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UWSR Eco Letter Commentaries

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Upper West Side Recycling produces this bi-monthly electronic newsletter as a public service at no charge. It is intended to provide substantive information about environmental activities, organizations and publications relevant to the Upper West Side of Manhattan.

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Please see the next page for a listing of all Commentaries to date.
Click on any topic to read further.

CONTENTS

Click below for any of these topics to date

Recycling, Re-Use & Waste Reduction

- DSNY Curbside Composting Program
- DSNY Recycling Programs
- Electronic Waste
- Food Waste
- Organic Waste
- Organic Waste Update (2020)
- Organics Collection in Residential Buildings
- Plastic Waste, Minimizing
- Plastics – Microplastics and Other Lightweight Plastics
- Recycling in Schools
- Recycling Process (The)
- Recycling Programs in Mid-Size and Large Residential Buildings
- Recycling Updates (2016)
- Recycling Update (2020): Organics, Electronics & Textiles
- Recycling & Waste Reduction Updates (2019)
- Re-Use and Repair
- Shopping Bags
- Styrofoam
- Textile & Plastics Recycling Updates
- Textile Recycling
- Textile Recycling and Reuse Update
- Waste Reduction / Zero Waste
- What Happens to Your Food Scraps

Climate Change & Energy

- Climate Change & Global Warming
- Climate Change Update (2020)
- Energy Conservation
- Energy Efficiency – Cooling & Heating
- LEDs and Smart Lighting
- Solar Energy Organizations
- Solar Energy Utilization
- Wind & Solar Power

Urban Greening

- Local Produce: Growing & Eating
- New York Restoration Project
- Oysters and Honeybees
- Raising Food in New York City
- Shade Trees of New York City
- Trees in Our City
- Urban Greening & Neighborhood Beautification

Environmental - Miscellaneous

- Air Quality
- Construction, Demolition and Renovation
- Electric Vehicles
- Environmental Education
- Geology of New York City & Surroundings
- GrowNYC
- Health and Our Environment
- Hudson River Estuary
- It's Easy Being Green
- Lower East Side Ecology
- NYC Sewage/Wastewater System
- NYC Water Supply
- PFAS – Forever Chemicals
- Religious Organizations and Our Environment
- Water Quality
- WE ACT for Environmental Justice

UWSR Eco Letter November/December 2025

COMMENTARY:
New York Restoration Project

Since its founding in 1995, the New York Restoration Project (NYRP) has collaborated with residents in communities across the five boroughs to renovate gardens, grow food, restore parks, plant trees, protect our shorelines, and build partnerships that transform the city's landscape. NYRP stewards over 80 acres of parkland in Northern Manhattan and plants or distributes thousands of free trees annually. They also build, own and operate community gardens throughout all five boroughs.

NYRP is the only nonprofit citywide conservancy in New York City that brings private resources to spaces that lack adequate municipal support, with the goal of fortifying the city's aging infrastructure and creating a healthier environment for those who live in the most densely populated and the least green neighborhoods.

History

When famed entertainer Bette Midler returned to the city that helped launch her celebrated career, she found many of its streets, neighborhoods, and parks consumed by a sea of litter and the accumulated effects of years of neglect. Appalled at the state of open, green spaces, Bette recruited friends and family to remove garbage from parks in northern Manhattan. Then, on July 7, 1995, she founded the New York Restoration Project, with the goal of revitalizing neglected neighborhood parks in economically disadvantaged New York City neighborhoods, including Sherman Creek Park, Highbridge Park, Fort Washington Park, and Fort Tryon Park in Upper Manhattan. In May 1999, then Mayor Rudolph Giuliani announced plans to auction 114 community gardens for commercial development. Midler and NYRP's founding president, Joseph Pupello, led a coalition of greening organizations, including Trust for Public Land, and quickly rallied and raised the money needed to save these gardens. NYRP worked closely with the City of New York and took ownership of 52 of the most under-resourced gardens in the city's most economically challenged communities, ensuring that these spaces would remain public gardens in perpetuity. In 2007, NYRP became the private partner of Mayor Michael Bloomberg's MillionTreesNYC campaign to plant one million new trees in New York City by 2015 (see more on this below under Tree Planting).

Parks and Community Gardens

NYRP currently owns and manages over 50 parks and community gardens throughout the City's five boroughs and works daily to promote the revitalized health of the neighborhoods these gardens serve. More than a thousand volunteers maintain these spaces by removing trash and composting organic matter.

If you're interested in volunteering, attending an online workshop, or joining a garden, click here to find out how to get involved. You or your organization can also host an event in an NYRP Garden from April through October.

The 13 gardens NYRP currently stewards in Northern Manhattan (comprising more than 80 acres) are scattered throughout East Harlem, Harlem, Inwood, and Washington Heights, with the majority being in East Harlem. Click here for a full list. Inwood's Sherman Creek Park, a former illegal dumping site, covers 15 beautifully reclaimed acres along the Harlem River including Swindler Cove, Riley-Levin Children's Garden, and a living shoreline installation (see below under Shoreline Protection). They also maintain the northern section of Highbridge Park, north of the George Washington Bridge, and between Highbridge, Sherman Creek, and the Harlem River Drive Greenway.

NYRP's gardens provide New Yorkers with room to grow fresh and nutritious food, exercise, spaces for children to play, and places to safely connect with friends and family. They have also served as venues for environmental education over the years, becoming outdoor classrooms and vibrant resources for many local schools. NYRP's educational programs also include online workshops, skill shares and technical consultations for urban growers and other community members.

Over the years, NYRP has deepened its work in the neighborhoods surrounding the community gardens they manage, and their staff has collaborated informally on greening projects with many likeminded local partners. In 2011, NYRP formalized this support network with the creation of its Gardens for the City program, providing materials, horticultural knowledge, and labor to transform underutilized spaces into flourishing gardens. Since then, they've helped build over 300 gardens and shared green-spaces citywide. Their partners have included schools, community centers, assisted living facilities, houses of worship, GreenThumb gardens, New York City Housing Authority properties, and many more.

Tree Planting

MillionTreesNYC was formed in 2007 to revitalize New York City's urban tree canopy by planting and caring for one million new trees throughout the city. To accomplish this ambitious goal, NYRP joined forces with Mayor Bloomberg and the New York City Department of Parks & Recreation and became a co-leader. While the Department of Parks & Recreation and other municipal agencies planted along city streets, in parks, and on public rights of way, NYRP focused on two primary areas: providing free trees to New York City home or landowners; and directly planting trees alongside corporate and community volunteers in parks, school yards, public housing properties, and other public spaces.

MillionTreesNYC became a citywide movement that engaged and energized New Yorkers of every background. This historic effort was completed when the millionth tree was planted in October 2015 in the South Bronx. Today, NYRP continues to steward and

care for thousands of trees planted during this time, and these now mature trees help keep city streets cooler, sequester carbon, and beautify neighborhoods. NYRP also continues to plant thousands of new trees each year as well as hosting free tree giveaway events. To date, they've distributed over 75,000 trees. You can get more information on tree giveaways here.

1,000 Chestnut Challenge:

NYRP is partnering with longtime American Chestnut conservationist Bart Chezar, The American Chestnut Foundation and others to help distribute chestnut saplings, which have been hybridized with other species of chestnut, throughout the five boroughs. The American Chestnut, a prized source of food and timber, was one of the most abundant and productive trees in North America before the emergence of the chestnut blight, a fungal disease that kills the trees' inner bark, thus preventing the flow of nutrients and water to the leaves, flowers, and stems. Scientists estimate there were roughly four billion chestnut trees in the Eastern United States before the blight hit in the early twentieth century, making the tree a critical part of forest ecosystems. Despite its demise as a lumber and nut crop species, the American Chestnut is not extinct. The blight cannot kill the underground root system as the fungus is unable to compete with soil microorganisms. Stump sprouts grow vigorously in cutover or disturbed sites where there is plenty of sunlight, but these sprouts inevitably succumb to the blight.

NYRP's goal is to eventually establish 1,000 thriving hybrid American Chestnut trees throughout our local urban tree canopy. They have already planted more than 300 hybrid American Chestnut trees in Highbridge Park and are looking to partner with individuals and institutions to plant and monitor these seedlings as part of a long-term community science experiment (the trees are free). Different seedlings have a range of resistance to the blight, and the monitoring data they collect will help identify resistant trees from which to collect seeds in the future. This data will also help inform larger restoration efforts lead by The American Chestnut Foundation. Click here for more information about this project.

Shoreline Protection

Sherman Creek Park is a cornerstone of the Inwood neighborhood that – like so much of New York City – is threatened by climate change-induced erosion and sea level rise. NYRP has been researching ways to protect it for years, and in 2020 they introduced an ecosystem-based solution called a living shoreline. Integrating native plantings and an artificial oyster reef (stacks of specialized concrete blocks called Oyster Castles), their living shoreline design aims to both attenuate waves that wash away sediment and enhance the native wetland habitat, one of the last of its kind in all of Manhattan. The NYRP also partnered with the United States Department of Agriculture's Natural Resource Conservation Service on their Coastal Zone Soil Survey (CZSS). The CZSS team and NYRP surveyed Manhattan's largest remaining wetland, which runs along the Harlem River at Inwood's Sherman Creek Park. This waterfront park is part of the last

remaining salt marsh environment predating European colonization on the entire perimeter of Manhattan, and the resulting map of its underwater soils is the first of its kind ever charted in the borough. Salt marshes such as those in Sherman Creek Park sequester CO_2 at a rate ten times greater than mature tropical forests.

Additional information:
New York Restoration Project, 254 West 31st Street, 14th Floor; 212.333.2552; info@nyrp.org

UWSR Eco Letter September/October 2025 COMMENTARY: What Happens to Your Food Scraps?

New York City began enforcing mandatory residential composting on April 1st this year and our city now has the largest curbside organics collection program in the country. On average, NYC residents produce a staggering 12,000 tons of waste every day. But by separating compostable materials – food scraps, soiled compostable paper, and yard waste – we substantially reduce that amount by about one-third, or 4,000 tons. So if you ever find yourself bridling at the need to store your compost or dump it into a collection container, know that you're having a significant and beneficial impact on reducing waste. You may even find, as we have, that removing both recyclables and compostables from your garbage means it takes a lot longer to fill up your garbage can. You're making an important difference.

But what happens to all that organic waste? The City's ambitious program to recycle food scraps from all our residential buildings utilizes both City agencies and private contractors: The NYC Department of Sanitation (DSNY) provides free curbside collection of compostable material, which is then transferred to processing stations operated by independent contractors. This material is then both directly composted and/or anaerobically digested to produce biogas.

Transport

The NYC Department of Sanitation (DSNY) provides free curbside collection of compostable materials for city residents. They also collect food scraps, soiled compostable paper, and yard waste from smart bins located on the streets and in schools and other non-profit organizations. This collection is organized by Sanitation Districts, which cover the same areas as Community Board Districts (e.g., Sanitation District 7 runs from 59th to 110th Streets and Sanitation District 9 runs from 110th to 155th Streets, both on the West Side). Participation is mandatory, though fines have been deferred except for buildings with more than 30 units that have received more

than four warnings. DSNY then delivers all these compostable materials to various transfer stations or processing facilities, which are operated by private contractors.

Processing

Contractors pre-process and decontaminate delivered organic material in preparation for recovery for beneficial use. It would be ideal if all this material could be directly composted, and much of it is (one large composting facility in New York City is located on the former Fresh Kills Landfill site—see below). However, space limitations and compost processing time make the use of composting alone impractical in our city. Therefore, most of our food scraps are digested to produce biogas as well as biosolids that are later used for compost and other soil amendments.

Three companies are contracted with DSNY to operate the processing facilities: *American Recycling*, *Denali Water Solutions*, and *Waste Management*. These contractors have different options: They can compost or anaerobically digest the organics themselves; they can pass on some of the pre-processed materials to the NYC Department of Environmental Protection (DEP), which then co-digests the material along with sewage sludge; or they can send the organic material to an anaerobic digester in Massachusetts or another composting facility in New Jersey.

DSNY anticipates future contract awards with these as well as other contractors. New York City has also broken ground on a new Sustainability Hub at Hunts Point that will include new digesters that will enable it to accept and process organics directly from the neighboring Hunts Point Market. When the first phase of construction is completed by 2027 it will be able to accept 250 tons of organics each day. A second phase is now being designed that will allow processing up to 1,000 tons per day, and that could include food scraps from residential buildings.

American Recycling Management operates a Transfer Station, Recycling Center and Food Waste Processing Facility located in Jamaica, Queens. They accept DSNY food scraps and yard waste, primarily from Queens. After processing, these are sent to various facilities throughout NY State and turned into compost.

Denali Water Solutions has two contracts with DSNY to receive food scraps and yard waste from different parts of the city. One contract is for the Metropolitan Transfer Station in the Hunts Point section of the Bronx (which mainly accepts organics from the Bronx). The organic material processed at the Metropolitan Transfer Station, including foods scraps, is sent to a variety of destinations to either be converted into compost or anaerobically digested, likely in the Massachusetts facility mentioned above. The other contract is for the Court Street Transfer Station in Brooklyn's Red Hook section, but it hasn't yet started receiving organic material.

Denali also operates the 33-acre Staten Island Compost Facility on the former Fresh Kills Landfill site for DSNY. This facility has been processing yard trimmings in open windrows

for over 10 years, along with some source-separated food waste from NYC households and schools, and it was recently upgraded to compost food scraps from all of Staten Island and sometimes from Brooklyn. The new facility, which has the capacity to process 60,000 tons a year of organics, features a 16-bay Sustainable Generation BUNKER® processing system with GORE Covers® and in-floor aeration trenching. Composting is done in three phases that include reducing pathogens and compliance with urban air quality standards. The BUNKER system is twice as fast as the old windrow system. Finished compost is marketed under the Big Apple Compost® brand, about 60% of which is sold to landscapers, with the remaining 40% given away to community groups, parks, residents, and others.

Waste Management is under contract with DSNY to operate five organics facilities that process food scraps, soiled compostable paper and yard waste (leaves, tree branches, plant cuttings, soil, etc.). These are:

1. Review Avenue Transfer Station, Long Island City, Queens – to open in 2026
2. Harlem River Yard Transfer Station, Mott Haven, Bronx – to open in 2026
3. Yonkers Avenue Transfer Station, Yonkers, NY – to open September 2025
4. Varick I Solid Waste Transfer Station, East Williamsburg, Brooklyn – now accepting food scraps and yard waste (see below).
5. Flora Transfer Station, Elizabeth, NJ – now accepting food scraps and yard waste (see below).

At both the Varick I Solid Waste and the Flora Transfer Stations, all the food scraps are used for bio-digestion, but all of the yard waste is sent to Natures Choice in New Jersey for processing into compost. In Waste Management's CORe system (which can accept both pre- and post-consumer food waste), food waste is first conveyed into a bioseparator, where contaminants such as plastic, packaging, glass, etc. are removed. The food waste is then liquefied within the bioseparator, passed through a screen creating a fluidized feedstock, then pumped into a blending storage tank to produce an engineered bioslurry. The slurry is transported by tanker trucks to Newtown Creek Wastewater Resource Recovery Facility, pumped into a feed-in station, and then anaerobically digested to produce biogas (a form of natural gas composed mostly of methane).

The Newtown Creek facility, which is operated by the NYC DEP, has eight massive "digester eggs" that handle the food waste from the Flora and Varick transfer stations along with wastewater. Eventually this facility will have the capacity to process 500 tons of food waste daily. It has been converting sludge to biogas by anerobic digestion (without oxygen) for decades and the facility began co-digesting it with food scraps in 2016. About 75% of the organics processed at Newtown Creek become biogas. The DEP uses about 40% of that biogas to power the treatment plant; the remaining 60% is routed to National Grid and used to heat homes in Brooklyn, thus replacing fossil fuels.

The remaining organic biosolids are shipped to various locations throughout New York State and the Northeast. About one quarter of the biosolids are used as compost; the rest are utilized for soil to cover waste in landfills to maintain sanitary conditions, as well as for soil amendments to restore contaminated land (e.g., mining sites). Only 5% of processed organic biosolids are not re-usable and go to a landfill.

Food Scraps from the Upper West Side

Almost all the food scraps currently collected from the Upper West Side of Manhattan are trucked to the Flora or Varick I Transfer Stations for processing. However, this may change as new processing facilities come online.

Sanitation districts correspond to Community Board Districts. Sanitation District 7 runs from 59th to 110th Streets on the West Side. Organics collected from that area go to the D7 Sanitation Garage at 650 West 57th Street (which also accepts material from District 4, in the Chelsea Clinton area below 59th Street) and then to a transfer station. Sanitation District 9 runs from 110th to 155th Streets, also on the West Side. Organics collected from that area go to the D9 Sanitation Garage at 125 East 149th Street in the Bronx and then to a transfer station.

Most of these food scraps and yard waste are currently transported to the Waste Management Flora Transfer Station in Elizabeth, NJ, but at times these organics are sent to Varick I Solid Waste Transfer Station in East Williamsburg, Brooklyn. Both of these stations produce a bioslurry that is transported by tanker trucks to Newtown Creek, where it is digested for co-production of biogas and biosolids for soil amendment (as discussed above).

Other Options for Your Food Scraps

While most buildings have brown containers where residents can dump their compost, Upper West Side residents can also drop off food scraps at designated locations like Smart Composting Bins or participating Community Gardens.

Smart Composting Bins are located throughout NYC. They are available 24 hours a day, 7 days a week, and are emptied regularly by DSNY. Click here to find a Smart Composting Bin or food scrap drop-off site near you or find and unlock available bins using the free NYC Compost app.

West Side Community Garden has weekly public food scrap collection from 11:00 a.m.-12:00 p.m. on Sundays. Drop-off is not available if it's raining or the Garden is closed because of snow or ice. Bring your organic waste to the collection point outside the garden gates on 90th Street, between Amsterdam and Columbus (no meat, fish, bones, dairy, fats). Click here for a list of other community gardens.

The Hudson River Park's Community Compost Program also has 10 drop-off sites that are open from 7:00 a.m. to 7:00 p.m. daily. (No compostable bags, utensils or containers, dairy, meat, fish and bone.

Lower East Side Ecology and Big Re-Use also operate composting sites, but none are on the Upper West Side.

More Information:

- City Plans for Organic Waste (pp.128-137)
- Curbside Composting (DSNY rules, bins, fines),
- New York awards organics contracts to WM, Denali, American Recycling worth $96M
- New York's Newtown Creek Wastewater Treatment Plant Revs up Anaerobic Co-Digestion Project
- SG Bunker Composting Facility Opens On Staten Island (at Fresh Kills),
- WM Varick I CORe – Newtown Creek Co-Digestion Project Converting NYC Food Waste Into a Clean, Renewable Energy Source

UWSR Eco Letter May/June 2025
COMMENTARY:
Shade Trees of New York City

A tree is a wondrous thing, and some 7 million of them grow in New York City, forming a canopy that covers 21 percent of the City's land. About 670,000 of them line our streets and the rest fill our parks, run along waterways and live in other open spaces.
They are vitally important to all of us. Trees fight climate change by absorbing carbon dioxide, and they send out oxygen. They help prevent water pollution by capturing stormwater runoff. They also absorb solar radiation and provide shade, both of which help lower temperatures during hot summer days while also reducing energy demand. Tree leaves also "breathe," helping cool by evaporation and transpiration. Their roots aerate compacted soil.

All these trees provide habitat and food for wildlife such as birds and other animals or important pollinators like bees. They beautify the streetscape and increase property values. They mask unsightly views, muffle sound, and reduce glare. Trees can make people happier and help reduce the incidence of mental problems. Significantly, neighborhoods that are barren have a greater incidence of violence than their greener counterparts.

There are approximately 150 different species of trees in NYC and the vast majority of them are deciduous. This means that, in order to conserve energy and help survive adverse conditions, they shed their leaves every year, typically in the fall, and then grow

new leaves in the spring. It's impossible to cover them all, so we'll just focus on 15 of the larger and more common species you find here, then briefly discuss street-tree maintenance.

Some Common Deciduous Trees of NYC (in alphabetical order) *

ASH Trees: There are an estimated 8 billion ash trees in the United States, the majority being green ash or white ash. In the fall they sometimes stand out early in the season because their pennate leaves change color earlier than most other species. The emerald ash borer, a beetle introduced to the U.S. from Asia in the 1990's, was recognized as a major threat to ash trees beginning around 2002, with substantial die-off in years since. However, it's been found that some green and white ash innately possess a natural genetic resistance to this pest.

Green ASH (*Fraxinus pennsylvanica)* usually reaches 40-80 feet in height with a trunk that grows up to 4 feet in diameter. A large specimen, with a trunk diameter of 55 inches, is located in the Bronx at Crotona Park, south of the Prospect Avenue entrance, behind the playground. Green ash is the most widely distributed of all the American ashes; its range centers on the midwestern U.S. and Great Plains. These trees are adaptable and can tolerate a wide range of temperatures, from deep freezing at -30°F to a very warm 95°F; while they prefer wetter conditions, they are hardy and will also grow in poorer, drier soils. Green ash trees typically live for 100 to 120 years, though some can live longer, reaching up to 200 years.

On young trees the bark is smooth and gray, but it becomes thick and fissured with age. Leaves are 6–12 inches long, green both above and below, and turn golden-yellow in the autumn. Inconspicuous flowers are small, green to purplish, and appear in clusters in the spring at the same time as the new leaves. The fruit is a samara, a winged fruit containing a seed that can be dispersed more easily by the wind. Its wood is used for a variety of purposes, including tool handles, baseball bats, furniture, flooring, and even in the construction of electric guitars.

Green Ash

White ASH *(Fraxinus americana)* is the largest of the ash trees, reaching 70-100 feet in height (rarely growing to140 feet) with a trunk up to 6 feet in diameter. The silhouette

of a young white ash has a narrow head, but the canopy widens with age. A large white ash currently grows in the Bronx's Van Cortlandt Park, not far from Van Cortlandt Mansion; it is 83 feet tall, with a trunk 60 inches in diameter, and a canopy that spreads 60 feet.

The species is native to a wide geographic range of hardwood forests from Nova Scotia west to Minnesota and Texas, south to northern Florida, and occasionally grows even further west. White ash is a forest tree that commonly occurs alongside sugar maple while green ash is a pioneer species that usually inhabits riparian zones (adjacent to rivers and streams) and disturbed areas. Though adaptable to various soil types, white ash thrives in moist, well-drained, and fertile soils and generally performs best in loams and can tolerate some flooding. The lifespan of white ash can reach 200 to 250 years.

The bark is similar to that of green ash but is more deeply fissured in age. The white ash's compound leaves usually have seven leaflets per leaf whereas the counts in other ash trees more often vary. The upper side of the leaves are green but the tree gets its name from the glaucous (dull grayish-green) lighter color on the undersides of the leaves, as opposed to the green ash, whose leaves are similar in color on both its upper and lower sides. White ash leaves turn yellow or red in autumn. Its flowers are small, green to purplish, and appear in clusters on separate male and female trees in early spring, before the leaves emerge. Its fruit is a samara, a one-winged, dry, flattened seed that matures in the fall and persists on the tree into winter, often in clusters. Its tough yet pliant wood is commonly used for furniture, cabinetry, flooring, tool handles, musical instruments, hockey sticks, and, most famously, baseball bats – although baseball bats of white ash are now second in popularity to bats made of maple.

White Ash

CALLERY PEAR (*Pyrus calleryana),* an invasive species native to China and Vietnam, is shorter than the other trees discussed here, growing to just 16 to 26 feet, with either a conical or a rounded crown. The United States Department of Agriculture first introduced them in the mid-1960's as ornamental landscape trees and they became

popular with landscapers because they were inexpensive, transported well and grew quickly. They'll grow in most soil types including clay and alkaline, are pollution-resistant, and tolerate compaction or drought. Callery pears are very resistant to disease or fireblight, but the spread of these invasive trees is limited by their intolerance to extreme cold, and they have a fairly short lifespan of about 15 to 25 years.

The bark of the callery pear is grayish-brown and smooth on young trees, becoming deeply fissured or scaly with age. The leaves are oval, 1½ to 3 inches long, glossy dark green above and pale beneath. At our latitude, the trees often remain green until mid-November, at which point they turn bright red, orange or yellow. However, since the color often develops very late in autumn, the leaves may be killed by a hard frost before full color can develop.

The abundant dense clusters of white, five-petaled flowers of about ¾ to 1 inch in diameter are produced in early spring before the leaves expand fully, and they are one of the first visible signs of the arriving springtime here in the City – although their odor is often compared to rotting fish! The fruits of the callery pear are small (less than ⅜ inch in diameter) and are often assumed to be inedible due to their abundant, cyanide-laced seeds, but once these hard, almost woody, fruits are softened by frost they are readily taken by birds.

Callery Pear

American ELM (*Ulmus americana)* is a stately, vase-shaped tree than can grow to heights of 70 to 115 feet and occasionally taller. The trunk may have a diameter at breast height of more than 4 feet, supporting a high, spreading umbrella-like canopy. Native to eastern North American, the American elm can be found from Nova Scotia west to Alberta and Montana, and south to Florida and central Texas. The species occurs naturally in an assortment of habitats, most notably rich bottomlands, floodplains, stream banks, and swampy ground, although it also often thrives on hillsides.

American elm grows best on rich, well-drained loams, but will tolerate some wetness. These trees can tolerate a wide range of temperatures, from freezing -40°F to very

warm 95°F. They can live for 175 to 200 years, with some individuals reaching 300 years, but their lifespan has been significantly impacted by the Dutch elm disease (DED, first discovered in the Netherlands in the early 1920s). It has been estimated that only approximately 1 in 100,000 American elm trees is DED-tolerant, most known survivors simply having escaped exposure to the disease.

Elms have been able to survive and to reproduce in areas where the disease had eliminated old trees, although most of these young elms eventually succumb to the disease at a relatively young age. There is some reason to hope that these elms will preserve the genetic diversity of the original population, and that they eventually will hybridize with DED-resistant varieties. There is a notable grove of old American elm trees in Manhattan's Central Park Mall, and they also line Fifth Avenue from 59th to 110th Streets. The trees there were apparently spared because of the grove's isolation in such an intensely urban setting. A few remain on Riverside Drive near Columbia University, the rest are disease-resistant elm cultivars.

The bark of the American elm is a dark, ashy gray color with flat-topped, thick ridges and a tendency to flake off in older trees. Leaves are alternate on stems 3 to 8 inches long, with double-serrate margins and an oblique base; they turn yellow in the fall. The flowers are small, purple-brown and, the fruit is a flat samara. Because the American elm's wood is coarse, hard, tough, and difficult to split or chop, it has few uses except for barrel staves, trunk-slats, hoop-poles and the like.

American Elm

GINKGO BILOBA (native to East Asia), also known as the maidenhair tree, normally reaches a height of 65 to 115 feet, with some specimens in China being over 165 feet, and their trunks can be 2 to 4 feet in diameter. Young trees are often tall, slender, and sparsely branched; the crown becomes broader and angular as the tree ages. It has long, somewhat erratic branches, and is usually deep-rooted and resistant to wind and snow damage. A combination of resistance to disease, insect-resistant wood, and the ability to form aerial roots and sprouts makes ginkgoes durable, with some specimens claimed to be more than 1,400 years old. Ginkgo trees are adaptable to various soil

types, including clay, loam, and sandy soil; they prefer well-drained soil and can endure temperatures down to -30 to -40 °F. While they can handle heat, consistent temperatures above 85°F can cause wilting or leaf scorch.

Ginkgo biloba bark is typically a light grayish brown color with shallow ridges and furrows, developing into deeper furrows and a more uniform ash gray color with age. Its leaves are usually 2 to 4 inches long but sometimes up to 6 inches long and are unique among seed plants in being fan-shaped with veins radiating out into the leaf blade, sometimes bifurcating (splitting). Ginkgoes are prized for their autumn foliage, which is a deep saffron yellow. *Ginkgo biloba* has separate sexes: Male plants produce small pollen cones; female plants do not produce cones. Two ovules are formed at the end of a stalk, and after wind pollination, one or both develop into fruit-like structures containing seeds. The fruits are ½ to 1 inch long, with a soft, fleshy, yellow-brown outer layer that is attractive in appearance, but contains butyric acid and smells foul like rancid butter or vomit once fallen. Ginkgo biloba leaves are a natural blood thinner and are also commonly used to improve memory, concentration, and overall cognitive function. Ginkgo wood, known for its fine texture and ease of carving, is used for making furniture, chessboards, and small carvings.

Ginkgo biloba

Linden Trees: The Littleleaf Linden is the tree most commonly planted in New York City, but other linden trees, including the American linden (also known as basswood), can be found in NYC parks and along streets.

Littleleaf LINDEN (*Tilia cordata*) is a naturally occurring hybrid tree that occurs in the wild in Europe. A common street tree throughout New York City and Central Park, the lttleleaf linden grows to a height of 50 to 80 feet, with a straight trunk 2 to 3 feet in diameter. There is a large linden at Woodlawn Cemetery's Jazz Corner, overlooking the gravesite of Duke Ellington. The base of the trunk often features burrs and a dense mass of brushwood, with tufts of denser hairs in the leaf veins. Littleleaf linden thrives in moist, well-drained, fertile soil that is sandy, loam, or clay, enduring temperatures

from -40°F to 90°F. They usually have a lifespan of a few hundred years but have been known to live for more than 1,000 years.

The bark is smooth gray/red/brown when young, but gray/brown and with shallow/narrow ridges at maturity. The heart-shaped leaves are 1 to 3 inches long and broad, with finely serrated margins. They are dark green above but bluish green below; they turn yellow in the fall. Linden trees are known for their fragrant, pale- yellow flowers, which bloom in early summer in clusters of four to ten. Pollinated by bees, honey is derived from these flowers. The fruit is a dry nut-like drupe (fruit with a single, hard pit or stone containing a seed) ⅜ inch in diameter, downy and faintly ribbed. The light wood is used for carving, and the inner bark for making baskets.

Littleleaf Linden

Black LOCUST (*Robinia pseudoacacia)* is native from Pennsylvania through the Appalachians to northern Georgia and westward to Arkansas and Oklahoma, but it has been widely planted and naturalized elsewhere in temperate North America. This is a shade-intolerant species and therefore is typical of young woodlands and disturbed areas where sunlight is plentiful and the soil is dry. The roots of black locust contain nodules that allow it to fix nitrogen, so it is a legume. Trees reach a typical height of 40–100 feet with a trunk diameter of 2 to 4 feet. With a very straight trunk, it is an upright tree with a narrow crown that grows scraggly with age. Young trees are often spiny, especially on root suckers and branches near the ground, but mature trees often lack spines. They tolerate a wide range of temperatures, as low as -40°F and also withstanding heat up to 100°F. Black locust trees are fast-growing but relatively short-lived, with an average lifespan of around 60-90 years.

The bark, leaves, and wood are toxic to both humans and livestock. The bark is black and gray and tinged with red or orange and becomes thick and deeply furrowed on older trees. The dark blue-green leaves, which appear relatively late in spring, are lighter on the underside and are compound, meaning that each leaf contains many smaller leaflike structures called leaflets, which are roughly paired on either side of the stem that runs

through the leaf. The leaflets fold together in wet weather and at night and turn a clear pale yellow in autumn. The elongated clusters of cream-white flowers open in May or June for 7–10 days, after the leaves have developed. The fruit is a flat and smooth pea-like pod 2 to 4 inches long. Locust wood is extremely hard, one of the hardest in Northern America. Being durable and very resistant to rot, it is prized for making furniture, flooring, paneling, fence posts, and small watercraft.

Black Locust

The **Honey LOCUST** (*Gleditsia triacanthos*), also known as the thorny locust, can reach a height of 65–100 feet. Like the black locust, honey locust is a legume. It's native to central North America where it is mostly found in the moist soil of river valleys but it's highly adaptable to different environments and has been introduced worldwide. Outside its natural range, however, it can be an aggressive and damaging invasive species. Due to the honey locust's tolerance of urban problems such as compacted soils, poor aeration, constrained planting areas, salt spray, and pollution, it has been widely planted in cities. It also adapts to relatively dry conditions and either alkaline or acidic soils, and tolerates temperatures from -30° F to 95° F. The honey locust grows quickly, but has a medium life span, as long as 125 years.

The bark is dark red-brown and smooth on young trees, but on older trees it develops longitudinal ridges with curled edges. Honey locusts commonly have thorns growing out of both their branches and trunks. The leaves are pinnately compound (arranged in a feather-like manner) on older trees. They are green in summer and turn yellow in autumn in shades ranging from cream and tan to golden yellow. Honey locusts leaf out relatively late in spring, but generally slightly earlier than the black locust. The strongly scented greenish yellow to greenish white flowers appear after the leaves have developed. The fruit of the honey locust is a flat pod (a legume) that matures in early autumn, is often twisted or curved, and contains as many as twenty dark brown oval seeds, each about 1 inch long. A niche market exists for honey locust furniture. It is also used for fenceposts and rails because of the dense, rot-resistant nature of the wood.

Honey Locust

LONDON PLANETREE (Platanus x acer folia) is a cross of the oriental Sycamore (native to Eastern Europe and Western Asia) and the American sycamore. It typically grows from 65–130 feet tall, with a trunk 3 to 8 feet in diameter, and can live for several hundred years. New York City's largest London plane tree is located near the East 96th Street entrance at the northeast corner of the Reservoir in Central Park, with a trunk diameter of 65 inches and a height of 95.9 feet. This is also the oldest tree in Central Park. London planetrees grow best in moist, deep, and rich well-drained soil in full sun. Because they're resistant to drought, soil compaction and pollution and are one of the most efficient trees for removing small particulate pollutants in urban areas, they're often used as street trees around the world. It's a hardy tree, tolerating cold down to -20°F and heat up to 104°F.

London Planetree bark is usually pale grey-green, smooth and exfoliating (patches shred off) – making it easy to spot as you go around the City – although sometimes buff-brown and not exfoliating. The leaves are broad, palmately lobed, superficially maple-like though larger at 4-8 inches long and 5-10 inches broad. The young leaves in spring are coated with minute, stiff hairs that wear off by late summer leaving them nearly or entirely hairless. In the fall they turn golden-yellow. Both male (yellowish) and female (reddish) flowers are produced in the spring, but on separate stems, and the mature fruit in the cold months forms a dense spherical cluster of achenes (one-seeded fruit that does not open to release the seed) about 1 inch in diameter and covered with numerous stiff hairs. It should be noted that these achenes can cause respiratory problems, especially among asthmatics, and cause eye irritation, affecting 40% of allergy sufferers. Although it's primarily an urban tree, its bark is occasionally used for veneer, plywood, and flooring applications.

London Planetree

Norway MAPLE (*Acer platanoides*) is a species of maple native to eastern and central Europe and western Asia. It was introduced to North America in the mid-1700s as a shade tree, but is now considered an invasive and so is no longer planted in Central Park; in fact, the Central Park Conservancy actively removes seedlings. However, it remains a very common street tree. Norway maples grow from 65 to 100 feet tall with a trunk up to 5 feet in diameter, have a broad, rounded crown, and generally live 100 to 150 years, although they can live up to 200 years. They can grow in low lighting conditions and, within the forest, are often found in the understory and in a large range of soil textures from sands to moderately compacted clays. However, they don't tolerate either waterlogging or soil that is too dry. They can endure temperatures down to -30°F and up to 90°F.

Norway maple bark is grey-brown and shallowly grooved. Unlike many other maples, mature trees do not tend to develop shaggy bark. Like the sugar maple, its waxy dark green leaves have five lobes, but are usually large, sometimes reaching 10 inches in width. They leaf out earlier than most North American maple species and turn a vibrant yellow in the fall. The flowers appear in the early spring before the new leaves emerge and are yellow to yellow-green. The fruit is a double samara with two winged seeds. Its hard wood is used for furniture, flooring and musical instruments.

Norway Maple

Red MAPLE (*Acer rubrum*), also known as soft maple (its wood is only three quarters as strong as sugar maple), is the most abundant native tree in eastern North America. It ranges from Canada, south to Florida, and southwest to East Texas. Over most of its range, red maple is adaptable to a very wide variety of soil conditions, perhaps more so than any other tree in eastern North America. Red Maple can be found growing in swamps, on poor dry soils, and almost anywhere in between. At maturity, it often attains a height of 90 to 120 feet and a trunk diameter that ranges from 18 to 60 inches, depending on the growing conditions. Red maples can tolerate temperatures from -40°F to 90°F. They typically live for 80 to 100 years, though some can reach 200 years of age. There are more than 18,000 red maples on New York City streets.

The bark is pale grey and smooth when the tree is young. As it grows the bark becomes darker and cracks into slightly raised, long plates. The leaves of the red maple offer the easiest way to distinguish it from its relatives. The three-lobed leaves are usually 3 to 4 inches long on a full-grown tree. They are green on the top and a light, greenish white on the underside. Red maple flowers, petioles, twigs, and seeds are all red to varying degrees. Among these features, however, it is best known for its brilliant deep scarlet foliage in autumn. The small, hanging clusters of bright red flowers appear in late winter to early spring, from December to May depending on elevation and latitude, usually before the leaves emerge. The fruit is composed of 2 samaras, which ripen from April through early June, before the leaf development is altogether complete. The tree's sap is used commercially on a small scale for maple syrup production and the wood for furniture, flooring, cabinetry, paneling, veneer, musical instruments, tool handles, and other small specialty items.

Red Maple

Sugar (Hard) MAPLE (*Acer saccharum*) is the state tree of New York normally reaching heights of 80–115 feet and exceptionally up to 150 feet, with a trunk diameter ranging from 2 to 5 feet. It's native to the hardwood forests of eastern Canada and the eastern United States. You can find them in Central Park, particularly near The Pool and the North Meadow. A large specimen is located in Wave Hill at the top of the lawn just

southeast of the Wave Hill House. It is 88.6 feet tall and has a trunk diameter of 46.5 Inches. Sugar maples thrive in well-drained, loamy soil with a slightly acidic to neutral pH; they don't like compacted or heavy clay soils that impede root growth and water drainage, so they are generally not planted as street trees. Although the sugar maple can be confused with the Norway maple, but they are not closely related within the genus. They tolerate temperatures from -40°F to 100°F and can live from 300 to 500 years.

The leaves are up to 8 inches long and wide, with five lobes borne in opposite pairs. The lower lobes are relatively small, while the upper lobes are larger and deeply notched. Leaves are green on the top and pale green to whitish on the underside**.** The fall color is often varied and spectacular, ranging from bright yellow on some trees through orange to a fluorescent red orange on others. The flowers arrive in early spring and are yellow-green and without petals. The fruit is a pair of samaras (winged seeds).
Sugar maple contains the sweetest sap of all maple trees and is used to make most maple syrup and maple sugar. The majority of wooden baseball bats are now made from sugar-maple, the preferred choice because of its exceptional hardness and durability. This also makes it ideal for flooring in high-traffic areas and commercial spaces like basketball courts, but it's used for various other applications like furniture, musical instruments, bowling pins, and cutting boards.

Sugar (Hard) Maple

Pin OAK (*Quercus palustris*) is related to red oak and gets its name from the large number of pin-like branchlets on its main branches. It grows 50 to 100 feet tall, with a trunk up to 3 to 4 feet in diameter. Pin oaks thrive in moist, slightly acidic soil, and they are known for tolerating wet conditions and even some soil compaction. Pin oak is one of the most commonly used landscaping oaks in its native range (eastern and central United States) because it's easy to transplant, grows relatively fast, and tolerates pollution. It can withstand temperatures from -20°F to 90°F and is considered short-lived, with a maximum lifespan of about 120 years.

Young pin oaks have a straight, columnar trunk with smooth bark and a pyramidal canopy. By the time it's 40 years old, it develops a rougher bark and the canopy loosens

and spreads, forming one of the most distinctive features of the pin oak: the upper branches point upwards, the middle branches are at right angles to the trunk, and the lower branches droop downwards. The deep-green leaves are 2 to 6 inches long and 2 to 5 inches broad, with five or seven *pointed* lobes, separated by deep, U-shaped sinuses; they turn a rich, bronzy-red color in the fall. Pin oaks produce small, yellowish-green flowers: The male flowers are pendulous catkins (elongated clusters), while female flowers are less conspicuous. The acorns are small, rounded, and have a shallow, saucer-shaped cap. Although it has a lot of knots, pin oak wood can be used for pallets, outdoor tables, work benches, cabinetry, furniture, and trim.

Pin Oak

Northern Red OAK (*Quercus rubra*) is native to eastern and central United States and southeast and south-central Canada. It is the second-most common species of oak in the northeastern US, after the closely related pin oak. Trees grow from 65 to 100 feet tall, with 3-to-5-foot trunk diameter. There is a large red oak, with a trunk diameter of 60 inches, at the New York Botanical Garden in the middle of the Spicebush Trail, across from a large rock outcropping**.** Northern red oak grows best in deep, well-drained loam to silty, clay-loam soils and can tolerate temperatures ranging from -20ºF to 95ºF. Trees may live up to 400 years.

Northern red oak is easy to recognize by its dark grey (sometimes reddish) bark, which features ridges that appear to have shiny stripes down their centers. The catkins and leaves emerge at the same time. As with most other deciduous oaks, leaves sprout in spring when the day length has reached 13 hours. Leaves are oblong, 5 to 10 inches long and 4 to 6 inches broad, with seven to eleven *pointed* lobes tapering gradually from broad bases. When full-grown, they're dark green and smooth, but yellow green and either smooth or hairy on the veins underneath. In the fall red oak leaves typically display a range of colors, including russet-red, or brown and, while most trees lose their leaves in October, some red oaks retain their dead leaves through the winter and drop them in the spring. Male flowers are yellowish-green catkins, similar to those of pin oak, and female flowers are less conspicuous. The acorns develop on the tree over two growing seasons and are released from the tree in early October. They are somewhat oblong, ¾ to 1 inch long, brown to reddish-brown color, and have a shallow, saucer-shaped cap. Red oak is a popular hardwood that is used extensively in furniture,

flooring, cabinetry, paneling, and millwork, as well as for industrial purposes like agricultural implements and railway ties.

Northern Red Oak

Eastern White OAK (*Quercus alba*) is one of the preeminent hardwoods of eastern and central North America, growing south as far as northern Florida and eastern Texas. It reaches heights of 80–120 feet at maturity, with a trunk diameter of 3 to 8 feet. Its canopy can become quite massive as its lower branches are apt to extend far out laterally, parallel to the ground, and the average canopy has a spread of 80 feet. A large specimen, 90 feet tall and a trunk diameter of 64 Inches, is in Woodlawn Cemetery, near North Border Avenue and Rutgers Avenue, overlooking East 233rd Street. White oak trees thrive in well-drained, slightly acidic to neutral soils, with a preference for rich, sandy or loamy types, and can also grow in clay. They prefer a temperature range of 32° to 95°F but can withstand temperatures as low as -20°F. White oak may live 200 to 300 years, but some have been found that are even older.

White oak bark is typically light gray with plates or scales that resemble vertical shingles on the lower trunk, and it may be furrowed with rectangular blocks on older trees. The deep glossy green leaves grow to be 5 to 8½ inches long and 3 to 4½ inches wide, are whitened underneath, and usually turn red or brown in autumn. They are characterized by their *rounded, finger-like lobes*, which are typically 7 to 10 in number. Flowers bloom in mid-spring as the leaves are unfolding. An individual tree produces both male flowers (yellow catkins) and less conspicuous female flowers and the catkins are an important spring food source for gray squirrels and many other animals. White oak acorns are oblong, light brown, and around 1 inch long, with a warty, bowl-shaped cap covering about a quarter of the nut. The white oak's name comes from the color of the finished wood. A strong and durable hardwood, it's known for its high water-resistance due to its closed-grain structure, making it a durable choice for applications involving water, such as barrels, casks, or boats. It's also used for cabinetry, desks and tables, interior trim, flooring, boatbuilding, barrels, and veneer.

Eastern White Oak

Street Trees

(see also UWSR Eco Letter March/April 2018 COMMENTARY*: Trees in Our City*)

Some of the most common deciduous street trees in New York City are London Plane (about 15% of street trees), Linden (Basswood), Norway Maple (about 14% of street trees), Red Maple, Pin Oak, Callery Pear (about 10% of street trees), Honey Locust, Green Ash, and Ginkgo Biloba. These shade trees have proven to be suited to the NYC climate – they are also hardy and tolerate a variety of soil conditions and wetness – and are resistant to the exhaust fumes released by vehicles around them. Evergreen trees currently comprise only a small minority of street trees but have been recently more frequently planted.

