change.' In QGIS, I identified the correct Geotiff files based on the coordinates of my shapefiles (the identified forest concessions) and analyzed the total unique raster values located within these geographic areas for tree height in 2000 and in 2020. For Guyana, I analyzed both the concessions currently rented by New York suppliers, and all forest concessions, since half of potential New York suppliers did not have their own concessions and therefore could be buying wood from any Guyana concession. I exported these unique value reports and continued my analysis in Python.

Additional Data

Other data I used for additional context included Guyana and Cameroon timber trade data from UN Comtrade, collated by James Hewitt; timber trade data downloaded from the International Tropical Timber Organization, information on the Guyana Forestry Commission's current allowable cut, presented by GFC in a July conference and provided by ITTO statistical assistant Jean-Christophe Claudon; and lobbying records on the TREES Act from the New York State Commission on Ethics and Lobbying in Government.