Maintenance of Street Trees

The NYC Parks Department recommends that newly planted trees receive about 20 gallons of water a week, especially in the hot, dry summer months. Tree pits should be kept free of garbage, road and sidewalk salt, and dog waste, which can contaminate the soil. No extra soil should be added to tree pits as adding soil can suffocate the tree and provide a breeding ground for fungi and insects where the soil touches the trunk of the tree.

In order to keep our mature trees healthy, NYC Parks conducts routine pruning every year on a portion of city trees in each community board. If you think a tree is in need of maintenance pruning, you can either wait for the regular cycle or you can contact 311 to request an inspection by a forester, who will assess the pruning needs of the tree and determine when that pruning will best correct the issues. If a tree appears to be dead, please call your borough forestry office (for Manhattan, 212-860-1845) or email Manhattan.Forestry@parks.nyc.gov. If an inspector determines that the tree is dead, NYC Parks will remove it within 30 days of receiving the request.

Trees New York has over 45 years of experience in community tree planting, stewardship and education projects. Since its founding, Trees New York has trained over 13,500 Citizen Pruners and over 9,000 youth in tree care and stewardship. During the last 10 years, they have planted over 5,000 trees in underserved communities throughout New York City, including on New York City Housing Authority campuses, school playgrounds, community gardens, and street trees.

The West 80s Neighborhood Association co-sponsors an annual Love Your Street Tree Day, a coalition of local organizations and volunteers focused on keeping us aware of the importance of NYC street trees and providing information on the care and maintenance of both trees and tree beds. You can watch tree stewardship demonstrations, receive a gardening goodie bag with supplies and their popular curb-your-dog sign, and get mulch for your tree.

* ***Measured in the year 2000 at a height of 133.8 feet with a girth of 18.6 feet, a tulip poplar tree called The Alley Pond Giant (in Queens) may be the tallest and the oldest living organism in the city. It is estimated to be about 350 years old.***

Additional information:

- *Great Trees of New York City*
- List of tree species in New York City
- Love Your Street Tree Day, PO Box 732, NYC 10024; West 80s Neighborhood Association
- *A Natural History of Trees of Eastern and Central North America*, Donald C. Peattie, Hughton Mifflin, Boston MA, 1991, 606 pp.
- New York City Department of Parks Tree Services, tel: 311
- *New York City Trees: A Field Guide for the Metropolitan Area*, Edward S. Barnard, Columbia University Press, New York, 2002, 237 pp.; (click here for a PDF)
- New York Restoration Project, 254 West 31st Street #10, New York, NY 10001; tel: (212) 333- 2552
- Street Tree ID Guide
- *Trees of New York Field Guide*, Stan Tekiela, Adventure Publications, Cambridge MN, 2022, 280 pp.
- *The Urban Forest of New York City*
- Trees NYC; tel: (718) 701-4463

UWSR Eco Letter March/April 2025
COMMENTARY:
Geology of New York City and Surroundings

You leave your apartment and head out to do some errands or meet a friend or go to a meeting. You feel the rigid sidewalk beneath your feet. The sound of an approaching subway train rumbling up through a grate makes you think of the complex systems underneath that make the subway possible and support the City's electrical, technical, water, and sewage needs.

We live only on the topmost layer of the crust of our planet and there is so very much more beneath. But what? If you take a walk in one of our beautiful parks, you'll see the slope of the land and some impressive rock outcroppings. If you go online, some of the many images there of the "blue marble" that is our Earth from space reveal the wrinkles of mountain ranges and the divots of lakes. We know how the crust of the earth formed continents that came together or drifted apart over eons, and that each part of the current individual continents has its own geological character.

So, what's under us here in the New York area?

First, a basic – and greatly simplified – summary of the Earth's composition and how it changed over vast amounts of time.

The *crust* on which we live is the Earth's uppermost and coldest layer. Just beneath it is the *mantle*, a thick layer of solid, silicate rock that separates the crust from the Earth's outer *core* and that makes up the vast majority of the planet's volume. Magma is created when the upper mantle partially melts over prolonged periods of time in response to extreme heat from the liquid outer core. When that magma reaches the surface of the earth, as it does when volcanos erupt, it is called lava.

The Earth's continental crust formed over billions of years. It's 30–70 kilometers thick and composed of sedimentary, metamorphic, and igneous rocks. *Sedimentary rock* is formed from the accumulation and compaction of sediments, including sand, mud, clay or bits of seashells; *metamorphic rocks* are those that have been changed from their original form by intense heat and pressure (such as the mountain-building events discussed below); and *igneous rock* is formed when molten rock, both magma or lava, cools and solidifies (New Jersey's Palisades across the Hudson River are an example).

The crust is relatively rigid and it broke into massive jigsaw puzzle pieces known as tectonic plates – large, solid slabs of rock that vary in size from a few hundred to thousands of kilometers across that essentially "float" on the Earth's mantle. The geology of the Earth's rocky crust has been influenced primarily by tectonic movement, as well as by volcanos, glaciers, water flow or freezing, and chemical weathering.

Tectonic plates can either be pushed together or pulled apart, and each action has distinct results. Two things can happen when tectonic plates are pushed together: (1) they collide, squeeze together, and push upwards to form mountains (these extended episodes of mountain building are called *orogenies*); or (2) one plate slides underneath the other and melts deep in the crust to form magma, which rises and creates a ring of volcanic mountains that are gradually eroded over hundreds of millions of years by water flow, freezing or glaciation, a process that produces sedimentary rock such as sandstone. Tectonic plates can also pull apart, or rift, creating valleys and basins, as well as causing volcanic eruptions, which result when magma plumes rise from the mantle to the Earth's surface.

The Grenvillian Orogeny – widely considered to be the oldest orogeny in our area – occurred roughly between 1 and 1.3 billion years ago. This orogeny is named after the village of Grenville in Québec, which lies on the Canadian Shield (metamorphic rock that underlies much of Eastern Canada and the U.S.). It is in Grenville that evidence for metamorphism of rocks is best preserved and visible for study in exposed mountain roots. Rock created during this period underlies all the other rock of New York State, and gneiss, a metamorphic rock of the Canadian Shield, surfaces in the Fordham area of the Bronx, as well as in the Hudson Highlands.

Three later orogenies followed the Grenvillian and influenced our area. The first, the Taconic, began about 550 million years ago and lasted about 110 million years. It occurred primarily in eastern Canada and New York State, but it extended south into Georgia, and in its later stages formed the metamorphic schist bedrock underlying most of Manhattan as well as the marble in the northern part of the island. It also resulted in the Taconic Mountains, which, at their peak, rivaled the Andes in height. The Taconic Orogeny was the first of three mountain-building events that uplifted the Appalachians, followed by the Acadian (about 415 to 360 million years ago) and Alleghenian (325 million to 260 million years ago) Orogenies. Eroded particles from the Acadian Orogeny formed much of the sedimentary rock of today's Catskill Mountains.

The Palisades cliffs that Upper West Siders can easily see across the Hudson River extend all the way from Haverstraw, NY south to Staten Island. They are part of a sill of igneous diabase (a sill is a flat sheet of igneous rock that forms between layers of older rock). The resultant cliffs are about 50 miles long and 1,000 feet thick and vary in height from 300 feet above sea level to their highest point at 832 feet in High Tor State Park in Rockland County. They began forming 200-250 million years ago (when the Earth's land mass was concentrated in a single supercontinent known as Pangaea) when magma intruded through giant cracks in the Newark Basin sandstone above it, producing the diabase sill. As these vertical volcanic gushers of magma solidified and cooled underground, the mass contracted and created intense pressure that subsequently produced vertical cracks several hundred feet long, transforming the sill into polygonal columns.

Over millions of years glaciation, river flow and freezing ice eroded the sandstone around it revealing the more durable rock cliffs on the Palisades' eastern side. (The columnar appearance of the Palisades looked like the stockades used by Native Americans to protect their villages and earned them their English name, but the Lenape called them "Wee-Awk-En," meaning "rocks that look like trees.")

Drone footage of the Palisades in summer

The Palisades form the western border of the ***Hudson River*** in the New York City region. We live, of course, at its mouth, where it enters the Atlantic and where it also receives a northern flow from the ocean's tide, making it more literally a tidal estuary or fjord. Traveling almost 300 miles south from Lake Tear of the Clouds, its source on Mt. Marcy in the Adirondack Mountains, the river cut a deep gap into the ancient gneiss rock of the Hudson Highlands. The course and character of the Hudson along its entire length reflect its underlying geological structure and the modifications of Pleistocene glaciations.

The bedrock foundation of the Hudson was established in the mountain-building episodes described above. The Northern Hudson Valley is a section of the larger Appalachian Ridge-and-Valley province, which was formed during the Alleghenian Orogeny. The softer parts of these rock units (chiefly sedimentary) were eroded to form the valleys, and the harder parts of the folds formed the mountain tops and ridges. Streams and rivers, such as the Hudson, developed these valleys and mainly flowed south, following the lines of the more easily eroded strata. The deep gorge through the Highlands was primarily formed by glacial activity and by the erosive power of the Hudson River itself, both following pre-existing fault lines within the bedrock.

During much of the last ice age of the Pleistocene glaciations – the ***Wisconsin Glaciation*** about 75,000 to 11,000 years ago – the Hudson Valley was covered by a thick sheet of ice as much as 10,000 feet thick that blanketed the land as far south as New York City

where it was about 1,000 feet in Manhattan. Sometime after it reached here, its furthest point, the Earth began to warm and the front edge the glacier melted, depositing a *terminal moraine*, a raised ridge of rock and other debris (or till) that it had scraped from the earth in its retreat. Parts of this moraine run from the southern tip of Staten Island through Brooklyn and Queens. As the glacier thawed, it also left behind *glacial erratics,* larger boulders the ice had carried south from their origins further north. You can see a large glacial erratic perched on schist in Central Park just north of the pond at West 103rd Street, and there are others scattered throughout the Park.

As the ice melted further and retreated, the Hudson Valley became submerged in water, covered by what geologists call Glacial Lake Albany and, to the north, Glacial Lake Vermont. To the west was an even bigger lake, Glacial Lake Iroquois, which was about three times larger than Lake Ontario is now. A huge ice dam separated Lake Iroquois from the other two lakes and, about 13,000 years ago, as the climate continued to warm, the ice dam was breached and floodwaters poured down the Hudson River Valley and across another hundred miles of coastal plain into the North Atlantic. Exactly how and where Lake Albany drained is still an open question. One theory proposes that, at first, the Hudson River emptied into the Atlantic Ocean through a more westerly course through the Newark Basin in northern New Jersey, and then on into the Atlantic Ocean via Raritan Bay. A build-up of water in the Upper New York Bay eventually allowed the river to break through the land mass of the Narrows (part of the glacial moraine), which connected Staten Island to Brooklyn, and to establish its present course. On the continental shelf (coastal plain), south of New York City and below the surface of the Atlantic Ocean, the Hudson Canyon marks the course of the ancestral Hudson.

To the east of the Hudson River lies the ***Manhattan Prong,*** a belt of ancient metamorphic rock created during the Grenvillian and Taconic Orogenies, that forms the bedrock of the entirety of the Bronx and Manhattan, the upper part of Staten Island, the western edge of Brooklyn and Queens, parts of Westchester County, and upland portions of Southwestern Connecticut. Most of Manhattan's bedrock has long since been covered by sediments, artificial fill, and other human-made features, making it difficult to see the extent of the bedrock.

The Manhattan Prong consists primarily of three types of metamorphic rock:

1. *Manhattan Schist* was formed from sedimentary rock such as mudstone, shale, or sandstone over a billion years ago during the Grenvillian Orogeny and modified during the Taconic Orogeny. Schist forms the island's spine from the Henry Hudson Bridge on its north end to the Battery on its southern tip; it dips abruptly several hundred feet below ground at Washington Square and makes a gradual ascent beginning at Chambers Street. These dips and rises account for the gap between Midtown and Downtown in the Manhattan skyline, since tall buildings originally had to be anchored on solid bedrock and not on the glacial till

that fills the valleys. The schist bedrock also dips at the125th Street and Dyckman Street Faults. *Glacial striations* occur where rocks contained within the glacier cause scratches in other rocks or with bedrock in which it comes in contact. Examples of these striations can be seen at the schist outcrop along the drive near 110th Street and Central Park West and also at Umpire Rock (see below).

Other outcroppings of Manhattan Schist are visible in many locations in Manhattan. Prominent examples include: Umpire Rock, in Central Park at about West 63rd Street (south of Heckscher Ballfields); the large cliff overlooking the Hudson just west of Riverside Drive at about West 83rd Street; and rock cuts along Central Park West from 103rd to 110th Streets. The tall retaining walls in Riverside and Morningside Parks are also made of schist.

2. *Inwood Marble* was formed from limestone created by the seashells of an ancient ocean about 450 million years ago. The 150- to 500-foot-thick marble beds lie beneath the Harlem River and adjacent regions, including Inwood. You can see beautiful outcrops of Inwood Marble in Isham Park at the corner of Seaman Avenue and Isham Street.

3. *Fordham Gneiss* was formed from igneous rocks like granite, also about 450 million years ago during the latter part of the Taconic Orogeny. It forms the Riverdale and Grand Concourse ridges in the Bronx. You can see exposed portions of the Riverdale ridge at the Wave Hill Overlook in the Northwest Bronx.

More Information:

- Field Guide for the Geology of Central Park and New York City (American Museum of Natural History)
- The Flood that Created the Hudson Valley (Times Union)
- Geology of New York: A Simplified Account (Isachsen, et al., New York State Museum Educational Leaflet 28)
- Geology of the New York Region (US Geological Survey)
- Grenvillian Orogeny (Science Direct)
- Hot Rocks: A Geological History of New York City Parks (NYC Parks)
- New York's Remarkable Geological Features: A Glimpse into Earth's History (Betsy McCully)
- Shaped by Nature and Man: The Geological History of the Palisades (American Museum of Natural History)

UWSR Eco Letter November/December 2024
COMMENTARY:
PFAS – Forever Chemicals

This is likely not the first time – and it will hardly be the last – that you'll read about PFAS, and with good reason. PFAS, or per- and polyfluoroalkyl substances, are a class of nearly 15,000 man-made chemicals that break down extremely slowly due to their very strong carbon-fluorine bond and can thus accumulate in the environment and in our bodies over time. This is why they're often referred to as "forever chemicals."

PFAS are probably the most persistent class of manmade chemicals that has ever been developed. They are used so widely and persistently in our environment that they can be found, usually at low levels, in the blood of people and animals all over the world. PFAS have contaminated drinking water in many areas of the United States. They've been widely used in various consumer, commercial and industrial products since the 1940's. These include food and food packaging, refrigerants, cookware, firefighting foam, soft contact lenses, cosmetics, household products, water- or stain-resistant textiles or carpets, adhesives, paints, other building materials, and even dental floss. They also occur at production facilities that produce or use PFAS – for example at chrome plating, electronics, and certain textile and paper manufacturers – as well as in landfills and hazardous waste sites. Scientific studies have shown that exposure to PFAS may be linked to harmful health effects in humans and animals.

The most common classes of PFAS chemicals are perfluorooctanoic acids (PFOAs), perfluorooctane sulfonic acid (PFOSs), and perfluorohexane sulfonates (PFHxS). These three substances have been phased out in the United States, but manufacturers here have developed numerous other PFAS to replace them and can, with government approval, still import PFOA, PFOS, and PFHxS for use in consumer goods. This means that, in spite of being phased out in the U.S., a persistent supply of PFAS-type chemicals remains in our environment that maintain their carbon-fluorine chemical structures and potential toxicity.

The U.S. Centers for Disease Control and Prevention's website says they have found some level of PFASs in the blood of nearly everyone it has tested for them. Most known exposures are relatively low. However, some can be high, particularly when people are exposed to a concentrated source over long periods of time. Adverse health effects are not expected at blood levels below 2 parts per trillion (PPT); between 2 and 20 PPT there is a small possibility that health will be affected; and above 20 PPT there is an increased risk of adverse health effects. PFAS rarely cause acute symptoms, but they can increase the risk for a wide range of diseases, such as thyroid and liver disease or prostate, kidney and testicular cancers. The chemicals have also been linked to ulcerative colitis, high cholesterol, hormonal disruption, immune system dysfunction, birth and developmental defects in children, as well as high blood pressure or cholesterol. Young children and infants may be more vulnerable, since they crawl on carpeted floors and put all kinds of things in their mouths.

The US EPA, Mamavation, and other organizations have tested for PFAS in drinking water, food and food packaging, as well as in various consumer products and other goods and materials. While PFAS exposure doesn't necessarily lead to health consequences, enough illnesses have turned up in enough people who have been exposed to PFAS that EPA scientists and other researchers are justifiably concerned, especially because of their persistence in the environment.

In spite of all this, these chemical substances can be challenging to study, and more research is needed to fully understand all the sources of exposure and how they may cause health problems. The most effective action at this time is to eliminate them from products as quickly as possible to at least stop exacerbating the problem. With this in mind, several pieces of legislation have been introduced in NY State (see below).

PFAS in Drinking Water

PFAS can get into water through a number of sources, including industrial processes, discharges from incinerators and sewage treatment plants, leaching from landfills, spraying of firefighting foams, when products containing them are spilled onto the ground or into lakes and rivers, and from PFAS chemical manufacturing facilities themselves. Clouds pick up PFAS in water evaporating from contaminated oceans and other water bodies and so PFAs actually fall from the sky in most rain. Switching to bottled water to avoid ingesting them isn't a solution because PFAS have been detected there, too.

In April 2024, the USEPA established legally enforceable levels, called Maximum Contaminant Levels (MCLs), for six PFAS in drinking water. These levels range from 4 to 10 PPT (or nanograms per liter) but can be lower if different PFAS are mixed. This is a problem for thousands of contaminated drinking water wells and systems across the country, but—fortunately for NYC residents—levels of 29 PFAS compounds were recently found to be below detectable levels in the City reservoir network (see *The City* - April 16, 2024). Also, granular activated carbon filters can be effective at removing PFAS from water, but their performance depends on factors such as type of PFAS, temperature, or other contaminants in the water. Spent activated carbon can be thermally reactivated to destroy over 99.99% of the adsorbed PFAS, allowing it to be recycled and reused.

PFAS In Food

PFAS can enter the food supply when crops, animals, or fish are grown or raised in areas contaminated with PFAS. Researchers have found them in products as varied as eggs, fruit juice and seafood. The sewage sludge used for years as fertilizer on farms can have high concentrations of these chemicals. Some farmers may inadvertently use PFAS-polluted water to irrigate their fields or feed livestock, or farms may be located over contaminated aquifers. PFAS are often used in food packaging or paper plates to make

them resistant to fat and humidity, and to give them non-stick properties. They can also enter food from cookware, particularly items with non-stick coating.

Consumer Reports tested more than 100 food packaging products from restaurant and grocery chains. Mamavation also tested food packaging. Both found these chemicals in many types of packaging, including grease-resistant paper, pizza boxes, candy and fast-food wrappers, microwave popcorn bags, paper bags for French fries, plastic sandwich bags, molded fiber salad bowls, and single-use paper plates or bowls. In fact, PFAS were found in some packaging from every retailer they looked at.

But there is some good news as well. Big brands like McDonald's and Whole Foods have committed to getting PFAS out of their supply chains. The U.S. Food and Drug Administration tested nearly 1,300 food samples for PFAS and found the vast majority, 97 percent, free of the types of PFAS that the agency is currently able to test for. Mamavation also found that a low percentage of the foods it tested (nut butters, cooking oils, tomato sauces, and ketchup) contained PFAS. Consumer Reports said it had detected PFAS and PFOA in six of the 50 samples of milk it tested (perhaps coming from the milk containers), including in brands marketed as organic, although milk coming directly from cows seems to be relatively free of them.

There are ways you can avoid PFAS in food:

- Cut back on fast food.
- Try to eat a balanced and varied diet to lessen the chance of eating too much of a single contaminated food.
- Reduce how often you eat takeout food and consider bringing your own container (see It's Easy Being Green).
- Don't reheat food wrapped in grease-resistant packaging.
- Use chinaware rather than coated paper plates and bowls.
- Avoid microwave popcorn.
- Avoid nonstick pans and other cookware. Choose cast iron, glass, stainless steel or ceramic pots and pans. Be particularly wary of nonstick pans that you've used for years, or that are chipped or have other visible damage.

PFAS In Textiles

PFAS are used widely in our clothing, shoes, and accessories, usually to make them more durable and/or stain- or water-resistant. Unfortunately, there are no laws in the United States requiring manufacturers to warn consumers that an item was made with PFAS. These chemicals cause pollution at every stage of production. At garment factories, they often contaminate the air, water, and soil of the surrounding environment. Textile products coated with PFAS can also directly expose consumers during wearing or other use. And PFAS-treated apparel that is washed or eventually dumped in landfills or incinerated leaks these chemicals into the environment. In response to pressure from both consumers and groups like NRDC, a number of apparel brands are taking

action. Levi Strauss & Co., Victoria's Secret, and Deckers Brands have already removed PFAS from their merchandise.

Many carpets are designed to be stain- and water-resistant and the chemicals used to give them those properties are filled with PFAS. In 2019, Home Depot announced it would no longer sell carpets containing PFAS, and other retailers have followed suit. But carpeting is not the kind of item consumers purchase often, and most homes still have carpets that were laid down before the switchover began. While carpeting is getting better, the padding remains a problem as it continues to contain PFAS.

The simplest way to reduce your exposure to these toxic chemicals is to opt against buying any apparel, carpeting, furniture, rugs, and bedding or other textile products that are labeled as being water- or stain-repellent. Those treatments nearly always contain PFAS. Check a brand's website to see if it has announced that it has eliminated PFAS from its products or has labeled their product lines as PFAS-free. You can also check out PFAS Central, a project of the Green Science Policy Institute, which offers a helpful list of products and brands that state they offer PFAS-free outdoor gear, apparel, and other products

PFAS In or On Other Products

***Cosmetics and Personal Care Products*:**

PFAS are added to these products to make them more durable, water resistant, or smoother spreading. But those qualities come at a price: some of the products, like dental floss and shampoo, are used in the mouth or near the eyes and mucus membranes there readily absorb contaminants. Multiple brands of both floss and shampoo now advertise themselves as PFAS-free, and the number of such products is growing. In recent years, tampons, period pads and underwear have also been found to contain PFAS. Consider using medical-grade silicone menstrual cups or discs instead or look for brands that state they are PFAS-free.

Even green beauty cosmetics sold in the United States may contain PFAS, according to a recent consumer study by Mamavation, which tested 165 green beauty products (mostly mascara and lipsticks). However, they are still preferable to conventional makeup. Mamavation also tested lip balms, deodorants, toilet paper, dental floss, soft contact lenses, band aids, condoms and lubricants, and menstrual products such as tampons and sanitary pads. They found some PFAS in most of these products. For safe cosmetics and personal care products, check PFAS Central's list.

Paints and Other Construction Products:

The Healthy Building Network tested 94 commercially available paint products for the presence of PFAS. Approximately 50% of paints tested positive for fluorine, a marker of PFAS. Other construction products or materials that may contain PFAS include plumber's tape, roofing, flooring, sealants and adhesives, glass, concrete and asphalt,

wires and cables, tape and even solar panels. These products or materials generally release very slowly into the environment.

Other Sources:

PFAS are found in detergents (they help to break down grease) and cell-phone screens (to resist fingerprints). We are becoming increasingly aware of household dust as a ubiquitous source of contamination, both in the air and on surfaces. Settled dust is especially dangerous for infants and children, who spend extended time on floors where they may inhale or ingest the PFAS contamination. A straightforward solution is to keep your house as clean as possible. Use a wet mop or cloth to wipe off surfaces. Vacuum carpets and change out your AC filters to reduce PFAS. It's helpful to remove your shoes before going into your home to avoid tracking in dirt containing PFAS and other pollution and to wash your hands before eating. The USEPA's Safer Choice Program certifies PFAS-free soaps, detergents, and other cleaning products.

NY State Legislation

- Section 37-0121 of the Environmental Conservation Law (ECL) will prohibit the sale of new apparel that contains intentionally added PFAS (effective January 1, 2025).
- Section 37-0203 of the Environmental Conservation Law (ECL) prohibits intentionally added PFAS in food packaging (effective December 31, 2022).
- NY State Senate Bill 2023-S5648F (A3556C), *PFAS in Everyday Items* would phase out these toxic chemicals in cookware, cleaning products, fabric treatments, rugs, ski wax, paint, and household textiles. It would also require manufacturers to notify sellers and distributors if their products contain PFAS (passed Senate, in Assembly Committee).
- S3529/ A5990 would ban PFAS in menstrual products like pads, tampons, liners, sponges, and more (passed Senate, in Assembly committee).
- S992B would prohibit the sale and distribution of anti-fogging sprays and wipes containing PFAS (passed Senate, in Assembly committee).
- S227B would amend the environmental conservation law to enact the "PFAS surface water discharge disclosure act" (in Senate Committee).
- NY Assembly Bill A3556C would amend state law to prohibit the sale of a wide range of products containing intentionally added PFAS starting January 1, 2026. The bill aims to substantially expand New York's existing restrictions (see above) on the use of PFAS. The bill prohibits use of "regulated PFAS" in an extensive list of "covered products" (on floor of Assembly).

Additional Information:

- Dangerous PFAS Chemicals Are in Your Food Packaging
- Forever Chemicals' Are Found in Some Milk, Including Organic
- Forever Chemicals Are Widespread in U.S. Drinking Water
- Forever Chemicals" Called PFAS Show Up in Your Food, Clothes, and Home

- How Can I Get 'Forever Chemicals' Out of My Life?
- Human Health and Environmental Risks of PFAS
- No 'Forever Chemicals' Worries for NYC's Drinking Water — But Environmental Agency Is Making Extra Sure to Be Safe
- Mamavation PFAS consumer studies
- PFAS //sources
- Safer Choice
- What We Know (and Don't Know) About 'Forever Chemicals' in Food

UWSR Eco Letter September/October 2024
COMMENTARY:
DSNY Curbside Composting Expands in Manhattan

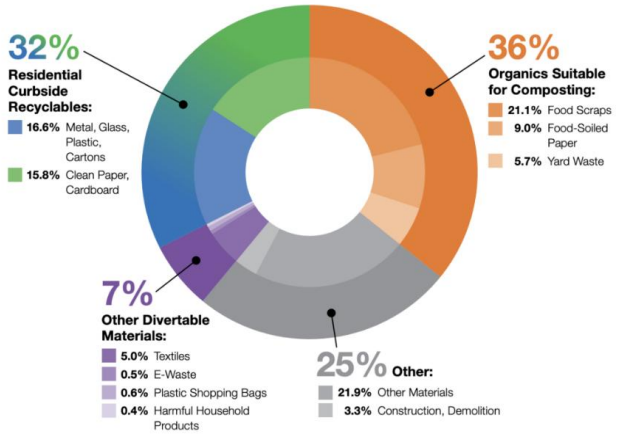
Composting food waste is one of the easiest and most beneficial ways to reduce our waste stream and our overall environmental impact. You may already be composting, but now the NYC Department of Sanitation (DSNY) is making it even easier.

On October 6, 2024, DSNY will be rolling out its Manhattan Curbside Composting program for all Manhattan residential buildings (apartment buildings and single-family homes), and residential composting will become mandatory in the Spring of 2025. No sign-up is necessary. DSNY will collect food scraps as a separate waste stream on the same day they collect paper and metal/glass/plastic recycling. The Composting Smart Bins already sited on sidewalks throughout the boroughs will remain in use.

Compostable materials picked up by DSNY include leaf and yard waste, food scraps and food-soiled paper, including meat, bones, dairy, prepared foods, and greasy uncoated paper plates and pizza boxes.

Why Composting is Important

DSNY has made curbside composting a priority because compostable material (i.e., food and other organic waste, including food-soiled paper) comprises a whopping 36 percent of the 24 million pounds of trash and recycling that New Yorkers generate every day.



Reducing rats: As we New Yorkers know all too well, when food waste is mixed in with other trash it attracts rodents, which can easily rip into garbage bags once they are set out on the curb the night before garbage collection. Putting your food scraps into a separate bin with a secure lid significantly reduces this rat problem.

Reducing the cost and impact of transporting NYC's waste: Composting food scraps and other organic waste also reduces the amount of garbage New York City has to export to other municipalities around the country (and which accelerates the filling up of these other area landfills). And any soil that's eventually produced in the landfills will have been contaminated by substances such as unrecycled materials like plastics and toxic heavy metals from e-waste.

Reducing our carbon footprint: When you reduce the amount of landfill-bound food waste that you produce it effectively reduces your carbon footprint. Once food waste is deposited in landfills, it starts emitting methane and carbon dioxide. Methane – a potent factor in global warming for about 20 years after its release – is emitted as the organic waste decomposes anaerobically (without oxygen). Without oxygen, decomposition of food waste is very slow; thus, an apple in a landfill can remain mostly intact for hundreds of years! Municipal solid waste landfills are the third-largest source of human-related methane emissions in the U.S. Conversely, when food scraps are properly composted, they release significantly less methane, decompose more quickly, and can be used to produce soil, renewable energy, or fertilizer.

How DSNY's Curbside Composting Program Works

Benning October 6, 2024, DSNY will pick up compostable materials from all Manhattan residential buildings (large and small apartment buildings as well as single-family homes) and qualifying non-profit organizations in the borough. No sign-up will be required. Owners of buildings with four or more units must provide a storage area and labeled bins for composting.

Businesses must arrange to have their food waste and recycling collected by a licensed private carter.

In spring 2025, participation in the curbside composting program will become mandatory for all residential buildings in New York City, and non-compliant buildings will face fines ranging from $25-$400, depending on the number of units in the building and the number of offenses.

Materials collected for composting by DSNY include meat, bones, dairy, eggshells, cooked food and all other kinds of food scraps (such as pieces of rotten fruit or vegetables), as well as food-soiled paper (including pizza boxes, plates, napkins, tea bags, and coffee filters) and yard waste (plants, flowers, leaves, twigs, and grass).

To temporarily store food scraps in your apartment before putting them in the DSNY brown bins (more on bins below), put them in large yogurt or other covered plastic containers, milk cartons or in commercially available compost buckets. You can place these containers in your refrigerator or freezer to minimize odors. A layer of used napkins or newspaper at the bottom of the containers helps absorb excess moisture.

Do not compost trash—such as diapers, personal hygiene products, animal waste, wrappers, non-paper packaging, and foam products—or plastic, metal, glass, or paper recyclables.

Before the scheduled pick-up day, place your collected compostables in your building's DSNY brown compost bin or another appropriately labeled bin with a secure lid. DSNY's brown bins are specially designed with latches and other features that keep pests out, so it's important to keep the bins latched at all times. Building staff can line the bin with any bag to help keep it clean. Your building can purchase the DSNY brown bins online (this is recommended, but not required). All other bins must be 55 gallons or less with a secure lid; if using your own bin, a free composting bin decal should be ordered and affixed to the bin. *All residential buildings must have at least one bin with a secure lid for composting*.

Any extra leaf and yard waste can be put in a paper lawn and leaf bag or clear plastic bag. Twigs and branches can be bundled with twine and placed next to bins and bags.

Building staff should take the bins and any other yard waste to the curbside on designated recycling days. Click here to find out your recycling day visit. To report a missed compost collection go here.

Getting Compost for Your Plants or Community Garden

NYC residents are eligible to receive free compost made in New York at one of DSNY's Compost Giveback Events. Registration is required, and the limit is one ticket per person. If carpooling, each person must bring their own ticket and present ID showing a distinct address. Community gardens, nonprofits and City agencies can request an appointment to pick up bulk compost or to have pallets of bagged compost delivered to their location for free.

You can join a virtual session to learn more about composting:

Curbside Composting (these sessions are open to anyone)

- Thursday, September 5, at 4:00 p.m.
- Thursday, September 12, at 6:00 p.m.
- Thursday, September 19, at 2:00 p.m.
- Thursday, September 26, at 4:00 p.m.

Building Management Sessions (these sessions are geared to property managers, superintendents, board members, and owners)

- Thursday, September 5, at 2:00 p.m.
- Thursday, September 12, at 2:00 p.m.
- Thursday, September 19, at 6:00 p.m.
- Thursday, September 26, at 2:00 p.m.

Smart Bins Will Continue to be Available

Smart Composting Bins, an alternative to the curbside composting program described above, are located throughout the City (including the Upper West Side) and are open 24 hours a day, 7 days a week. DSNY has sited over 400 Smart Bins on sidewalks across the City designated for food scraps, including about 30 on the Upper West Side from 59th to 110th Street. Click here to find one near you.

These Smart Bins accept the same food scraps, plant and yard waste, and food-soiled paper described above in the "How DSNY's Curbside Composting Program Works" section. You can drop off these materials in a compostable bag (like the produce bags from Trader Joe's), a paper bag, or even a plastic bag (though the latter is not desirable).

To use Smart Bins you need to download the free NYC Compost mobile app (Apple or Android). The app will show you a map of all the Smart Bins in the City and indicate whether they are available for use (when a bin is full, the app won't be able to open it until the City has collected the compost inside). It gives the precise location of the bin and shows whether it's available (check mark in a green circle), full (horizontal line in a red circle), or nearly full (exclamation mark in a brown circle). Once you're within ten feet or so of the Smart Bin you want to use, select it in the app and then tap "Unlock Bin." A green light will flash and a melody will play, indicating that the bin is unlocking. After you toss your bag of compost into the bin and close the door, the bin will lock again automatically.

In addition to finding and unlocking smart bins, the NYC Smart Compost app provides users with information about the DSNY composting program, gives details on how to use the curbside bins, lists what types of food/materials may or may not be composted with this program, and enables you to report problems with a specific bin or bins.

Additional Information:

- As NYC Rolls Out Mandatory Composting, Will New Yorkers Comply?, *City Limits*, October 11, 2023
- By the Numbers: Compost 'Smart Bins' Used More Than 150,000 Times in First Year on UWS, *West Side Rag*, July 25, 2024
- Curbside Composting, DSNY
- DSNY Curbside Composting Tenant Flier
- Earth Month UWS Explainer: How to 'Compost' Food Scraps and Why It Matters, *West Side Rag*, April 11, 2024
- Smart Composting Bins, DSNY
- Smart Composting Bins Arrive on the UWS, *West Side Rag*, June 27, 2023

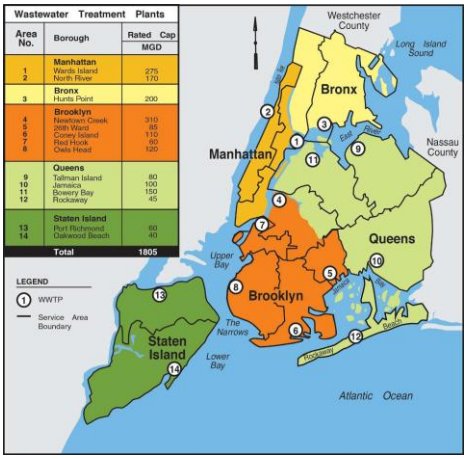
UWSR Eco Letter May/June 2024
COMMENTARY:
The New York City Sewage/Stormwater System

Where does the water go when it leaves our sinks and toilets? What happens to the rain and melting snow? We don't tend to think about this very much, except in more extreme conditions when flooding results.

Most of this water in New York City flows into a combined sewer system—a stormwater and wastewater conveyance that carries domestic sewage, greywater, stormwater runoff, and various pollutants in the same pipes. And this fundamental and crucial process goes on under our feet every minute of every day.

In the United States a considerable population shift from rural to urban areas began in the mid- to late-1800s. Our expanding cities became overwhelmed with wastewater, which resulted in unsanitary conditions and sometimes even disease outbreaks, ultimately leading to a need for centralized wastewater management. At the time, combined sewer systems were the preferred option for managing stormwater and wastewater in urban areas because transporting them together required less pipe, making these systems more affordable than those that separated stormwater from domestic sewage.

Construction of New York City's sewer system began in 1849 (spurred by a major cholera outbreak), and by 1902 most of the City had sewage service. Today, about 60 percent of New York City (including almost all of Manhattan) has a combined sewer system, while the remaining 40 percent has separate stormwater and wastewater systems. In these systems, wastewater and/or sewage travel through 7,500-miles of pipe to 14 wastewater or sewage treatment facilities located across the five boroughs, which treat *in toto* about 1.3 billion gallons of wastewater daily.



Wastewater from sinks, tubs and toilets flows from smaller pipes into larger sewer mains that are typically three to five feet in diameter. It then combines with runoff from rainstorms as well as all the debris and chemicals that wash off the streets or are poured into storm drains.

On average, the drainage limit of NYC's sewage/stormwater system is 1.75 inches of rainfall per hour, but some locations overload more quickly. During periods of heavy rainfall, the combined volume of sewage and stormwater can exceed a sewage treatment plant's capacity so, in order to keep sewage from backing up in the system – where it could spurt through manhole covers or flow back into homes and businesses – the combined system is designed to overflow during heavy rains and discharge excess wastewater and sewer directly into the Hudson River and other waterbodies. When the maximum flowrate is exceeded (as it is now more often due to climate change), Combined Sewage Overflows (CSOs) are triggered. The result is that about 11 billion gallons of CSOs enter our rivers, bays, and oceans each year. Occasionally, when the sewer pipes can't handle the excess flow, the system backs up, and some of that untreated wastewater can wind up in the basements of homes and businesses around the City where sewer water can flow out of their drains or their basement toilets.

The Hudson River has historically been quite polluted, but the river along the West Side of Manhattan has improved dramatically since the construction of the North River Sewage Treatment Plant (NRSTP), which opened in 1986. The plant stretches eight blocks along the Hudson River from 137th Street to 145th Street and is built on a 28-acre, reinforced concrete platform over the river that rests on 2,300 caissons pinned into bedrock up to 230 feet beneath the river. The plant's roof is the home of Denny Farrell Riverbank State Park, a popular recreational facility with three swimming pools, an amphitheater, an athletic center, a skating rink, a restaurant, and sports fields.

The NRSTP serves approximately 550,000 people on the West Side of Manhattan, from Bank Street in Greenwich Village to Inwood Hill at the island's northern tip. It normally

treats about 170 million gallons per day, but it can process even more during storm outflows. There are four stages of treatment: preliminary, primary, secondary, and disinfection using sodium hypochlorite and de-chlorination. The plant discharges about 170 million gallons per day of treated wastewater into the Hudson River.

In 2012 the NRSTP suffered significant flooding from Hurricane Sandy, so in October 2013 the NYC Wastewater Resiliency Plan was developed. This plan called for more than $300 million in capital protective measures to upgrade the City's wastewater pumping stations and Wastewater Resource Recovery Facilities. The plan is intended to harden these facilities against changing climate and future storms, to reduce damage and enable rapid recovery back to full service in the event of a flooding event. This includes elevating and flood-proofing pumps and control panels, sealing doors and windows, raising vents and louvers that open to the Hudson River, and installing floodgates and barriers to protect critical equipment.

Concentrations of bacteria such as E. coli and Enterococcus, which are indicators of fecal contamination, have been shown to increase dramatically following storm events. A small drop of fecal matter can contain millions of microorganisms of many types, some of which are disease-causing pathogens, and exposure to the microbial pathogens found in sewage can lead to short-term and chronic illnesses. The most common types of waterborne illnesses are short-term gastrointestinal infections that cause stomachaches and/or diarrhea. The elderly, children, pregnant women, and people with compromised immune systems are at greater risk of contracting chronic illnesses from sewage-contaminated water.

In 2012 the Sewage Pollution Right to Know Law was passed in the New York State Senate and Assembly and was signed into law. This law requires public notification within four hours when raw or partially treated sewage is discharged into New York waters, allowing the public to avoid unnecessary exposure to dangerous sewage pollution. Riverkeeper, an organization dedicated to defending the Hudson River and its tributaries and protecting our drinking water supply, oversees the largest number of water testing sites in the New York City area. Working with Columbia and CUNY Queens universities, as well as a network of volunteers, they test for Enterococcus (the leading indicator of fecal contamination), as well as dissolved oxygen content (low oxygen levels indicate that water is not safe to drink or for the aquatic organisms that live in it).

Reducing the frequency and volume of CSO events is part of the long-term Mayoral plan and is critical to improving the environmental quality of City rivers and bays, as well as expanding their future recreational use. Various strategies to control CSOs have been proposed. These can be roughly divided into *source controls* (applying to buildings, lots, streets and greenspaces) and *in-system controls* (applying to the sewage/stormwater system and treatment plants).

Source controls, which are easier to implement than in-system controls, consist of both gray infrastructure (e.g., permeable surfaces or holding tanks) and green infrastructure (e.g., trees, green streets, green roofs).

Paved Surfaces: About 40 percent of Manhattan's surface area consists of paved surfaces such as streets, sidewalks, or lots, which are usually paved with impermeable materials such as concrete or asphalt. Because the stormwater can't be absorbed by them, it just empties into the stormwater/sewage system.

The best remedy for this is to replace the paved surfaces wherever possible with soil and plant vegetation, which absorbs some of the water. Another option is to create permeable pavements that control runoff by allowing stormwater to infiltrate the surface of the pavement into the ground below. These permeable pavements are ideal for parking spaces or gutter retrofits, and they can also be used for green alley applications, parking areas, and sidewalks. Types of permeable pavements include porous asphalt, pervious concrete, or permeable interlocking concrete pavement. As with impermeable pavement, these should be installed on a crushed stone aggregate bedding layer and base, which can temporarily detain stormwater that has passed through the permeable surface layer. Some of the water also percolates down into the soil below. In addition, runoff from street gutters (which can also be permeable) can be disconnected from the storm sewer system and the outflow redirected towards vegetated areas or holding tanks.

Rooftops comprise about 12 percent of the area of NYC, and that percentage is likely higher in Manhattan. Green roofs reduce the amount of stormwater runoff by about 50-90 percent for each building, and there are currently about 730 of them in NYC. Depending on the roof design and rain event, a green roof may even be able to retain 100 percent of the water that falls on it. Green roofs also filter out potential stormwater pollutants, including cadmium, copper, lead, nitrogen, and phosphorus.

Rainfall entering a green roof is stored in the substrate (soil medium), absorbed by plants' root systems, and retained in plant foliage. Some green roof systems have additional water storage capacity in a drainage layer under the entire system that can hold up to 1.5 inches deep of water. These roof systems have the added advantages of cooling the buildings and mitigating greenhouse-gas. They can also be used to grow vegetables – an added bonus!

Rooftops can also be designed so that excess rainfall flows into large holding tanks or rain barrels, where it's stored during and after storms. Specially engineered valves on these storage containers release the water gradually so it can be slowly introduced into the surrounding soil, into the stormwater system, or even into community gardens. Alternatively, rooftop drain spouts can be disconnected from the storm sewer system and their outflow redirect to vegetated areas or holding tanks.

Trees: Healthy trees, especially street trees, can reduce the amount of runoff and pollutants entering our waters by intercepting raindrops as they fall to the ground as well as absorbing it into their roots. When raindrops hit the leaves of a tree's canopy, there is less water hitting the ground in a short period of time, allowing more rain to soak into the ground. And larger street-tree pits trap more water. On average, a single tree absorbs about 1,500 gallons of stormwater every year.

Parks: About 70 percent of NYC parkland (including Riverside and Inwood Parks) is part of the Municipal Separate Stormwater Sewer System (MS4), meaning rainwater that falls on these areas flows directly into local waterways without treatment. However, Central Park is an exception, relying on the City's overwhelmed 19th century combined sewer system to carry off its stormwater. To lessen runoff, Central Park's decommissioned reservoir (with a carrying capacity of one billion gallons of water) could be retrofitted to act as a stormwater retention lake for the entire Park's watershed; and Central Park's artificial concrete-lined waterbodies could be returned to a more natural state (clay-lined) and adapted to retain stormwater from their own watershed instead of draining to the City's overloaded combined sewer systems.

Rainfall runoff in all NYC parks can also be reduced by the use of *bioswales, rain gardens, or large underground holding tanks*. Bioswales are channels designed to concentrate and convey stormwater runoff while removing debris and pollution; a bioswale looks like a dry creek bed with plants growing inside. A rain garden is a depressed area in the landscape that collects rainwater from a roof, driveway or street and allows it to soak into the ground. Both of these greenspaces feature a well-draining soil or gravel base and plantings of native shrubs, perennials, and grasses so stormwater is absorbed quickly and deeply rather than running off hillsides or into streets. They should be constructed to allow for some runoff after a day or two to prevent mosquito breeding. Any underground holding tanks should have some overflow structure (such as a perforated underdrain) that allows the water to gradually flow into the surrounding soil or gravel.

In-system controls include separating wastewater from stormwater runoff from paved surfaces, installing regulators or pumps in the sewer system, or increasing the capacity of wastewater treatment plants.

Stormwater generated from impervious areas, such as roads and driveways, can be disconnected from storm sewers and redirected to vegetated areas or holding tanks. These tanks can be designed to release sewage or water into the surrounding earth or back to the combined system when its flow has lessened.

Flow regulators in the combined sewer system limit the amount of flow and divert excess discharge to nearby water bodies via outfall lines when the hydraulic capacity of the system is exceeded. Most of the regulator structures have tide gates to prevent sea or river waters from infiltrating back into the sewer system. One type of flow control is a

bending weir, which is similar to a small, flexible dam. Alternatively, more pumps can be installed in the City's sewer system to move excess water and prevent overflows.

Treatment plant capacity can be increased either by adding on to the treatment plants or by making them more efficient. Efficiency can be improved by upgrading to a high-density sludge process, replacing old pumps, or implementing smart metering technology.

More Information:

- *DDC Cool & Green Roofing Manual* (NYC Department of Design & Construction)
- A Design Guide for Green Stormwater Infrastructure Best Management Practices Scalable Solutions to Local Challenges
- Stormwater Best Management Practice Permeable Pavements (US Environmental Protection Agency)
- *How NYC Parks Fights Climate Change: Cleaning Our Water and Protecting Flood-Prone Communities* (NYC Parks)
- Combined Sewer Overflows (NYC Environmental Protection Agency)
- Sewage Contamination (Riverkeeper)
- Water Quality (Riverkeeper)
- *Why New York City Keeps Flooding* (The New York Times)
- *What are Combined Sewer Overflows?* (Penn State Extension)

$300 Million Upgrade of West Harlem's North River Wastewater Resource Recovery Facility Will Reduce Greenhouse Gas Emissions by Nearly 50 Percent

UWSR Eco Letter March/April 2024
COMMENTARY:
It's Easy Being Green

It's Easy Being Green (IEBG) is an example of the adage "act locally and think globally," and how a small, local organization that promotes action within the community can have a much broader effect in alleviating a shared climate problem.

IEBG is an all-volunteer climate education and personal action group on Manhattan's Upper West Side, with a mission to educate their neighbors about the City's efforts toward sustainability by providing them with easy-to-implement green practices. Areas on which they focus are: Reducing Plastic Usage (including bringing your own container to local restaurants and coffee and tea shops); Compost Resources; Climate Change and Energy Efficiency; and Legislation (Federal, State and Local).

Sharon Waskow founded It's Easy Being Green in 2019. According to Sharon, it was the birth of her granddaughter that prompted her. At that time she was a climate conscious person but did very little to help alleviate the problem. She asked herself, what would I say to my granddaughter if in the future she asks me, "What did you do about the climate crisis?" Sharon felt she had to get involved, so, with the networking assistance of Bloomingdale Aging in Place and the West 104th and West 102/103rd Street Block Associations, she recruited volunteers and IEBG was launched.

Sharon's years spent as a Middle School Librarian taught her the power of information. The mission was clear from the start: inform our neighbors about the effects of climate change in New York City and what our civic institutions, organizations and scientists are doing to mitigate those effects.

The chief means of communicating their mission to neighbors is a monthly newsletter, whose subscribers now number 500+, and whose open rate stays near an impressive 68%. Each issue features an interview with a key NYC person working on sustainability, legislation, carbon reduction, zero waste and more. A monthly "Let's Be Plastic Free" column provides reviews of personally tested products to help readers reduce reliance on plastic (see below). Up to date information on the City's curbside food waste program and ways to advocate for NYC and NYS environmental laws are also offered. And periodic *Personal Action Blasts* provide commentary on a variety of environmental topics.

Reducing Plastic Usage

In each newsletter IEBG reviews plastic-free products for household cleaning and laundry; toiletry and bathroom cleaning; personal care and hygiene; water bottles, cutlery, pens and pencils; and more. They've compiled an *Index of Plastic Free Product Reviews* that includes links to products discussed in their newsletters. Among their *Personal Action Blasts* is material on an Australian group called *Plastic Free*. Sharon is especially proud of their latest plastic pollution reduction campaign, BYO Container/UWS Reduces Waste (see below).

IEBG also offers tips on how to reduce consumption of plastics. Reducing plastic usage is extremely important since over 90% of the world's plastic ends up in landfills, oceans and waterways, and elsewhere in the environment. Plastics do not biodegrade but, instead, slowly break down into smaller pieces called microplastics, which take thousands of years to decompose. For more information about plastic, click on the link in the newsletter to our Archive of Past Commentaries (just above the Events listings) to see these previous *UWSR Eco Letter* Commentaries: "Minimizing Plastic Waste" (November/December 2020); "Microplastics and Other Lightweight Plastics" (September/October 2021); "Shopping Bags" (January/February 2020); and "Styrofoam" (September/October 2019).

Their BYO Container/UWS Reduces Waste project mentioned above is another part of IEBG's plastic reduction efforts, in which IEBG asks local food and beverage shops to attach the BYO Container green sticker to their window (which indicates they will accept your reusable container to fill with your favorite coffee, tea or smoothy) and to refill customers' containers. As of January 2024, there were 16 Upper West Side shops that have posted the BYO Container sticker. Click here and scroll down their newsletter for a list of stores.

Look for this sticker in shops.

Please patronize these forward-thinking neighborhood shops and let them know you appreciate their efforts to create a greener NYC. You can also help by bringing your own travel mug or food container to participating food and beverage shops, identifying stores that might participate, or actually joining IEBG in spreading the word. They'll supply fliers and stickers; email them at itseasybeinggreen.uws@gmail.com. Stores interested in joining can email IEBG or check their website.

Compost Resources

To help get you started composting, IEBG offers advice on gathering and storing food scraps, explains what is accepted by DSNY or at Greenmarkets, shows you how to use the latched DSNY brown bins in a short video, and outlines respective responsibilities of residents and building staff. They also provide tips for bringing neighbors on board and list the benefits of free composting, which include reducing the amount of trash hauled by the building staff, better protection from vermin such as rats, reducing offensive odors, and reducing production of the greenhouse gas methane.

IEBG also provides information about *Smart Compost Bins*, which, along with some Greenmarkets, are an alternative to the DSNY food scrap collection. You can access Smart Composting Bins 24 hours a day, 7 days a week, using a free and simple app that you can download here.

Smart Bins in the Bloomingdale neighborhood of the Upper West Side are located at:

- the SW Corner, West End Avenue & West 96th Street
- the NE Corner, Broadway & West 97th Street
- the SE Corner, Broadway & West 102nd Street
- the SE Corner, Broadway & West 109th Street

Other locations in the Columbia University vicinity are:

- the SW Corner, Broadway & West 112th Street
- the SE Corner, Amsterdam Avenue & West 113th Street
- the SW Corner, Amsterdam Avenue & West 114th Street
- the SE Corner, Amsterdam Avenue & West 123rd Street

For more information about Smart Bins, see the West Side Rag article.

For more information about Composting and Organic Waste in general click on the link in the newsletter to our Archive of Past Commentaries (just above the Events listings) to see these previous *Eco Letter* Commentaries: "Organic Waste" (March/April 2015); "Organics/Composting Update" (July/August 2020); and "Organics Collection in Residential Buildings" (November/December 2019).

Note that food-scrap collection will be mandatory for all residential buildings in Manhattan starting October 2024.

Climate Change and Energy Efficiency

IEBG provides information about *Local Law 97*, which deals with energy efficiency and greenhouse gas emissions. Buildings account for approximately two-thirds of greenhouse gas emissions in New York City, and *Local Law 97* phases in carbon caps in one of the most ambitious plans for reducing emissions in the nation. This law — part of the Climate Mobilization Act — was passed by the City Council in April 2019. On December 18, 2023, the NYC Department of Buildings published the final version of the newest package of rules for *Local Law 97*.

Under *Local Law 97*, most buildings over 25,000 square feet are required to meet new energy efficiency and greenhouse gas emissions limits as of 2024, with stricter limits coming into effect in 2030. The goal is to reduce the emissions produced by the City's largest buildings by 40% by 2030 and 80% by 2050. The carbon caps vary across 60 property types. To meet a building's carbon limit, owners can lower carbon directly through energy efficiency and switching to lower-carbon fuels. They can also use credits from eligible renewable energy generation or greenhouse gas reduction projects (GHG offsets) or install solar or battery storage onsite to help meet the law's targets. The law also established the *Local Law 97 Advisory Board and Climate Working Groups* to advise the City on how best to meet these aggressive sustainability goals.

Personal Action Blasts

Aside from plastics, Personal Action Blast topics include: Seven Reasons to Buy Local; LED Light Bulbs; Environmental Impact of Blue Jeans; Boil Water Better; Eat Out, Speak Up; Meat: What's the Beef?; and Zero Waste Gift Guide.

We've covered some of these topics previously in our UWSR Eco Letter (see the link in the newsletter to our Archive of Past Commentaries), so we'll focus here on some of those we haven't.

Seven Reasons to Buy Food Locally

1. When produce is harvested locally, it can be picked much closer to peak ripeness, which means it will have more flavor than produce picked for shipping.
2. Buying fresh produce in season means it isn't grown far away and shipped thousands of miles (spewing lots of carbon dioxide into the atmosphere).
3. Having only a short distance to travel to market means the produce retains more of its vitamins and nutrients.
4. Buying local is also a great way to support the local economy. Money spent at local farms goes back into local services.
5. Buying local keeps farms in business and keeps the land they use from going to developers.
6. Keeping produce local also means fewer steps on the way to market, which often keeps the food safer from contamination.
7. If you happen to get your produce at a Farmer's Market or CSA, you can often ask questions directly of the grower and learn the best way to store and use your produce.

Environmental Impact of Blue Jeans

It turns out that the production of denim is one of the worst planetary offenders. Growing and processing cotton requires using up to 7,600 gallons of water per kilogram (2.2 pounds) of cotton, 16% of all insecticides used for global food and fiber production, and a lot of toxic synthetic dyes and bleach that end up polluting our rivers and drinking water. Read a full account on the impact of blue jean manufacture on the environment in Tatiana Schlossberg's report for The National Resource Defense Council.

There are actions we can take to mitigate the toll their manufacture takes on the environment. According to Schlossberg we should:

- Avoid overconsumption. Wear the denim you have as long as possible.
- Forgo "fast fashion," cheaply made, trendy clothing manufactured to last only a season or two and end up in landfills.
- Mend your jeans instead of tossing them.
- Shop for jeans at thrift and consignment shops to extend their life and lower their carbon footprint.
- When buying new, opt for durable items that will last years and not months.

Meat: What's the Beef?

Production of meat and dairy, particularly from cows, also has a large environmental impact. It accounts for about 14.5% of the world's greenhouse gas emissions each year — roughly the same amount as the emissions from all the cars, trucks, airplanes and ships combined. There are a number of reasons for this: clearing forests to make room for farms and livestock releases large amounts of carbon into the atmosphere; cows, sheep and goats burp up methane (a greenhouse gas much more potent than carbon dioxide in the short term) when they digest their food; and methane is also released in

large quantities from their manure. You can reduce your individual carbon footprint by eating less red meat, lamb and cheese (the greatest offenders); using fake meat alternatives; and by increasing the amount of fresh fruits and vegetables in your diet and making meat a side dish rather than the main dish.

UWSR Eco Letter November/December 2023
COMMENTARY:
Food Waste

Overview:

Most people don't realize how much food is discarded in general, or even how much they themselves throw away every day. It may be the uneaten leftovers sitting in the back of your fridge or the fruits and vegetables that may be old but could be eaten or repurposed. *But preventing food from going to waste is one of the easiest and most impactful actions you can take to both save money and lower your environmental impact by reducing greenhouse gas emissions and conserving natural resources.*

Food waste statistics are sobering. Food and other organic waste make up about one-third of New York City's 24 million pounds of daily garbage. Looking beyond the City, about 60 million tons of food is wasted each year in the U.S. – between 30% and 40% of the country's food supply, of which only about 4% is composted. And globally, about 1.3 billion tons of the food produced throughout the world is lost or wasted every year. All the world's nearly one billion hungry people could be fed on less than a quarter of the food that is wasted in the U.S., the UK and Europe alone.

There is a direct economic cost of this waste: about 750 billion US dollars. If food waste could be represented as its own country, it would be the third largest greenhouse gas emitter, behind China and the United States. The resources needed to produce the food that becomes lost or wasted result in a carbon footprint of about 3.3 billion tons of CO_2.

In the U.S., food goes to waste at every stage of food production and distribution – from farmers to packers and shippers, from manufacturers to retailers to our homes. Agricultural waste (e. g., damage by weather, pests, and disease; surplus crops that can't be marketed) is responsible for about one-third, and what we throw away in our homes makes up about 40% of all food waste. The remainder occurs during food distribution—with grocery stores contributing the largest amount.

Here in the City, half of food waste is generated in our homes and about 20% is produced by restaurants and caterers, with the remainder generated by health care facilities, colleges and universities, grocers, and markets, and in other settings. Most of the City's discarded food scraps and yard waste are sent to landfills or incinerators. When residential food waste is put out in black bags with other garbage for Sanitation Department collection it provides an easy food source for an increasingly brazen rat

population. So, by reducing the amount of food you waste, you have a positive impact on our environment and climate change and also help reduce the proliferation of rats and other vermin.

When food is wasted, the land, water, energy, and other resources that are used in its production, processing, transportation, preparation, storage, and disposal are wasted as well. More than 85% of greenhouse gas emissions (primarily carbon dioxide) associated with food waste are due to activities prior to food entering a landfill. But once food waste is deposited in landfills, it emits methane, a potent greenhouse gas, as it decomposes anaerobically (without oxygen). Without oxygen, decomposition of food waste is very slow; thus, an apple in a landfill can remain mostly intact for hundreds of years! Municipal solid waste landfills are the third-largest source of human-related methane emissions in the United States.

What Can You Do About It?

It's important to remember that, in spite of the scope of these challenges, individual actions can have a significant beneficial impact. Here are some things to keep in mind.

Planning and Shopping:

- **Save money** by buying only what you need, eating what you buy, and avoiding throwing away food. The average family of four spends $1,500 each year on food that ends up uneaten.
- Keep a running list of meals and their ingredients that your household already enjoys. Check your refrigerator, freezer, and pantry first to avoid buying food you already have. Plan your meals for the week before you go shopping and buy only the things you need for those meals.
- Purchase imperfect or upcycled food products. Imperfect produce may have physical imperfections but is safe and nutritious and can sometimes be found at discounted prices. Upcycled products are made from ingredients that might have otherwise gone to waste.

Storage:

- Refrigerators should be set to maintain a temperature of 40 °F or below. Store meat, poultry, and fish on the lower shelves, which are the coldest parts of the fridge.
- Most refrigerators have a high humidity drawer (a "crisper drawer") and a low humidity drawer. Vegetables, especially those that tend to wilt (such as leafy greens, carrots, cucumbers, and broccoli), should go in the high humidity drawer (i.e., the setting in the front of the drawer is open). Most fruits, as well as vegetables that tend to rot (such as mushrooms and peppers), should go in the low humidity drawer of the fridge (i.e., the setting in the front of the drawer is closed).

Produce, such as potatoes, eggplant, winter squash, onions, and garlic, should be stored in a cool, dry, dark, and well-ventilated place, while fruits like bananas, apples, pears, stone fruits, and avocados should be stored away from other produce because they release ethylene gas as they ripen, which makes other nearby produce ripen – and thus potentially spoil – faster.

- Periodically check the back of your refrigerator for leftovers; eat them for lunch or incorporate them into dinner. A recent NRDC study (see below) showed that about two-thirds of food discarded in NYC was actually still edible.
- Freeze any food, including leftovers, that you know won't be eaten soon enough to prevent spoilage.

Cooking and Preparation:

- Produce that is past its prime, as well as odds and ends of ingredients and leftovers, may still be fine for cooking. Repurpose these in soups, casseroles, stir fries, frittatas, sauces, baked goods, pancakes, or smoothies.
- Consider the edible parts of food that you normally don't eat and find ways to utilize them. For example, stale bread or crusts can be used to make croutons, beet greens can be sautéed for a side dish, and vegetable scraps and chicken bones can be used for soup stock.
- Learn the difference between "sell-by," "use-by," "best-by," and expiration dates. The *Food Date Labeling Act (S 1484, HR 3159)* would establish a dual label system and reduce labeling language to two phrases: one quality date indicator and one discard date indicator. It would eliminate state laws that bar the sale or donation of food past the quality date. However, states would still be allowed to prohibit the past-date sale or donation of foods bearing the "Use by" discard date.

Composting:

Compost your unusable food scraps (though it's preferable to avoid food waste in the first place as much as possible). Intro. 244-A will make residential organics collection mandatory for all New York City residents as of October 2024.

DSNY supplies brown bins to all buildings participating in their organics collection program for storage of residents' compostable organics. These brown bins are specially designed with latches and other features that keep pests out, so it's important to keep the bins latched at all times. To temporarily store food scraps in your apartment before putting them in the brown bins, place food scraps in large yogurt or other covered plastic containers, plastic bags, milk cartons or in commercially available compost buckets. Store them in the refrigerator or freezer to minimize odors. A layer of used napkins or shredded newspaper at the bottom of the containers helps absorb excess moisture.

Local Organizations Dealing with Food Waste:

- *Avid Waste Systems* provides organics services to a wide variety of customers in the agricultural, food distribution, and production and event industries in addition to micro-haulers, through both composting and anaerobic digestion. They also offer food-scrap pickups to residential buildings up to three times per week for a fee (jokun@avidwaste.com; 718-991-9700).

- *Big Reuse* operates two compost processing sites: one underneath the Queensboro Bridge, and the other in Gowanus, Brooklyn. They also partner with DSNY to conduct curbside composting outreach in order to encourage New Yorkers to sign up for the service. (718-725-8925).

- *City Harvest (*150 52nd Street, Brooklyn) is New York City's first and largest food rescue organization. The organization collects **excess food** from restaurants, grocery stores, bakeries, manufacturers, and farms and delivers it free of charge to **food pantries, soup kitchens and other community food programs across the City**. (646-412-0600).

- The Department of Sanitation of NYC *(DSNY) collects food scraps from residential buildings on a weekly basis free of charge. They supply latched, brown, food-scrap containers on wheels. DSNY isn't currently accepting new buildings for this program in Manhattan, but* starting **October 7, 2024**, Curbside Composting will be available to all Manhattan residents! No sign-up needed. (311)

- *Earth Matter* runs a Compost Learning Center on Governors Island, where they process more than a million pounds of food scraps each year that are sourced from all over NYC. (contact@earthmatter.org; (646) 734-6151)

- The *Food Recovery Network,* with chapters at Columbia and NYU, helps to divert **wasted food** from college campuses to nonprofits. It's **the largest student-led food recovery movement in the United States.**

- *GrowNYC* provides food-scrap drop-off sites at over 50 greenmarket locations throughout the city, including sites at 66th, 79th, 97th and 116th Streets. See their website for hours and exact locations.

- *Harlem Grown*, (127 West 127th Street) has transformed **13 vacant lots** into urban farms and gardens. These agricultural sites divert **food scraps** from landfill into their composting system. (info@harlemgrown.org; 212-870-0113)

- *Lower East Side Ecology* (Seward Park) is the longest-running community compost program in New York City, providing New Yorkers with free food scrap drop-off opportunities at 20 collection sites. They also offer technical assistance to other community composting efforts. (212-477-4022)

- *New York Food Bank Association* (39 Broadway) has a network of approximately 1,200 emergency and community food providers, including soup kitchens, food pantries, shelters, as well as day care and rehabilitation centers. They provide food donated from the Fulton Fish Market, the Hunts Point meat and produce markets, government agencies and other sources. In addition, Food Bank runs Kid's Café, an after-school program providing free meals to children. (212.566.7855)

- *Reclaimed Organics* offers weekly collection of compostable material for a fee to offices and some small businesses in Manhattan neighborhoods south of 75th Street, east or west. Pickups will be on the same day of the week each week, depending on your neighborhood-- generally between 10 a.m. and 3 p.m. They supply containers. (info@ReclaimedOrganics.org; 347.395.6377)

- *Rethink Food NYC* (75 Broad Stret) takes excess food from restaurants, corporations, farmers markets and other sources, then transforms it into nutritious meals, which they offer at little or no cost to families in need in New York City. (212-364-7040)

- *Vokashi Kitchen Waste Solutions* is a micro-hauler that picks up food scraps from residential buildings in NYC and Westchester County for a fee. Vokashi uses the Japanese method of fermentation called "bokashi" and provides an airtight bucket and bran containing microbes to start the fermentation. (718-623-2515)

More information:

In addition to the resources below, also see our *Hard-to-Recycle List*, available by clicking on any of the links to it in the Eco Letter

- US Environmental Protection Agency, Preventing Food Waste at Home
- Feeding America
- Natural Resources Defense Council, Estimating Quantities and Types of Food Waste at the City Level
- DSNY, Food Scraps and Yard Waste
- RTS, Food Waste in America in 2023
- RTS, NYC Waste Statistics – What You Need to Know

UWSR Eco Letter September/October 2023
COMMENTARY:
WE ACT for Environmental Justice

On January 15, 1988, Martin Luther King, Jr.'s birthday, seven West Harlem activists engaged in an act of civil disobedience to protest the North River Sewage Treatment Plant. This massive facility – originally planned to be sited in a wealthier, predominately white neighborhood of Manhattan – was eventually built in the predominantly Black community of West Harlem. Not only did it produce noxious odors from its open sewage tanks, but the plant was not built to code, resulting in harmful air pollution for a community already burdened with health issues resulting from air pollution.

That morning, then West Harlem Democratic District Leaders Peggy Shepard and Chuck Sutton, then-state Senator and later Governor David Paterson, former Council member Hilton Clark and three others were arrested for peacefully holding up rush-hour traffic on the West Side Highway. As a result of this protest, they were branded the "Sewage Seven."

Two months later, in March of 1988, Peggy Shepard, Vernice Miller-Travis, and Chuck Sutton filed the 501(c)(3) paperwork to create West Harlem Environmental Action, which became known as WE ACT for Environmental Justice. It was New York City's first environmental justice organization, and one of the first environmental organizations in New York State run by people of color.

The organization was formed in order to file a lawsuit – along with fellow plaintiffs, including the Natural Resources Defense Council (NRDC) and the Hamilton Heights Day Care Center – against the New York City Department of Environmental Protection for operating the North River Sewage Treatment Plant as a public and private nuisance. In 1993, they reached a settlement with the City, which included the establishment of a $1.1 million fund related to environmental health and quality of life.

The organization's next major campaign sought to address the disproportionate air pollution caused by the fact that six out of the seven Metropolitan Transit Authority's (MTA) bus depots in Manhattan were located north of 99th Street in communities of color. This public awareness campaign, "Dump Dirty Diesel," was launched in 1997 and urged the MTA to commit to invest in clean-fuel buses and modify their bus depots to accommodate them.

In 2000, WE ACT and several Northern Manhattan community residents filed a Title VI Complaint with the U.S. Department of Transportation (DOT), charging the MTA with violating the civil rights of Northern Manhattan residents. In response, the DOT concluded that the MTA must give due consideration to environmental justice principles in its siting decisions. Two years later, then Governor George Pataki and key state legislators promised that the MTA would replace hundreds of diesel fuel buses with

alternative fuel vehicles. The MTA has been investing in cleaner buses ever since, including a new electric articulated bus that is now operating on the M60 SBS route in Harlem.

WE ACT's mission is to build healthy communities by ensuring that people of color and/or low-income residents participate meaningfully in the creation of sound and fair environmental health and protection policies and practices. By utilizing community-based participatory research, they address a variety of issues about environmental justice and the overall improvement of the environmental health and quality of life of the Northern Manhattan community.

Over the years WE ACT has expanded its focus on diverse environmental activities in the City to those in the State and in Washington, DC, and to policies concerning climate justice, clean air, jobs, healthy homes, and sustainable and equitable land use. These include:

- The development of an Environmental Health Report Card;
- lead pipe remediation;
- an Environmental Justice Leadership Forum;
- working to improve indoor air quality in affordable housing;
- working to limit the use of PFAS and phthalates;
- raising awareness about toxic ingredients in beauty products;
- finding solutions to extreme heat and other climate related issues;
- exploring benefits of transitioning from fossil fuels to renewable energy in affordable housing; and
- partnering in community solar power development projects.

An Environmental Health Report Card

WE ACT created a *downloadable report card* to reconcile disagreement among different sources and generate a more inclusive evaluation of Northern Manhattan's environmental health status. They first reviewed environmental health indicators from a variety of sources – such as government agencies and advocacy groups – and then contrasted Northern Manhattan's performance on these indicators against all of New York City. They also researched government policies (including actions under consideration) that would affect specific indicators and assigned a letter grade to each identified environmental concern based on environmental statistics, related health impact and current policies. When the data showed a high impact on a particular community (a disparity), they identified policies and practices that would reduce that impact.

Lead Pipe Remediation

New York State still has about 360,000 lead pipes delivering water to people's homes, ranking it fourth in the nation. Lead is a toxic substance, and children are the most

vulnerable to its harmful effects. These include impairment of their brain and nervous system as they develop, which can result in permanent and profound health issues. Even though lead poisoning is preventable it remains a deadly threat, and studies show that Black children living below the poverty line are twice as likely to suffer from lead poisoning as poor white children.

WE ACT is part of a project that is creating a *lead service line (LSL) replacement inventory tool* to overcome this challenge. With the help of BlueConduit, a company that builds machine learning software to support efficient lead removal, they are creating a public-facing map for communities to use with local decision-makers, utility leaders, and other stakeholders. Working with WE ACT and NRDC, each hub city will have a community organization lead, and their partners will work within their community to educate them about the health concerns with LSLs and engage with decisionmakers. Their goal is to ensure that communities are able to accurately identify and advocate for the removal of these toxic lead pipes. This will ensure better quality drinking water for generations to come as well as create healthier homes and communities.

Environmental Justice Leadership Forum

WE ACT's Federal Policy Office coordinates the *Environmental Justice Leadership Forum* (EJ Forum), a national coalition of 54 environmental justice organizations working together to advance climate justice and impact policy to ensure the protection and promotion of communities of color and low-income communities throughout the U.S. The forum was initiated in 2008 in response to the emerging concerns about possible mitigation strategies and regulations to reduce greenhouse gas emissions, which had the potential to amplify the disproportionate environmental burden on communities of color and/or low-income people.

On December 9, 2020, the EJ Forum released a *Green Jobs Report*, offering community-based solutions for a diverse green jobs workforce. The Federal Policy Office is currently working with EJ Forum members and other community-based organizations across the country to raise awareness and understanding of President Biden's Justice40 initiative – a 2021 executive order that directs "at least 40 percent of the overall benefits from federal investments in climate and clean energy" to disadvantaged communities – through its Justice40rward campaign.

PFAS and Phthalates

Per- and Polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that are a public health and an environmental concern. The use of PFAS is widespread in the making of products that resist grease, oil, water, and stains – such as non-stick pans, microwave popcorn bags, raincoats, cosmetics, fire-fighting foam, carpets, and food wrappers.

Phthalates are a group of chemicals linked to a variety of health concerns. They are used to make plastics more flexible – especially polyvinyl chloride (PVC) plastics – and act as a

dissolving agent for other materials, often to help retain color and fragrance. As a result, they can be found in a wide range of products.

WE ACT has been working to raise awareness of PFAS and the threat these chemicals pose to the public, as well as to advance legislation that will limit the continued use of these harmful chemicals. With its partners, WE ACT hosted a PFAS Webinar in 2019 to help educate the community about these chemicals and the threats they pose, and WE ACT has also published a phthalate fact sheet.

Beauty Inside Out

Beauty Inside Out addresses the issue of toxic chemicals in personal care products that are often used daily but are largely unregulated. To ensure the community is aware of the risks posed by the chemicals commonly found in these products, WE ACT has partnered with Columbia's NIEHS Center for Environmental Health and the Columbia Center for Children's Environmental Health to create a community briefing on cosmetics and other personal care products. They are surveying girls and femme-identifying people of color between 13-17 years of age that live in Northern Manhattan (West Harlem, Central Harlem, East Harlem, Inwood, and Washington Heights) to help understand how they use and feel about some types of cosmetic products and how this might affect their health. With more workshops and a soon-to-be-launched Beauty Justice Coalition, the goal is to raise awareness of the serious health hazards people face when using these products, as well as to provide suggestions on how to minimize these risks.

Transitioning from Fossil Fuels to Renewable Energy

In 2021, WE ACT launched a pilot program called *Out of Gas, In with Justice* to demonstrate the feasibility and benefits of transitioning from fossil fuels to renewable energy in affordable housing and to improve indoor air quality. The program replaced gas stoves with induction stoves in ten affordable housing homes in a New York City Housing Authority (NYHCA) building in the Bronx. Working with partners at the Columbia University Mailman School of Public Health and Berkeley Air Monitoring, they monitored the changes in indoor air quality compared to control homes.

In 2023, WE ACT released the findings of its study, which found significant reductions in indoor air pollution when transitioning from gas to induction stoves. For example, it discovered that nitrogen dioxide concentrations in kitchens with gas stoves were on average 190% higher than in kitchens with induction stoves, thus drawing national attention to the public health threat of gas stoves and the importance of including those living in affordable housing in the transition to renewable energy. NYCHA has since announced its intention to replace gas stoves with induction stoves in 10,000 of its apartments.

Climate Change

WE ACT partnered with East Harlem COAD and Harlem Emergency Network to create the *Climate Ready Uptown Plan*, a document that helps Northern Manhattan community members understand their individual risk from climate related disasters (specifically extreme heat, as well as coastal and stormwater flooding) and provides practical information to help prepare them and their families. The plan is tailored to residents of Northern Manhattan, and it includes an interactive map that helps residents better understand their flood risk.

WE ACT recently held a webinar on extreme heat, which included a *2023 Extreme Heat Policy Agenda* that outlines the programs and policies they are pursuing. Extreme heat is the deadliest impact of climate change, and studies show that its worst impact is in communities of color. Cooling Centers are often the only relief for residents without air conditioning. Their *Cooling Center Audit Report* identifies gaps in coverage for heat-vulnerable neighborhoods and also provides accessibility information and operating hours for the Cooling Centers.

Solar Energy

To expand the use of solar energy in Northern Manhattan, WE ACT partnered with Solar One and the Urban Homesteading Assistance Board to launch *Solar Uptown Now* (SUN), a campaign to bring Northern Manhattan community members together in order to purchase solar energy as a group. The SUN model, which became the first successful solar purchasing program specifically for multi-family affordable housing, helps customers choose a solar installer that offers competitive, transparent pricing. And purchasing solar as part of a group helps to reduce the cost of solar installation for all the participants. SUN targeted Housing Development Fund Corporation (HDFC) cooperatives for solar installations because they make up the bulk of New York City multi-family, occupant-owned affordable housing, which means the residents typically have a say in their energy choices. In addition, some members of the community were trained as certified solar panel installers, thus creating green jobs for the community. SUN has installed solar panels on the roofs of 11 HDFC buildings in Northern Manhattan that produce 415 KW-DC of renewable energy and provide significant cost savings for building residents.

The *Community Power Project* is a 1.2 MW project in the Carver Houses in Spanish Harlem that guarantees a 20% electricity bill savings to 500 NYCHA low- to middle-oncome households, each of which receives a share of the energy generated. WE ACT and the Brooklyn Movement Center worked in multiple languages with community boards, tenant associations, affordable housing and social service providers, and elected officials to build trust in and awareness of the opportunity for households to subscribe to this project.

For more information, contact WE ACT, 1854 Amsterdam Avenue (at 152nd Street), 2nd Floor; https://www.weact.org/ ; info@weact.org; (212) 961-1000.

UWSR Eco Letter May/June 2023
COMMENTARY:
Waste from Construction, Demolition and Renovation

Sometimes it seems as if everywhere you look some kind of construction, demolition or renovation is taking place. New builders are demolishing older structures to make room for new ones; businesses lease commercial spaces and need to reconstruct the interior for their own use; new tenants redesign their apartments, while others are perhaps redoing their kitchen or bathroom, or just making structural repairs.

All this ends up generating an estimated 7,500 tons of Construction and Demolition (C&D) waste every day in New York City, and incomplete reporting means this figure may actually be low.

C&D debris is uncontaminated waste, meaning it doesn't contain any hazardous substances. But it is not considered to be part of municipal solid waste and is therefore picked up by private carters rather than by the NYC Department of Sanitation (DSNY). If the amount of waste is too small to justify the use of a dumpster, a local waste debris removal contractor can be contacted. Or, if C&D waste is generated from do-it-yourself projects, you can dispose of it via the DSNY refuse collections or you can recycle some of it with DSNY or at some of the organizations listed below.

C&D materials include steel, wood products, drywall and plaster, bricks, clay tiles, asphalt shingles, concrete, and salvaged building components (such as doors, windows, and plumbing fixtures). Waste materials that are not considered C&D debris – even if they are generated from C&D activities – include asbestos- or lead-containing waste, household garbage, corrugated cardboard (which is recycled by DSNY), electrical fixtures and lights, carpeting (read about the new carpeting law in our January/February 2023 Eco Letter), furniture, appliances, tires, oil drums, and fuel tanks (see our Hard-to-Recycle List for ideas about what to do with these).

So what happens to all this debris? First, it's generally loaded into dumpsters, which, when full, are then transported by a hauler to a construction and demolition debris handling and recovery facility (CDDHRF), where the materials are processed. These processing centers either accept specific, separated materials, such as metal for recycling, or extract recyclables from mixed loads before sending the balance of the material to a transfer station. At transfer stations the waste is loaded into larger trucks that take it to landfills or incinerators located outside the City.

There are about 20 CDDHRFs in New York City, although none of them are in Manhattan. Each facility is required to be inspected annually and must regularly submit a report of their activities.

Recycling and Re-use of C&D Waste

NYC has a number of facilities that accept segregated streams of materials. For example, scrap yards (including a few in Manhattan) generally accept metals, and "clean fill" processors accept only concrete, dirt and other inert materials. These facilities recycle or re-use virtually 100% of the material they handle, and their fees for accepting segregated materials are much lower than those charged by mixed C&D processors.

Following are some local companies that recycle a variety of C&D waste materials:

- Big Reuse is a non-profit retail outlet for salvaged or surplus building materials, furniture, carpeting, furniture, doors and windows, tools, lighting, and appliances (see here for their Donations Guide). Their drop-off center is at 1 12th Street, Brooklyn, NY, (718) 725-8925, brooklyn@bigreuse.org. Pickup and deconstruction services are available for large quantities. No sheetrock.
- Cardella Waste, 2400 Tonnelle Avenue, North Bergen, NJ, (800) 548-7001 and (201) 867-7903. Cardella accepts mixed waste in its dumpsters, then separates and recycles the different types of waste, including sheetrock, at their materials recovery facilities; they work with Habitat for Humanity.
- Cooper Recycling, 123 Varick Avenue, Brooklyn, NY 11237, (718) 384-7727. Cooper Recycling is the largest construction and demolition debris recycling facility in NYC. Ceramic, concrete and brick are separated, crushed, and recycled back into aggregate materials used for roadbeds or fill. Metals and wood are separated and recycled. Clean scrap sheetrock is recycled with Saint-Gobain (see below).
- Habitat for Humanity ReStore, 62-01 Northern Boulevard, Woodside, NY 11377, (646) 876-9460, restore@habitatnyc.org, accepts furniture, flooring, appliances, tools, plumbing, lighting and electrical goods. They will pick up materials.

Materials

Bricks:

An interesting example of the utilization of recycled bricks is The West, a new condo building with 219 residences at the corner of 47th Street and Eleventh Avenue. The facade is constructed from bricks made from nearly 580,000 pounds of demolition and industrial waste. Created by the Dutch company StoneCycling, the recycled bricks contain 60% waste, including ceramic toilet bowls, roof tiles, and steel.

Local brick recyclers include:

- Big Reuse (see above),

- Brick It
- Chief Bricks
- Cooper Recycling (see above)
- Reclaimed Bricks
- Used Bricks NYC - Evan Materials, Bronx, NY, (929) 227-6092
- Vintage Brick Salvage
- See also a list of Solid Waste Management Facilities from the NYS Department of Environmental Conservation Division of Materials Management

Concrete and Asphalt:

- You can also find local clean-fill processors in the list of Solid Waste Management Facilities from the NYS Department of Environmental Conservation Division of Materials. Some of these also handle wood stumps, branches or chips.

Gypsum Wallboard (Sheetrock):

- Cardella Waste (see above) recycles clean scrap Sheetrock (gypsum wallboard) with US Gypsum in Denver, PA, where the paper is stripped off and recycled, and the gypsum core is reused as additive to concrete, plaster, and stucco or as a soil amendment.
- Cooper Recycling (see above) recycles Sheetrock with Saint-Gobain NA (in Malvern, PA), through Saint-Gobain's building products subsidiary business unit, CertainTeed Gypsum, which has begun reclaiming scrap gypsum wallboard at its new Buchanan, NY facility. The gypsum material is processed at the Cooper Recycling facility and then reclaimed at the Buchanan plant to create new drywall.

Wood:

Wood can be reclaimed as vintage lumber. It can also be shredded and then re-used as bedding for pets or agricultural uses, or it can be incorporated into new products such as tables and other furniture. See also Concrete and Asphalt, above.

More and more people are using reclaimed wood, which combines a distinctive character with the eco-friendliness of a recycled building material. Most often used in wall paneling, reclaimed wood can also be turned into flooring, furniture, beams and other structural members. You'll likely get a lot of hits if you search for "reclaimed wood" on Amazon, E-Bay, Home Depot or Lowes, but be alert to the fact that some wood purchased through large retailers isn't actually reclaimed but is new wood that has been distressed, stained or otherwise processed to look older and more weathered. Real reclaimed wood is usually unstained, unfinished and may be riddled with nail holes.

Builders are aware of the value of reclaimed lumber. During demolition they'll often make a concerted effort to salvage usable flooring, interior woodwork, siding and structural timber. They may already be under contract with a distributor, but they're often happy to sell to anyone willing to haul the wood away.

Local recyclers who process and sell used or vintage wood include:

- Big Reuse [see above] (lumber over four feet in length, doors and windows, flooring, furniture)
- Habitat for Humanity ReStore [see above] (furniture, flooring)
- M. Fine Lumber, Brooklyn, NY, (781) 381-5200 (reclaimed shelving, beams, paneling, flooring)
- NYCitySlab, Yonkers, NY, (914)-239-3556 (reclaimed wood from NYC's lost buildings - lumber, water-tank wood, flooring, stumps)
- Sawkill Lumber, Brooklyn, NY, (917) 862-7910 (flooring, paneling and dimensional lumber)
- Singh Hardwood, Far Rockaway, NY, (718) 474-5600 (decking, slabs, stair parts, millwork)

More Information:

- NYS Department of Environmental Conservation - Construction and Demolition Debris Processing Facilities
- New York State Department of Environmental Conservation Division of Materials Management - list of NYS C&D Facilities
- U.S. Environmental Protection Agency, "Sustainable Management of Construction and Demolition Materials"
- Family Handyman, "Best Places To Buy Reclaimed Wood"
- Gypsum Association
- NYC Department of Design and Construction, Construction and Demolition Waste Manual for NYC
- Recycle Track Systems, NYC Waste Statistics - What You Need to Know
- RTS NYC Office, NYC Commercial Waste Removal and Disposal

UWSR Eco Letter March/April 2023
COMMENTARY:
Textile Recycling and Reuse: An Update

Introduction

Large quantities of both pre- and post-consumer textile waste are created every year. As retailers and their customers churn through styles at a frenetic pace, more clothing is being produced than ever. But it's not just clothing; household and other fashion trends change so rapidly that the pace of production often exceeds demand. Increased

production creates a lot of pre-consumer textile waste – defective fabric, garment samples, overstock, or excess rolls of fabric. Statistics are hard to come by, but a high percentage of this pre-consumer textile waste ends up in landfills. Likewise, only a fraction of post-consumer textiles is actually reused or recycled.

Textile production from raw materials is energy-intensive, uses a lot of water, and is a source of pollution and greenhouse gases. So it stands to reason that reuse and recycling of textile waste significantly reduces environmental and health damage. In a truly circular economy, this waste could be significantly reduced by extending the life of textile products and materials for as long as possible through design for durability, reuse, repair, and remanufacturing, as well as recovering materials at end-of-life through recycling.

About 3.8 billion pounds of post-consumer textile waste are diverted from the solid waste stream each year in the United States, primarily through wearable clothing dropped off at charities or picked up from residential buildings. Despite this, only about 15% of post-consumer textile waste is actually recycled or reused; the remaining 85% goes into landfills or is incinerated. On average, each New Yorker tosses about 50 pounds of clothing and other textiles into the trash per year, producing about 200,000 tons of textile waste.

Polyester, a ubiquitous form of plastic that's derived from oil, has overtaken cotton as the backbone of textile production (comprising about 52% worldwide); yearly polyester fiber production is projected to exceed 92 million tons in the next 10 years. Textiles now account for about one-fifth of the 300 million tons of plastic produced globally each year, making up 15% of all petrochemical products. The environmental impact of polyester's dominance in the clothing industry varies, but garments made from polyester and other synthetic fibers constitute a large source of pollution. Polyester requires a large amount of energy to produce, and worldwide polyester production for clothing emits over 300 billion tons of the greenhouse gas, carbon dioxide, every year.

Compounding the problem, synthetic textiles like polyester shed tiny pieces of plastic every time they are washed. These microplastics eventually end up in our rivers, oceans, and surrounding land and pose a danger to the animals that consume them, inhibiting their growth and reproduction. Scientists estimate that, globally, 35% of the microplastics found in oceans can be traced to textiles, which makes them the largest source of microplastic pollution.

However, polyester can also be made from natural polymers, like bioplastics, although these alternatives to petrochemical-based polyester currently only make up a small fraction of its use in the fashion industry. Bioplastic textiles are usually made of plant materials, such as those found in sugarcane, corn, or cassava. Enzymes are used to break down starch from these plants into glucose, which is then fermented to obtain lactic acid. This lactic acid is then polymerized and converted into bioplastics. While

bioplastic-based textiles are generally biodegradable, most of them require high-temperature industrial composting facilities to break them down.

Textile Reuse

The most desirable option for minimizing their environmental impact is to reuse both pre- and post-consumer textiles. Clothing and other fabrics can be mended or, if no longer needed, donated for resale. It's estimated that thrift stores sell approximately 20% of the textiles that have been donated to them, with the remainder resold to sorters and graders who assess and sort the textiles based on quality, condition, and polymer. In turn, they are marketed to downstream textile vendors (mainly international) or, if unwearable, turned into industrial rags, fleece, stuffing, or low-quality yarn.

Local Organizations
(Please note this is a partial list. For additional options, *see our Hard-to-Recycle List*)

- *FABSCRAP* (929-276-3188) is a non-profit organization that accepts clean fabric scraps and rolls from over 700 companies in the fashion and textile industry. They sort these materials at their Warehouse at the Brooklyn Army Terminal (140 58th Street, Building B, Unit 5H-4). Useable fabric composed of only one fiber (e.g., 100% cotton or 100% polyester) is sold to schools or individual crafters.

- *Fashion Institute of Technology*, 227 West 27th Street (212-217-4100; fitfoundation@fitnyc.org). Clean fabric scraps can be donated for student use.

- *Goodwill*, 157 West 72nd Street (212-799-2723), accepts wearable clothing and other textiles and will site containers in large residential buildings and make pick-ups of large quantities from organizations. If items go unsold after four to six weeks, the store ships them to Goodwill outlets, which sell clothing at 99 cents per pound. Their nearest Outlet Store is at 47-47 Van Dam Street, Long Island City (718-392-0125). Whatever is left at the outlets gets sent to textile recyclers or shipped overseas.

- *Green Tree Textiles* collects wearable clothing, shoes, accessories, and household linens at the Morningside Park Down to Earth Farmers Market, 110th Street and Manhattan Avenue (Saturdays, 9:00 a.m.–2:00 p.m., year-round). They sort materials at their Bronx warehouse and donate clothing to charity partners. Textiles and clothing in poor condition are sourced to fiber and rag vendors; none enter the waste stream.

- *Grow NYC* (212-788-7900) accepts clean and dry clothing, paired shoes, linens, handbags, belts, and other wearable or reusable textiles. They do not accept

fabric rolls or scraps of any size, rugs, carpeting, pillows, comforters, or luggage. Textiles can be dropped off at the 77th/79th Street Greenmarket (77th Street between Columbus Avenue & Central Park West; Sundays, 9 a.m.-12 p.m.); and at Columbia University Greenmarket (Broadway & 116th Street; Sundays, 9 a.m.-12 p.m.). They also operate other Manhattan locations, but check their website for the current status and hours of various sites. Materials are picked up by Wearable Collections and your donation is tax deductible.

- *Housing Works* stores on the Upper West Side are located at 306 Columbus Avenue between 74th & 75th Streets (212-579-7566), and 2569 Broadway between 96th & 97th Streets, (212-222-3550). Stores accept used clothing, handbags, and shoes. Textiles donated through re-fashionNYC, along with unsold goods from its stores, are sorted at the Housing Works warehouse in Queens. Some unsold items are listed online, while others are sent to other nonprofit second-hand stores. The remainder goes to graders, who further sort the textiles for sale and/or recycling. All proceeds from donations support the charitable mission of Housing Works to end the dual crises of homelessness and AIDS.

- *re-fashionNYC* (tel: 311) is a partnership between the NYC Sanitation Department (DSNY) and Housing Works. They make free collections of textiles from nearly 1,300 residential buildings, schools, and other organizations. DSNY sites small and large containers in apartment buildings with 10 or more units and Housing Works picks them up when they're full. They accept wearable and unwearable clothing, shoes, purses, gloves, scarves, hats, belts, towels, curtains, bedding and linens, and clean rags.

- *Salvation Army*, 536 West 46th Street (212-757-2311), accepts wearable clothing, shoes and other textiles. To arrange for pickups go to https://satruck.org/, or call 800-728-7825.

- *United War Veterans Council* (212-693-1476) will pick up wearable or torn clothing and other textiles, which can be mixed with other household items. There is no minimum quantity, and items are sold for reuse or recycling.

- *USAgain* (718-810-2527) collects wearable clothing, shoes and other textiles in bins located in schools, stores and other locations. The clothing is then sold to wholesalers, thrift store chains and textile recyclers. Deposits in their bins are not tax deductible **(for collection sites, go to** https://www.nysar3.org/page/re-clothe-ny-78.html**)**

- *Wearable Collections* (646-515-4387) collects all wearable or non-useable textiles (no carpeting) from residential buildings, greenmarkets and community

organizations, and charges $**20 per pickup.** They will site containers in larger buildings or make pick-ups of a minimum of 4-5 large garbage bags of materials. After they sort, about 50% of the collections are sold in secondhand markets throughout the world; most of the rest are used as rags for industrial wiping, or shredded into fiber products for insulation, carpet and car-seat padding and mattress stuffing.

- *WeCycle* (646-922-8378) accepts wearable and unwearable clothing, shoes, purses, gloves, scarves, hats, belts, towels, curtains, bedding & linens, stuffed animals, and clean rags. They will pick up from apartments on a regular schedule with a minimum of 5 garbage bags, and will site indoor bins of two sizes. A textile drop-off location is at 206 Varick Street, Manhattan, and is open 24 hours. Goods are sorted at their Brooklyn warehouse; some are donated to charities and the rest are sold to textile recyclers.

Textile Recycling

If textiles can't be reused, the next best thing is recycling them. Even non-donatable goods — clothing too ripped, damaged, or dirty to be re-worn — can be sold to a textile merchant to be "downstream recycled." Unsold clothing, shoes and other textiles from thrift stores and other reuse locations are sold to various vendors in the NYC metropolitan area, sorted by the vendors into wearable or unwearable categories, and then resold for further use or recycled. Wearable or reusable clothing (about 50%) is then distributed to markets where there is a demand for secondhand clothing; much of it goes overseas. Textiles that are not wearable are sorted by fabric type and then recycled either for industrial use (e.g., wiping rags) or scrap that will be shredded and re-constituted into lower grade fiber products such as insulation.

To make this process more efficient and economical, we need to develop high-speed automated sortation systems and other advanced recycling processes. Unfortunately, progress in this direction has been slow. For instance, fiber-to-fiber recycling is a newer technology that separates fibers at the molecular level to produce yarn for new fabrics (see below), but only about 1% of textiles currently collected are processed this way. However, while fiber-to-fiber recycling is not yet widely practiced, *bottle*-to-fiber is common practice, whereby PET bottles are mechanically recycled into polyester textiles and fiberfill lining for winter jackets. Nearly all recycled polyester is currently derived from PET bottles.

Local Recyclers

- *All of Us Clothing*, 505 Fifth Avenue (212-328-4012; customerservice.us@stories.com) accepts any old textiles to be recycled as insulation material for the construction materials industry, fleece, carpet

underlay, and stuffing. No shoes or sneakers. To schedule pickup service, call 516-309-9040 **at least 2-3 days in advance.**

- *FABSCRAP,* 110 West 26th Street (929-276-3188), is a non-profit organization that accepts clean fabric scraps and rolls from over 700 companies in the fashion and textile industry. Also, individuals can drop off their fabric scraps for the recycling service fee of $1.50/pound at their Brooklyn location. Clothing, bedding, linens, towels are not accepted. They sort these materials at their Warehouse at Brooklyn Army Terminal (140 58th Street Building B, Unit 5H-4). Usable fabric composed of only one fiber (e. g., 100 percent cotton or 100 percent polyester) is sold to schools or individual crafters. Single-fiber fabric that's not usable, as well as all mixed-fiber fabric, is sent to a local shredding facility.

- *Mill Wiping Rags,* 1656 East 233rd Street, Bronx, NY (718-994-7100), accepts new or used textiles, including gloves and reclaimed rags. They are the largest supplier of cleaning cloths and rags in the Northeast, producing close to 4 million pounds per year.

- Trans Americas Trading Corporation, 50 Carol Street, Clifton, NJ 07014 (973-778-4611), sorts, processes and sells post-consumer textile waste, including secondhand/used clothing, vintage clothing, wiping rags, and materials for fiber recycling; they recycle over 16.8 million pounds annually.

Fiber-to-Fiber Chemical Recycling – U.S. Companies

- *Ambercycle*, based in Los Angeles, is developing and scaling technology to take old garments collected from aggregators and garment manufacturers, then put them through a series of processes that separate the fibers out at a molecular level, and recover them to make new yarn for new textiles. They diverted over 2.5 million pounds of end-of-life textiles away from landfills in 2022.

- *Circ*, located in Danville, VA, uses water as a solvent to create cellulosic pulp and polyester monomers from cotton polyester blended fabrics. These monomers can be used to make polyester or other textile materials.

- *Evrnu,* based in Seattle, produces a yarn called NuCycl from textile waste. Discarded textiles are gathered, sorted, shredded and purified down to the molecular level. A new fiber, similar to rayon, is made from the resulting raw material.

***More Information*:**

- **"Chemical recycling separates blended textiles!" (Cattermole Consulting)**

- **Council for Textile Recycling, 3465 Box Hill Corporate Center Drive, Suite H, Abingdon, MD 21009; (443) 640-1050**
- **"Facilitating a Circular Economy for Textiles: Workshop Report" (National Institute of Standards and Technology (NTIS) Special Publication 1500-207**
- **How NYC Is Stopping Textile Waste With Low-Tech Donation Bins (re-fashionNYC)**
- Re-Clothe NY Coalition (list of textile collection sites)
- A Review on Textile Recycling Practices and Challenges

UWSR Eco Letter November/December 2022
COMMENTARY:
New York City Water Supply System

Water – it's a part of every day. You fill your tea kettle or coffee maker, you brush your teeth, flush a toilet, wash dishes, take a shower, maybe water your plants or keep yourself hydrated. For brief moments we may feel grateful to have a readily available supply of clean and safe water, but more often we don't give it much thought.

In fact, New York City has some of the best water in the world, and it's delivered to us from an extraordinary system that began to take form over 150 years ago. That system draws from a nearly 2,000-square-mile watershed that reaches 125 miles northwest of the City and spans portions of the Hudson Valley and Catskill Mountains. It consists of 19 reservoirs and three controlled lakes with a combined storage capacity of 550 billion gallons, enough to supply NYC for over a year and a half. The water from these reservoirs and lakes flows into aqueducts, tunnels and pipes that deliver it directly to our taps, the majority of which arrives by gravity feed alone.

Every day the New York City Water Supply System provides more than one billion gallons of clean and safe water to more than 8.5 million residents and to millions of tourists and commuters who visit the City throughout the year. It also supplies another 110 million gallons a day to about one million people living in outlying counties. This means that the New York City Water Supply System provides nearly half the population of New York State with high-quality water.

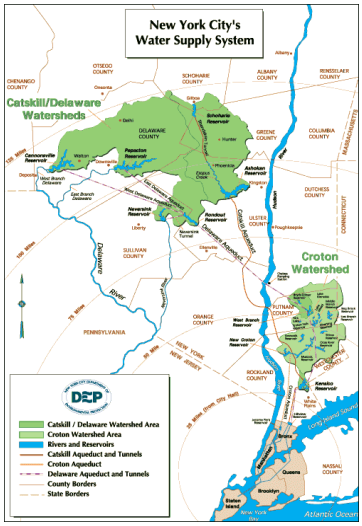
A Brief History of NYC's Water System

The first public well was dug in Bowling Green in 1677. The well used a pump — the first in the City's history — to bring up water from underground. Until the 18th century, New York City depended solely on means such as wells and rainwater ponds to collect water for daily use. However, as the population increased, these methods didn't provide enough water. In the early 1700s, water was hauled from Brooklyn, which had

an excellent supply of fresh groundwater, but it still wasn't enough to meet all of the City's needs.

At the same time, there were other significant challenges. Because there was no system for disposing of sewage and garbage, human waste and trash polluted waterways, which ultimately contributed to cholera outbreaks that killed thousands of people. And the stone-lined wells originally dug to tap groundwater became contaminated by salt water from the tidal Hudson and East Rivers. Then there was the issue of fighting fires in an increasingly densely populated city where most buildings were made of wood – a fire in 1776 destroyed a quarter of Manhattan's buildings. The City built its first reservoir on the East Side in 1831 and a new water supply and distribution system became available for fighting fires. It included a well and cistern on 13th Street between Bowery (4th Avenue today) and Third Avenue.

It became increasingly clear to City leaders that they needed to develop cleaner and more abundant sources of water for a constantly expanding population. After exploring alternatives, the City decided to take water from the Croton River, in what is now Westchester County. By the 1880s, the City opted to enlarge the Croton system with a new dam and aqueduct pulling from a larger watershed. As the population grew, the following decades saw development of the Catskill and Delaware reservoir systems. Now, about 90% of the City's water comes from the Catskill and Delaware Watersheds and the remainder is via the Croton Watershed.



The Croton Water Supply System

Spreading over Westchester, Putnam, and Dutchess Counties, the Croton water supply system consists of *12 reservoirs* and *three controlled lakes*. While this system normally supplies 10% of the City's drinking water, it can produce more if needed.

Between 1837 and 1842 about 4,000 immigrants built the Old Croton Aqueduct, with a capacity of 90 million gallons per day and which included the Old Croton Dam above the junction of the Croton and Hudson Rivers. The Old Croton Aqueduct ran from the Croton

Reservoir in Westchester County, south to the Yorkville Receiving Reservoir between 79th and 86th Streets in Manhattan (now the Great Lawn in Central Park), then down to a 20-million gallon distributing reservoir (now occupied by the New York Public Library). Starting in 1848, water ran across the East River on the High Bridge (prior to that, it had flowed through pipes laid under the High Bridge). In 1862 the construction of Lake Manahatta to the north of the Yorkville Reservoir increased storage capacity (now called the Central Park Reservoir, it is no longer part of the NYC water supply system.)

To meet the ever-growing need for water, the City began construction of the New Croton Aqueduct in 1885. The Old Croton Dam was submerged in the reservoir created by the New Croton Dam. The new aqueduct opened for operation in 1890 with a capacity of 300 million gallons per day —almost three times the size of the old aqueduct—and ran from the Croton Reservoir to the Bronx, then over the High Bridge to the Central Park reservoirs in Manhattan. Today, if you look just west of the back side of the New Jewish Home, you'll see a building that slants back from West 105th Street; the slanted alleyway to the east of that building marks the former path of the New Croton Aqueduct.

By the turn of the century, City leaders were yet again forced to expand the water supply. New York State passed legislation that created the New York City Board of Water Supply, which allowed the City to purchase watershed land in the Catskill Mountains and to create new reservoirs by damming streams and rivers. In addition, the City built the Chelsea Pumping Station (just north of the upstate town of Beacon), which can extract water from the Hudson River during droughts; so far it's been used only twice.

The Catskill Water Supply System

Construction of the Catskill system, which began in 1907, includes the *Ashokan* and *Schoharie Reservoirs*, with an operational capacity of approximately 850 million gallons per day, of which less than half is normally used. It currently supplies 35-40% of the City's overall water supply.

Men and mules (and lots of dynamite) built the *Ashokan Reservoir*, as it pre-dated the era of diesel-powered equipment. It consists of two basins separated by a concrete dividing weir and roadway. The reservoir holds 123 billion gallons at full capacity and was the largest man-made reservoir in the world when it was put into service in 1915.

In 1926 the *Schoharie Reservoir* in Gilboa began operation, increasing overall capacity by 18 billion gallons. This reservoir is connected to the Catskill System by the 18-mile-long Shandaken Tunnel, which flows south under the Catskill Mountains into Esopus Creek and subsequently into the Ashokan Reservoir. Gilboa Dam, at the north end of Schoharie Reservoir, marks the furthest point of the water supply system, approximately 125 miles from NYC. It was recently found to have structural defects and underwent significant repairs.

Water from both the Ashokan and Schoharie Reservoirs is transported via the Catskill Aqueduct by gravity feed. The system is designed with a gentle grade to take advantage of the descending elevation, and it employs inverted siphons to maintain the flow under the valleys it crosses. From the Ashokan Reservoir (elevation 611 feet above sea level), the aqueduct leads in a southeasterly direction through Ulster, Orange, and Putnam Counties, then runs through a larger inverted siphon 1,100 feet below the Hudson River from Storm King Mountain on the west to Breakneck Mountain on the east. The siphon was bored from both sides and, amazingly, the two sides were less than an inch off perfect alignment when they met in the middle! After going under the river the water travels to the Kensico Reservoir in Valhalla (elevation 355 feet) and on to the Hillview Reservoir in Yonkers (elevation 295 feet), where it connects to the NYC water distribution system.

The Delaware Water Supply System

This system includes four large reservoirs – the *Rondout*, *Neversink* , *Pepacton*, and *Cannonsville* with tunnels and an aqueduct – with a combined capacity of 320 billion US gallons. It supplies about 50-60% of New York City's water.

The *Roundout Reservoir* (in Ulster and Sullivan Counties), which holds 50 billion gallons, was started in 1937 but, because of restrictions on the supply of materials and equipment during World War II, it didn't go into service until 1951.

Next came the nearby *Neversink Reservoir*, put into service in 1954, with a capacity of 35 million gallons, and connected to the Roundout by a 6-mile-long tunnel.

The *Pepacton Reservoir* (also known as Downsville Reservoir) is located in Delaware County on the East Branch of the Delaware River and was added to the system in 1955. Holding 140 billion gallons at full capacity, the Pepacton normally contributes more than 25% of the total daily water flow into New York City. Water withdrawn from the Pepacton Reservoir enters the East Delaware Aqueduct and flows southeast for 25 miles into Rondout Reservoir.

The *Cannonsville Reservoir* (also in Delaware County, on the West Branch of the Delaware River) was placed in service in 1965 with a capacity of 96 billion gallons. It is connected to the Roundout via the 44-mile-long West Delaware Aqueduct.

Water from the Roundout – and from the other three reservoirs that feed into it – enters the Delaware Aqueduct, which was completed in 1945 and, stretching 84 miles to the Hillview Reservoir in Yonkers, is the longest continuous tunnel in the world. The first section of the aqueduct runs from the Roundout to the Hudson River, where it tunnels 600 feet below the river's surface via an inverted siphon from Newburg on the West to Wappingers on the East. It then runs into the West Branch Reservoir in Carmel, which serves as a supplementary settling basin that removes silt from the water.

Since the early 1990's the NYC Department of Environmental Protection (DEP) has monitored two leaking sections of the Delaware Aqueduct, one in Newburgh and the other in the Ulster County town of Wawarsing. The leaks release an estimated 20 to 30 million gallons per day, most of which is lost in Newburgh. To seal off that leak, the DEP has built a 2.5-mile-long Bypass Tunnel that goes under the Hudson River from Newburgh to Wappingers that will connect to the aqueduct on either side of the leak. In order to make repairs, water from the aqueduct will be shut down and diverted through the Bypass Tunnel; t*he shutdown is scheduled to begin on October 1, 2023, and end May 31, 2024. In anticipation of this diversion, t*he DEP plans to take more water than usual from the Delaware System reservoirs, thereby reducing those reservoirs to about 30% of their normal capacity and letting the reservoirs in the Catskills and Croton systems fill up so that water can be drawn from them once the DEP shuts down and empties the Delaware Aqueduct.

In the next section of the Delaware Aqueduct water flows from the West Branch to the Kensico Reservoir in Valhalla, where it joins the Catskill system.

Testing and Purifying the Water Supply

In the Kensico Reservoir robotic buoys transmit information about the water quality. Chlorine, which kills bacteria, and fluoride, for dental health, are added here. Water then travels to a nearby UV disinfection facility located in Greenburgh (the world's largest drinking water UV disinfection system, with a maximum flow of 2.4 billion gallons per day). The last section runs to the Hillview Reservoir in Yonkers where the water receives further disinfection before entering the City's distribution system. In 2019 New York City agreed to build a concrete cover over the Hillview to prevent excrement from seagulls and other birds from contaminating the water with bacteria and viruses.

In 1997, due largely to the efforts of DEP Commissioner Marilyn Gelber, the City implemented a comprehensive watershed protection program that targeted potential sources of water contamination upstate. For example, barnyard run-off cannot run into streams that enter the reservoirs, septic systems have to be a certain distance from the reservoirs, and swimming or washing clothes in the reservoirs is prohibited. In addition to 230,000 tests performed in the watershed the Environmental Protection Agency performs more than 330,000 tests annually at about 1,200 sampling locations throughout New York City. (See the September/October 2016 *Eco Letter Commentary* on *Water Quality*; just click on "Archive of Past Commentaries" in the *Eco Letter*, then select "Water Quality" from the list on the first page.)

Impact of NYC's Water System on Local Communities

It's important to note that, in order to provide New York City with this water, construction of its different parts had a huge impact on local upstate communities. About 20 towns and villages were flooded; houses, stores, farms and churches were forced to move or torn down; about 6,000 people were displaced; land was lost; and

highways and cemeteries were relocated. Not surprisingly, the people affected by all this resented it greatly; many households had been there for generations. The City paid for the properties, but only at only half the assessed value. However, on the positive side, these major constructions created local jobs and new businesses. And New York City pays taxes on the land it acquired and in many towns it is the largest taxpayer.

NYC Distribution System

From the Hillview Reservoir in Yonkers, water flows by gravity into three tunnels under New York City.

1. *Water Tunnel No. 1*, completed in 1917, flows under the Central Bronx, Harlem River, West Side, Midtown, and Lower East Side of Manhattan, and then under the East River to Brooklyn, where it connects the Richmond Tunnel to Staten Island.
2. *Water Tunnel No. 2*, completed in 1935, runs under the Central Bronx, East River, and Western Queens to Brooklyn, where it connects to Tunnel 1.
3. *Water Tunnel No. 3* is the largest capital construction project in New York City's history. It was started 1970, and its first and second stages are complete. Stage 1 starts at the Hillview Reservoir, runs through the Bronx into Northern Manhattan, then crosses under Central Park, goes under the East River and Roosevelt Island, into Astoria, Queens. Stage 2, with two sections, continues into Southern Manhattan and also runs further into Queens and Brooklyn and connects with the Richmond Tunnel.

   These tunnels provide the City with a critical third connection to its Upstate New York water supply system so that the City can, for the first time, close Tunnels No. 1 and No. 2 for repair. The third stage, which will start at the Kensico Reservoir, then run parallel to the Delaware and Catskill Aqueducts to the Van Cortlandt Valve Chamber complex in the Bronx (bypassing the Hillview Reservoir), will not be completed until about 2026.

Water flows from the tunnels into a 6,800-mile-long network of water mains, some of which are large enough for a man to easily stand upright inside. There is at least one water main underneath almost every street in New York City. The water is then connected to individual buildings through over 800,000 smaller pipes called service lines. Since the water has flowed by gravity from elevations hundreds of feet above sea level, it has built-up pressure (called a “head”), and this head is sufficient to raise the water to the top of a six-story building.

Buildings taller than six stories need to pump water up their roof where it is often stored in large wooden tanks, each holding up to 10,000 gallons of water. Wood acts as a natural insulator, preventing the water from freezing in the winter. Also, the wood expands with water inside, preventing leaks. These tanks have been built and

maintained by three family-run businesses for over 100 years and are an iconic aspect of our city's skyline.

Only a fraction of the City's water is actually used for drinking. Most of it ends up in toilets, showers, washing machines, dishwashers, fire hydrants, etc. Water consumption has decreased more than 30% since the late 1980s, when the City made a concerted effort to educate the public about the need for water conservation and required the installation of water conserving devices in modern toilets, faucets and showerheads. The City has also actively looked for and fixed leaks in water mains and service lines.

In addition to the third water tunnel, the City is spending billions of dollars for dozens of projects to fix decaying infrastructure and improve water quality. One such project is the Croton Underground Water Filtration Plant constructed next to the Mosholu Golf Course in Van Cortlandt Park in the Bronx. With a capacity to filter up to 290 million gallons of water a day, it is the largest facility of its kind in the United States.

Additional information:

- Galusha, Diana (1999) *Liquid Assets: A History of New York City's Water System*, Purple Mountain Press, Fleishmanns, NY, 303 pp.
- How New York Gets Its Water, *New York Times*, March 30, 2016
- History of the NYC Water Supply, Catskill Watershed Corporation
- How Does New York City Get Its Water, Hudson Reed
- New York City's Water Supply System: Past, Present, and Future, National Library of Medicine
- Water Supply, NYC Environmental Protection

UWSR Eco Letter May/June 2022
COMMENTARY:
Electric Vehicles

Introduction

As part of an effort to combat global warming the Biden administration has set a national goal for half of all new vehicles sold by 2030 to be electric-powered. It has also launched a $5 billion program to help cities and states build out networks of charging stations and promote financial incentives for consumers who buy electric cars.

New York City is gradually electrifying its fleet of buses, taxis, and other municipal vehicles, and a high percentage of its buses are already run at least partly on electricity.

It should be noted that electric vehicles are most effective in mitigating climate change and air pollution if the electricity comes from renewable sources such as wind, solar or hydro energy.

Electric-powered vehicles (EV's) fall into three general categories:

- Vehicles powered solely by electricity;
- Hybrid vehicles, which utilize some form of supplementary gasoline engine; and
- Vehicles powered by fuel-cells.

Some EV's have range extenders that utilize a very small gasoline engine to charge the battery or power the electric motor so that you're not left stranded if the EV's battery loses its charge.

Vehicles powered solely by electricity draw current from large, onboard battery packs. Because these EV's have no internal combustion gasoline engine, they generally have much larger capacity batteries and kilowatt-hour outputs than comparable hybrid vehicles. This means they cost more than hybrid vehicles, but they require less maintenance than either hybrids or gas-powered vehicles.

EVs powered solely by batteries must be charged to be driven. This can be done with either a home charger or at a DC fast-charging station, as well as by energy recovered when the vehicle's brakes are used (*regenerative braking*).

There are three types of **Hybrid vehicles:** Full Hybrids, Plug-In Hybrids, and Mild Hybrids.

- **Full-hybrid vehicles** are equipped with both a small gasoline engine and an electrical component but they can actually operate for some distance solely on electric power. This typically happens at lower city speeds, and it's one reason why the full hybrid's city MPG rating is higher than its highway MPG rating (whereas the opposite is true for standard gasoline-powered vehicles). A full-hybrid's battery system is charged via energy from the gasoline engine as well as by energy recouped from regenerative braking.

  There are two types of power trains in full-hybrid vehicles: Parallel hybrids and Series hybrids. With *Parallel hybrids*, the engine can be powered in one of three ways: directly by the engine, directly by the electrical motor, or by both systems working together. In *Series hybrids*, the electric motor alone powers the wheels, while the gasoline engine provides power for the electric motor, sort of like a generator.

- **Plug-in hybrids** can charge their batteries via external chargers as well as through the internal chargers mentioned above. As a result, plug-in hybrids usually have greater electric-only ranges than full hybrids. Plug-In hybrids essentially serve as a half-way point between full hybrid vehicles and fully electric vehicles.

- The **mild hybrid system** is a new technology that is used to give a small boost to the vehicle's gasoline engine, typically upon acceleration from a dead stop, and to assist in removing the burden of power-hungry systems, such as air conditioning, on the gasoline engine. The system normally includes a 48-volt electric battery system that is recharged through a combination of power from the gasoline engine and energy recovered from regenerative braking.

There are about 30 types of all-electric vehicles on the market in 2022, and about an equal number of hybrid vehicles. The hybrids are generally much less expensive than the all-electric ones, with a longer driving range before refueling or recharging is necessary.

The proliferation of EVs has impacted almost every type of vehicle – buses, cars, trucks, and SUVs. However, one type of vehicle nearly absent from the EV market is the van. Ford's E-Transit is the only full-size van currently being shipped to customers, although several minivans and trucks are available. With a range of only 126 miles, the E-Transit would seem to be suitable for city driving.

Hydrogen fuel-cell vehicles

Because of the risk of explosion in the event of an accident, in 2008 *hydrogen fuel-cell vehicles* were banned in tunnels in and around *New York City*, so they're not yet an option here.

EVs and hybrid vehicles in New York City

As reported in a recent article in the New York Times, electrifying the City's vehicles is challenging and complex. Of the City's fleet of more than 5,900 public buses, approximately 2,000 are hybrid, but only 15 are all-electric. But the Metropolitan Transportation Authority plans to buy another 500 electric buses and retrofit eight bus depots with charging equipment in an attempt to achieve a goal of a zero-emissions bus fleet by 2040. Riders could see another 60 all-electric buses on the road as soon as next year.

All City-owned school *buses* are expected to be all-electric by September 1, 2035. The taxi industry has many hybrids already on the street and has dispatched 25 all-electric yellow taxis out of a fleet of nearly 13,600. Throughout the City, there are nearly 12,500 fully electric passenger vehicles – including cars, SUVs and trucks – and roughly another 7,300 plug-in hybrid electric vehicles.

Charging Stations

There are three main types of EV charging: Levels 1 and 2; and DC fast-charge.

- Batteries typically use DC, or direct current, to charge. *Levels 1 and 2 charging* – which can be done in home garages – convert alternating current (AC) to DC using the on-board converter in the EV. Each vehicle's on-board converter has specific limits on how fast it can charge. Level 1 is very slow and is most useful when a vehicle will be parked for two or three days between uses. Level 2 charging works up to six times faster than Level 1 charging, requiring about 8 hours for a 200-mile battery, and will generally give you enough power to get around town. Most plug-in hybrids can only charge at Level 1 or 2.

- With *DC fast charging*, the conversion from AC to DC happens in the charging station, not in the EV. This allows stations to supply more power, thus charging vehicles faster. This is often preferable for long trips or when you're pressed for time and need a faster charge to get where you're going. DC fast chargers can power some EV batteries to 80% in 20-30 minutes, but the stations have various power output levels.

  As of March 2022, there were only 86 public curbside DC fast-chargers throughout all of New York City, with about 15 of them in Upper Manhattan – although there are another 1,000 or more in garages and parking lots. This spring, a company called Gravity is converting an indoor parking garage in Midtown Manhattan into a dedicated fast charging hub.

  It's important to note a few facts about DC fast charging: Not all plug-in-hybrid cars on the road today have a DC fast charging port, and not all EVs come with DC fast charging as a standard feature, though it's often available as an upgrade package. And there are three different DC fast charging connector standards used in North America, each used by different EVs. So when choosing a DC fast charging station, it's important to check the connector to make sure it fits your car's charging port.

EV Batteries and Their Recycling

- Most of today's EVs and Plug-In Hybrids use Lithium-Ion (LiH) Batteries, though the exact chemistry for these often varies from that of consumer electronics batteries. It should also be noted that there is currently a shortage of lithium. These batteries have a high power-to-weight ratio, high energy efficiency, good high-temperature performance, and low self-discharge. While no battery performs perfectly in freezing weather, lithium batteries perform much better than other battery types in the cold, although they will lose some efficiency. Research and development are ongoing to reduce their relatively high cost, extend their useful life, and address safety concerns in regard to overheating. The newer hybrid buses in NYC use lithium batteries.

As of 2020, 1.7 million tons of LiH batteries had reached their end of life and that number will grow to about 15 million tons by 2030 as electric carmakers increase production. The LiH batteries used in EVs are recyclable, though the technology for recovering and recycling their components is still in its infancy. Thus, although they contain valuable metals that can be reused, only about 5-10% of spent LiH batteries are actually currently being recycled, and not 100% of the materials are recovered.

According to one study, transportation makes up about 40% of the overall cost of recycling. EV battery packs are so massive they need to be shipped by truck (*not* airplanes) in specially designed cases, often across vast distances, to reach centralized recycling facilities. You can get more information from Battery Recyclers of America at 866-290-3849 and read comprehensive reviews in Wired and How Stuff Works.

- **Nickel-metal hydride (NiMH) batteries** offer good power capabilities and thus have been widely used in hybrid vehicles. NiMH batteries operate best above −20 °C (-4 °F). These batteries have a much longer life cycle than lead-acid batteries and are safe. However, the main challenges with nickel-metal hydride batteries are their high cost, high self-discharge, heat generation at high temperatures, and the need to control hydrogen loss.

  Several processes have been proposed for NiMH battery recycling, but none is widely used, and a more complete recycling of all the critical metal components within these batteries is often still lacking. Both the nickel and the electrolyte used in NiMH batteries are semi-toxic; thus, if they can't be recycled, these batteries should be disposed of in a secure waste landfill.

- **Lead-acid batteries** are primarily used in electric vehicles to supplement other battery loads, although most of the older hybrid buses in NYC utilize them. These batteries are high-powered, inexpensive, safe, and reliable, but their weight, short life, and poor cold-temperature performance make it difficult for them to be a primary power source in electric vehicles. However, they're easy to recycle where you purchase them, including auto-parts stores and department stores. According to trade groups, 99% of all lead acid batteries are safely recycled, and 96% of the materials in the battery – including the lead – is recovered.

Energy Savings and Pollution

In New York, 28% of the City's overall greenhouse gas emissions in 2019 came from transportation. The biggest culprit was gasoline-powered passenger cars, which alone accounted for nearly 23% of total emissions.

- An EV directly converts electricity into movement. This makes it far more efficient than a conventional car, which has to burn fuel, which in turn creates heat, and then converts that heat into motion.

- EVs convert over 77% of the electrical energy coming from the power grid to power at the wheels, whereas conventional gasoline vehicles convert only about 12%–30% of the energy stored in gasoline to power at the wheels.

- An EV's electricity is generated in the U.S., thus reducing our reliance on imported oil.

- EV's emit no tailpipe pollutants, although the power plant producing the electricity may emit them. Electricity from sources such as solar, wind or hydropower causes no air pollutants and results in almost no global warming. Fortunately, almost one-third of the electricity in NY State is produced by these sources, and State law now mandates that 70% of our electricity be generated by renewable energy by 2035. (*See our May/June 2021 Eco Letter Commentary*)

Additional information:

All-Electric Vehicles - US DOE

Batteries for Hybrid and Plug-In Electric Vehicles - USDOE

Can Electric Car Batteries Be Recycled? – How Stuff Works

Cars Are Going Electric. What Happens to the Used Batteries? - Wired

Driver's Checklist: A Quick Guide to Fast Charging – ChargePoint

Electric Vehicle Basics - *Electric for All*

Here's How Slowly New York City Is Moving on Electric Vehicles - NY Times

Understanding Hybrid Vehicles: The 4 Main Types - Motor Lease

Used Lithium-Ion Batteries - US EPA

UWSR Eco Letter March/April 2022
COMMENTARY:
The Hudson River Estuary

An estuary is a partially enclosed coastal water body that is fed by sources of both freshwater and salt water. The Hudson River Tidal Estuary stretches 153 miles from Troy upstate to New York Harbor south of

Manhattan, nearly half the river's full 315-mile course from its origin at Lake Tear of the Clouds in the Adirondacks to the Battery at the tip of Manhattan.

The local parts of this tidal estuary include the Hudson River along The Bronx and Manhattan, Upper and Lower New York Bays, as well as the East River, Jamaica Bay, and a western portion of Long Island Sound. Its waters are affected by the tidal rhythms of the ocean into which it empties and by the mixing of the ocean's salt water with fresh water from rivers and streams that flow into it. This creates a rich environment that sustains a wide variety of life.

The Hudson River Estuary is an important ecosystem that supports varied species of aquatic, avian and mammalian life. After many decades of pollution from industrial waste and urban runoff, legislation and the building of sewage treatment plants have been helping restore the health of the estuary and its ability to maintain a biologically rich environment.

This restoration is further supported by projects designed to create or expand existing habitats. One example is the Hudson River Estuarine Sanctuary located between Pier 26 and Pier 34 on the West Side of Lower Manhattan. The Sanctuary is comprised of hundreds of structures that create habitat for Hudson River wildlife, including reef balls (artificial reef modules), gabions (cages or cylinders filled with rocks), oyster wraps (curved wire mesh cages attached to piles), biohuts (artificial fish nurseries) and textured piles. The NYS Department of Environmental Conservation, the Billion Oyster Project, the Hudson River Foundation, and the River Project, along with other environmental partners, helped to design and implement the project. For information about the Sanctuary contact the Hudson River Park Trust (info@hrpt.ny.gov; 212.627.2020).

The portion of the Hudson flowing from the Northern Bronx to the southern tip of Manhattan is sometimes referred to as the **North River**, and it contains the highest percentage of fresh water in the estuary. The shorelines of both the Hudson and the East Rivers have been altered since the first Dutch settlements in the early 17th century, as deposits of landfill and the addition of human-made structures have expanded, straightened, and hardened the waterfront.

New York Harbor, comprised of Upper and Lower New York Bays, is fed by the Hudson River and empties into the Atlantic Ocean. One of the largest natural harbors in the world, it's an important port as well as home to a variety of marine species. The harbor's natural depth of about 17 feet has been dredged to about 24 feet to accommodate

larger shipping vessels. Water temperatures range from the upper 30s F in February to the lower 70s F in August.

Upper New York Bay stretches from the southern tip of Manhattan to the Narrows—a tidal strait separating the boroughs of Staten Island and Brooklyn. The **Lower New York Bay** is located between The Narrows and Sandy Hook, a peninsula jutting out to the east from New Jersey. **The East River**, also a tidal estuary, connects Upper New York Bay on its southern end to Long Island Sound on its northern end. This segment of the harbor was once one of the most polluted sections of the estuary, but it has been cleaned up considerably in recent years.

Jamaica Bay is an 18,000-acre wetland estuary surrounded by the Rockaway Peninsula to the South, Brooklyn to the West, and Queens to the East. The mean depth of the Bay is approximately 13 feet, with maximum depths reaching 30 to 50 feet in navigation channels and sand borrow pit areas. Water temperature here is slightly higher than that of the NY Harbor.

The bay contains numerous islands, a labyrinth of waterways, meadowlands, and two freshwater ponds, and these wetlands provide a unique environment for both wildlife preservation and urban recreation. One of the prime bird-watching sites in the Northeast, Jamaica Bay currently hosts over 325 species of migratory and nesting birds. Its waters sustain about 100 species of fish.

Much of Jamaica Bay was placed under NYC Parks jurisdiction in 1938, and the Jamaica Bay Wildlife Refuge was established in 1951, in part to preserve and restore the natural nesting grounds of waterfowl and shore birds. In 1974, over 9,000 acres of Jamaica Bay were transferred to the newly created Gateway National Urban Recreation Area, which also includes of sections of Breezy Point, Sandy Hook, and Staten Island.

<u>SALINITY</u>

Most of the local estuary is brackish, that is, a mixture of both fresh and salt water. The salinity can vary depending upon the time of day and the season, and the estuary typically contains more ocean water than fresh river water as far up as the Tappan Zee. However, during snow melt or heavy rainfall the estuary is primarily freshwater all the way to the northern part of Manhattan. Since freshwater floats over saltier (denser) water, the surface waters are sometimes fresh as far south as New York Harbor, especially during ebb tides (going from high tide to low tide).
Seawater from the ocean generally has a salinity level of about 35,000 parts per million (ppm). Freshwater draining into the Hudson River usually has a salinity level of about 25-50 ppm. On the Hudson River, scientists consider salinity readings of 100 ppm or higher as an indicator of the presence of seawater.

TIDES

The moon's gravitational pull causes the Earth—and its water—to bulge out on the side closest to the moon and the opposite side farthest from the moon. When the pull is strongest we experience high tides, and when it's weakest we have low tides. Since the Earth rotates through two tidal "bulges" every lunar day, we experience two high and two low tides every 24 hours and 50 minutes. Thus, each high and low tide occurs about 12 hours and 25 minutes apart. High tide is about four feet above low tide in Battery Park and about five feet above low tide in Jamaica Bay; these differences – and the tides effect on the water's salinity – are significant for many marine species. Because the intertidal zone (the area between high and low tide) is alternately covered and uncovered by the ocean throughout the day, plants and animals must be able to survive both under water and out in the air and sunlight. Those that can anchor themselves to the rocks along a shoreline (such as mussels) can survive the lashing from waves and the less violent movement of the changing tides. Sand crabs follow the tides to maintain just the right depth to burrow into the wet sand.

POLLUTION

The New York Harbor Estuary is cleaner now than at any time in the last 100 years. Continued improvements to wastewater handling and treatment are chiefly responsible for better harbor water quality, and – in addition to supporting increasing animal and plant life – this has led to more recreational opportunities along our coasts, such as swimming and fishing. The Lower New York Bay region has the highest water quality because of the frequent exchange of water with the Atlantic Ocean.

The NYC Department of Environmental Protection employs a fleet of boats to regularly monitor the waters and shoreline for sources of pollution and overall water quality. Water is tested for bacteria (fecal coliform and enterococcus), dissolved oxygen, chlorophyll a (the primary pigment of photosynthesis), Secchi depth transparency and nitrogen. The DEP also operates 14 sewage and wastewater treatment plants that together treat around 1.3 billion gallons of wastewater and biosolids daily. However, billions of gallons of raw sewage and polluted stormwater are still discharged into New York Harbor annually. The main culprit is our outmoded sewer system, which combines sewage from buildings with dirty stormwater from streets; runoff from heavy rains that exceeds the system's capacity fails to flow through the treatment plants. Thus, parts of the waterfront and its beaches are unsafe for recreation after a heavy rain.

Locally, the North River Sewage Treatment Plant, stretching eight blocks along the Hudson River from 137th Street to 145th Street, was completed in 1985. It was recently upgraded with the installation of five co-generation engines that cut greenhouse gas emissions in half. Mixed wastewater and sewage undergo three stages of treatment to separate the sewage sludge from the wastewater. The separated water is disinfected to remove any remaining disease-causing microorganisms, then released as effluent into the Hudson River. The thickened sludge is transferred into tanks called digesters, which

maintain a low-oxygen environment heated to about 98°F. Microorganisms that thrive in this anaerobic environment digest the sludge, and much of the material is converted into methane gas (biogas). The digested solids are composted, added to agricultural soils, or further processed for other beneficial uses. The biogas released during sludge digestion can be used to produce heat and electricity for the wastewater resource recovery facilities or the local community. Riverkeeper periodically tests the effluent for enterococcus (a sewage-indicating bacterium) and the other parameters noted above. They've found recent levels acceptable, although levels rise after a heavy rainfall or snow melt-off.

MARINE LIFE

The Hudson River Estuary is a diverse natural environment. In addition to the water flowing in the river itself, there are tidal wetlands, submerged aquatic plant beds, the river's natural shoreline and the bottom of the river itself. These provide critical habitats and essential spawning and breeding grounds for many species. The plants and animals that flourish in these tidal areas can tolerate various degrees of salinity. Deep-water habitats are havens for many life stages of fish, shellfish and invertebrates that enrich the food chain and help cycle nutrients and sediments.

The estuary's environment is home for a wide variety of animals and plants. Among the animals are rays and sharks, cephalopods (squid and octopus), turtles, and marine life including starfish, sand dollars, corals, worms, sponges, bryozoans (aquatic invertebrates that live in colonies) and algae. Since there are far too many to enumerate and describe in this newsletter, we'll highlight just a few of them.

Fishes include dozens of species ranging in size from Anchovy to Ocean Sunfish.

- *Atlantic Sturgeons* are large, bottom-dwelling fish with an elongated body and a flattened snout and head. They live and breed in the depths of Upper New York Bay and in the main channel of the Hudson River. They're bottom feeders and typically consume invertebrates such as crustaceans, worms, and mollusks, as well as other bottom-dwelling fish. An adult can grow up to 15 feet long, weigh 800 pounds, and live for 60 years. Atlantic sturgeon are anadromous fish: They're born in brackish water, then migrate to the sea at six years of age and finally return to freshwater when fully mature to spawn (females may lay up to four million eggs in a single year). Overfishing for caviar and the alteration of its habitat put the Atlantic sturgeon on the endangered species list.
- Bluefish are blue-green on their backs and silvery on their sides and belly. They have a prominent jaw, with sharp, compressed teeth and can grow up to 30 pounds and 39 inches long and live up to 12 years. In spite of being ocean fish, smaller bluefish live nearly year-round in the Hudson Estuary, where they can tolerate a salinity concentration as low as 7,000 ppm. As they mature, they migrate up and down the Eastern Seaboard, seeking water at 60° F or higher. Bluefish eat other fish (primarily menhaden), as well as squid, shrimp, and crabs. They often attack baitfish near the surface, churning the water like a washing

machine. Bluefish are a popular sport and food fish and, though overfished, are not listed as endangered.

Shellfish include Lobsters, Crabs, Oysters, Clams, Mussels. Cockles, Whelks, Periwinkles, and Snails.

- *Eastern Oyster* is a bottom dweller once abundant through much of the estuary and a staple of the local diet. Overharvesting, as well as the dumping of commercial waste and raw sewage into the Harbor, decimated the oyster population by the late 1800s. Fortunately, restoration projects have been undertaken in recent decades (especially since the Clean Water Act was passed in 1972), and efforts to purify both the Hudson River and Lower Bay have resulted in waters that are measurably cleaner. As a result, we are now witnessing a resurgence in the oyster population. The Billion Oyster Project has planted about 40 million live oysters that have filtered over 20 trillion gallons of water. (*See also* the March/April 2021 *UWSR Eco Letter*.)

- *Blue Mussels* are abundant, bivalve mollusks of the intertidal and shallow, subtidal zone. They are generally found attached to rocks and other hard substrates in densely populated beds just above and below mean low water, and thus they are at times submerged and at times exposed to the air. Because mussels are filter feeders, they sometimes consume bacteria and toxins, making them potentially dangerous to eat. Blue mussels often form aggregations, where they attach to each other using collagenous protein strands. The aggregations vary in density and are influenced by predation, food availability and other conditions.

- *American lobsters* are found south of the Verrazano Bridge, near the Southwestern end of Long Island and just off Sandy Hook. They're also often attracted to artificial reefs found in Lower New York Bay. Their bluish green to brown bodies have red spines, and they can reach a body length of two feet and weigh more than 40 pounds, making them the heaviest crustaceans in the world. Lobsters grow by molting—a process in which they struggle out of their old shells while simultaneously absorbing water, which expands their body size. After molting, lobsters eat voraciously, often devouring the shells they've just shed. This replenishes lost calcium and hastens the hardening of the new shell. Mating only takes place shortly after the female has molted and her exoskeleton is still soft

Mammals include Whales, Dolphins, and Seals.

- Most of the whales that visit New York's waters are baleen whales. They are generally larger than toothed whales and have two blowholes. Instead of teeth, they have large plates of keratin that act as a giant sieve or strainer. To feed, they take in a mouthful of sea water that contains huge numbers of small food—krill, plankton and small fish—and then use their tongue to push out all of the water through the baleen, trapping the food inside.

- Up to five species of seals can be seen locally, but Harbor Seals are by far the most abundant and they're easily recognizable by their round head and blunt snout. They feed on a variety of fish and breed in late spring through fall.

Birds: Over 400 species have been recorded in the estuary area. Jamaica Bay is a very important point for bird migration; many raptors and waterfowl use this Bay as a rest area along their journey.

- *Snowy Egrets* have pure white plumage, black legs, and bright yellow feet, with which they stir up small aquatic animals as they forage. At one time the filmy plumes Snowy Egrets develop when breeding were so fashionable that the species became endangered. Fortunately, efforts by conservationists in the early 20th century resulted in their comeback and they're now a common sight in shallow coastal wetlands. Jamaica Bay provides winter nesting grounds where male and female Snowy Egrets take turns incubating their eggs.
- *Spotted Sandpipers* can be found all across North America, and they 're common in estuary shorelines. They can be identified by their spotted breeding plumage, stuttering wingbeats, showy courtship dances, and teetering gait (for which no one has yet determined the meaning or purpose). In a reversal of most avian breeding habits, it's the female Spotted Sandpiper that claims and defends a nesting territory; she sometimes mates with up to four males, producing a separate clutch of eggs for each, and it's the male that tends the eggs and raises the young. They eat insects and their larvae, as well as small crustaceans, mollusks, and marine worms.
- *Bald Eagles*, when mature, have the iconic white head and tail and a blackish-brown body. They first go through several stages of immature plumages, from fully dark brown to messy and mottled with large patches of white. Every winter, Bald Eagles can be seen on the banks of the Hudson River, where they feed on fish. Usually mating for life, nesting pairs build a nest 4-5 feet wide and 2-4 feet deep, to which they add each year. (The nests can grow so large it can make a tree top heavy and possibly prone to topple in storms.) The female typically lays one to three eggs each year. Hatching after about 35 days, young eagles fledge within three months, but continue to use their nest as a "home base" where their parents care for them for an additional 4-6 weeks.

Additional Information:
All About Birds (The Cornell Lab)
The Billion Oyster Project
Hudson River Park
Hudson River Park virtual field trips of the estuary; education@htpt.ny.gov
Jamaica Bay Park
Marine Life of New York/New Jersey Harbor Estuary (list of species)
NYC Environmental Protection - Harbor Water Quality
Riverkeeper

Map 1: Source: https://hudson.dnr.cals.cornell.edu/about-us/where-we-work
Map 2: Source: https://en.wikipedia.org/wiki/Geography_of_New_York%E2%80%93New_Jersey_Harbor_Estuary

UWSR Eco Letter November/December 2021
COMMENTARY:
Energy Efficiency – Cooling & Heating

Most of us probably don't give much thought to the daily processes of cooling or heating the spaces in which we live and work or of the refrigeration of our food before and after it reaches our kitchens. But these processes actually consume about three-quarters of the energy used in an average house or apartment, and together they produce hundreds of millions of tons of carbon dioxide per year in the United States alone, primarily the result of burning fossil fuels to generate the necessary electricity. Thus, making sure you heat and cool efficiently is a very important factor in helping to mitigate climate change.

In this Eco Letter Commentary we'll be reviewing the current status and future prospects for cooling and heating in the NYC area, and we'll also specifically explore the use of heat pumps in some detail.

COOLING

How it works:
Most refrigerators and air conditioners use a four-step vapor-compression refrigeration cycle.

1. A refrigerant enters a *compressor* as a low-pressure, low-temperature gas, and leaves the compressor as a high-pressure, high-temperature gas.
2. Next, a *condenser* removes heat from this high pressure and hot refrigerant gas until it condenses into a high-pressure, low-temperature liquid.
3. The low-temperature liquid refrigerant is then routed to an *expansion device*, which creates a drop in pressure.
4. Finally, the low-temperature, low-pressure liquid refrigerant enters an *evaporator*, and a fan forces air across the evaporator's fins, cooling the air by absorbing the heat from the space around it into the refrigerant. Then, the refrigerant is sent back to the compressor, where the process starts all over again.

Both air conditioners (AC's) and refrigerators vent the hot air removed by the compressor and condenser outside the appliance itself. An air conditioner vents outside your house or apartment while a refrigerator vents into the room it sits in. The AC unit creates dozens of times more heat than a fridge—enough so that if it vented indoors it would negate its own cooling effect.

Air Conditioning

Because of technological improvements made in the last 25 to 30 years, today's best air conditioners use 30% to 50% less energy to produce the same amount of cooling as ACs made in the mid-1970s. Even if your air conditioner is only 10 years old, you may save 20% to 40% of your cooling energy costs by replacing it with a newer, more efficient model. Also, an aging AC unit slowly loses some of its original efficiency over time, using up more and more electricity to hold the same temperatures. All of this points toward replacing your old AC unit with a newer, more efficient model.

While using any AC, it's important to follow these guidelines:

- Turn the thermostat up to 76-78^{o} F in summer.
- Install thermal or cellular blinds to block the sun's rays in the summer.
- Draw your curtains or close the blinds on sunny summer days to reduce heat gain from the sun.
- Clean your AC's air filters annually and replace them when necessary.
- Don't block inside vents or outside units.
- Install supplemental ceiling fans or use portable fans to circulate air.

More information on cooling:

- Consumer Reports Air Conditioning Buying Guide
- How Does A Wall Mounted Air Conditioner Work? (New England Ductless)
- The Best Ductless Mini Split Air Conditioner (NY Times "Wirecutter")
- Cellular shades

Refrigeration

There have been improvements in compressor technology, and so an average-sized, new refrigerator uses only about 350 Kilowatt Hours (KwH) per year, whereas a similar older one may consume over 1,000 KwH (and its usage may result in more than a ton of CO_2 emissions each year). If you have an old, inefficient refrigerator, now is a good time to think about buying a new one—you can both save money on your electric bill in the long term and help to mitigate climate change. Since the average total cost of electricity in NYC is over 20 cents per KwH, the savings can be significant.

Another option—if you have the space—is to utilize a new, small freezer to supplement your existing refrigerator. They generally only draw about 100 to 200 Watts of electricity, the same as two incandescent light bulbs.

There are other ways to save energy:

- Don't overload your refrigerator.
- Keep most-used products in accessible areas.
- Arrange contents for optimal efficiency.
- Set your fridge to the manufacturer's recommended temperature.
- Regularly clean behind and underneath the refrigerator to maintain airflow.

More information on refrigeration:

- How Much Energy Does Your Refrigerator Really Use?
- Consumer Reports Refrigerator Buying Guide

HEATING

Space and water heating increasingly utilize energy-efficient *heat pumps.* The vapor-compression cycle described above for cooling is also employed by most heat pumps, which use electrical energy to extract heat from the outside environment and **transfer this heat into** a building or apartment, either in the form of warm air or hot water. There are three types of heat pumps: ground-source; water-source (which pull heat from a body of water such as a lake or pond); and air-source.
Air-source heat pumps extract heat from the outside air and blow heated air into inside rooms, and can be utilized to both heat your apartment or house during the winter and to cool your home during hot summer days. They look much the same as air conditioners and employ essentially the same technology, and because they're far more energy efficient than electric resistance heating, use of heat pumps can help to reduce CO_2 emissions.

Because heat pumps' efficiency decreases as the temperature drops, they were initially primarily used in the South. But there's a lot of heat that can be extracted—even from cold air—and technological advances now make them practical in our area. In fact, modern heat pumps work well in temperatures well below freezing (although supplemental heating is recommended if the temperature drops below 0 deg. F). The development of smaller tubing allowed for additional coils in the outdoor units, and therefore more surface area for heat to be absorbed. Inverters, which control the power supplied to the compressor, allow heat pumps to operate at variable speeds. At faster speeds, refrigerant will flow through the system more quickly and increase overall heat transfer. New sensors and controls also communicate within the system to deliver refrigerant at precise temperatures and pressures, helping it run more efficiently.
Aside from helping to mitigate climate change, heat pumps provide several advantages. The cost of heating and cooling your home with a heat pump is typically less than that for oil, propane, or electric resistance. With a heat pump, you can individually control the heating and cooling preferences for different rooms in your house or apartment. And heat pumps last longer than conventional heating and cooling systems and require minimal maintenance. It's important to keep in mind that these new heat pumps are only fully effective in properly insulated dwellings.

Heat pumps or heat-pump systems can be utilized to heat an entire apartment building or an individual apartment within that building. They may include ducting or not. Most heat pumps are *split-systems*—that is, they have one coil inside and one outside. Supply and return ducts connect to the indoor central fan. *Packaged systems* usually have both coils and the fan outdoors. Heated or cooled air is delivered to the interior via ductwork that passes through a wall or roof.

Ductless, mini-split heat pumps have two main components -- an outdoor compressor/condenser and an indoor air-handling unit. A conduit, which houses the power cable, refrigerant tubing, suction tubing, and a condensate drain, links the outdoor and indoor units. Mini-splits are an option for apartments in older multifamily buildings that don't have central shafts that can accommodate new refrigerant and electrical lines. However, installation may necessitate electrical upgrades, and mini-split units are currently more expensive than air conditioners.
Despite these drawbacks, cold climate, air-source heat pumps are gradually making their way into some New York City buildings. They've been installed in new and existing apartments buildings, including one 10-unit co-op retrofit on the Upper West Side. Several brownstone residences in Brooklyn have completed full heat pump retrofits. An HVAC Market Report prepared for the New York State Energy Research and Development Authority (NYSERDA) found that at least 10,720 heat pumps were sold in statewide in 2018.

However, few existing large multifamily buildings in NYC have utilized heat pumps so far. A heat pump retrofit in a multifamily building is a big project. It requires running new refrigerant and electrical lines throughout the building, installing new units in every apartment, and figuring out where to put the outdoor units. Needless to say, this can be quite costly. There are currently no financial incentives available form NYSERDA, but Con Edison does offer rebates), and Federal Tax Credits of up to $300 are available.

More information on heat pumps:

- Upper West Side Co-Op Steps Into the Electrified Future
- Is it Possible to Heat an Apartment with a Heat Pump?
- Making NYC Greener with Air Source Heat Pumps and Solar Power
- One Thing You Can Do: Consider a Heat Pump (NY Times)
- NYSERDA Heat Pump Programs
- Air-Source Heat Pumps

Your Existing Heating System

About three-quarters of all buildings in NYC use oil or natural gas for space and water heating (most of the remainder rely on steam produced by Con Edison). Until heat pumps become more prevalent, this will remain the case, so it's important to use these fossil fuel heaters as efficiently as possible. You can do a few things to help:

- Check the temperature of the hot water in your building with your super; if it's set at 140^{o} F, have the super reduce the setting to 120^{o} F (still plenty hot to take a shower or wash dishes and less likely to burn you).
- Make sure your building has insulated steam and water pipes.
- Make sure your building has its boiler tuned up or cleaned once a year. If the existing boiler is old, encourage your landlord or co-op board to buy a newer, more efficient one; it will gradually pay for itself as it uses less heating oil.
- Make sure your building has energy efficient clothes washers and dryers.

- Detect leaks in your own windows by carefully using a candle on a windy day. These leaks can be inexpensively caulked or weather-stripped. If there are numerous leaks, encourage your landlord to replace the windows with new double-paned metal-framed ones; they can significantly reduce the landlord's fuel bill every year.
- Install thermal curtains or cellular blinds; open them during sunny winter days to let in solar heat. Then close them when the sun sets to keep that heat in.
- If you have a thermostat, turn it down to 65^{o} F in winter.
- Wear a sweater and scarf for extra wintertime warmth.

Other heating and cooling options

- Solar water heating systems were employed in many buildings in NYC during the 1970s (for example, 924 West End Avenue had several water-heating collectors on its roof at that time). This technology is due for a revival and will likely be more widely employed in our city in the future, either as primary or supplemental sources for water heating. Tax rebates are available.
- Passive solar heating design for space heating has been increasingly incorporated into buildings throughout the city, Features utilized are:
    - roof overhangs that shade rooms during the hot summer months but let the low-angle sunlight enter and heat the rooms during the winter;
    - more windows on the south-facing side than on the north-facing side;
    - advanced window glass that has the ability both to insulate and transmit the sun's rays;
    - thermal mass to absorb heat from sunlight during the heating season and absorbs heat from warm air in the house during the cooling season; this mass is commonly composed of concrete, brick, stone, or tile, all of which have the advantage of doing double duty as structural materials;
    - movable window insulation (shutters, shades, blinds, etc.);
    - skylights with movable insulation:
    - adequate wall., floor, and ceiling insulation :
    - sealing of air spaces around doors and windows;
    - good ventilation; and
    - green or white roofs to lessen heat absorption during the summer.
- Geothermal Energy employs wells and pumps to extract hot water from reservoirs deep below the Earth's surface and then uses it to heat and cool buildings. It can be used with ground- or water- source heat pumps. A few NYC public buildings currently have geothermal heating systems, and Mayor DiBlasio is promoting its further deployment. To figure out where it should be sited, the city is launching a pilot feasibility study.

UWSR Eco Letter September/October 2021
COMMENTARY:
Microplastics and Other Lightweight Plastics

Introduction

We've discussed plastics often in recent Commentaries because their proliferation has become an increasingly pressing issue, especially in the ways they affect our rivers, lakes, and oceans.

During the pandemic, New York City and the rest of the world have experienced a significant uptick in plastic use, especially single-use disposables. Of particular concern to us locally are the lightweight or flexible microplastics that result when plastics break down. These microplastic particles can be ingested or inhaled by land animals or sea creatures and also continually inhaled by humans, which can result in serious health issues. Less solid plastics – such as shopping bags and other film, Styrofoam, or plastic straws – can also be harmful when whole or in larger pieces, and these items aren't recycled by NYC's Department of Sanitation (DSNY).

Microplastics

Plastic microparticles are defined as pieces under five millimeters (or about 0.2 inches) in length that can harm humans, fish and any other creatures that ingest or inhale them. These microparticles come from drinking straws, plastic film, food and drink containers, utensils, synthetic textiles, wet wipes, cigarette butt filters, cosmetics, rubber tires, as well as other sources we're probably not even aware of.

The most pressing issue is the vast quantity of plastic debris that ends up in our oceans. The highest concentrations of marine plastic debris are found in the central areas of the North Atlantic and North Pacific Oceans, with much of it entering the water via coastal cities such as New York. Ocean creatures that ingest plastics include organisms from the bottom to the top of the food chain—from plankton to top predators such as tuna or sharks.

Ingestion of plastic can lead to dire circumstances for both sea creatures and land-dwelling animals. Plastic materials can create intestinal blockages that may lead to a slow and painful death. Animals can also be poisoned by chemicals they absorb from the plastic. And, since plastic doesn't easily break down in animals' digestive tracts, it often accumulates in their abdomens, which results in the animal feeling full even when it hasn't eaten anything so it may eventually starve, become malnourished, and die.

Humans and other land animals are continually inhaling microparticles circulating in the air (especially in cities), which can result in serious health issues. Studies have shown that people breathe in or eat tens of thousands of microparticles each year. Inhaled plastics can produce inflammation and lesions in lungs, and repeated exposure is suspected of leading to respiratory problems like asthma and cancer. Inhaling

microplastics may also increase exposure to other toxic substances and coatings associated with plastics and their manufacture. The production and distribution of microparticles can exacerbate climate change as well.

What You Can Do:

You can help to lessen the proliferation of microparticles but minimizing the use of *all* plastics, especially water bottles and other lightweight items such as bags and film, Styrofoam or drinking straws. Avoid wet wipes and try to buy clothing made from natural fibers rather than synthetic textiles. See here for more information from Think Zero .

It's important to remember that larger pieces of these non-rigid plastics can also be harmful. Underscoring the importance of reducing our use of these lightweight plastics is the fact that there are currently no local processing plants for these materials, so there is a limited market for their remanufacturE, and DSNY does *not* recycle them.

Bags and Other Film Plastic

Plastic bags and film are ubiquitous: In New York State alone, over 23 billion plastic bags are typically used every year; and Amazon is estimated to use over 450 million pounds of plastic film in their packaging annually (see this Op Ed piece in the April 6, 2021 *NY Times*).

We've all seen the plastic bags that get stuck in trees, litter our neighborhoods, or float in our waterways. These bags and film also clog up the processing equipment at the Sims Recycling Facility in Red Hook, Brooklyn. Sims can occasionally find recycling markets for plastic bags and film they recover, but they must ship most of it to landfills in Pennsylvania or Ohio. Many animals, both aquatic and terrestrial species, consume plastic bags and develop severe health issues as a result. Although domestic animals and livestock suffer from plastic bag ingestion, it's sea creatures, such as turtles and fish, that face increasingly larger risks from plastic bags. (Sea turtles are particularly affected; plastic bags represent a significant percentage of the plastic debris they ingest because they often mistake them for jellyfish, which they particularly like.)

The Law:

Most single-use plastic shopping bags were banned by New York State Law A27T28 as of March 1, 2020, which also prohibits stores from handing out re-usable plastic checkout bags to customers. Exempt plastic bags include those used to package meat and other food, produce bags for bulk items such as fruits and vegetables, garbage and food-storage bags, dry cleaning bags, and restaurant carry-out bags. Any person or store in violation of this law will receive a warning for the first violation, a $250 fine for the second violation, and a $500 fine for each of any subsequent violations.

Enforcement by the NY State Department of Environmental Conservation (DEC) was delayed because of COVID, but the law finally went into effect in October 2020. However, compliance remains spotty – particularly in smaller food stores – and enforcement has been lax. The DEC purportedly encourages the public to submit complaints about violators for investigation. However, they've issued just 69 warnings and one small fine despite having received over 500 email complaints by the end of July 2021. You can report violators and encourage DEC to be more proactive by calling 518-402-8706.

The law included the option for State localities to charge a fee for paper carry-out bags. New York City opted to do just that and imposed a fee of 5 cents per bag. Three cents of the fee collected go to the NY State Environmental Protection Fund, and the other two cents go toward production of reusable bags. Exempt from the paper bag fee are recipients of food stamps, those with special nutrition requirements, and others in similar circumstances.

Stores covered under the NYS Plastic Bag Reduction, Reuse and Recycling Act will still be required to collect plastic bags and other film plastics from consumers for recycling (see below). Exempted are chain-stores with < 5,000 sq. ft or non-chain stores with < 10,000 sq. ft.

Recycling It:

Plastic film recycling (including bags) is complex. There are three categories: pre-consumer waste, post-consumer waste, and mixed waste (both pre- and post-consumer). And film plastics can also be made of different polymers (such as Polyethylene, Polypropylene, Polyvinyl Chloride, Polyester, Polyethylene Terephthalate or Nylon). When plastic polymers are mixed during recycling, the resultant material is generally only suitable for making plastic lumber.

Large department stores such as Walmart or Target generate large quantities of pre-consumer film such as shrink wrap. Since this is composed of a single polymer and thus commands the highest price in the recycling market, it can also be recycled into new, re-useable bags (Target uses plastic retail bags with 40% recycled content). Chain supermarkets generate both pre- and post- consumer plastic waste, so they're paid less for the plastic bags and film they recycle but they have some leverage with processors because of the quantities they generate. They have an additional incentive to recycle these materials because it reduces their carter costs.

Sims Recycling receives only mixed, post-consumer plastic film at its processing facility, which makes it more difficult for them to find a market for the material. This means that there's a much higher chance that your plastic bags and film will be recycled—and not end up in a landfill—if you bring them to a supermarket or a department store.

The Trex Company, in Winchester, VA (1-800-BUY-TREX; 800-289-8739), is one of the largest plastic film recyclers in the U.S. and the world's largest manufacturer of wood-alternative decking and railing. They also provide community and school educational programs for recycling plastic film and bags. A high percentage of the film Trex recycles

comes from the Northeastern U.S.; they work directly with stores such as Target, Walmart and Whole Foods, as well as with other stores through intermediate brokers. Trex accepts only clean, single polymer plastic, specifically polyethylene, both pre- and post-consumer (with only a small amount of contamination) – such as grocery, bread and dry-cleaning – as well as films such as bubble wrap or shrink wrap (see here for more information).

Novolex, in Hartsville, SC, (800-845-6051), is a leading company that manufactures food service items and packaging using recycled plastics, including film and bags. About half their raw material comes from recycled post-consumer plastics and renewable resources such as wood. The recycled plastics are baled and shipped to a processing plant in North Vernon, IN. Their Hilex Poly Division, in Milesburg, PA (814-355-7410), manufactures and recycles plastic retail bags (many re-useable), can liners, and other film products. These can be ordered online or bought at stores such as Office Depot.

What you can do:

As a consumer, you can help lessen plastic film proliferation.

- When shopping, bring your own reusable bags, such as those made of fabric or compostable materials. You can get free fabric bags from the Department of Sanitation or by calling 311. The DSNY bags fold into a built-in pouch with a carabiner clip so they're always handy - and the bags are made of 90% recycled material. Also, some greenmarkets sell mesh-cloth bags, and fabric bags are often distributed for free by local politicians and community groups. One common plant-based material used for reusable bags is polylactide plastic (PLA), which is typically manufactured using fermented plant starch from corn, cassava, sugarcane or sugar beet pulp.

  Keep these reusable bags in your backpack or purse or pocket, or clip some onto your shopping cart so you always have them handy. You can store them near the door or coat closet so you'll be more likely to remember them on the way out.

- Try to avoid using plastic film to cover or wrap food (such as Saran Wrap, shrink wrap or packaging material) as it's not collected by DSNY. Instead, store it in containers with covers or in reusable zip-lock bags, or wrap it in recyclable aluminum foil. Zip-lock bags can be washed and re-used many times. If you have to use plastic film, you can recycle it, along with plastic bags, at most supermarkets and many other large stores. See here for a list of locations.

- Don't put plastic bags and film into the garbage. Instead, take them to a supermarket or department store that recycles them. This way there's a much higher chance they won't end up in a landfill.

- Garbage bags must be impermeable to liquids so paper alone is not always the solution. However, if you live in a larger building and the food waste isn't too wet, brown kraft paper bags can be used to line rigid plastic containers in your

apartment before it's transferred to the building's larger receptacles. The same is true of bags used to collect organic waste in residential buildings. For compostable bag manufacturers see The Biodegradable Products Institute list.

More information on plastic bags and film:

- *January/February 2020 Eco Letter Commentary* (return to the current Eco Letter and click on the link to our *Archive of Past Commentaries*)
- Bag It NYC
- Biodegradable Products Institute
- NY State Plastic-Bag Law
- PlasticBagLaws.org

Styrofoam (expanded polystyrene, or EPS)

Plastic foam products, including Styrofoam, are used all over the world since they can be adapted to many uses—such as packing peanuts, coffee cups or insulation. Since EPS foam is composed of 98% air, it's lightweight and buoyant and thus can easily drift into our waterways and ultimately into the ocean, where it can remain for hundreds or thousands of years as it gradually breaks down into microparticles.

As mentioned above, these microparticles present a significant hazard to all animals: Fish, sea birds, sea turtles and other ocean creatures often ingest these them, with adverse and often fatal effects. A recent Food and Agriculture Organization study found that more than 100 commercial seafood species had ingested them and close to 700 species have been impacted. These microparticles can also work their way into the food chain and result in human health problems. In fact, the EPA and International Agency for Research on Cancer consider styrene a possible human carcinogen. Also, the manufacture and transport of EPS creates air pollution and, as a petrochemical product, exacerbates the effects of climate change.

The Law:

For these and other reasons, New York City banned most single-use foam products in January 2019. Banned products include single-service items, such as cups, bowls, plates, takeout containers, trays, and coolers. Additionally, manufacturers, distributors, and stores may no longer sell or offer for sale loose fill foam packaging ("packing peanuts") in the City. Exemptions include foam containers used to package or store raw meat, fish and other seafood, poultry, or eggs sold from a butcher case or similar food retailer, and foam blocks used as protective packaging in shipping goods such as electronic devices or appliances.

What You Can Do:

- Avoid throwing EPS foam peanuts in the trash. Most Mail Boxes, Etc. and UPS Stores (800-789-4623) accept EPS foam peanuts and other packaging materials

such as bubble wrap and plastic foam for reuse in shipping. (This is also often true of other local businesses that do a lot of shipping.)

- Whenever possible use non-plastic alternatives to EPS foam, such as cornstarch-based peanuts, crumpled newspaper or cut strips of cardboard. Ecovative Design's Mushroom® Packaging Material (made from mushroom mycelium) is an innovative alternative.

- When shipping an item, choose a box that fits it as closely as possible. You might stockpile a few boxes for this purpose from delivery of your on-line purchases.

- If your host a party at your home or other venue the best environmental option is to give out reusable cups, bowls, or plates instead of Styrofoam ones.

- Whenever possible, buy eggs packed in recyclable paper cartons.

More detailed information on Styrofoam:

- See the *September/October 2019 Eco Letter Commentary* (return to the current Eco Letter and click on the link to our Archive of Past Commentaries).

Plastic Straws

These are strewn all over the world. About 500 million plastic straws (primarily composed of polypropylene) are used in the U.S. alone each year. Since they're so lightweight, they're often blown off garbage collection trucks or waste disposal sites. And because there's no secondary market, DSNY doesn't collect and recycle them. Aside from littering our city, they're another source of hazardous microplastic particles; many end up in our oceans, contributing to the vast vortices of plastic waste and interfere with or endanger aquatic life. Seabirds seem particularly prone to eating straws that they find on beaches or floating on the ocean surface.

The Law:

The good news is that NYC Councilmember Helen Rosenthal's long-awaited plastic straws and stirrers bill is now a state law (Assembly Bill A.90A) and will **take effect on November 21, 2021. After this date,** in NY State (including NYC) restaurants are allowed to provide plastic straws *only if customers specifically request them*.

Avoid using straws at home or, if you must, use paper ones or any of the multitude of options now available for reusable straws.

More information on plastic straws:

- Beyond Plastics; they also have a quarterly NYC joint organizing call with NYPIRG
- Cafeteria Culture

- Surfrider Foundation
- Think Zero LLC
- We Hate To Waste

UWSR Eco Letter May/June 2021
COMMENTARY:
Wind and Solar Power

Renewable energy, such as that provided by wind and solar power, is the fastest-growing energy sector in both our state and our city. NY State law now mandates that 70% of our electricity be generated by renewable sources by 2035. Several large wind power facilities off the shore of Long Island are currently under construction or scheduled to be built in the next three to four years. Solar electricity, generated in far smaller facilities, is also growing very rapidly in New York City, as well as in the rest of the State.

There are many reasons to replace the use of fossil fuels with renewable energy technology (see the Eco Letter's *Archive of Past Commentaries* under Energy and Climate Change). Both solar and wind technology have been increasingly employed in the New York City metro area. Wave and tidal power are also suitable. For instance, Verdant Power, a local company, has installed an array of three tidal power turbines at its Roosevelt Island Tidal Energy (RITE) Project site in the East River – the first U.S. licensed tidal power project. However, so far this is the only tidal or wave energy project in our area, so we'll concentrate here on wind and solar power.

Both State and local political legislation have helped in the implementation of these technologies. In addition to the State's mandate, in November 2020 the City signed two bills into law – Local Law 92 of 2019 and Local Law 94 of 2019 **(**sponsored in part by City Council Member Helen Rosenthal) – that require all new buildings and existing buildings undergoing certain major roof renovations to have a solar photovoltaic system, a green roof system, or a combination of the two. These systems must cover 100% of any applicable roof. Also, the ***Renewable Rikers Act*** was signed into law by Mayor de Blasio in late February 2021. This act will close Rikers Island jail complex no later than August 2027 and transform the island into a renewable energy facility that will include composting and wastewater treatment.

WIND POWER

Large-Scale Wind Power

With almost 2,000 MW of wind capacity installed on land, New York State now ranks eleventh in the country, but it continues to expand, and our state is now poised to be the leader in offshore wind. In 2019, Governor Cuomo signed into law a bill that mandates 9,000 MW of offshore wind by 2035. To meet these ambitious goals, New York is moving forward with a series of large wind farms off the coast of Long Island. The

five projects described below will power more than 2.4 million homes in total, and thousands of jobs will be created in construction, maintenance, and operation of these wind farms.

- Ørsted, a Danish renewable energy company, is currently constructing New York's first offshore wind project (in partnership with Eversource). The 132 MW South Fork Wind Farm is sited about 35 miles southeast of Montauk Point on Long Island. Once it comes online some time in 2023 it will supply power for about 70,000 homes in Eastern Long Island.

  Ørsted is also developing Sunrise Wind off Suffolk County that will be connected to the grid in Port Jefferson, Long Island, which will also be the site of a maintenance and operations hub. Sunrise will deliver 880 MW of power to the NY State grid, enough for over 500,000 homes. *Info*: Jennifer Garvey, jegar@orsted.com

- Equinor, a Norwegian power company, currently has three projects. The first is Empire Wind off the coast of Long Beach, which will deliver 816 MW of renewable energy to the NY State Grid, enough to power close to 500,000 homes. Construction should start in 2023, with power scheduled to be online about 2026. Equinor plans to use the South Brooklyn Marine Terminal (in Sunset Park, Brooklyn) for construction activities and its operations and maintenance base. The proposals include plans for manufacturing offshore wind components upstate at the Port of Coeymans and the Port of Albany.

  Equinor's two other projects will supply power for an additional 1.3 million homes. The 1260 MW Empire Wind 2 (in partnership with BP) will be located about 20 miles off the south shore of Long Island. Electricity generated will enter the existing grid at South Brooklyn Marine Terminal. *Info*: Julia Bovey, jbov@equinor.com
  Beacon Wind, a 1230 MW wind farm, will be located 60 miles off Montauk, and Equinor plans to connect it to the grid in Astoria, Queens. Since the electricity will have to travel a long distance underwater, they'll be using highly efficient, underwater HVDC cables. The power will be converted back to alternating current (AC) in Astoria. Construction is scheduled to begin in 2025 and completed in 2028. *Info*: Beth Treseder, EWOG@equinor.com

Environmental and Economic Considerations

Both Ørsted and Equinor are conducting environmental studies to learn how to best coexist with marine life and birds in the leased area. They're reaching out to fishermen, conducting marine life surveys, and installing improved whale detection systems. The concrete foundation for each wind turbine can become a type of artificial reef, attracting diverse marine life. Both companies also took bird migration routes into account for the siting of their turbines. The relatively low speed of large wind-turbine

blades should make it easier for birds to avoid them; sonic devices, lights, or red coloring on the blade tips may also help.

GE Renewable Energy recently announced a multi-year agreement with Veolia North America for the first U.S. wind turbine blade recycling program of its kind. The majority of blades from onshore turbines that GE changes out during repowering efforts will be shredded and used as raw materials for cement manufacturing, creating a circular economy for composite materials. This recycling will have a positive environmental impact by lessening the amount of coal or other raw materials required to produce cement.

Eric Adams, the Brooklyn Borough President, unveiled a plan in April to make NYC the wind power hub of the Northeast by building wind turbine manufacturing plants at ports throughout the city. Waterfront factories would design, construct, and ship the components necessary to build wind farms planned for the region and create green jobs for city residents.

Small- and Medium-Sized Wind Power

For a variety of reasons, including safety issues, its impractical to site large wind turbines (5 to 15 MW each) within New York City. However, it's feasible to site small and medium-sized turbines in vacant lots or on rooftops (where the wind speeds are generally higher). It's also theoretically possible to site wind generators between buildings in some areas with high winds, such as along Riverside Drive.

For more information:

- Citizens Campaign for the Environment
- Equinor
- Ørsted

SOLAR ENERGY

In contrast to wind power facilities, solar installations in New York City are relatively small. Most of them convert sunlight to electricity using photovoltaic (PV) cells and arrays, usually on rooftops. Interestingly, about one-fifth of all horizonal space in our city is composed of rooftops – more than 1.6 billion square feet.

310 MW of electricity is currently generated by solar power in NYC (up from about 50 MW in 2016). This is only a small percentage of our overall electricity usage, but that percentage is growing rapidly. Individual customers often cooperate with other customers in what is termed Community Solar (more on this below) but building owners can decide to solarize their buildings individually, and tax abatements are available.

Several for-profit and non-profit organizations support the spread of PV deployment in our city (see below) and there are at least a dozen installers in the NYC Metro Area. More information on installers can be found at these sites: Here Comes Solar, Solar Tribune, or Energy Sage.

There are some solar water or space heating systems in New York City, but that technology has yet to become as widely adopted as it was in the 1970's. However, contractors are increasingly employing passive solar designs in their buildings that include such features as skylights, roof over-hangs, insulating shades, and smart glazing.

Community Shared Solar

Community Shared Solar (CSS) is defined as a solar-electric system that provides power and/or financial benefit to multiple community members. Despite the substantial amount of square footage on City rooftops, a 2008 study by the National Renewable Energy Laboratory (NREL) found that only 22-27% of residential rooftop area is actually suitable for siting individual PV systems. Thus, the community option can expand access to solar power for renters, those in buildings with shaded roofs, and those who choose not to install a residential system on their home for financial or other reasons. As a group, ratepayers and taxpayers fund solar incentive programs, and it reduces up-front costs for participants. It also permits improved economies of scale, optimal project siting and increased public understanding of solar energy. And it helps produce local jobs as well.

There are now over 30 community-solar sites in NYC. Con Edison is training residents of New York City Housing Authority (NYCHA) developments to become solar technician apprentices so they can install solar panels on NYCHA building rooftops as part of the Community Power program.

The *Shared Solar NYC* program enables CSS by connecting interested subscribers with viable host sites built by trusted developers. Subscribers can own their home or be a tenant/renter. By signing up for a CSS system, participants subscribe to a specific solar energy system and receive credit on their energy bills. Property owners who agree to host CSS systems can earn money from lease payments while supporting the community, and they don't have to pay for the system themselves.

Some PV Installations in Manhattan

- New York City announced in February that it will be installing rooftop solar at nearly 50 public schools and build solar projects at four City-owned water treatment facilities. The PV arrays, scheduled to be online by 2022, will total about 22 MW, and several of the projects are expected to include energy storage systems.
- We Act and Solar One (see below) have installed PV systems on 13 Housing Development Fund Corp. buildings (HDFC) in Northern Manhattan, such as the one at 128 West 138th Street.
- The New York City Housing Authority (NYCHA) plans to **deploy around 1 MW of** rooftop solar on NYHCA buildings **across the city.** Solar One has already installed a PV system on the Carver Houses at 1475 Madison Avenue, a 13-building complex in Spanish Harlem.

- Stuytown Solar is Manhattan's largest solar project, with 9,671 PV panels installed on 22 acres of rooftops in the building complex north of East 14th Street. It generates a total of 3.8 MW of electricity, or enough energy to power over 1,000 typical New York apartments each year.
- Brooklyn Solar Works (see below) has completed five installations in West Harlem: on 118th Street between Malcom X and Adam Clayton Powell; 132nd Street between Malcom X and Adam Clayton Powell; 142nd Street between Convent and Amsterdam; 142nd Street between Hamilton and Broadway; and
- 144th Street between Convent and Amsterdam.

Some Local Solar Organizations

- Brooklyn Solar Works (tel: 347-318-4771). Founded in 2015, Brooklyn Solar Works is the Borough's leading residential solar system design and installation provider, with more than 800 systems completed. They're gradually expanding into Manhattan and now have some installations in West Harlem.
- Google Project Sunroof (various locations). Project Sunroof looks up your home in Google Maps and combines that information with other databases to create an analysis of your own roof's solar potential. It considers local shading, sun positions at various times of the year, as well as historical cloud and temperature patterns. Project Sunroof uses current solar industry pricing data to run the numbers on leasing, taking a loan, or buying solar panels for your house to help you choose what's best for you. It includes incentives in calculating your final cost, such as federal and state tax credits, utility rebates, renewable energy credits and net metering.
- Green Power Solutions (121 East 24th Street, New York, NY 10010; tel: 718-744-7625). Coordinates photovoltaic and solar thermal projects throughout the Northeast.
- IPP Solar (299 Broadway, #1501, tel: 212-791-2100) is an independent power provider of solar energy to electric vehicles and commercial/industrial customers in the New York metropolitan area. They operate a network of DC Fast-Charge stations in New York, New Jersey, and Connecticut. Their stations are most often solar powered and will fast charge your car in 15-30 minutes.
- Mpowerd (45 Main Street, #522, Brooklyn) sells a variety of small PV-powered lights, including some that are inflatable.
- New York Sun Works (157 Columbus Avenue, tel: 212-757-7560; info@nysunworks.org) runs a Greenhouse Project dedicated to improving K-12 Environmental Science Education in urban schools through integrated facilities, hands-on curriculum, and professional development. Students learn about climate change and other environmental issues as well as how to grow food. Their labs can include solar panels, hydroponic growing systems, a fish farm, a rainwater catchment system, a weather station, integrated pest management and a vermicomposting station. New York Sun Works also sponsors an annual youth conference.

- Solar One (24-20 FDR Service Road E., tel: 212-505-6050) provides clean energy and other environmental education services. They offer a number of environmental programs including K-12 sustainability curriculum/education, green worker training, and technical assistance to NYC buildings that want to adopt energy efficiency and renewable energy. Their *Here Comes Solar* program envisions a city where solar energy is accessible and affordable for all New Yorkers. They help both affordable and market rate multifamily buildings implement rooftop solar projects by consulting with co-op boards, providing realistic solar financial estimates, and assisting buildings to secure competitive proposals from local solar companies.
- Urban Green Energy (UGE) (417 Fifth Avenue, tel: 917-720-5685) is the second largest commercial solar developer in New York and also works with residential buildings. They offer full-service renewable energy systems, including PV-powered products, site assessment and design. They also provide end-to-end solutions, including engineering and design as well as construction and management for both solar photovoltaic and wind energy projects.
- We Act for Environmental Justice (1854 Amsterdam Avenue, tel: 212-961-1000). We Act's *mission is to build healthy communities by ensuring that people of color and/or low-income residents participate meaningfully in the creation of sound and fair environmental health and protection policies and practices.* In 2016 they partnered with Solar One and the Urban Homesteading Assistance Board to launch Solar Uptown Now (SUN), which targeted Housing Development Fund Corporation cooperatives for solar installations. As of April 2021, SUN had installed solar panels on the roofs of 13 HDFC buildings in Northern Manhattan, annually producing 415 KW of renewable energy. They also train local residents to do the actual installations of PV systems, creating green jobs for the community.

What you can do:

- Buy PV-powered small electronics, e.g., calculators, watches, radios, lights.
- Get your electricity from a supplier that generates electricity via wind or hydro power. This is a very easy way to help, although it probably will cost you a bit more. Suppliers include: Alpha Gas and Electric, Citizens Choice Energy, Clean Choice Energy, Green Mountain Power, Greenlight Energy, IDT Energy, Mpower Energy, Pure Energy, Residents Energy, and Starion Energy NY.
- Join a Community Solar PV Project.
- Buy insulated window shades or drapes to control solar radiation and reduce both heating and air-conditioning load and conserve energy in other ways. For more information, see **the Eco Letter's *Archive of Past Commentaries* under** Energy Conservation.
- Join the New York Solar Energy Society.

General Information:

- Community Power
- Co-ops Go Solar
- National Renewable Energy Lab, *Guide to Community Shared Solar*
- New York City and State Solar Maps and Statistics
- New York State ERDA – Solar for Your Home and Wind Energy
- Shared Solar NYC
- Sustainable CUNY

UWSR Eco Letter March/April 2021
COMMENTARY:
Oysters and Honeybees

Oysters and honey may seem like an odd combination, but the two are actually often eaten together (yes, we googled it and found many recipes). Both have been and are still grown or raised locally, and – most significantly – the culturing of each has its own significant environmental benefits.

When the Dutch first landed here in 1620, they found that the bottoms of the Hudson River, New York Harbor and surrounding salt-water areas were lined with a vast number of oysters. They were already being used by the native Lenape people for food, money and knives, and oysters became a favorite food of the Dutch and English settlers. By the late 1800's, however, overharvesting and pollution had reduced their numbers drastically.

In contrast, the Lenapes had never seen honeybees (there were many species of bees here, but they didn't make honey). Honeybees are a Eurasian species, and European settlers brought them to Virginia in the early 1600s, from where the bees gradually spread throughout the Northeast. Fast forwarding to recent decades, there's been a revival of interest in raising honeybees within New York City itself.

OYSTERS

The first oysters evolved over 500 million years ago, and they were originally quite small. They survived the Permian Extinction about 225 million years ago, when over 95% of marine species disappeared, and then began to grow larger.

The earliest oyster-shell refuse piles (middens) in the New York City area date back to around 10,000 BC. There were once nearly 220,000 acres of oyster reefs locally that were part of a biologically productive and diverse ecosystem that hosted thousands of associated species.

In fact, by the 1800s New York City had become the oyster capital of the world. Their quantities were so great that it wasn't unusual for local families to have two oyster meals in a day. Many more oysters were pickled and sold to Europe, a trade that produced millions of dollars in revenues for the City annually.

But sadly, this didn't last, for reasons with which we're all too familiar. Overharvesting, as well as the dumping of commercial waste and raw sewage into the Harbor decimated the oyster population by the late 1800s. By 1906 the oyster reefs had been dredged up.

Fortunately, restoration projects have been undertaken in recent decades (especially since the *Clean Water Act* was passed in 1972), and efforts to purify both the Hudson River and Lower Bay have resulted in waters that are measurably cleaner. As a result, we are now witnessing a resurgence in the oyster population, as well as that of other marine species, and concurrently an increase in oyster farming in the metropolitan area.

Unlike clams and scallops, which move about their habitat, oysters attach themselves to a hard object – old shells, rocks, piers, another oyster, or any hard, submerged surface – by means of a substance secreted from their foot. As oysters cluster together on these hard surfaces they fuse together as they grow, forming rock-like reefs that provide habitat for other marine animals and plants. Oyster reefs also help to reduce erosion and thus can mitigate the effects of the large tidal surges that have become more frequent due to climate change (like the one that occurred during Hurricane Sandy).

The oyster's top and bottom shells are different from each other in size and shape, an asymmetry that's unusual in nature. Oysters always rest on the side with the deeper, more curved shell. They grow faster in warmer water, but colder water gives them a stronger flavor. However, if the water is too warm (as might result from climate change), they won't survive at all. Males and females look the same; the males discharge sperm that fertilize up to 50 million eggs released at a time by the females. Fertilized eggs become larvae, and each larva subsequently develops a foot and attaches itself at about six months of age.

Adult oysters are powerful ecosystem engineers. One adult oyster can filter up to 50 gallons of water per day! The massive population that existed when European settlers arrived could filter all the water in the NYC Harbor in just a few days.

Along with other efficient filter feeders like clams and other shellfish, they help remove excess nitrogen from water by incorporating it into their shells and tissue as they grow. While nitrogen is an essential nutrient for plants and animals, too much nitrogen—often from fertilizer runoff and septic tanks—boosts the growth of algae, which can overwhelm water bodies and ultimately reduce oxygen levels in them. Oysters also remove sediment from the seawater, shaping it into small packets that are then deposited on the bottom of the river or bay, where it isn't as harmful.

In the high turbidity environment of the lower Hudson, it appears that oysters grow more quickly in the upper zone of the harbor (where more sunlight penetrates), rather than at lower depths. Salinity and the quantity and quality of food also affect how much water oysters can filter or whether they will even survive. They act like a canary in a coal mine: If the water is too polluted, they die.

Oysters are now being grown by at least three local organizations: the Billion Oyster Project, the River Project, and Fishers Island Oyster Farm

- *The Billion Oyster Project* (10 South Street, Slip 7; 212-458-0800, x9).

  In partnership with the *Lobster Place*, the Billion Oyster Project collects shells daily from about 25 restaurants in Manhattan and Brooklyn and delivers them to dumpsters in Greenpoint, Brooklyn. Full dumpsters are then emptied onto the Project's open-air curing site on Governors Island, where piles of shells sit exposed to weather, sun, insects, and birds. In about a year the tissue and pathogens are gone, and the shells are clean enough to be reused for oyster larvae to settle onto in their hatchery. Last, they place them into wire-mesh cages and bring them out to their restoration sites.

  These wire-mesh structures keep out most of the silt on the bottom of New York Harbor and thus allow the oysters to breathe. To date, they've restored oysters at 15 reef sites across the five boroughs— from Coney Island Creek in Brooklyn to SUNY Maritime College in the Bronx. They also run four oyster nurseries where they grow oysters for future reef installations and conduct scientific experiments. So far, the Project has planted 37 million live oysters that have filtered 19.7 trillion gallons of water and collected over 1,600,000 pounds of oyster shells that were diverted from landfills.

  The Billion Oyster Project works with more than 100 schools and 800 students across New York City. Along with the NY Harbor School, their hands-on introduction to STEM education invites students to engage with the Harbor and trains them as scientists. Also, along with The Nature Conservancy, they measure the environmental impact of oyster reefs.

- *The River Project* (353 West Street, 917-661-8748). The River Project also has an oyster-restoration program. They've studied wild and captive oysters at their Pier 26 site since 1998 and are developing plans for creating a small oyster reef in Tribeca. In addition, The River Project has a growing oyster outreach component in partnership with NY/NJ Baykeeper, the New York Harbor School, and the Harbor Estuary Stewardship Program. This work allows oyster gardeners to learn about local ecology while they participate in hands-on restoration and promote a broader community support for improving the environmental health of the harbor. The program currently involves hundreds of oyster gardeners from schools and community organizations around New York City.

- *Fishers Island Oyster Farm* (Fishers Island, NY 06390; hello@fisherislandoysters.com)

  The oysters from Fishers Island can be eaten since they're grown in a brackish salt pond on the island, but the ones from the NYC Harbor aren't currently safe to eat. This family-run farm off the northeastern end of Long Island has been growing and distributing oysters for more than 30 years and is focused on environmentally sound farming practices that produce oysters for the commercial and consumer market as well as seed oysters for other farms. Fresh oysters are shipped directly from the Farm to markets and restaurants and individual consumers.

More Info:

- *Billion Oyster Project*, 10 South Street, Slip 7, 212-458-0800, x9
- *The Big Oyster*, Mark Kurlansky, New York, Ballantine Books, 2006, 307 pp.; reprinted by Random House Trade Paperbacks, 2007
- One Earth, "Oysters: Nature's Water Filtration System"
- The River Project, oyster restoration
- Good Morning America, "How oyster shells from NYC restaurants are recycled to restore reefs"

HONEYBEES

Honeybees are native to Europe, not the United States, and the only bee species now living in North America that produces honey from flower nectar. (Another smaller bee from Central America also makes honey). European settlers brought honeybee hives with them to Virginia in 1622, and within a couple of decades they'd spread throughout the Northeast.

In addition to producing honey, the bees pollinate many flowers, including those on crops of vegetables or fruit and nut trees. By pollinating these flowers, honeybees increase our nation's crop values each year by more than 15 billion dollars.

Apis mellifera, or the western honeybee, goes into its mating season between April and June; that's when swarms are most frequent. But swarms can also occur in late August as a result of overcrowding or overheating within the hives. Once bees reproduce, their colony splits in half; half of the colony swarms with the older queen to a new home, and the other half stays in the original hive with a new queen. A small hive contains about 20,000 bees, while some larger hives may have over 100,000 bees.

There are three types of honeybees:

1. *Worker bees*, the smallest, are female and have a stinger, but they don't breed. Thousands of worker bees keep the colony going. They clean and guard the hive,

feed the developing bee brood, build the honeycomb, and collect nectar to process into honey stores for the long winter when there are no flowers. The workers also keep the hive cool in summer and warm in winter (they use large amounts of water to control temperature and humidity).

2. *Queen bees* are also female—the mother of the hive and the largest bee in it. There is only one queen in each hive, and each day she must lay the 1,000 or so eggs that will develop into new honeybees. Her strong pheromones keep the colony working together and prevent the worker bees from trying to lay eggs.
3. *Drone bees* are male but don't have a stinger. The lazy drones have only one responsibility in the colony, and that's to mate with the queen.

Honeybee workers visit flowers for two purposes – to collect pollen, which is used to feed the brood in the warmer months, and to collect nectar that is then made into honey to feed the colony over the winter. Honeybees don't hibernate, but rather huddle together to retain heat and protect their queen, so nectar is a vital energy source during the winter.

Pollen is a fine powder from the stamen, or male flower part, that is needed to fertilize the pistil, or female flower parts, for the plant to produce seeds or fruit. Nectar is the sweet substance made by some flowering plants to attract pollinators like butterflies or bees. As the bees collect the nectar, pollen sticks to the hairs on their bodies and they thus accidentally carry it from the male to the female flower parts, thereby pollinating the flower.

An average beehive can produce between 30 and 60 pounds of honey per year, but some of this must be kept in reserve for the winter. However, under optimal circumstances, a large hive will yield up to 100 pounds in one year. Several factors determine how much honey a beehive will produce, including weather conditions, hive location, diseases and pests, and the potential for bee robbing (when b*ees* invade another hive and steal the stored honey).

During the warmer months, worker bees leave the hive in search of flowering plants and trees. When they return to the colony, honeybees perform a 'waggle dance' to tell other workers where they can find good pollen or nectar sources. These sources include fruit tree blossoms in the Spring, some vegetable flowers, and other flowers as they bloom from Spring through Fall. A variety of flowers attract honeybees; their favorites are often blue or purple, but yellow flowers such as sunflower, goldenrod or zucchini flowers also attract them.

Sadly, honeybee populations in the United States have generally been declining in recent years for many reasons, including Colony Collapse Disorder, diseases like American Foulbrood, or infections caused by Varroa Mites. To better understand how to protect bees, researchers are also looking into the effects of other factors such as land-use changes and the use of chemicals on honeybee habitat.

Honeybees have been raised in New York State for a long time. The **Empire State Honey Producers Association** was established in 1870, and about 1.5 million pounds of honey were produced that year. In 2019, that figure had more than doubled to about 3.5 million pounds. New York City legalized beekeeping in 2010, and the practice has increased exponentially since then. There are actually now more honeybees in New York City than there are people. Hundreds of hives are located throughout the city on rooftops or in backyards, but no figures seem to be available for the amount of honey produced by them. Both the Hilton Midtown and the Intercontinental Hotels have hives on their rooftops that provide fresh honey for food and drink options. Urban honey contains few chemicals because city flowers usually don't get sprayed with pesticides.

The New York City Beekeepers Association is a "hive" for urban beekeepers. Its membership consists of an ever-growing group of local beekeepers, bee enthusiasts, and honey lovers. The NYCBA's mission is to provide members with a medium for sharing knowledge and mutual interest in beekeeping, to educate and promote the benefits of beekeeping to the general public, and to do so safely and responsibly in an urban environment. They offer periodic classes, seminars, and apprenticeships.

More Info:

- New York City Beekeepers Association
- New York Times, "Remember the Bees that Swarmed Times Square? We Tried to Find Out Where They Came From"
- Manchester and District Beekeepers' Association, general be
- e information

UWSR Eco Letter November/December 2020
COMMENTARY:
Minimizing Plastic Waste

In 2018, about 359 million metric tons of plastics were produced worldwide. Plastics are useful, of course, and we need them for medicine, food safety and technology. But do we really need plastic lawn (or door) decorations for every holiday? Or so much plastic packaging?

Plastic waste in our oceans has become a very serious problem: In addition to the estimated 150 million metric tons that currently circulate in marine environments, about 8 million metric tons of plastics enter our ocean *each year*. If this trend continues, it's estimated that our oceans will soon contain a greater amount of plastic than fish.

During the pandemic, NYC and the world have seen a huge uptick in plastic use, especially single-use disposables (e.g., increased medical supplies and food service/take-

out adhering to health safety modifications). Recent data is harder to come by in the U.S. but, according to the *Los Angeles Times*, Singapore saw an increase of 1,470 tons of plastic waste from takeout and food packaging alone during their 8-week shutdown (information courtesy of Think Zero).

Minimizing our use of plastic, and re-using or recycling plastic items whenever possible, reduces energy consumption and overall levels of the greenhouse gas carbon dioxide.

It can take up to 1,000 years for plastics to fully decompose in landfills, and the process of decomposition can produce harmful microplastic particles. Plastics that are carelessly strewn around our landscape can clog water systems, pollute our soil and waterways, and often end up being washed out to the ocean. The Great North Pacific Garbage Gyre now covers an estimated surface area of 1.6 million square kilometers, an area twice the size of Texas, and there are similar garbage patches on all our oceans. These patches are made up almost entirely of plastic.

Airborne microparticles (pieces under five millimeters in length) can harm humans, fish and any other creatures that ingest or inhale them. They come from clothing, straws, food and drink containers, utensils or other plastic goods as well as packaging that's used briefly and then thrown away, sometimes decades ago. Those microparticles don't care what ZIP code you live in, and they're continually inhaled or ingested by all of us, especially city dwellers. Previous studies have shown that people breathe in or eat tens of thousands of microparticles each year. Inhaled plastics can produce inflammation and lesions in lungs, and repeated exposure is suspected of leading to respiratory problems like asthma and cancer. Inhaling microplastics may also increase exposure to other toxic substances and coatings associated with plastics and their manufacture.

To learn more about how to reduce your household impact on plastic waste, Think Zero is now offering individual coaching on waste reduction and improved sustainability practices in the home (email home@thinkzero.com for a consultation). Other suggestions are included in the sections below on Solid Plastics, Styrofoam and Plastic Bags & Other Film.

SOLID PLASTICS

(accepted for recycling by NYC Department of Sanitation [DSNY])

Food Utensils – It's best to avoid them, even though they're accepted by DSNY. When you can't, try at least to re-use them. We routinely carry around phones, credit cards, water… why not cutlery? People used to bring their own. In fact, hosts and hostesses generally didn't provide cutlery and flatware until the 19th century (information courtesy of wehatetowaste.com). Do a quick computer search for "portable camping flatware" and you'll see a number of options of flatware sets (some even include straws) made of bamboo or stainless steel that tuck into a carrying case you can put in your purse, pocket or backpack.

Clamshell Containers, except those made from Styrofoam, are recycled by DSNY. If you're ordering catering at home or work, ask the restaurant or caterer to bring food in reusable metal catering trays. To avoid single-use containers, order takeout from DeliverZero, which is now serving the Upper West Side. Reusables are safe to use and hygienic, provided they are properly sanitized, (information courtesy of Think Zero). If you're interested in learning more about the safety of reusables during COVID-19, Upstream Solutions has valuable information on their website.

Other Food and Drink Containers – Containers for milk, juice, water, soda, yogurt, detergent, etc., are recycled by DSNY, but it's still best to minimize their usage.

- Drink tap water rather than buying water in plastic bottles. (NYC water is continuously monitored for safety and our tap water is still ranked one of the best in cities around the world). If you need to purchase something in a plastic bottle, buy one larger drink container rather than two or more smaller ones.
- Buy a juicer and make your own lemonade or other fruit juice.
- Make your own yogurt.
- Reuse larger yogurt and similar containers to store leftovers or collect food scraps for composting.
- If possible, buy milk in glass bottles. Some local sources are Manhattan Milk, Maxdelivery, Rustic Roots, or Drink Milk in Glass Bottles.

Here are some sources of other alternative containers, plates and trays:

- **Sustainable Produce Containers** (888-883-7259) sells compostable cardboard containers that have vents to prevent condensation and are easy to recycle.
- **Ecovative Design** (518-273-3753) sells containers made from mushroom mycelium (the filamentous roots of mushrooms). These are hydrophobic, meaning they repel water.
- **Footprint** (480-640-9401) sells plant-based food containers that are biodegradable, microwavable and ovenproof.
- For a list of Bagasse and other Biodegradable products see **Biodegradable Products Institute** or **GreenGood**.

Plastic Straws are strewn all over the world. About 500 million plastic straws (primarily composed of polypropylene) are used in the United States alone each year. Because there's no secondary market, DSNY can't collect and recycle them. Aside from littering our city, they're another source of hazardous microplastic particles; many end up in our oceans, contributing to the vast vortices of plastic waste and interfere with or endanger aquatic life.

Cities such as Seattle and Fort Myers have already banned single-use plastic straws. Here in NYC Assembly member Linda Rosenthal's legislation (**Assembly Bill A.90A**)

requires that restaurants only provide single-use plastic straws to customers when explicitly requested by the customer. The bill advanced out of the Assembly Environmental Conservation Committee last session. Unfortunately, due to the abbreviated session as a result of COVID, it remains in the Codes Committee and was not placed on an agenda this session. They're looking forward to pushing this legislation forward next year.

Whenever possible use paper straws or, better yet, don't use straws at all. It's perfectly easy for most of us to drink directly out of a glass or cup. When you're drinking something outside your home, just ask that a straw not be included with your drink or bring your own reusable straw.

E-Waste – Most electronic products contain some plastic, and some are primarily made of plastic. The law prohibits your disposing of electronics such as TVs and computers with your regular trash or recycling because they may contain hazardous materials, including lead, mercury, arsenic, and cadmium. Unfortunately, because of budgetary restrictions resulting from COVID, the City has suspended the NYC E-Waste Appointment Program and no new collection locations are currently being added to the ecycleNYC program. Additionally, Safe Disposal events are canceled through June 2021, and the Special Waste Sites are closed through June 2021.

However, there are some alternatives:

- Bring electronic goods to a drop-off site (*call first*). These include:
  - Best Buy, (888-237-8289)
  - Goodwill, (212-799-2723)
  - The Salvation Army (800-728-7825)
  - Staples. (800-333-3330)
- Lower East Side Ecology (212-477-4022) has resumed its E-Waste Collection Events. One is planned for November on the Upper West Side (see Events listings).
- Cell phones can be dropped off at any store that sells service plans. Assemblyman Danny O'Donnell's office also accepts cell phones (212-866-3970).
- See our Hard-to-Recycle List for other places you can donate them.
- Return electronic goods to the manufacturer.
- Contact ecycleNYC recycling program (*only for apartment buildings already enrolled in the program*).

Toys can be donated to a relative or friend or to a thrift shop (*call first*). Local thrift shops and other charitable organizations include Goodwill (212-799-2723); The Salvation Army (212-757-2311); St. Francis on West 96th (212-932-8040); see also our Hard-to-Recycle List, or DonateNYC.

Personal Protective Equipment (PPE). We're all wearing face masks right now and disposable masks have begun to litter the streets. If possible, wear fabric masks that

can be washed regularly. If you need to wear other items of PPE, wherever possible avoid disposables and purchase reusable items that can be cleaned regularly.

STYROFOAM or EXPANDED POLYSTYRENE (EPS)

(*not* accepted for recycling by DSNY)

These products are used all over the world since they're lightweight and can be adapted to many uses—such as packing peanuts, coffee cups or insulation. But there are serious problems with the use of this material:

- Because it's lightweight, EPS can break down into small particles that clog our rivers and oceans.
- It can further break down into the dangerous microparticles mentioned above.
- EPS is considered a potential human carcinogen and has also proven to be very harmful to aquatic life.

EPS cannot economically be recycled and so New York City banned single-use foam products on January 1, 2019. This law became enforceable as of July 1, 2019, and DSNY now issues tickets to businesses who continue to use EPS foam products.

Banned products include single-service items, such as cups, bowls, plates, takeout containers, trays, and coolers. Additionally, manufacturers, distributors, and stores may no longer sell or offer for sale loose fill foam packaging ("packing peanuts") in the City. Exceptions include foam containers used to package or store raw meat, seafood, poultry, or eggs sold from a butcher case or similar food retailer. Also exempt are foam blocks used as protective packaging in shipping goods such as electronic devices or appliances.

Despite the ban, you might still receive Styrofoam peanuts in products shipped from outside New York State. These can be re-used for packaging. Most Mail Boxes Etc. and UPS Stores (800-789-4623) accept Styrofoam peanuts and other packaging materials such as bubble wrap and plastic foam. This may also be true for other local businesses that do a lot of shipping.

Alternative Packaging Materials

- Cornstarch peanuts, which are dissolvable in water, are becoming more common. They're now available from a few vendors, including Uline and Amazon.
- Ecovative Design (518-273-3753) has developed a mushroom-based product that can be grown to fit any space, much like Styrofoam, but with completely biodegradable materials.

Here are a few tips for avoiding Styrofoam use:

- Ask your local coffee shop if it will accept a reusable container and bring your own container when purchasing coffee. You can add the shop's name to the tracker created by Zero Waste Workshops.
- Whenever possible, buy eggs packed in recyclable paper cartons.
- Avoid buying meat, fish or produce that has been pre-packaged in EPS.
- To avoid single-use takeout containers, order takeout from DeliverZero, which is now servicing the Upper West Side.

PLASTIC BAGS and OTHER PLASTIC FILM

(*not* accepted for recycling by DSNY)

Plastic bags were only invented about 50 years ago; for thousands of years, people carried food items in cloth bags, baskets, and other containers. But plastic bags have become so ubiquitous that each of us now discards an average of 20 single-use plastic bags every week, which adds up to about 10 billion bags a year just in New York City.

These bags aren't recycled in NYC, and nearly all of them are not biodegradable. They can clog up the equipment DSNY uses to process recyclable materials. Because they're so lightweight, discarded plastic bags are easily blown about by the wind – we've all seen plastic bags stuck in trees or clogging storm and sewage drains, but they're also washed to the shores of our waterways and often out to sea where they cause harm to fish and other marine-life.

Plastic bags and film are another primary source of microplastic particles and they become more toxic once they break down in a marine environment. Fish that ingest bag fragments accumulate chemicals that can cause liver toxicity and other pathology. As noted above, microparticles are also ingested or inhaled by humans.

The NYS Bag Waste Reduction Law, which passed March 1, 2020, stipulates that no vendor required to collect tax can distribute any plastic carryout bags to its customers except for exempt bags, and that re-usable checkout bags provided to customers in stores cannot be made out of plastic. Certain exemptions are stated in the law (see the January/February 2020 Eco Letter "Commentary: Shopping Bags"). This law wasn't enforced at the time because of an agreement between the parties in a lawsuit brought by Poly-Pak Industries, Inc., et al., in New York State Supreme Court. However, the NY State Department of Environmental Conservation did start to enforce its ban on **October 19, 2020**.

Alternatives to plastic bags

- Bring your own reusable shopping bag (keep one in your purse, coat pocket or backpack, or hang one on your front doorknob to grab as you go out). DSNY distributes free reusable shopping bags across the City. These bags fold into a

built-in pouch with a carabiner clip so they're always handy – and are made of 90% recycled materials.

- Substitute paper bags as much as possible for shopping, as trash or compost containers, for dog or cat poop, and anything else for which you might have used plastic. If you must use some plastic bags, wash them and re-use them for future shopping.
- Avoid using plastic film (such as Saran Wrap) to cover or wrap food. Instead, store food in paper bags, re-usable containers with covers (such as glass jars, Tupperware, or reusable yogurt or other product containers), reusable zip-lock bags, or wrap items in recyclable aluminum foil.
- aNYbag, 115 West 29th Street, Suite 500. You can also bring your used bags to aNYbag where they're made into new, re-useable bags (please call first). Each aNYbag saves 95 plastic bags from reaching New York City's landfills and waterways. This durable, reusable tote is constructed from various types of discarded plastic bags that are cut into thin strips and woven together with cotton cord, resulting in a truly unique textile.

More Information

- "You're Probably Inhaling Microplastics Right Now," *New York Times*, OP-ED, June 25, 2020.
- Alliance to End Plastic Waste
- Bag It NYC
- Plastic Film Recycling
- Think Zero LLC
- We Hate to Waste

UWSR Eco Letter September/October 2020
COMMENTARY:
Health and Our Environment

The relationship between our local environment and our health is complex and often not obvious at first glance. There are a number of relevant issues that affect this relationship, including air pollution, individual susceptibility to COVID-19 and other diseases, water pollution, heavy metals, solid waste/vermin (including sewage), and climate change. Each of these can impact your health in different ways, and the effects are often interrelated.

AIR POLLUTION

Nothing is more precious to us than the air we breathe. We can go without food or water for days, but we can only be deprived of oxygen for a few minutes. Breathing in and out has a close relationship to our physical and emotional well-being. In places where air pollution is a routine problem, we have to pay particular attention to individuals who may be more exposed or vulnerable than others to polluted air, such as theomelesss, those who don't have air filtration in their homes, or those whose health is already compromised. These individuals may need even more attention and support in extraordinary circumstances like the current COVID-19 pandemic.

Pollutants in the air include fine particulate matter and black carbon, microplastics, oxides of nitrogen and sulfur, and ozone. All of these can affect people's health adversely, causing maladies such as asthma, chronic obstructive pulmonary disease, stroke and other cardiovascular and neurological problems, especially in the elderly and those with pre-existing conditions. Research suggests that long term exposure to some pollutants increases the risk of emphysema even more than smoking a pack of cigarettes a day and can also impact mental health and worker productivity. Inhaling microplastics can produce inflammation and lesions in your lungs, and repeated exposure is suspected of leading to respiratory problems like asthma and cancer. (These will be covered further in a future *Eco Letter*.)

Air pollution impacts the land around us as well: It can cause acid rain that makes lakes sterile, kills trees and leaches essential plant nutrients out of the soil. Whatever affects the land ultimately affects human health by changing the water we drink and the foods we eat.

Disturbingly, air pollution levels seem to be rising in many areas around the world. But the good news is that it has *not* been rising recently in New York City because of local and federal environmental regulations. In fact, according to data from the NYC Health Department and the NYC Community Air Survey, air pollution in the City is at or near the lowest levels ever recorded. Sulfur dioxide saw the biggest drop – 84% over seven years – after the City tightened heating oil rules.

Although overall air quality in New York City has improved over the past several decades, concentrations of multiple air pollutants remain at harmful levels, particularly for seniors, children, and those with pre-existing health conditions. A recent study of more than 60 million Medicare recipients found that even pollution levels below those generally considered safe, especially from particulate matter, increase the risk for premature death by 7.3%.

Ways you can help:

Increased energy usage produces more air pollution since the energy is usually

produced by burning coal, oil or natural gas. Here are some of the ways you can reduce your energy use:

- Install LED light bulbs and smart-energy controls, as well as taking other energy conservation measures. (For more information, *click on the "Archive of Past Commentaries"* in the Eco Letter email, then select *LEDs and Smart Lighting and Energy Conservation*.**)**
- Avoid excessive use of air conditioners or other energy-gobbling devices (such as toaster ovens or electric blankets). Also, set your air conditioner thermostat to mid- to upper- 70's or low cool.
- If you own a car, be aware that a City law restricts engine idling time. You can also report other vehicles that have been idling more than three minutes (or one minute if parked in front of a school).
- Eat and/or grow local produce.
- Plant trees and shrubs. They improve air quality, reduce asthma rates and enhance public health and well-being in other ways. Property owners can request a free street tree by submitting a service request to the NYC Department of Parks or by calling 311.

COVID-19

Does air pollution increase the risk of getting the coronavirus? Does it make symptoms worse? Recent research from Rachel Nethery, Xiauo Wu, Francesca Dominici and other colleagues at Harvard indicates that people who live in places with poor air quality are more likely to die from COVID-19 even when accounting for other factors that may influence risk of death, such as pre-existing medical conditions, socioeconomic status, and access to healthcare. This finding is consistent with prior research that has shown that people who are exposed to more air pollution and who smoke fare worse with respiratory infections than those who are breathing cleaner air and who don't smoke.

WATER POLLUTION

As water travels over the surface of the land or through the ground, it can pick up a variety of potential contaminants, including dissolved naturally occurring minerals, microbial contaminants, inorganic contaminants, pesticides and herbicides, organic chemical contaminants, and radioactive contaminants. Therefore, the NYC Department of Environmental Protection (NYC DEP) carefully tests the water in the distribution system, in upstate feeder streams, and in reservoirs and wells.

Certain water quality parameters are monitored continuously as the water enters the distribution system, and the NYC DEP regularly tests drinking water quality at nearly 1,000 sampling stations throughout the City. Thus, New York City's water is healthy and safe to drink, and delivered virtually lead-free from our upstate reservoir system to more than nine million New Yorkers. However, some older residences may have

plumbing pipes that release small amounts of lead into the water (see the Heavy Metals Section below).

Brown or discolored water is often related to plumbing corrosion problems inside buildings and from rusting water heaters. If you have an ongoing problem with brownish water, it may be due to rusty pipes in or outside your building. You can usually eliminate the brown color by running your cold water for 2-3 minutes to flush the line. On its own, rust in water is not a sign of harmful bacteria or lead, which are hazards. In fact, the limits set by the Environmental Protection Agency for iron in drinking water are based on aesthetics (taste, odor, color), not safety concerns.

Discoloration is a temporary condition that can also come from iron and manganese particles that have settled to the bottom of the water pipes buried under the roadways. Any sudden change in the flow of water within the pipes or external vibration may loosen or resuspend the brown/red/orange particles of iron into the water. This temporary problem is generally resolved or reduced when the DEP flushes water from a nearby hydrant. For questions contact: Safe Drinking Water Hotline (1-800-426-4791) or see the New York City 2018 Drinking Water Supply and Quality Report put out by the NYC DEP.

Another potential health problem exists in our sewage system, which is combined with our stormwater run-off system. When it rains hard the system can become overwhelmed; instead of being diverted to a wastewater treatment plant, some of what goes down your toilet can then end up flowing in rivers and on to the shores of our beaches and waterfront parks. Even with the installation of sewage treatment plants (such as the North River Plant in West Harlem), more than 20 billion gallons of feces-polluted water is flushed out onto the City's coastline each year. Disease such as salmonella, typhoid fever and cholera have historically been associated with exposure to raw sewage. Ingestion of sewage infested water has also been linked to other forms of diarrhea, encephalitis, hepatitis, and several other maladies. Therefore, people should still avoid swimming in or eating fish caught in NYC Hudson River waters.

HEAVY METALS

Lead:

Aside from drinking water there are many sources of lead in the environment, most notably peeling paint, and it is important to reduce exposure to lead as much as possible. Lead can be harmful, especially to young children and pregnant women. It's a neurotoxin that can impact a young child's development, behavior, and ability to learn. Lead exposure during pregnancy may contribute to low birth weight and developmental delays in infants.

To monitor drinking water for lead, in 1991 the US EPA published the Federal Lead and Copper Rule that required all municipalities to regularly test drinking water for these

two metals, and to take protective measures if standards are not met. The DEP analyzes the drinking water from hundreds of homes each year to confirm these samples meet the federal standards.

What you can do about lead toxicity:

The DEP Lead Unit (718-595-5364, DEPLeadUnit@dep.nyc.gov) recommends you take the following steps when using drinking water for drinking or cooking to reduce lead exposure:

- Run your water for at least 30 seconds or until it gets cold. Once the water is cold, run it for 15 seconds more.
- Use cold water for cooking, drinking, or preparing infant formula, since hot water is more likely to contain lead and other metals.
- Remove and clean the faucet screen (also called an aerator) monthly, where small particles can get trapped.

If you are concerned about lead in your drinking water, you can have your home's water tested at no cost. The DEP offers free testing kits, with prepaid postage, to all New York City residents. Call 311 or going to the 311 website. Additional information is available from the US Environmental Protection Agency.

Other heavy metals, such as mercury, cadmium, and arsenic, can enter the body via food, water, and air**.** **Frequent** exposure to any number of them can lead to toxicity. Unfortunately, sources of heavy metal can be found in such things as dental fillings, fumes, and some items in your home. Symptoms of **heavy metal poisoning** include a metallic taste in your mouth, fatigue, anemia, mood swings, muscle tremors, gastrointestinal disorders, osteoporosis, thyroid problems, and respiratory issues.

Mercury:

Mercury toxicity, even in small amounts, can cause serious nervous, immune, and digestive problems. Symptoms include anxiety, depression, irritability, memory problems, and tremors. Mercury is usually accumulated through fish or shellfish consumption, but it is also present in thermometers and CFL lightbulbs. There's currently no cure for mercury poisoning, so the best way to treat it is to stop your exposure to the metal.

Cadmium:

When addressing cadmium toxicity, prevention is key since there is little agreement regarding treatment. Most of the cadmium that builds up in individuals' bodies comes from smoking cigarettes, but nutritional deficiencies and contaminated food can affect overall levels. Chronic exposure to cadmium negatively impacts the kidneys and bones, and is also associated with anemia and insulin resistance, as well as decreased attention level and memory.

Arsenic:

While arsenic is naturally occurring, it also comes in inorganic chemicals used in agriculture (such as pesticides), mining, and manufacturing. Overexposure to arsenic causes skin, lung, and internal cancers, anemia, and skin lesions. In regard to gastrointestinal health, arsenic toxicity causes the loss of vitamins, elevated liver enzymes, and bloody diarrhea. Symptoms of arsenic poisoning may include red or swollen skin that has lesions or warts, abdominal pain or nausea, abnormal heart rhythm, muscle cramps or tingling of fingers and toes. As with mercury, there's no specific treatment for arsenic poisoning and the best way to treat the condition is to eliminate arsenic exposure.

What you can do to prevent heavy metal toxicity:

- Eat organic, unrefined, low sugar foods. Normalizing insulin levels is an important step in healthy detoxification.
- Get lots of rest and establish healthy sleeping patterns.
- Avoid smoking, alcohol, and illegal drug use.
- Limit dust exposure in the home.
- If you eat fish, make sure you are aware of local advisories regarding mercury levels.
- Read all food and product labels for items you bring into your home, which can determine how toxic they are.

SOLID WASTE

Some portions of our waste stream are potentially hazardous to our health, especially rotting food and discarded electronics goods. Electronic devices contain small amounts of heavy metals, some of them quite toxic (e.g., lead or cadmium). Small quantities added bit by bit over time to the soil and water in landfills produce a net effect that can be cumulatively destructive to healthy living. This is why it's so important to recycle electronics whenever possible so their components can be handled responsibly. Budget cuts necessitated by the pandemic resulted in DSNY suspending its E-Waste Recycling until June 2021, but you can check from time to time with Lower East Side Ecology to find out when they'll resume their e-waste collection events (212-477-4022). Other options are listed in our UWSR Hard-to-Recycle List in the Computer and Batteries & Lighting sections.

At first glance, it might seem that recycling of food waste isn't particularly important. After all, it's biodegradable and will, in theory, eventually be turned back into soil (though that soil will likely be contaminated). But decomposing food waste in garbage bags that DSNY trucks and deposits in landfills is a vector for diseases. It also attracts rats and other vermin, which carry diseases themselves. In addition, any organic waste buried deep in landfills decomposes anaerobically (without oxygen) and thus produces methane, a potent greenhouse gas.

However, collecting food waste for composting in latched, rigid containers sharply reduces detrimental health effects. And when organics are composted, they're periodically turned over, and organics decompose primarily in an aerobic process (in the presence of oxygen), which significantly reduces methane production and the resultant health effects of climate change.

CLIMATE CHANGE

Climate change has already made conditions more favorable to the spread of some infectious diseases, including Lyme disease, waterborne diseases such as Vibrio parahaemolyticus which causes vomiting and diarrhea, and mosquito-borne diseases such as malaria and dengue fever. Rising temperatures raise health risks for people with existing physical or mental illness, children and older adults, those who work outdoors, and those living along the coast or in areas prone to flooding. Warmer temperatures, which can expand ranges for disease-carrying insects, can also increase pollen production and air pollution. Pollen and pollution raise risks for people who suffer from asthma; infectious diseases transmitted by mosquito and tick bites (such as Lyme disease or West Nile Virus) may appear in previously unaffected locations when the insects' range expands.

For information on mitigating climate change *click on the "Archive of Past Commentaries"* in the Eco Letter email, then select *Climate Change;* or see the NYS Department of Environmental Conservation website.

More information:

- Environmental Defense Fund
- NYC Health Department – Healthy Homes at (646) 632-6023
- US Environmental Protection Agency

UWSR Eco Letter August 2020
COMMENTARY:
Organics (Composting) Update

Although we promise to send only six emails to you a year, we feel this update of the July/August Eco Letter Commentary will at least help with one of the many uncertainties resulting from the pandemic.

As you probably already know the NYC Department of Sanitation (DSNY) has suspended collection of food scraps from residential buildings until late June 2021. In addition, funding for members of the Compost Project was sharply reduced. As a result, Grow

NYC has been forced to temporarily halt its Greenmarket food-scrap collection while they seek other sources of income.

The good news is that there are still some ways to compost your food scraps in Manhattan. These include a few drop-off sites and companies that will pick up from your building for a fee.

Drop-Off Sites

- Reclaimed Organics now has a food-scrap drop-off location each Wednesday, from 4:00 to 6:00 p.m. at West 107th and Columbus Ave [southeast corner] near the CitiBike dock at the Mobilization for Change Community Garden. Look for the green compost trike called Sunshine. *For more information*: Reclaimed Organics; info@ReclaimedOrganics.org, 347.395.6377

- Lower East Side Ecology, Union Square West and 17th Street, accepts food scraps on Monday, Wednesday, Friday, and Saturday from 8:00 a.m. to 5 p.m. They also operate two other sites further down on the Lower East Side: East River Park Compost Yard, open; 24/7; and East 7th Street Community Garden, Sundays from 8:00 a.m. to 5:00 p.m. No animal products (such as fish, meat or bones) since these will attract rats and other vermin. *For more information*: Lower East Side Ecology, info@lesecologycenter.org, 212.477.4022

- Community Gardens: You might ask at your local community garden to see if they'll accept your food scraps. *No animal products* (such as fish, meat or bones) because they attract rats and other vermin. A few that accept organics on a limited basis include the following: (please call first):
  - *Harlem Grown*, 127 West 127th Street. *Info*: Harlem Grown; info@harlemgrown.org; 212-870-0113
  - *Jenny's Garden*, West 138th Street & 12th Avenue. *Info*: Jenny's Garden, 212-870-3070
  - *The Ring Garden*, between Broadway & Seaman Avenue on Dyckman Street; will accept your food scraps if you become a member for $10 ($5 for students and seniors). *Info*: The Ring Garden; (212) 639-9675)

For more possibilities see our May/June 2018 commentary, Growing and Eating Local Produce in Upper Manhattan or check with Green Thumb, (212-602-5300) for a list of Community Garden locations.

Food-Scrap Collection from Residential Buildings in Upper Manhattan
(see also the July/August 2020 Eco Letter)

- Avid Waste, 718-991-9700, jokun@avidwaste.com. Provides food-scrap pickups up to three times per week for a fee.

- Mr. T Carting, 718-821-9706 x 122. Provides food-scrap pickups up to 59th Street for a fee.
- Vokashi Kitchen Waste Solutions, 718-623-2515, vokashi@gmail.com. A micro-hauler that picks up food scraps from residential buildings in NYC and Westchester County for a fee.

To keep up with future developments in food-scrap collection and composting check with these organizations:

- Big Re-Use, 718-725-8925, ext 2 (Composting site under the Queensborough Bridge - *currently inactive*)
- Commit-to-Green, Shien-ru Tsao, 335 Madison Avenue; (646) 490-6330; srt@committogreen.com (Mapping of NYC composting sites, compostable bags)
- Earth Matter NY; Governors Island; (646) 734-6151; contact@earthmatter.org (Compost learning site on Governors Island)
- Green Thumb, 100 Gold Street, New York, NY 10038; 212-602-5300 (Community Garden locations)
- GrowNYC, 100 Gold Street, New York, NY 10007; (212) 788-7900; fax: (212) 788-7913 (Green market food-scrap drop-off sites - *currently inactive*)
- Lower East Side Ecology, PO Box 20488, New York, NY 10009; 212-477-4022 (Food-scrap drop-off sites in Lower Manhattan)
- Reclaimed Organics, (347) 395-6377, info@ReclaimedOrganics.org (Food-scrap drop-off site at 107th and Columbus Avenue; see above under Drop-Off Sites)

UWSR Eco Letter July/August 2020
COMMENTARY:
RECYCLING UPDATE
Organics, Electronics and Textiles

As most of you probably know, the NYC Sanitation Department (DSNY) has suspended collection of organics, electronics, and textiles until June 2021 due to the City's financial crisis resulting from COVID19. *Please note that DSNY will continue to collect plastic, metal, glass and paper products from residential buildings and non-profit organizations.*

In this commentary, we'll briefly review the situation in regard to organics, electronics and textiles as well as explore existing alternatives. A more thorough review of alternatives for organics collection (composting) will appear in a Fall *Eco Letter*, when the situation has been further clarified.

COMPOST: LEGISLATION AND BROWN BINS

- Compost Project members (including GrowNYC, Lower East Side Ecology, and five other organizations) have ardently lobbied for restoration of their $7 million funding. Many thanks to all of you who sent e-mails or called City Council members indicating your support on this issue. Maintaining this tiny expenditure (relative to the $95 billion NYC budget) would enable Project members to maintain the necessary infrastructure and momentum. It would also be a signal that the City is willing to be responsive to the needs of its environmentally conscious residents. As of today, June 30th, the budget hasn't yet been approved, so we don't yet know the short-term future of organics collection at Greenmarkets. To check the status of Greenmarket Food Scrap Collection after this week check with GrowNYC or call 212-788-7900. The limited alternatives for composting food-scraps are discussed below.

- The Core Act consists of two separate pieces of legislation:
    1. *Intro. 1942*, sponsored by Council Member Powers of Manhattan, would require three drop-off composting sites in each community district.
    2. *Intro. 1943*, sponsored by Council Member Reynoso of Brooklyn, would establish three recycling centers in each district. Among the materials these centers would accept would be electronic goods, which by State law cannot be disposed of into our general waste stream. Funding for this act is unlikely for FY 2021 (starting July 2020), but it has good intermediate- to long-term prospects.

- DSNY guidance on what to do with brown bins: If you already have brown bins intended for collecting food scraps, during the suspension you may use them for garbage to be put out for collection.

COMPOST ALTERNATIVES (see here also for more information)

- Residential Pickup (carters or haulers that charge a fee for pickup). Following are two we're aware of that service Northern Manhattan:
    1. Avid Waste, (718) 991-9700, jokun@avidwaste.com. Provides food-scrap pickups up to three times per week. There can be no contamination with items such as plastic utensils. plates, bags packaging, etc. Bins have to be either unlined or use certified compostable ASTM#D6400 bags, and buildings are responsible for cleaning out their own containers. There's a small per-bin fee and a minimum pickup charge of $75.
    2. Vokashi Kitchen Waste Solutions, 718-623-2515, vokashi@gmail.com. A micro-hauler that picks up food scraps from residential buildings in NYC and Westchester County for a fee. Vokashi uses the Japanese method of fermentation called "bokashi" and provides an airtight bucket and bran containing microbes to start the fermentation. Every month they swap and

collect your full bucket of fermented food scraps and leave a fresh bucket(s) and bran.
3. For a longer list of potential carters who will pick up food scraps from residential building, see here.

- Making Compost at Home or on Your Block - NOTE that food scraps must be covered and properly managed - especially important in an urban environment. Use plant matter only (veggies, fruits, bread, etc.), Meats, fish, poop, etc. will attract rats and other vermin and will not decompose properly except in an official composting facility (such as the ones DSNY uses). You can get more tips on making compost yourself from the DEC, from this Outdoor Composting Guide, and from this guide on worm bins.

    1. *Outdoor Composting* - This is an option for you if you have access to a private outdoor space (such as a rooftop, backyard, or alleyway). Once you obtain an outdoor compost bin, all you'll need to get started are some leaves or grass and food scraps and worms. You can use this guide from the NYC Compost Project. If you live on a block of brownstone-type buildings, you might consider doing this communally. The backyards of one or two buildings on the block (perhaps rotating areas) could contain compost piles or bins and the resulting compost used for soil to grow vegetables. Crops such as herbs. lettuce, kale, summer squash, tomatoes, bush or pole beans, and root crops such as carrots and radishes are relatively easy and quick to grow. You can think of these gardens as similar to the numerous Victory Gardens that popped up during World War II.
    2. *Indoor Composting* - If you have a lidded plastic bin and a drill, this can be a very inexpensive DIY project for just the cost of some red wiggler worms, which you can purchase online. If you'd rather buy a ready-to-use worm bin, search online for a bin that suits you. For more information see Indoor Composting with a Worm Bin (from the Compost Project) and "How to Start a No-Smell, No-Hassle Compost Box in Your Living Room" (from the NY Times).
    3. *Uses for the Compost You Create*
        - Flowerpots, vegetable gardens paired with outdoor compost sites.
        - Community gardens. Some community gardens collect food scraps and process compost locally. Community gardens are currently closed to the public but hope to reopen, at least for a short time each week, as stay-at-home orders are lifted. Check here to find the location of your closest community garden.
        - Homes you or friends might have in the country.

- Waste Less Food (see also information from the DEC)
    1. Learn how to better store produce.
    2. Check the shelf life for fruits and veggies.
    3. Preserve what you can't use right away.

4. Get creative with your cooking and/or re-use leftover portions.

TEXTILES AND E-WASTE

- Textiles – *Wearable Collections*, (646) 515-4387, still provides pick-up of all textiles from residential buildings, either by siting of a permanent bin or periodic clothing drives, but they've now been forced to charge a small fee. Other organizations also provide pickups. (See the attached Hard-to-Recycle List for more details). Call first to be sure

- E-Waste – *Lower East Side Ecology*, (212) 477-4022, has temporarily suspended all E-Waste collection events because of the COVID pandemic. Call them in late July or August to check the status then. Best Buy has also suspended recycling services at its stores. Click here for a status update.

Check the attached Hard-to-Recycle List for more possible options. *Always call first*.

UWSR Eco Letter May/June 2020
COMMENTARY:
Climate Change Update

Since we wrote the original Climate Change Commentary in the July 2015 *UWSR Eco Letter*, carbon dioxide (CO2) levels in our atmosphere have risen from about 400 to 415 parts per million (ppm). This may not seem like a big jump, but the level was about 325 ppm in 1970 (a level already higher than at any other time in the last 800,000 years), and the steady rise is already having dire consequences.
During the last five years, the world has experienced a continued elevation of temperatures – the five warmest years on record globally have all occurred since 2014 – as well as a multitude of other consequences resulting, at least in part, to this warming. These include:

- More extreme heat waves;
- Devastating wildfires;
- Accelerating melting of icecaps and glaciers in Greenland, Antarctica and the Himalayas;
- More frequent flooding and droughts;
- Disruption of ecosystems;
- Unpredictable weather for farmers; and
- Economic hardship for millions of people displaced by the hot and dry weather, particularly in Africa and the Middle East.

Many of these changes occur slowly, almost imperceptibly, so it's easy for people not to notice them, attribute them to other causes, or even to deny that they exist. Coupled with the willful ignorance of the White House, a lack of action has resulted in a

potentially very dangerous situation, one that must be addressed soon, before the effects of climate change really snowball and are almost impossible to reverse.

But there is hope. Renewable energy usage is growing rapidly and, according to the American Council for an Energy-Efficient Economy, *increased* energy efficiency alone can take us halfway to our climate-change goals.

We need to consider global warming on both a local and a worldwide basis. If the U.S. Government is not acting, action must be taken locally. In this Commentary, we'll consider how global warming will likely affect us in the NYC Metro Region, what steps we can take to avert it, and what local organizations are doing to address it.

Climate change *will* have local effects – more extreme heat waves, more frequent heavy downpours, and continued sea level rise are predicted. The mean annual air temperature in Central Park has already increased over 3.5 degrees Fahrenheit from 1900, although the trend has varied substantially over shorter periods of time. Mean annual precipitation increased more than 8 inches from 1900 to 2020. Both year-to-year and multi-year variability of precipitation has also become more pronounced, especially since the 1970s. Today, global sea level is 5 to 8 inches higher than it was in 1900. The situation is even worse in NYC, which has experienced at least 12 inches of sea-level rise since 1900, mostly due to expansion of warming ocean water. Scientists project that by 2100 sea levels will be 18 to 50 inches higher than today along New York's coastlines and estuaries: if it occurs, this rise will be locked in for centuries by heat-trapping greenhouse gases already in the atmosphere.

If these effects aren't compensated for they'll have a significant impact on our local economy, infrastructure, food supply, agriculture, fisheries, and ecosystems.

- Houses, commercial buildings and vehicles in low lying areas will suffer significant damage.
- Insurance rates and taxes will rise.
- Higher electric bills and more blackouts are likely.
- Outdoor work recreation and exercise may at times become almost unbearable.
- Allergies and other health concerns will increase.
- Water and air quality will likely become worse.
- Disruptions in travel caused by power outages, flooding, or other weather-induced changes will become more frequent.

Because we've already experienced rises in greenhouse gases and the resultant warming, responding to future climate change involves a two-pronged approach, utilizing both *mitigation* and *adaptation.*

The first, and most desirable, is *mitigation***,** which consists of reducing the amount of heat-trapping greenhouse gases streaming into the atmosphere, either by limiting the production of these gases at their source (e.g., electrical generation, heating and cooling of buildings, or cars and trucks) or else by accelerating our usage of renewable energy sources and energy conservation measures. In the short term, methane gases are the

biggest problem. Although methane remains in the atmosphere for a much shorter time than carbon dioxide (CO2), within the first two decades after being emitted, it traps 80 times more heat than an equivalent amount of CO2. However, in the long term, carbon dioxide is the primary pollutant driving climate change; the CO2 we emit now will warm the planet for centuries.

We can also mitigate climate change by facilitating greenhouse gas absorption by "sinks" that absorb and store these gases – such as water, forests and soil. This type of mitigation includes methods such as carbon sequestration, which some regard as a primarily stop-gap measure and at least a partial capitulation to the fossil fuel industry. Since cow manure is also a significant source of methane, cutting down on the amount of beef we eat helps as well.

Adaptation involves adjusting to actual or expected future climate. The goal is to reduce our vulnerability to the harmful effects of climate change (like sea-level encroachment, more intense extreme weather events or food scarcity) rather than only trying to reduce the emissions of the greenhouse gases themselves. New York City has been investigating a broad range of climate resiliency policies and programs. One example that's been hotly debated is the construction of a 120-billion-dollar tidal barrier to protect the New York-New Jersey Harbor Estuary from storm surges. Other proposed solutions include:

- Flood-proofing or elevating existing structures;
- Elevating existing streets and highways;
- Amphibious building;
- Creating smaller barriers or walls around subway entrances and certain low-lying district;
- Restoring marshes and seaside dunes;
- Constructing living breakwaters that include oyster beds; and
- Building elevated park-like islands around lower Manhattan and other low-elevation districts.

What You Can Do to Help Locally

You can have an impact by making small changes in your daily life. Taken collectively, these small changes can add up and make a significant difference. Much of what you can do revolves around your personal consumption of energy from fossil fuels. Steps you can take include:

- *Energy conservation* options:
    - Turn off lights in empty rooms;
    - Buy energy-efficient appliances and light bulbs (e.g., LEDs);
    - Use smart controls for lighting and air conditioning;

- Minimize the use of your air conditioner (don't leave it running when you're not home and use fans instead when you can);
- Don't hold your refrigerator door open for longer than necessary;
- Keep your thermostat down during the winter;
- Walk, use bikes or mass transit as much as you can;
- Don't idle your car when sitting in a parking space, and report busses and other vehicles that are idling;
- If you're replacing your car, consider buying a hybrid or all-electric vehicle; and
- Try to interest your building management in investing in energy conservation measures, such as energy-efficient windows, replacing or upgrading an old inefficient boiler, installing smart controls and thermostats for space and water heating, and using LED bulbs in the building's public spaces.

More information is available from Con Ed and Citizens Air-Complaint Program.

- *Use renewable energy* such as solar, wind or hydropower as much as possible instead of fossil fuels. For instance,
  - You can opt to use electricity produced primarily by wind power, solar energy or hydroelectricity via suppliers such as Con Ed Solutions (914-286-7000) or Green Mountain Power (800-636-5690).
  - If possible, have photovoltaic panels or solar water heating installed on your building rooftop (contact Urban Green Energy).
  - You can also try (along with fellow alumni) to convince the college or university you attended to divest its investment portfolio from fossil fuels (*see* 350 NYC Divestment Campaign).
- *Help reduce atmospheric CO_2 and methane* by
  - planting trees or gardens (which absorb CO_2);
  - installing a green roof; or
  - eating less meat, especially beef.

Local Organizations Doing Climate-Change Work

- *350NYC*, a local affiliate of 350.org, is a community of local activists mobilizing for climate solutions. They've taken action to oppose natural gas and oil pipelines, divest from fossil fuels, and support renewable energy. Various committees of 350NYC meet regularly to discuss these issues (*see Events listing under Climate Change and Energy*).

- *Climate Works 4 All*, formed in 2014, is a coalition of local unions, environmental organizations, civic groups, and local community development groups all working to promote climate action in NYC that is equitable and just for all New Yorkers (contact: Phoebe Flaherty, phoebe@alignny.org). To further the understanding of climate change, they hold periodic meetings and forums and also gather pertinent information. Their report, Climate Works for All: A Platform for Reducing Emissions, Protecting Our Communities, and Creating Good Jobs for New Yorkers, details ten proposals to make our city more resilient, create nearly 40,000 jobs each year, and to cut our annual greenhouse gas emissions by nearly 12 million metric tons of carbon equivalent. One of their principal members, The Alliance for a Greater New York (AlignNY), is a longstanding coalition of labor and community organizations united for a just and sustainable New York.

- The *Columbia Earth Institute* (2910 Broadway, 212-845-3830) is composed of more than two dozen research centers and several hundred people who collaborate across many disciplines and schools at Columbia University. The study of climate science and policy is at the core of the Earth Institute's research. More than a dozen Earth Institute centers and affiliates combine research and knowledge from many disciplines to address these issues. Foremost among these are the renowned Lamont-Doherty Earth Observatory in Palisades, NY and its Center for Climate and Life. They sponsor frequent lectures and workshops about climate change, many of which have been listed in the events section of this newsletter.

- The Consortium for Climate Risk in the Urban Northeast (CCRUN) is a NOAA Regional Integrated Sciences and Assessments (RISA) project based at Columbia University and Goddard Institute for Space Studies. CCRUN assesses risks from climate variability and how they can be managed. They are currently the only RISA team with a principal focus on climate change adaptation in urban settings. Key projects in the NYC metropolitan region that CCRUN has recently participated in include the third New York City Panel on Climate Change, the Climate Resiliency Design Guidelines, Con Ed's Climate Change Vulnerability Study, and the Coastal Flood Hazard Mapping Tool.

- *The Environmental Defense Fund* (EDF, 257 Park Avenue South, 800-694-3322), headquartered in New York City, is a non-profit group of scientists, litigators and administrators working on local, state, corporate and international levels. They investigate and promote climate change in the following areas:
    - Cutting emissions of short-lived and long-lived climate pollutants.
    - Supporting climate resilience to withstand the impacts of global warming that are here and unavoidable.
    - Removing pollution already emitted (research on removing carbon dioxide from the atmosphere).
    - Lobbying for increased wind and solar energy usage.
    - Protecting tropical and other forests (which act as a carbon sink)

Their December 2019 report, *Stabilizing the Climate and Averting Catastrophe*, is available.

EDF is developing policies to deploy more electric trucks and buses in New York as part of their goal to achieve at least a 30% market share for such vehicles worldwide by 2030. They've also helped pass landmark congestion pricing legislation in the city. See their annual report for more information.

- *Goddard Institute for Space Studies (NASA-GISS,* 2880 Broadway, 212-678-5528) is a laboratory in the Earth Sciences Division of the National Aeronautics and Space Administration's Goddard Space Flight Center. A key objective of GISS research is prediction of atmospheric and climate changes in the 21st century. Program areas are roughly divided into the categories of climate forcings (e.g., levels of solar radiation or greenhouse gases); climate model development; Earth observations; atmospheric radiation; atmospheric chemistry; climate impacts; planetary atmospheres; and paleoclimatology.

  GISS holds frequent seminars and workshops but, because of security regulations, these aren't open to the general public. They publish numerous reports that discuss their research on climate change issues. Many of these are technical in nature and published in scientific journals; some are more general in nature and can be downloaded via the NASA-GISS website. Cynthia Rosenzweig of GISS was one of the lead authors of a 2015 review report, *Building the Knowledge Base for Climate Resiliency: New York City Panel on Climate Change.* This seminal report is still available online here.

  GISS works cooperatively with area universities and research organizations, most notably with Columbia University. Many of their personnel are members of Columbia's Earth Institute (see above), the Center for Climate Systems Research, the Department of Earth and Environmental Sciences, or the Department of Applied Physics and Applied Mathematics. GISS is a key member of the New York Panel on Climate Change.

- *It's Easy Being Green* (itseasybeinggreen.uws@gmail.com) is a neighborhood climate education and action group under the sponsorship of Bloomingdale Aging in Place and the West 102,103 and 104 Block Associations. Their projects include:

  - reducing the amount of single-use plastics at restaurants and local supermarkets;
  - aiding participation in the DSNY organics curbside pick-up program; and
  - encouraging readers to consider energy conservation projects such as changing to LED lightbulbs.

  They also host speaker events, partner with environmental science students at Barnard and Columbia University, and take field trips to places such as Sims

Recycling Sorting Center and the Green Roof on Javits Center. They produce and distribute a monthly newsletter.

- The *Natural Resources Defense Council* (40 West 20th Street, 212-727-2700) is a non-profit international environmental advocacy group headquartered in New York City. It was founded in 1970, partially an outgrowth of the Scenic Hudson Preservation Conference v. Federal Power Commission— the Storm King environmental case.

  NRDC has over 3 million members and a staff of about 700 lawyers, scientists and other policy experts and has litigated many important cases involving climate change and energy. For instance, they have advocated for and provided research for the *Regional Greenhouse Gas Initiative*, a cooperative effort among the northeastern states (including New York) to reduce greenhouse-gas emissions in those states. Staff members also sometimes give lectures on environmental topics.

  NRDC's New York Council is a volunteer group comprised of New Yorkers from a wide variety of backgrounds and professions who share a strong commitment to the environment and are dedicated to furthering NRDC's mission.

  NRDC'S Climate and Clean Energy Program aims to reduce global CO2 emissions to at least 35% below 1990 levels by 2030. They've recently focused on countering the federal government's pro-polluter agenda and urging it to take climate change seriously. In 2019 they published their report, *Clean Energy Opportunities and Dirty Energy Challenges*.

  Their real-time, energy efficiency software (Noveda) enables them to pinpoint opportunities for improvement and potential cost savings and report on the effectiveness of energy conservation measures (ECMs) once implemented. This analysis evaluates the aggregate benefits of four measures: set points and timing adjustments; boiler controls; air sealing; and electric heating. It can produce energy savings in both heating (up to 30%) and cooling (up to 76%).

More Information:

- American Council for an Energy-Efficient Economy
- The Big U Project
- The Blue Dunes Project
- The Intergovernmental Panel on Climate Change
- Coastal Protection, NYC.gov
- NASA, *Climate Change: How Do We Know?*
- New York City Panel on Climate Change

- New York City Panel on Climate Change 2019 Report
- New York State Department of Environmental Conservation, *Impacts of Climate Change in New York*

UWSR Eco Letter March/April 2020
COMMENTARY:
Religious Organizations and Our Environment

In recent years religious organizations have increasingly turned their attention to environmental stewardship as both a spiritual and a practical issue. For instance, the Cathedral of St. John the Divine, with the full support of the then Dean James Parks Morton, was home to Upper West Side Recycling's community drop-off center and our materials-collection and job-training project from the early 1980s through the early 2000s. It also hosted the Urban Bioshelter Project (which aimed to construct a prototype rooftop greenhouse for growing vegetables) and the Gaia Institute (which explored James Lovelock's concept of the Earth as a living organism). Later, in September 2014, Union Theological Seminary hosted the *Religions for the Earth Conference,* during which religious leaders from around the world convened in an effort to address climate change.

All New York City non-profit religious organizations are entitled to receive free pick-ups of paper, plastics, metal and glass for recycling. In this Commentary we'll discuss other current environmental initiatives or programs hosted or conducted by local religious organizations that address areas such as e-waste recycling, organics (composting), climate change, energy efficiency, urban greening, environmental justice, and food systems.

Let's start with religious organizations that don't have congregations per se.

Union Theological Seminary (UTS), 3041 Broadway, NYC 10027; tel: (212) 662-7100. In addition to DSNY's collection of plastic, metal, glass and paper, UTS recycles both e-waste and organics. They use a mix of compostable plastic dishes and cutlery as well as metal and china dishes and cutlery; they have facilities to wash the kitchenware. In addition, UTS hosts both a clothing closet and a food pantry. Environmental topics are discussed in their sermons. And last semester there was an entire class-led chapel series on preaching about "Extractivism" (the extraction of minerals from the earth and its subsequent environmental effects).

They are also home to two separate environmental organizations: The Center for Earth Ethics and The Eco-Justice Caucus.

- ***The Center for Earth Ethics*** *(CEE),* tel: (212) 280-1425; info@centerforearthethics.org; https://centerforearthethics.org/#**.** Founded by

Karenna Gore, CEE grew out of the groundbreaking *Religions for the Earth Conference* held at UTS in September 2014, which convened religious leaders from around the world to address climate change as both a spiritual and a practical issue. They operate on the local, national, and international levels, with an emphasis on climate change, education, sustainability, ecology and environmental justice. To fulfill their mission, they work to cultivate the public consciousness needed to make changes in policy and culture that will establish a new value system where value is measured according to the sustained well-being of all people and our planet. For example, they publish periodic blogs with a focus on climate-change issues (https://centerforearthethics.org/blog/).

CEE administers four core programs that complement and connect to each other:

1. The *Eco Ministry* fosters educational opportunities and dialogue about humanity's relationship to the rest of the natural world for seminary students, faith leaders and local communities. They offer an annual Minister's Training to educate and empower faith leaders as they respond to climate impacts in their communities.
2. The *Environmental Justice & Civic Engagement Program* works at the intersection of social inequity and injustice and the ecological crisis.
3. The *Original Caretakers Program* honors, supports and learns from indigenous knowledge and traditions, especially regarding the spiritual dimensions of our ecological crisis.
4. The *Sustainability & Global Affairs Program* engages policy makers and civil society in order to bring faith, wisdom and indigenous traditions to bear on the establishment of a new economic development paradigm.

- ***The Eco-Justice Caucus*** (EJC) at UTS (Ryan Felder, rf2682@utsnyc.edu) is a student organization that focuses on climate change, energy issues and recycling. It currently has three areas of concern and programming:
  1. campaigning for UTS to declare a climate emergency and become a certified green seminary;
  2. encouraging the growth of a more socially just and ecological UTS (some of the results of these efforts can be seen above in the first paragraph about UTS); and
  3. building ecological partnerships with neighboring institutions and groups that promote social and ecological justice. They are currently planning community gardens with an area church for the Spring and Summer.

Hazon, 25 Broadway, NYC 20004; https://hazon.org/; info@hazon.org; tel: 212.644.2332. Hazon is the largest faith-based environmental organization in the U.S. and is building a movement that strengthens Jewish life and contributes to a more

environmentally sustainable world for all. As the Jewish lab for sustainability, Hazon effects change through immersive experiences and inspires individuals and communities to make specific commitments to change with a particular focus on food systems. Their Hazon Seal of Sustainability program provides guidance and support to Jewish institutions to advance sustainability-related education, action, and advocacy. They have a full range of educational materials and resources available on their website.

Marlene Meyerson JCC Manhattan (Jewish Community Center), 334 Amsterdam Avenue (between 75th-76th Streets), NYC 10023; tel: 646-505-4444; https://jccmanhattan.org/. JCC provides a sidewalk space for yearly e-waste collection events, as well as recycling their own electronic waste. They also host occasional talks on environmental topics.

Plaza Jewish Community Chapel (a funeral home), 630 Amsterdam Avenue, NYC 10024 (https://www.plazajewishcommunitychapel.org/; tel: 212-769-4400) accepts usable medical equipment and supplies, including items used in hospice care – with the exception of bedding. The Chapel works with the Afya Foundation in Yonkers (https://afyafoundation.org/). *Please call the Chapel before bringing any items.*

We've also found a number of local religious organizations with congregations that host or conduct specific environmental activities. These include:

Ansche Chesed Synagogue, 251 West 100th Street, NYC 10025; https://www.anschechesed.org/; tel: 212-865-0600. In addition to plastic, metal, glass and paper, DSNY picks up food scraps from their building. They utilize china or plastic compostable dishes, as well as metal cutlery and have facilities to wash the cutlery and dishware for regular re-use. Ansche Chesed also hosts occasional speakers on environmental topics and has plans to participate in a local tree-planting program.

B'nai Jeshurun, 270 West 89th Street, NYC 10024; https://www.bj.org/; tel: (212) 787-7600. Overseen by Larissa Wohl, Assistant Director of Community Engagement, B'nai Jeshurun has instituted a varied environmental program, including community organizing and advocacy. Their BJ Environmental Advocates Group recently signed onto Climate Works for All, a platform for reducing emissions, protecting our communities, and creating good jobs for New Yorkers (https://alignny.org/campaign/climate-works-for-all/). They even have a site where local residents can drop off food scraps for pick-up by the DSNY compost program (in addition to organic waste generated by the synagogue itself). B'nai Jeshurun also has a variety of sustainability projects within their building. For instance, they utilize compostable plastic cups and plates for their meals and have installed LED lighting in their facility. They've conducted an energy audit and have plans to increase energy efficiency in other ways in their building. Environmental topics that relate to the Torah are at times discussed in sermons, and their calendar does list some environmental events.

Church of the Holy Name of Jesus, 207 West 96th Street, NYC 10025 ; tel: 212-749-0276 x112; Jackie Espinal; https://www.holynamenyc.org/. In collaboration with their lay

Justice, Peace, and Integrity of Creation Committee, they have an active environmental program: they host a yearly E-Waste Collection event on the sidewalk in front of their building on Amsterdam Avenue just north of 96th Street; St. Francis Thrift Shop is located in their basement; and they also have a food pantry. The Church has hosted a film series on Climate Change (they encourage all event attendees to bring their own bowls and cutlery). They're looking into organics collection by DSNY as well. Environmental topics pertinent to the teachings of Saint Francis are occasionally discussed in sermons.

Riverside Church, 490 Riverside Drive, NYC 10027 (next to Union theological Seminary); https://www.trcnyc.org/; tel: 212-870-6700. The Riverside Church works in concert with the Beloved Earth Community, (tel: 646-216-9809; https://www.trcnyc.org/ministries/belovedearth/), a group of climate change activists who strive to fulfill the church's mission to care for the Earth. The Beloved Earth Community is involved primarily with projects in environmental education, greening the church, and environmental justice and political actions such as divestment from fossil fuels. In order to implement their goals, they host forums and films and act to influence church environmental policy.

The church started a food scrap program in February 2020 and is also looking into e-waste and textile recycling. They primarily use china or plastic-compostable dishes as well as metal cutlery, and also encourage caterers at their events to avoid using plastic. The Church operates both a clothing closet and a food pantry. They are installing LED lighting and storm windows and also have an efficient, computerized water heating system.

Rutgers Presbyterian Church, 236 West 73rd Street, NYC 10023; tel: 212-877-8227. In addition to DSNY pickup of plastic, metal, glass and paper, Rutgers Presbyterian Church recycles their electronic waste. They use bagasse (sugarcane) cutlery as well as china plates and bowls and have washing facilities for these. They're gradually converting their office spaces to LED lighting. In addition, Rutgers hosts environmental meetings and talks on topics such as recycling, climate change and water pollution, and environmental topics are frequently discussed in sermons.

For more information related to environmental activities in religious organizations

Green Faith; tel: 732-565-7740
Interfaith Power and Light

UWSR Eco Letter January/February 2020
COMMENTARY:
Shopping Bags

Film and rigid plastic items biodegrade extremely slowly, which means that just about every piece of plastic ever manufactured is still in existence today. Much of that discarded plastic ultimately ends up in our oceans, causing major problems for sea life. And the processes of its manufacture and transport regularly spew large quantities of carbon dioxide into our atmosphere.

But there's actually some good news locally. As you know, in January 2019 the City banned Styrofoam. And now a new *Bag Waste Reduction Law will go into effect March 1, 2020* that will ban most single-use plastic shopping bags in New York State, and paper carry-out bags will be subject to a five-cent fee in New York City.

Plastic bags were only invented about 50 years ago; for thousands of years, people carried food items in cloth bags, baskets and other containers. But plastic bags have become so ubiquitous that each of us now discards an average of 20 single-use plastic bags *every week*, which adds up to about 10 billion bags a year just in New York City. The majority of these bags aren't recycled and are not biodegradable. Plastic bags and other plastic film comprise about 7.5% of the City's residential waste stream, and these materials clog the processing equipment at the Sims recycling facility in Red Hook. It now costs the City over $12 million a year to separate these bags from other waste and dispose of them.

Plastic bags are not recycled by the NYC Department of Sanitation (DSNY) – they simply end up in the trash. Because they're so lightweight, discarded plastic bags are easily blown about by the wind – we've all seen plastic bags stuck in trees and clogging storm and sewage drains – and they're also washed or blown out to sea where all kinds of sea life encounter them, often ingesting or becoming tangled in them. Plastic bags and film become more toxic once they break down in a marine environment and fish that ingest bag fragments accumulate chemicals that can cause liver toxicity and other pathology.

Avoid using **plastic film** (such as Saran Wrap) to cover or wrap food as much as possible (plastic film is also not recycled by DSNY). Instead, store food in containers with covers (such as glass jars or Tupperware), reusable zip-lock bags or wrap it in recyclable aluminum foil. Zip-lock bags can be washed and re-used many times. If you have to use plastic film, you can recycle it along with plastic bags at most large supermarkets. Stores covered under the NYS Bag Waste Reduction Law will still be required to collect plastic bags and other film plastics from consumers for recycling. Exempted are chain-stores with less than 5,000 sq. ft or non-chain stores with less than 10,000 sq. ft.

The NYS Bag Waste Reduction Law

The NYS Bag Waste Reduction Law, which goes into effect March 1, 2020, stipulates that no vendor required to collect tax can distribute any plastic carryout bags to its customers except for exempt bags, and that re-usable checkout bags provided to customers in stores cannot be made out of plastic.

Exempt bags include:

- Bags used solely to contain or wrap uncooked meat, fish or poultry;
- Bags used by a customer solely to package bulk items such as fruits, vegetables, grains or candy;
- Bags used solely to contain food that is sliced or prepared to order;
- Bags used solely to contain a newspaper for delivery to a subscriber;
- Bags sold in bulk to a consumer at the point of sale;
- Trash bags;
- Food storage bags;
- Garment bags;
- Bags prepackaged for sale to a customer;
- Plastic carryout bags provided by a restaurant, tavern or similar food service; or
- Bags provided by a pharmacy to carry prescription drugs.

Any person or store in violation of this law will receive a warning for the first violation, a $250 fine for the second violation, and a $500 fine for each subsequent violation. (For more detailed information see the link to the law at the end of the Commentary.)

The NYS Bag Waste Reduction Law also gives localities the option of charging a fee for paper carry-out bags. New York City has opted to do just that, imposing a fee of five cents per bag. Three cents of that fee will go to the NY State Environmental Protection Fund, and the other two cents will go toward the production of reusable bags. Exempt from this fee are customers using the Supplemental Nutritional Assistance Program (SNAP) or any successor programs used as full or partial payment for the purchased items.

How You Can Make a Difference

- Say “no” to plastic bags that may be legally exempt but you don’t really need.
- Keep reusable bags in your pocket or with your shopping cart or in your car; clip folding reusable bags onto your coat, backpack or purse so you always have them handy. If you store them near the door or coat closet, you'll be more likely to remember them on the way out. Every time you use a reusable bag, you’re helping prevent litter and waste – and you can also save yourself the 5-cent paper bag fee.
- Remind your family, friends, and neighbors to bring reusable bags with them when they shop.

Cloth and Other Non-Plastic Bags

Re-usable shopping bags are made of cloth or other materials that can be cleaned and are often compostable or biodegradable. You can get free *cloth bags* from the Department of Sanitation by calling 311 or clicking here. The DSNY bags fold into a built-in pouch with a carabiner clip so they're always handy - and the bags are made of 90% recycled material. Also, some greenmarkets sell mesh-cloth bags, and cloth bags are often distributed for free by local politicians and community groups (see DSNY Events for a listing of these community events). Low-cost, reuseable cloth bags are also easily purchased through the internet.

Other alternatives are certified *biodegradable or compostable bags* made of other materials. One common plant-based material used is polylactide plastic (PLA). PLA is typically manufactured using fermented plant starch
from corn, cassava, sugarcane or sugar beet pulp. You can buy biodegradable or compostable bags at some local grocery and home improvement stores or through online vendors.

The Biodegradable Products Institute provides certification services for these products, assuring they meet ASTM (American Society for Testing and Materials) testing standards and that they will biodegrade in a managed compost facility. BPI also provides a list of companies that manufacture these products. The BPI logo identifies products that will perform satisfactorily in facilities that achieve temperatures needed to assure rapid biodegradation; *This is usually not true of home composting units*.

It's important to note that the terms "biodegradable" and "compostable" are not the same, and their use should be carefully considered.

- A *biodegradable* item, given the right conditions and presence of microorganisms, fungi, or bacteria, will eventually break down to its basic components and blend back in with the earth. The best biodegradable materials will break down quickly rather than taking years. These include items such as paper and food waste (except bones). Other materials, including some plastics will biodegrade eventually, but it may take many years for this to happen. Most plastics essentially last forever. Also, some materials degrade only aerobically (in the presence of oxygen) so they won't break down in most landfills, where the conditions are primarily anaerobic (no oxygen).

- *Compostable* products are capable of disintegrating into natural elements in a compost facility, or other environment having the necessary temperature and certain other conditions This typically should occur within about 90 days. But just because a product is "bio-based" doesn't necessarily mean it will biodegrade in a composting facility. For example, the lignin and cellulose in wood products can take years to break down.

Garbage and Recycling Containers

Garbage bags must be impermeable to liquids, so paper alone is not the solution. But they can be made of BPI-certified bags, as well as plastic. The same is true of bags used to collect organic waste in residential buildings. The bags themselves can be put out for DSNY organics or garbage collection but are not accepted at GrowNYC Greenmarkets food scrap collection sites.

Another interesting idea is to use a *two-bag garbage or organics system.* The reuseable outer bag (placed in a rigid container) would be impermeable to liquids and made of something like wax coated cloth, bagasse from sugar cane, or even re-useable plastic. The disposable inner bag would be made of a compostable material, such as brown kraft paper. Used paper towels or napkins can be placed in the bottom of the disposable inner bag to absorb moisture. Both bags would be taken to the larger collection receptacle where garbage is assembled for DSNY pickup. Both the inner bag and its contents would be put into the larger receptacle and the outer bag taken back to your apartment to be rinsed out (if necessary) and re-used. If you recycle and compost all the items DSNY accepts—including food scraps, electronics, textiles, paper, glass, metal and glass—you'll find you accumulate surprisingly little garbage.

Recycling. Whenever possible, collect your paper, glass, metal and glass recycling into a rigid container (which can be periodically washed out) — *not* into a plastic bag – and empty it into the larger container put out for DSNY pickup. If you must use plastic bags to collect or transport recyclable items, empty them into the larger collection container and be sure to wash them out and re-use them.

For more information:

- bag it nyc
- Biodegradable Products Institute
- Department of Environmental Conservation Information for Consumers
- NY State Bag Waste Reduction Law
- PlasticBagLaws.org
- PlasticFilmRecycling

UWSR Eco Letter November/December 2019
COMMENTARY:
Organics Collection in Residential Buildings

The NYC Department of Sanitation (DSNY) program for organics collection from residential buildings has resulted in a dramatic increase in the amount of organic waste that's being recycled (mostly composted) in NYC. This organic waste includes both food

and yard waste and it now comprises over one quarter of residential waste by weight. As encouraging as this is, however, most of our organic waste is still being put out with our garbage.

At first glance, it might seem that recycling of food waste isn't particularly important. After all, it's biodegradable and will, in theory, be turned back into soil someday. But there are at least four very good reasons to recycle organics:

1) Organic waste accounts for almost a third of the waste produced by NYC residents. Recycling them reduces the total volume of garbage the City must export to other municipalities around the country, where it will sit dormant in their respective landfills.
2) Any organic waste buried deep in landfills decomposes anaerobically (without oxygen) and thus produces methane, a potent greenhouse gas. When DSNY processes organics, they periodically turn them over, meaning that these organics primarily decompose aerobically (in the presence of oxygen), which significantly reduces methane production.
3) Because food waste packed into a landfill decomposes anaerobically, it biodegrades extremely slowly since it's not exposed to the oxygen needed for aerobic bacteria to break it down completely. Thus, an apple in this condition can remain intact for hundreds of years
4) Any soil that's eventually produced from the organics in a landfill is contaminated by materials such as plastics and toxic heavy metals from e-waste.

DSNY Organics Collection Program

DSNY offers free pick-up of organic waste from all residential buildings in all the City's boroughs. Their Organics Collection Program accepts:

- all food items, including bread, vegetables, fruit, fish, meat, bones, eggshells, dairy, and leftovers;
- food-soiled paper like tea bags, coffee filters, napkins, and paper plates; and
- leaves and yard waste.

Conditions at NYC's industrial composting facilities allow for the breakdown of all these materials, as well as paper and certified compostable plastic bin liners, which small-scale and backyard systems cannot typically process.
So, what happens to the organic waste after Sanitation collects it? Most of the organic waste collected from residents is taken to local and regional composting facilities, where it is composted on a large scale. Finished compost is used in NYC parks and gardens. Additionally, a portion of the organic waste collected is converted to renewable energy. Buildings interested in participating in this program can apply here. Following the submission of an inquiry form, DSNY will contact the building's management to confirm interest and organize a site visit, during which DSNY will assist the building in developing an implementation and education plan and answer any questions or concerns. Once a building plan is submitted to DSNY, the building will need to educate and train residents

and staff. DSNY will supply posters and labels to clarify and publicize the building's organics program and, at the building's request, DSNY will also attend resident information or education events. Finally, DSNY will conduct a site visit to confirm the building is ready to begin collection.

Having proactive residents and the support of building management can make the enrollment process easier and faster. Interested residents should notify their building management as soon as possible and supply them with relevant information and, after submitting the inquiry form, make an effort to build support for the program among the building's residents and management. Once the organics program is in effect, it can sometimes be helpful to have a different person to check on how the organics collection is doing on each floor.

DSNY supplies brown bins to all buildings participating in their organics collection program for storage of residents' compostable organics. These brown bins are specially designed with latches and other features that keep pests out, so it's important to keep the bins latched at all times. If they're placed outside, it's also best to store them in a shaded area, especially during warm weather. The containers may or may not be lined. Certified compostable bags are available at grocery and home improvement stores and through major online retailers. But there are many options that don't require a special product: For instance, you can collect organic scraps in newspaper or in a paper bag and discard them together in the brown bin. Unlined bins must be washed out regularly after each DSNY collection.

As for temporary storage of food scraps in your apartment before bringing them down to the brown bins, these can be placed in large yogurt containers or other covered plastic containers, plastic bags, milk cartons or in commercially available compost pails. Storing items in the refrigerator or freezer reduces odors. A layer of used napkins or shredded newspaper at the bottom of the storage containers helps absorb excess moisture.

If a building's bin is lost or stolen it may qualify to receive a replacement bin or - repair an old one, which can be **picked up** from one of DSNY's Borough Offices from 8 a.m. to 4 p.m. every Friday and Saturday. You can find more information here.

Examples of Buildings with Successful Organics Collection

Very Large Co-op:

Schwab House, between 73rd and 74th Streets, fills the entire square city block between West End Avenue and Riverside Drive that was formerly occupied by the Charles Schwab Mansion. The current structure was completed in 1951. It has 17 floors plus garden and solarium levels. A self-managed co-op, it contains approximately 650 units, with 10 to 20 apartments on each floor. Divided into an East Wing (285 West End Avenue) and a

West Wing (11 Riverside Drive), Schwab House is essentially two separate buildings with two separate elevator banks that are connected via the lobby.
The DSNY Organics Pilot Program is overseen by Rick Schulman, a building resident. The brown pest-proof bins are located in the basements of both wings of the building, and residents bring their food scraps and organics down to the bins in their own collection containers that may be lined with newspaper to help absorb any excess liquid. Porters put the filled, vermin-proof bins out for collection by DSNY on Mondays, Wednesdays, and Fridays.

Although the Schwab House Board of Directors was initially reluctant to allow the building to be a part of the pilot program, Rick explained that when organics were thrown down trash chutes, food residue inside the chute attracted insects. By separating organics and placing them in DSNY's impenetrable hard plastic compost bins residents could prevent insect and rat infestations, keep the garbage chutes cleaner, and reduce the number of black plastic bags containing food waste. Many residents have reported that they're happy they no longer have to bring their organics to weekend Greenmarkets or store their decomposing organics until the weekend.

Condominium:

Strivers Gardens, at 300 West 135th Street, is a 12-story building that was constructed in 2006. Its 170 condominium units are managed by New Bedford Management; Martin Robertson, the building superintendent, has been the driving force in developing and maintaining the building's environmental programs.

DSNY's brown bins are stored in the building's garage. Residents bring their organics to the garage in a number of ways: some in recyclable bags, some in paper bags; some bring it down frozen after they've stored it in their freezer. Newspaper is provided to reduce smell, as is a bin for the plastic bags residents used to carry their organics.

Strivers Garden residents may empty their organics storage containers themselves directly into the DSNY bins or they may participate in the building's Composting VIP Program whereby residents bring their food scrap containers to the concierge desk in the lobby, from where porters take it to the brown bins in the garage. Residents wishing to use this service must purchase the food scrap container from the building, but there are no additional charges or recurring fees.

Medium-Sized Co-op:

717 West End Avenue is a 92-unit co-op building located between 94th and 95 Streets. Their organics program was initiated by resident Doris Solomon. Apartment owners take their compostable materials down to the building's basement, where they can deposit them in three DSNY brown bins. In turn, porters bring any full bins out to the curb for collection on Mondays, Wednesdays. and Fridays.

Brownstones:

West 107th Street, between Riverside Drive and West End Avenue
The brownstones on this block work together in a program organized by superintendent Ron Fields. DSNY's brown bins are chained to the garbage collection areas in front of four buildings on the block. Block residents can put food waste—as well as plants or yard waste—in the latched bins at any time. The brown bins are put out for collection each Monday, Wednesday, and Friday (except holidays) at about 4 pm and are usually emptied be DSNY by 8 p.m. Because the containers are latched, there has been a significant decrease in the rat population on the block.

Other Options If Your Building Doesn't Currently Receive DSNY Organics Pickup

- *Compost On-The-Go* (GrowNYC), (212) 788-7900. Operates nine compost collection sites in Northern Manhattan. These include a total of three on the Upper West Side and the Upper East Side
    - 110th Street and Central Park West
    - 110th Street and St. Nicholas Avenue
    - 96th Street and Lexington Avenue.

  For a full list of locations and times, see their website.

- *Greenmarkets* (GrowNYC), (212) 788-7964. Their food scrap compost program is available at various year-round greenmarket locations on the Upper West Side; see their website for times.
    - Tucker Square Greenmarket [66th and Columbus Avenue], 8 a.m.-1:00 p.m., Saturdays
    - 79th Street Greenmarket [79th & Columbus Avenue], 8 a.m.-1 p.m. Sundays
    - 97th Street Greenmarket [97th & Columbus Avenue], 8 a.m.-2 p.m., Fridays
    - Columbia University Greenmarket [Broadway between 114th-115th Streets.], 8 a.m.-1 p.m. Sundays and 8 a.m.-3 p.m. Thursdays

- *Lower East Side Ecology* (LESEC), (212) 477-4022. Year-round food scraps and plant matter drop-off sites in Manhattan include:
    - 23rd Street west of 8th Avenue, open Tuesday and Thursday, 8:00-11:00 a.m.
    - 127th Street & Malcolm X Boulevard, open Wednesday, 8:00-11:00 a.m.

GrowNYC and LESEC accept fruit and vegetable scraps, beans, nuts and nutshells, non-greasy food scraps (rice, pasta, bread, flour, cereal etc.), coffee grounds and filters, tea bags, spices, egg shells, pits, cut or dried flowers, houseplants, non-contaminated potting soil, and soiled napkins and brown paper products. They do not take fish, meat, bones, cheese and dairy products, fat or oil, animal waste, litter or bedding, coal or

charcoal, coconuts, or metal, glass, and plastic (including biodegradable/compostable plastics).

For more information:

- DSNY or call 311 for general organics collection information.
- Neighborhoods receiving DSNY organics collection service
- How New York Is Turning Food Waste Into Compost and Gas (NY Times article)
- The Big Apple Takes on Composting (Our Town article)

UWSR Eco Letter September/October 2019
COMMENTARY:
Styrofoam

Overview

Plastic foam products, including Styrofoam, are used all over the world since they're lightweight and can be adapted to many uses—such as packing peanuts, coffee cups or insulation. But there are a number of serious problems with the use of this material:

- because it's lightweight and can break down into small particles that drift into our rivers and oceans, it has proven to be very harmful to aquatic life;
- it's considered a potential human carcinogen;
- its manufacture and distribution increase the emission of carbon dioxide, which exacerbates global warming; and
- it clogs up municipal landfills and biodegrades very slowly.

For these and other reasons, New York City banned most single-use foam products as of January 1, 2019.

"Styrofoam" is a trademarked brand of closed-cell extruded polystyrene foam or EPS foam. This material is light blue in color and is primarily manufactured for use as foam building insulation board for use in walls, roofs, and foundations or as a water barrier. However, the colloquial use of the word Styrofoam often refers to another material that is usually white in color and made of expanded (not extruded) polystyrene foam. In this case, correctly referred to as EPS foam instead of Styrofoam, it's used in disposable coffee cups, plates and coolers, or as cushioning material in packaging (e.g., packing peanuts).

As mentioned above, EPS foam usage is accompanied by several serious problems. Polystyrene creates air pollution when it's manufactured and transported, the latter also consuming fossil fuels that increase the effect of climate change. After it's used and discarded, it often winds up in landfills or in our seas. Also, since polystyrene isn't biodegradable, it can remain in our environment for hundreds or thousands of years.

Since EPS foam is composed of 98% air, it's lightweight and buoyant and thus can easily drift into our waterways and ultimately the ocean. Plastic waste in our oceans is becoming a very serious problem. Every year, about 8 million metric tons of plastics enter our ocean on top of the estimated 150 million metric tons that currently circulate in marine environments. If this trend continues, it's estimated that the ocean will soon contain a greater amount of plastic than fish.

EPS foam can break down into micro-particles (pieces under five millimeters in length). Fish, sea birds, sea turtles and other ocean creatures often ingest these micro-particles, with adverse and often fatal effects. A recent Food and Agriculture Organization study found that more than 100 commercial seafood species had ingested them; all-in all, close to 700 species have been impacted. These micro-particles can also work their way into the food chain and thus result in human health problems. In fact, the EPA and International Agency for Research on Cancer consider styrene a possible human carcinogen. Toxic polystyrene can also leach from containers (such as coffee cups) into beverages or food.

If you receive packages containing EPS foam peanuts, avoid throwing them in the trash. Most Mail Boxes Etc. and UPS Stores (tel: 800-789-4623) accept EPS foam peanuts and other packaging materials such as bubble wrap and plastic foam for reuse in shipping. (This is also often true of other local businesses that do a lot of shipping.)

NYC Ban

The New York City Department of Sanitation concluded that EPS foam could not be recycled in an economically efficient and environmentally feasible manner and thus decided that most uses of this material should be banned. It took a few years for this legislation to pass, but it finally happened. New York City's ban on single-use foam products (such as EPS foam) went into effect January 1, 2019. This law became enforceable as of July 1, 2019, and DSNY is currently issuing tickets to businesses who continue to use EPS foam products. Establishments found in violation of the foam ban will receive fines for each violation starting at $250; repeat violators will incur higher fines.

Banned products include single-service items, such as cups, bowls, plates, takeout containers, trays, and coolers. Additionally, manufacturers, distributors, and stores may no longer sell or offer for sale loose fill foam packaging ("packing peanuts") in the City.

Exceptions include foam containers used to package or store raw meat, pork, fish, seafood, poultry, or eggs sold from a butcher case or similar food retailer. Also exempt are foam blocks used as protective packaging in shipping goods such as electronic devices or appliances.

Any business or store that is located in or operates in New York City, such as retail stores, food service establishments, mobile food commissaries (e.g., food trucks and food carts) and manufacturers must comply with the ban. Small businesses (with less than $500,000 in gross income) and non-profits may apply for temporary hardship exemption from the Department of Small Business Services.

Reporting a violation:

- Citizens can call 311 to report a violation. When calling 311 let them know this is a Department of Health violation and that you are reporting a business using EPS foam or Styrofoam containers that have been banned from use.
- You can also use the 311 app to report a violation.
    - Click on 'New Request'.
    - Scroll down to 311 Online Shortcuts. Click on 'Food Complaint'.
    - Scroll down and select the type of food service establishment in violation of the Foam Ban.
    - Once this selection has been made, click on the blue link to 'Report unsanitary conditions or unsafe food practices'.
    - Under Problem Detail select 'Food Protection'.
    - Under Additional Details select 'Food Display/Storage Improper'.
    - In the Description, describe the EPS foam products being used. Click on the data observed and hit 'Next'.
    - Enter the 'Location type' and business name and address in as much detail as possible.
    - Continue filling out the form and make sure you click on 'Submit' to complete the form and send it in.

Non-plastic alternatives to EPS foam (*see also* Manhattan SWAB)
For packing peanuts used in shipping:

- *Cornstarch-based peanuts*. These are available from several vendors online – or when you receive packages containing them you can save them for future use. (Test to see if they're cornstarch by dissolving them in water—EPS foam peanuts don't dissolve.)
- Ecovative Design's *Mushroom® Packaging Material* is made from mushroom mycelium (mushrooms' intricate root structure) and is a high performing packaging solution, cost competitive with conventional foams, and 100% home compostable. This material is just as lightweight as EPS foam, but with much less negative environmental impact. Info: Ecovative Design, tel: 518-273-3753.
- Crumpled newspaper, shredded office paper, junk mail, cut strips of cardboard
- Rags or unusable textiles, yarn
- Choose a box that fits the item to be shipped as closely as possible. You might want to stockpile a few of these when you receive small packages containing vitamins, drugs, cosmetics, etc.

For other EPS foam products—including cups, bowls, plates, clam-shell containers, egg cartons: If your host a party at your home or a restaurant or other venues the best environmental option is to use reusable, dish-washable cups, bowls, containers, and/or plates.
Here are a few more tips to avoiding EPS foam containers and packaging:

- Bring your own reusable cup when purchasing coffee.

- Bring your own “doggie bag” to restaurants for leftovers.
- When ordering catering at home or work, ask the restaurant or caterer to bring the food in reusable metal catering trays.
- Whenever possible, buy eggs packed in recyclable paper cartons.

For more information:

- NYC Department of Sanitation (DSNY)
- Cafeteria Culture

The Manhattan Solid Waste Advisory Board is a voluntary citizens organization dedicated to helping the City meet its zero waste goals. The Board meets monthly except during July and August, and meetings are open to the public.

UWSR Eco Letter July/August 2019
COMMENTARY:
Recycling and Waste Reduction Updates

• ***DSNY Curbside Organics Collection***

Apartment buildings in Manhattan (and the rest of the City) with 10 or more units are now eligible for free DSNY Curbside Organics Collection. Enrollment requires the approval of the building’s management or co-op board. For an online application click here. DSNY supplies brown bins for food scraps, plant trimmings and food-soiled paper. Before bringing these items to the brown bins, you can re-use plastic containers to store them in your refrigerator or freezer to minimize odors. DSNY collects three times weekly.

DSNY will also be expanding organics collection to all schools (about half of public schools have it now). Click here for an excellent article on composting that appeared recently in the West Side Spirit.

• ***donateNYC Food Portal***

Organizations and businesses can donate excess food via donateNYC's Food Portal instead of discarding it. donateNYC passes on these goods to organizations that can use or redistribute the food to those in need. Individual residents wishing to donate their own excess food can search donateNYC’s online map, which lists dozens of greenmarkets, food pantries, thrift stores and other organizations. For more information email donateNYC at donate@dsny.nyc.gov.

• ***Funding for Food Waste Diversion***

The Foundation for New York’s Strongest Microgrant Program provides local businesses with funding and technical support to begin or expand food waste diversion. Through

the Food Waste Creative Solutions Grant, the Foundation will award up to $2,000 plus technical support to small businesses based in New York City. Click here for an application and more information.

• ***Electronics Recycling***
New York City appears to be doing much better with electronics recycling. According to the DSNY Waste Characterization Study, the volume of electronics in the trash dropped 60% from 2012-2017. Buildings with 10 or more units are eligible for pickup, and you can find an online application here. If your building isn't enrolled or eligible to be enrolled in the program, you can check with Lower East Side Ecology or look at the *Electronic & Textile Recycling* section in the Events listed below.

• ***Ban on Single-Use Foam Products***
New York City's ban on single-use foam products (such as Styrofoam) went into effect January 1, 2019. Banned products include single-service items such as cups, bowls, plates, takeout containers, trays, and coolers. Additionally, manufacturers, distributors, and stores may no longer sell or offer for sale loose fill foam packaging ("packing peanuts") in the City.

Any businesses or stores located or operating in New York City, such as retail stores, food service establishments, mobile food commissaries (e.g., food trucks and food carts) and manufacturers must comply with the ban. Small businesses (with less than $500,000 in gross income) and non-profits may apply for temporary hardship exemption from the Department of Small Business Services.

Exceptions to the single-use foam products ban include foam containers used to package or store raw meat, seafood or eggs sold from a butcher case or similar food retailer. Also exempt are foam blocks used as protective packaging in shipping goods such as electronic devices or appliances.

Beginning July 1, 2019, establishments found in violation of the foam ban will receive fines for each violation starting at $250; repeat violators will incur higher fines. Citizens can call 311 to report a violation.

More information on the ban is available on the nyc.gov website here, as well as from the Manhattan Solid Waste Advisory Board (SWAB). The Manhattan SWAB is a voluntary citizens organization dedicated to helping the City meet its zero waste goals. It meets monthly (except during July and August), and meetings are open to the public. See here for more information on the Manhattan SWAB.

• ***Plastic and Paper Bags***
Earlier this year, New York State lawmakers approved a statewide ban on single-use plastic carryout bags. At the same time, they gave local governments the option to charge extra for paper-bag alternatives. The New York City Council did just that, voting to tack on a nickel fee for each paper carryout bag a customer uses at retail and grocery

stores. Under New York City's plan, 2 cents from every paper-bag fee would go toward boosting an existing initiative that has already provided close to 475,000 free reusable bags to city residents.

This bill was signed by the Mayor, with an effective date March 1, 2020, the same as the statewide bag ban. All retailers must comply, but there are exemptions for restaurants and for SNAP/WIC transactions. The goal of the two bills is to encourage people to bring reusable bags to markets (the City's Sanitation Department collects nearly 30,000 tons of paper bags every year). More information is available here.

• ***Drugs and other Medical Supplies***

The New York State Drug Take Back Act mandates that manufacturers establish, fund, and manage a New York State approved drug take back program(s) for the safe collection and disposal of unused covered drugs. Collection and disposal are free of charge to both the consumer and pharmacy. Check with your local pharmacy to see if they participate (some Walgreens and CVS stores do).

The Afya Foundation in Yonkers sponsors a donation program to re-source usable medical equipment and supplies, including items used in hospice care, with the exception of bedding. You can drop off these items at the Plaza Jewish Community Chapel, 630 Amsterdam Avenue (91st Street). Please call first at 212-769-4400.

UWSR Eco Letter May/June 2019
COMMENTARY:
GrowNYC

GrowNYC, an organization we've been working with for a long time, was originally founded in 1970 by Mayor John Lindsay and Marian Sulzberger Heiskell as the Council on the Environment for New York City (CENYC). Born out of the spirit of the first Earth Day that same year, CENYC was initially a policy-based organization, writing comprehensive reports about quality of life issues like air quality, traffic, and noise. In 2010 they started doing business as GrowNYC and, as the City changed, so did they. Expanding their activities over the years, they became the City's largest and most established local environmental organization, providing millions of New Yorkers with resources that enable healthy and sustainable living. Their work is focused on three primary environmental areas: Urban Greening & Food Production; Recycling & Re-Use (including Composting); and Environmental Education.

We discussed their Environmental Education program in our November/December Eco Letter Commentary, so here we'll review their programs in urban greening, food production, recycling, re-use and composting.

URBAN GREENING & FOOD PRODUCTION

1. **Greenmarket Farmers Markets:** Greenmarket Farmers Markets was founded in 1976 with a two-fold mission: to promote regional agriculture by providing small family farms the opportunity to sell their locally grown products directly to consumers, and to ensure that all New Yorkers have access to the freshest, most nutritious locally grown food the region has to offer. Each Greenmarket sells locally grown produce, meat, baked goods, preserves and other goods produced in our region. Unsold produce feeds the hungry: In 2017 Greenmarket farmers and bakers donated nearly 1 million pounds of food to City Harvest, Food Bank of New York City, and neighborhood soup kitchens and food pantries.

GrowNYC operates about 50 Greenmarkets throughout NYC, some on a seasonal basis. Year-round Greenmarkets on the Upper West Side include:

- Tucker Square Greenmarket [66th & Broadway], open Thursdays and Saturdays;
- 79th Street Greenmarket [79th & Columbus Avenue], open Sundays;
- 97th Street Greenmarket [97th & Columbus Avenue], open Fridays; and
- Columbia University Greenmarket [Broadway between 114th & 115th Streets], open Thursdays and Sundays.

See here for hours of operation and other Manhattan locations. Many of these Greenmarkets also collect textiles and/or food scraps (see below under **Recycling and Re-Use**).

Other Greenmarket programs include Greenmarket Co., Youthmarket, Fresh Food Box, and the Wholesale Greenmarket (located in the Bronx; seasonal)

- Greenmarket Co. was launched in 2012 and is New York City's first and only "food hub" dedicated to supporting regional food producers by making their products available to wholesale buyers throughout the city. Their clients range from Michelin-rated restaurants and specialty retailers to bodegas, senior centers, and soup kitchens. Greenmarket Co. sources from small and mid-sized farms in the Northeast region – most products come from New York State, but they also purchase from farms in New Jersey, Pennsylvania, and Maine. Greenmarket Co. helps each of their customers maintain a connection to the farms where their food is produced and provides them with high-quality, locally-produced farm products.

- Youthmarket is a network of urban farm stands operated by neighborhood youth, supplied by local farmers, and designed to bring fresh fruits and vegetables to communities throughout New York City. GrowNYC purchases produce from local farmers and trains young people to operate a farm stand in their neighborhood as their own small business. Many neighborhoods in the City are experiencing epidemic rates of diet-related disease like obesity and diabetes at the same time that supermarkets are closing in these neighborhoods, thus

making fresh fruits and vegetables less accessible to communities. In working to overcome this problem, Youthmarket benefits both community and farmer: the community, by providing fresh and healthy food, and the farmers, by giving them access to new markets.

- Fresh Food Box is a food access initiative that enables under-served communities to purchase fresh, healthy, and primarily regionally-grown produce well below traditional retail prices. Through the power of collaborative purchasing, Fresh Food Box customers purchase for $14-$15 what would cost $20-$30 in a store. To make their shares even more affordable, all Fresh Food Box sites accept SNAP/EBT and Health Bucks. Each Fresh Food Box contains the best of what's seasonally available. For locations click here.

2. **Healthy Exchange** provides the framework for making healthy, regionally-produced food accessible to all New Yorkers by overseeing GrowNYC's work to promote and accept nutrition benefit programs, incentive coupons, and debit/credit cards. Healthy Exchange also collaborates with City government and community-based organizations to implement special projects and nutrition education to enhance food access in New York City.

3. **Project Farmhouse** is a state-of-the-art event space and sustainability center located just steps from Union Square Park. With 3,500 square feet of flexible-use space and featuring the Con Edison Green Wall, Project Farmhouse is ideal for cocktail parties, seated dinners, workshops, panel discussions, meetings, and everything in between.

RECYCLING & RE-USE

Food-Scrap Collection/Composting: Grow NYC has collected over thirteen million pounds of food scraps since this program was established in 2011. NYC residents can easily compost household food waste by dropping kitchen scraps at dozens of GrowNYC Food Scrap Drop-off sites Citywide, including 59 Greenmarket, Youthmarket, Fresh Food Box and other locations. For a location near you, see here.
Food comprises about 21% of NYC's waste stream. If this material is sent to a landfill it contributes to our city's disposal costs and can also create greenhouse gas emissions (such as methane). When composted, however, food scraps and other organic waste become a useful product that adds nutrients and improves the quality of soil for street trees, gardens and more. The household food scraps you've dropped off at collection sites will be transported to one of several NYC compost sites and transformed into a fertile soil amendment for use on local urban farming and gardening projects.

Accepted materials include fruit and vegetable scraps, non-greasy food scraps (rice, pasta, bread, cereal, etc.), coffee grounds and filters, tea bags, egg and nut shells, pits, cut or dried flowers, houseplants, potting soil, and soiled brown paper products. [NO meat, chicken, fish, greasy food scraps, fat, oil, dairy, animal waste, cat litter or animal bedding, coal or charcoal, coconuts, diseased and/or insect-infested houseplants/soil,

biodegradable/compostable plastics, or receipts.]. Food scraps can be collected in covered plastic containers (such as yogurt tubs), paper bags, milk cartons or in commercially-available compost pails. Paper bags can be put in with the compost, but containers made of other materials should be re-used or recycled. To reduce odors while collecting and storing compostables at home, you can place food-scrap containers in the freezer or refrigerator. A layer of newspaper at the bottom of your storage container also helps.

Clothing & Textiles are collected at many GrowNYC greenmarkets, including eight locations in Upper Manhattan. For more detailed information about locations and hours, click here. Grow NYC has collected about five and one-half million pounds of clothing, footwear and other textiles since 2007. Any contribution you make to the GrowNYC program is tax deductible.

They accept clean and dry clothing, paired shoes, bed linens and towels, handbags, belts, and other textiles. They do ***not*** accept rolls of fabric or fabric scraps of any size, rugs, carpeting, pillows, comforters, or luggage. Textiles are, in turn, picked up by Wearable Collections (a for-profit company) and sold to processing facilities where they are sorted into different grades. An effort is made to recover as much usable clothing as possible for distribution to second-hand markets, mainly overseas. Items that are not suitable for reuse will go to recycling markets to be used as wiping rags or shredded for low grade fiber products such as insulation.

Recycling Champions Program **(RCP)** develops model recycling programs at over 100 NYC public schools each year, educating 100,000 students, staff, and custodians about recycling. Innovative outreach created specifically for the K-12 community includes inquiry-based, experiential student programs aligned with the Common Core, and professional development workshops for faculty and staff. In partnerships with the NYC Department of Education Sustainability Initiative and the NYC Department of Sanitation, RCP helps establish best practices in schools throughout the City.

This program was also discussed in the November/December 2015 Commentary on School Recycling. (You'll find a link to an Archive of Past Commentaries in the *UWSR Eco Letter* under the current Commentary.)
Their **Stop 'N' Swap** program hosts free community re-use events throughout the city.

You can bring clean, reusable, portable items such as clothing, housewares, games, books, and toys that you no longer need, and take home something new-to-you, at no charge. You don't even have to bring something to take something. But p*lease do NOT bring furniture, large items, tube televisions, expired or open food, unsealed personal care products, medicine, dirty or ripped clothing, fabric scraps, incomplete toys and games, non-working electronics, magazines, or sharp objects.*

Drop off items you want to give away in the Sorting Area and select items you want to take from the Swap Area. Be sure to leave plenty for others. Participants may attend only six Swaps events per year, to ensure equitable access to goods.

UWSR Eco Letter March/April 2019
COMMENTARY:
Recycling Programs in Mid-Size and Large Residential Buildings

With recycling now pretty much the norm, most residential buildings are set up to collect and process residents' materials. However, various circumstances – and sometimes just human nature – can impact the overall effectiveness of the set-up. In order to maximize the volume of materials recycled it's helpful to look at residential buildings in Upper Manhattan that have well-functioning programs and see exactly how they accomplish this.

We've selected three buildings with successful recycling operations: a very large building in the west 70's that contains about 650 co-op units; a building in the West 100's with about 50 units that are either co-op or rental; and a building on West 135th Street with 117 condo units.

Successful recycling programs in these and other buildings require having a knowledgeable superintendent, a supportive and understanding board, and a caring management company, all of whom work in close cooperation with porters and other building staff. Among these three buildings there's some variation in the materials recycled as well as the respective procedures and containers used. Most of the recycling is collected by or for the Department of Sanitation (DSNY), but some materials or goods are recycled separately. This Commentary provides a detailed review of how each of these programs is carried out.

If you're looking for ways to improve your building's recycling program, we encourage you to forward this to your super or building management so they can use ideas from it to implement more effective recycling or re-use programs and perhaps also suggest they sign up to get our Eco Letter.

Before we discuss each of these three buildings, here are some additional valuable resources:

- The Manhattan Solid Waste Advisory Board has created two free recycling guides for multi-family residential buildings:
    - "Creating a Culture of Recycling and Re-Use on Your NYC Multi-Family Building"

- "Engaging Residents of Your NYC Multi-Family Building in Organics Collection"

Click here to download free copies of these guides.

- The Department of Sanitation's website explains Residential Recycling here.
- Grow NYC's website tells how you can increase the percentage of materials recycled in your building here.

THE SCHWAB HOUSE

The Schwab House is located between 73rd and 74th Streets, filling the entire square city block between West End Avenue and Riverside Drive that was formerly occupied by the Charles Schwab Mansion. The current structure, completed in 1951, has 17 floors plus garden and solarium levels. It contains approximately 650 co-op units, with 10 to 20 apartments on each floor. It's divided into an East Wing (285 West End Avenue) and a West Wing (11 Riverside Drive): The Schwab House is essentially two separate buildings with two separate elevator banks that are connected via the lobby.

It is a self-managed co-op. Located on the premises, management has tried to make the building as environmentally friendly as possible. Over the past 10 years it has implemented numerous environmentally proactive projects that have not only benefitted the environment but have also reduced costs. Board packages for new residents include an "Environmental Wayfinder" so they're aware that it's an environmentally friendly building. This Wayfinder shows residents the locations of the building's recycling facilities, outlines procedures and informs them that they're expected to comply with recycling rules.

The Schwab House Environmental Committee (SHEC), chaired by Rick Schulman, oversees recycling. The SHEC meets monthly, sends out meeting minutes to residents, and compiles names for an in-house mailing list. A Co-op Board liaison is present at every meeting. The Committee has initiated numerous environmentally favorable programs that have been adopted by the building. Committee members make every effort to stay on good terms with the building staff who are involved in the recycling process, particularly the super and porters.

The SHEC communicates with residents regarding the building's environmental initiatives via BuildingLink, an in-house intranet web portal where ads, information and announcements can be shared and accessed via email. Rick is the point person to whom residents reach out if they have questions about recycling or other environmental concerns within the building. If issues require changes to current procedures, the SHEC gives details to the Co-op Board and also consults with the building superintendent and property manager. If a new initiative is starting, Rick posts information on BuildingLink, sets up a table in the lobby, recruits SHEC members and

also shares information in person. Notices are also posted on building bulletin boards, stanchions and in laundry rooms, and publicized at environmental meetings.

A trash room is located behind the service elevator on each floor of each wing (a total of 34 trash rooms). In addition to a garbage chute that empties into a bag in the basement, each of these trash rooms has recycling stations for paper, plastic, metal and glass—with a separate 30inch high plastic container for paper and another one for plastic, metal and glass. These containers are each lined with a large plastic bag. Recycling signs are posted by the containers, both those provided by DSNY and others printed by Rick with additional information.

Building porters empty these containers a few times a day, floor by floor, then also break down and bundle paper and cardboard—all to be transported down for storage in the basement. The plastic/metal/glass and mixed paper recyclables in plastic bags are placed in large rolling bins in the basement prior to the porters taking these materials to the curb for recycling collection by DSNY each Saturday. Both the porters and concerned SHEC members keep an eye on whether the proper items are placed in the correct receptacles. However, there is currently no punitive program in place for individuals and apartments who are not in proper compliance.

As with any community the Schwab House recycling program faces certain challenges. Some residents are cynical, some are too busy, and some just aren't aware of programs or laws that are in place. To help alleviate these problems, Rick keeps in touch with the co-op board and maintains a column in their monthly in-house "Update" publication. He also notifies residents via BuildingLink of any changes or infractions being committed within the building regarding recycling programs. Rick encourages the Board's support of recycling programs, pointing out that the vast majority of building residents are in favor of the project and highlighting the cost benefits to the whole building. He prompts more residents to participate in recycling programs by showing them how simple the procedures are to carry out and how their efforts benefit our society, our environment and their building.

<u>Textiles & E-Waste</u>

A large Wearable Collections textile bin is located outside one of the laundry rooms in the Schwab House. This is an ongoing program and the bin is frequently overflowing with used clothing and acceptable textiles for pick up. Wearable Collections picks up these textiles after being notified by Rick, SHEC members or building staff.

There are also two DSNY E-cycle cages (for recycling computers and other electronic goods), one in each of the sub-basements of each wing of the building. People with electronics to recycle notify Rick or building staff, who bring the electronics down to the bins. When the bins are full, they are picked up by DSNY.

Food Scraps/Compost

The Schwab House is part of the DSNY Organics Pilot program, which provides the locking pestproof bins located in the basements of both wings of the building. Residents bring their own food scraps and organics down to the bin using either their own collection bins or bags. Once in the basement they either deposit their organics along with a compostable bag or empty their bins which have been lined with newspaper which helps to soak up any liquid in their bin. Porters put the filled bins out for collection by DSNY on Mondays, Wednesdays, and Fridays.

Initially, the Schwab House Board of Directors was reluctant to allow the building to be a part of the pilot organics program, but Rick explained that when organics are thrown down the trash chute, food residue remaining inside the chute attracts insects. By separating organics and placing them in the plastic compost bins, insect and rat infestations would be prevented. Convincing both residents and management to participate was a huge success for Rick and for the building. Many residents have reported that they're happy they no longer have to bring
their organics to weekend greenmarkets and store their decomposing organics until the weekend.

Other Schwab House Building-Wide Green Initiatives

- Recycling collection stations for materials not picked up by DSNY (batteries, corks, ink, Brita filters, eyeglasses, light bulbs, plastic bags)
- Periodic specialty re-use and recycling collections (e. g., pill bottles, coats, yarn)
- LED lighting in common spaces
- Motion sensor smart lighting in small trash rooms
- Highly energy-efficient washing machines
- Building-wide zoned heating system
- Cogeneration of lobby heating
- Upgrade to insulated windows
- Low-flow toilets
- Scheduled green lectures and local tours
- Community Supported Agriculture (CSA) program
- Internal lending library (over 8,000 books)

325 RIVERSIDE DRIVE

325 Riverside Drive is located at the farthest west end of 105th Street. Constructed about 1917, it has 13 floors and 52 units, four on each floor. About three-quarters of the units are co-ops and the rest remain rentals. The building is managed by Tudor Realty Services and has a live-in superintendent; a porter and three doormen have rotated shifts but live elsewhere. Both the staff and Tudor Realty are supportive of the

building's recycling program. Since 325 Riverside is much smaller than the Schwab House, recycling procedures are fairly simple and practicality dictates that fewer types of materials can be recycled.

Recycling is overseen by the super, the porter, and Jeff Twine, and questions or requests are referred to the co-op board or to Tudor. Although there is no environmental committee, the building has generally been receptive to recycling and other green initiatives. Notices of special environmental projects, such as textile collection drives, are posted on bulletin boards in the mailroom and outside the laundry room in the basement; Jeff also puts fliers under the doors of apartments and to publicize special collections. On request, Tudor Realty will also send out recycling notices for distribution throughout the building.

Three rigid plastic containers about 30 inches high, each lined with a clear plastic bag, are located in the small room adjacent to the service elevator door on each floor. A black top indicates the container is for garbage; the one with a white top is for paper; and the one with the blue top is for plastic, metal and glass. Appropriate signage is posted above them. Both the porter and Jeff monitor these containers for contamination.

The porter removes the large plastic bags of recyclables or garbage from their containers daily and transfers the materials to an outside courtyard storage area, where they're combined with any partly full bags. The porter also breaks down and bundles cardboard boxes, then brings them down to the same storage area along with any bundled newspapers. Each week he moves these materials to the curb for recycling collection on Tuesday by DSNY. As with the Schwab House, there is currently no penalty in place for individuals and apartments who are not in proper compliance.

The recycling program also faces some of the same challenges—cynicism, general lack of interest or a need for correct information. To help alleviate these, Jeff keeps in touch with the super, the porter, the co-op board and Tudor Management.

<u>Textiles, E-Waste & Compost</u>

Wearable Collections has periodic textiles collection drives in the building and bags are kept in the basement in which residents can place their items. Jeff initiates and publicizes these drives, putting a notice under each apartment door and posting it on bulletin boards in the mail room and by the laundry in the basement. DSNY has visited the building with the aim of setting up a food scrap/composting program, but the super hasn't heard back from them yet. Due to space limitations, the building has no DSNY E-waste collection.

Other 325 Riverside Drive Building-Wide Green Initiatives

- LED lighting is in place in all common spaces; residents will also be urged to switch to LEDs.
- Energy-efficient washing machines and dryers are available in the basement.
- The building's masonry was thoroughly repointed to minimize air leakage.
- Leaky old windows were replaced and upgraded.
- A new boiler was installed.
- Low-flow toilets were installed.
- Building staff uses environmentally friendly cleaning fluids.
- The super and Jeff are looking into collecting materials not picked up by DSNY (e.g., batteries).
- Residents will be notified they should avoid putting plastic shopping bags and Styrofoam in recycling containers (although plastic bags are currently still necessary for bagged garbage) and urged to bring extra single-use plastic shopping bags to supermarkets to be recycled.

STRIVERS GARDENS

Strivers Gardens, at 300 West 135th Street, is a 12-story building that was constructed in 2006. Its 170 condominium units are managed by New Bedford Management, and Martin Robertson, the building superintendent, has been the driving force in developing and maintaining the building's environmental programs. Working in cooperation with the condo board and New Bedford, Martin communicates with residents regarding various environmental initiatives in the building via BuildingLink, an in-house intranet web portal where ads, information and announcements can be shared and accessed via email. He also posts information on recycling, re-use and other environmental initiatives on a shelf and a bulletin board in the lobby, next to the mailroom. Martin encourages the building's porters to participate in the free recycling trainings that DSNY offers, and five of the six porters on staff have completed this training.

Each floor has a refuse room with a chute for garbage and two blue containers lined with clear plastic bags, one for paper and the other for plastic, metal and glass. The paper container is about two feet high and the one for plastic, metal and glass is a bit taller. Custom signage, along with signs provided by DSNY, is used to indicate what should be placed in each of the containers, to provide recycling instructions, and to establish a friendly tone for recycling in the building. Two similar recycling containers have been placed in the laundry room and at the entrance to the building, and a recycling container for mixed-paper is situated in the mailroom, across from the lobby.

Porters remove the contents of the large plastic bags of recyclables from their containers three to five times a day, then transfer them to a storage area in the basement, where they're combined with any partly full bags. The porters also break down and bundle cardboard boxes, then bring them and any bundled newspapers to the

same storage area. Once a week the porters bring these materials to the curb for recycling collection by DSNY on Wednesday.

Martin and the porters inspect the receptacles to make sure the correct items have been placed in them and there is no contamination. They sort the trash to ensure that the most efficient recycling practices are followed, focusing on this rather than policing residents. Newspapers, magazines, books, and all cardboard are removed from the large clear bags to reduce plastic bag usage. They next bundle as many materials as possible with twine and use paper shopping bags from supermarkets to package smaller items like toothpaste boxes. This has allowed Martin to cut plastic bag orders by 25 percent, both reducing costs and helping to alleviate the problems caused by plastic bags at the Sims Recycling Facility.

There's a strict enforcement policy within the building: A recycling notice is sent to the respective resident with a photo of the offense. An escalating system of fines starts with $50 per offense; records are kept on BuildingLink and unpaid fines are collected at move-out. Fines are only issued after obvious violations continue after the issuance of a written notice and a conversation with the tenant – typically on the third or fourth offence.

Expanding the recycling program, Martin has added textiles, electronic waste and organics to the materials collected by or for DSNY.

Textiles

A re-fashion NYC bin for textile recycling is located in the laundry room, where residents can place their used items. Strivers Gardens is on automatic biweekly textile pickup with Housing Works, who call the day before to notify Martin when they're coming. On the pickup day they come into the laundry room, empty the bin, and take the textiles for recycling.

E-Waste

An E-cycle container for electronics recycling is located in the garage. Residents bring e-waste to the lower level, from where porters move electronic goods down to the garage. Martin calls DSNY for pickup when the container is full; the DSNY contractor comes into the garage, removes the full e-waste container, and replaces it with an empty one.

Food Scraps/Compost

Brown containers for food scraps and other organics are also located in the garage. Residents bring their organics to the garage in recyclable bags, in paper bags, or in a bin; some store it in their freezer prior to emptying it. Newspaper is provided to reduce smell, as is a bin for the plastic bags residents used to carry their organics.

Strivers Gardens also has a composting VIP Program, in which residents can bring their food scrap bins to the concierge desk in the lobby, from where porters take it to the garage. Residents wishing to use this service must purchase an inexpensive but fashionable bin from the building, but there are no additional charges or fees.

Other Strivers Gardens Building-Wide Green Initiatives (many of the energy-efficient features were installed when the building was constructed in 2005)

- Used light bulbs are removed from the recycling containers and taken to Home Depot for recycling.
- LED lighting in common spaces is gradually being installed.
- Motion-sensor smart lighting has been installed by Martin in trash rooms (lighting in these rooms that was originally on for 24 hours is now on for less than 20 minutes a day)
- Energy-efficient windows
- Energy-efficient washing machines and dryers
- New boiler
- Low-flow toilets

UWSR Eco Letter January/February 2019
COMMENTARY:
Re-Use and Repair

(Editor's Note: Our thanks to Jacquie Ottman: Much of the material in this commentary has been taken from her article, *What Comes After Shopping?,* and from her website. To read the original article and find out more about waste reduction, visit http://www.wehatetowaste.com/.)

We New Yorkers generate an astounding 25,000 tons of waste *every day*—more than any other city in the world. About half of this is residential waste, of which three-quarters is potentially re-usable, recyclable or compostable. However, City budget limits, lack of markets for materials and poor participation by residents means that less than one-fifth of residential waste is actually recycled or composted at this time. Discarding all this recyclable material both squanders our natural resources and costs the City a great deal to collect the resulting garbage. On a broader scale, it also creates pollution and exacerbates global warming throughout the products' entire cycle, from the mining of raw materials to their manufacture, sale and eventual disposal.

There are potential legislative solutions to some these problems. For instance, the State electronics law that went into effect in early 2015 has resulted in the diversion of many electronic goods from landfills, to be either re-used, repaired or recycled. A significant section of this bill dealt with manufacturers' responsibility to take back the electronic goods they originally produced, a concept that could to applied to other types of consumable products and packaging materials.

Another legislative approach is the introduction of outright bans or similar approaches that sharply curtail the use of materials hazardous to our environment (including plastic goods, which generally don't biodegrade). To encourage re-use, small fees could be charged for certain items; e.g., a five-cent fee on single-use plastic bags passed the New York City Council in 2017, only to be repealed by the Republican-controlled State Senate. Now that both the New York State Senate and Assembly have Democratic majorities, this bill may have a greater chance of passage. In the meantime, you can make a difference by using cloth or other reusable bags for all your shopping.

The best option for decreasing this staggering quantity of waste would be to sharply reduce the amount we buy in the first place. Sadly, purchasing large quantities of consumer goods seems to be ingrained in our culture – and even in our identity as Americans. Since about 70% of the U.S. economy is based on consumer consumption, it's unlikely any significant reduction in purchasing will occur soon. But right now, as we try to limit future purchases, we *can* focus on re-using, donating, swapping or repairing the goods we already own.

Re-use, Donate or Swap

Each year, the Manhattan Solid Waste Advisory Board, in partnership with the Citizens Committee for New York City, awards small grants to organizations conducting reuse or repair projects, research on those projects, or other activities that will help lead to replicable reuse or repair models in New York City. For more information click here or contact kgrassle@citizensnyc.org; (212) 822-9567.

Nextdoor.com can help you re-use or swap goods in your neighborhood. You can also find ideas for re-using items or information on helpful local organizations detailed below.

Some Ideas and General Information

- Avoid using plastic straws.
- Carry reusable water bottles or coffee cups with you.
- Bring your own reusable shopping bag to the market and say no to disposable plastic bags whenever possible. If the cashier tries to load you up with plastic bags, remind them how harmful these can be for ocean creatures.
- If the sheet of paper you no longer need has printing on only one side, use the blank side for scrap paper. Do the same for the junk mail you receive.
- Some apartment buildings already have a bookcase or shelf of books for all residents to share or swap. Why not do the same for other goods as well; for instance, a Free Stuff box or a shelf in your apartment building or office space?
- Share or swap CDs, household appliances, tools, printers or other electronic items with your neighbors. Requests to borrow or receive can be posted manually on designated bulletin boards in the laundry room, mailroom, or other community areas.

- If you have an intranet, you can do the posting electronically. Intranets are hosted—for your building or building complex only—by services such as Building Link or Verizon Concierge. For a fee, these services provide access to property-specific news, calendars, amenities and services.
- Community refrigerators are becoming more popular in Europe and could be utilized in buildings here. How about a community food shelf for just dry goods as well?
- There are informal exchanges for books, furniture, and other goods on many blocks on the Upper West Side. Just put what you want to give away on balustrades, next to stoops, or elsewhere on your street. The goods are usually picked up quite quickly.
- Also, some block associations (such as the West 102nd & 103rd Streets Block Association host block parties or street fairs where used goods can be donated, swapped or sold. For a calendar of these events, see the nyc.gov or the newyorkled.com sites.
- Some churches and other community organizations sell used goods to raise funds.
- Sacramento, California now has a Library of Things. Residents can borrow guitars, sewing machines, cookie cutters, and many other objects. Why not here in NYC?

Where to Donate Specific Types of Goods

Toys

Pass toys on to relatives, friends, or neighbors with younger children; if you can't do that, most plastic or metal toys can be donated or recycled in your building along with other plastic, metal and glass.

These organizations accept donations of toys:

- Good+ Foundation, 306 West 37th Street, 8th floor, NYC; (212) 736-1777; info@goodplusfoundation.org; (toys are given to antipoverty programs)
- Goodwill Industries, (212) 874-5050 (vintage toys and clean stuffed animals only)
- Grow NYC, at their Stop 'n Shop events, (212) 788-7900 (see listing below)
- NYC Mammas Give Back (supports agencies and shelters in the NYC area serving homeless pregnant woman and families and young children at or below the poverty line)
- United War Veterans Council, (212) 838-8982 (toys, baby items)

Furniture

- Goodwill Industries, (212) 874-5050
- Housing Works, (212) 579-7566; (212) 222-3550
- The Salvation Army, (212) 757-2311
- United War Veterans Council, (212) 838-8982

Textiles (see also our *Hard-to-Recycle List*)

- Grow NYC, (212) 788-7900 (accepts cleans textiles at local greenmarkets)
- NYC Mammas Give Back (accepts gently used clothing and other textiles for infants and young children in poor families)
- re-fashionNYC, call 311 (will set up containers and pick up textiles from apartment buildings with 10 or more units; *no fabric scraps, pillows, comforters, luggage or carpeting*)
- Thrift Shops such as Goodwill Industries, Housing Works and The Salvation Army (see below and our *Hard-To-Recycle List*)
- United War Veterans Council, (212) 838-8982 (will pick up clothing and other textiles)
- Wearable Collections, (646) 515-4387 (picks up most textiles and footwear from larger buildings and non-profits; *they don't accept fabric scraps, pillows, comforters, luggage or carpeting* (see below for ideas on re-use of these items)

- *Fabric Scraps* can be re-sewn into book covers, wall hangings. snack bags, shopping bags, quilts, children's blankets or incorporated into art.

- *Pillows and Comforters*

- The Humane Society of New York, (212) 752-4840 (used for animal bedding)
- New York City Rescue Mission, (646) 362-3157 (gives to homeless shelters; also accepts clothing, footwear and towels)

- *Luggage*

- Goodwill Industries, (212) 874-5050
- The Salvation Army, (212) 757-2311

- *Carpeting*

- Carpet Cycle, 360 W 1st Ave, Roselle, NJ 07203; (973) 732-4858 (removes and recycles old carpet tiles and padding from commercial buildings for a fee)

Electronic Goods (see also our *Hard-to-Recycle List*)

- Computers and other electronics are accepted at periodic collection events hosted by Lower East Ecology, (212) 477-4022, as well as at their Brooklyn warehouse. See the Electronic & Textile Recycling Section of our Events Listing or our *Hard-to Recycle List*
- Assemblyman Daniel O'Donnell, 245 West 104th Street; (212) 866-3970. (Office accepts used cell phones for re-use or recycling on an on-going basis.)
- United War Veterans Council (will pick up)

Organizations Accepting Other Goods or Materials

- Big Reuse, in Brooklyn, (718) 725-8925, is a non-profit retail outlet for salvaged or surplus building materials, lighting and appliances

- Goodwill Industries, (212) 874-5050
- Housing Works, (212) 579-7566; (212) 222-3550
- Materials for the Arts, Long Island City, (718) 729-3001
- The Salvation Army, (212) 757-2311
- United War Veterans Council, (212) 838-8982
- Swap.com is an online consignment and thrift store

Also check our *Hard-to-Recycle List*.

Swap or Loan – Organizations

- Grow NYC, (212) 788-7900 (hosts free Stop 'N' Swap events—at local greenmarkets and schools—where people can drop off unwanted clothes, books, shoes, toys and housewares; others can grab them on a first come, first served basis)
- FreeCycle.org (online materials exchange)
- Next Door.com (a private social network that helps you keep informed about what's going on in your neighborhood)
- ReUse NYC Donations Exchange, (212) 650-5832; donations@reusenyc.info (materials exchange service for businesses and non-profits)

Repair

Another good option is to repair damaged goods rather than buying new replacement items. By extending the life cycle of an object you help create jobs for communities and individuals. When you invest in repair, you also operate within a circular economy, which creates value beyond the point of sale, in addition to the environmental benefits of reducing pollution and greenhouse gases.

Each year, the Manhattan Solid Waste Advisory Board, in partnership with the Citizens Committee for New York City, awards small grants for organizations conducting reuse or repair projects, research on those projects, or other activities which will help lead to replicable reuse or repair models in NYC. For more information click here or contact kgrassle@citizensnyc.org; (212) 822-9567.

You can learn to repair items yourself, join an existing repair group, or use one of the services listed below.

- Crown Sales & Services, (212) 663-8968, 2792 Broadway (at 108th Street), repairs a variety of electronics goods at their store. These include sewing machines, vacuum cleaners, other small appliances, electric tools (saws, drills, etc.), computer equipment, televisions, stereo equipment, video

cameras, and more. They charge a diagnostic fee for most goods, but this fee is applied to the final repair cost when they fix it.

- Pop-up Repair; Drop off your goods at a partner location (see their website) and pick it up at that same location one month later. Goods repaired include lamps, jewelry, appliances, furniture, toys, clothing and textiles, and more. They charge a diagnostic fee for appliances and other electronic goods, which is applied to the repair cost if they can fix it. See their website for a list of what they don't fix. All payment is online.
- iPhone Repair Café, 38 West 32nd Street, Room 505; (347) 781-5757; (over 30,000 iPhone & Macbook devices repaired in last eight years).
- IFixit provides advice, components and repair manuals for almost anything, including computers and other electronic devices.

Fixers Collective; info@fixerscollective.org (creating and publishing a best practices guide to starting a repair group)

UWSR Eco Letter November/December 2018

COMMENTARY:

Environmental Education

Since 2009, New York City has been the only major municipality in the country to require each of its public schools to appoint a sustainability coordinator – part of the city's broader sustainability plan to send zero waste to landfills by the year 2030. In a city of 1.1 million students and more than 1,700 public schools, this creates a large team that can and does influence environmental awareness throughout the five boroughs. Several organizations, including governmental offices and non-profits, are concurrently working in the area of environmental education. In this commentary we'll provide a synopsis of number of these organizations who do at least some of their work in Manhattan.

The following groups are discussed:

- Columbia Earth Institute
- Columbia University Teachers College: Working Group on Environmental and Sustainability Education
- Department of Education (DOE) Office of Sustainability
- Department of Environmental Protection (DEP)
- District 3 Green Schools Group
- Environmental Education Advisory Council of New York City
- Green Schools Alliance
- GrowNYC
- Lower East Side Ecology's Education Program
- NY Sun Works
- The National Wildlife Federation Eco-Schools

NYC OFFICES & SCHOOLS

Department of Education (DOE) Office of Sustainability

The DOE Office of Sustainability aims to help New York City public schools become more sustainable by making school buildings eco-friendly and efficient; inspiring students, teachers, parents, and school communities to take part in environmental programs; and promoting everyday practices that benefit the environment. Flagship programs include Zero Waste Schools and NYC Solar Schools. The office also runs a number of energy conservation programs, leads sustainability trainings for all DOE employees, and supports school garden and green infrastructure projects across the city.

DOE Chancellor's Regulations require each public school to have a designated Sustainability Coordinator on staff. Any school faculty person may serve in this capacity, except for the Principal or Custodian Engineer. Sustainability Coordinators must be designated by the Principal and registered annually with the Office of Sustainability by the last Friday in September. They work with the Principal, food and custodial staff, parents, and students to develop and implement all the sustainability initiatives in the school. The responsibilities of the Sustainability Coordinator are to:

- Develop and implement a site-specific sustainability plan which shall, at a minimum, include a recycling and waste reduction plan that follows DSNY recycling rules. Reporting of the plan to the Office of Sustainability is due annually the last Friday of October.
- Utilize the U.S. EPA Energy Star Portfolio Manager provided by the DOE in assisting with energy conservation programs.
- Complete the Office of Sustainability's annual survey by the second Friday of June.
- Work collaboratively with Sustainability Coordinators from other campus schools. If their school is located on a campus (a building with multiple schools under one roof), Sustainability Coordinators on that campus are to hold periodic campus-wide sustainability meetings to coordinate their conservation efforts (e.g. turn off the lights and equipment that are not in use).
- Create a student and staff Green Team to lead school sustainability projects.

The office has ten outreach coordinators that work with all schools citywide to provide direct support to Sustainability Coordinators and key DOE staff. For more information please read the 2016-17 annual report or visit the Office of Sustainability website. Email: sustainability@schools.nyc.gov.

The Department of Environmental Protection (DEP); educationoffice@dep.nyc.gov; (718) 595-3506

DEP's Education Office provides pre-Kindergarten–12th grade students and teachers, college students, and non-formal educators with a wide range of free

programs, publications, and other resources about New York City's drinking water supply, wastewater treatment system, harbor water quality, climate change, and stewardship opportunities.

ORGANIZATIONS DEVOTED PRIMARILY TO ENVIRONMENTAL EDUCATION

The **Columbia Earth Institute,** (212) 854-3830

The Earth Institute (EI) is composed of numerous scholars spread out across dozens of research centers and programs at Columbia University. These researchers, appointed by the Provost, are refining our understanding of how the planet works and how humans are affecting natural systems. The Lamont-Doherty Earth Observatory in Rockland County, which has been seeking fundamental knowledge about the natural world since 1949, is the scientific heart of EI. Their research includes subjects such as climate change, geology, pollution, water supply, and urban greening.

They've also created a number of education programs that require students to learn environmental science and social science along with applied policy and management analysis. EI uses data analytics, social impact assessments, economic models, legal evaluations and mobile applications. They also host many seminars, workshops, panel discussions and conferences, most of which are open to the public and many of these are listed in each *UWSR Eco Letter*

Columbia University Teachers College: Working Group on Environmental and Sustainability Education; Oren Pizmony-Levy; 212-678-3180; Pizmony-Levy@tc.columbia.edu

Launched in 2015 and directed by Dr. Oren Pizmony-Levy, the Teachers College Working Group on Environmental and Sustainability Education brings together faculty, students, and staff from across the College to promote sustainability. To do so, the Working Group supports innovative research, teaching and training, Faculty and students conduct research on different aspects of environmental and sustainability education. Teachers College also offers courses on environmental health, nutritional ecology, teaching environmental science, and environmental and sustainability education. Finally, the College engages educators and parents through professional development and training.

In October 2018 Teacher's College held the first annual *Parents Making Sustainable Change in NYC Schools Conference.* Hosted with the New York City Department of Education's Office of Sustainability and the District 3 Green Schools Group, the conference included a panel discussion with parents/activists, and mini-workshops intended to promote environmental and sustainability initiatives in schools.

Past research by the Working Group examined the work of Sustainability Coordinators in NYC public schools. Dr. Pizmony-Levy and his team explored the professional background of these coordinators (whether they are teachers, Assistant Principals, etc.) and the ways in which they define – or make sense of – the term "sustainability."

Although official definitions of the term address the three pillars of sustainability – environment, social justice and economics – Sustainability Coordinators tend to focus only on the environment, specifically on resource management (recycle, reuse, reduce). The research team has also investigated which schools are more likely to establish partnerships with non-profit organizations. They found that about one-third of NYC schools have at least one partnership and that schools located in Manhattan are more likely to have such a partnership, as are those schools whose students have a higher socio-economic status. In addition, partnerships appear to be more common in high schools than in elementary and middle schools.

For further info**:** Sustainability in the Schools: It Starts with Cleaning Up the Data and TC Working With NYC, Parents to Promote Sustainability in Schools

The **District 3 Green Schools Group**, founded in 2009, brings together parents and school staff on the Upper West Side to improve sustainability in our area schools. Many of their schools have model programs in the areas of waste reduction and recycling, schoolyard gardens, energy conservation and environmental education.

Members of the D3 Green Schools Group started the D3 composting pilot in five school buildings in 2011. This program was a huge success, achieving 85% overall reduction of garbage by volume. Through intensive education, the schools also dramatically increased the capture of recyclables in the cafeteria. This D3 program became a prototype for New York City, and the Department of Sanitation has since expanded it to 725 schools. The D3 Green Schools Group continues to work closely with the Department of Education and Department of Sanitation to refine the program for continued success as it expands throughout the City.

The group meets six times a year to assist one another and learn from each other's successes and failures in the D3 community. They also gain advice from expert panels, government representatives, and tour facilities such as the SIMS recycling plant. D3 Green Schools encourages District 3 parents to join their listserve and come to their meetings. They're striving to get representation from every district school in order to ensure that the district continues to lead the way in greening efforts.

For more information contact Megan Nordgren (megan.nordgren@gmail.com)
*To subscribe to the group email***:** d3greenschools-subscribe@yahoogroups.com

The **Environmental Education Advisory Council of New York City**, eeac.info@gmail.com)

The Environmental Education Advisory Council (EEAC) was founded in 1974. A non-profit organization made up of dedicated educators, youth leaders, environmental professionals and students, EEAC members work together to stimulate and encourage environmental education in New York City and the surrounding region. They provide environmental education information for classroom teachers; advise the New York City

Department of Education; hold workshops, and publish an electronic newsletter (back issues of which are available online).

The **Green Schools Alliance** (The Alliance); Contact: Arlae Castellanos acastellanos@greenschoolsalliance.org

The Green Schools Alliance was founded in October 2007 as a result of the UN Foundation Report on Climate Change and former Mayer Bloomberg's PlaNYC. A 501(c)(3) nonprofit organization, The Alliance unites and empowers primary and secondary schools worldwide to address climate change and conservation challenges and lead the transformation to a sustainable future. Representing more than 5 million students in 48 U.S. states, and more than 90 countries, The Alliance has created a peer-to-peer network of more than 9,000 schools, including 25 of the largest U.S. school districts, with the intention of reducing their greenhouse gas emissions and accelerating the implementation of sustainable solutions. The Alliance envisions a world where every person is aware of and accountable for the impact they have in creating an environmentally, economically, and equitably sustainable future.

The Alliance's signature programs include the student-driven Green Cup Challenge(™) and Student Climate & Conservation Congress that connects youth to nature, as well as the District Collaborative, Purchasing Consortium, and soon to be launched Sustainable Tracking And Roadmap Tool (START), a sophisticated metrics roadmap tool to help schools benchmark and analyze their sustainability efforts and impact. Through The Alliance's online community, school Sustainability Champions -- including faculty, staff, students, administrators, and other school decision-makers -- can share best practices that promote connections between schools, communities, and the environments that sustain them. Signatory Schools/Districts join the Alliance through a Climate and Sustainability Leadership Commitment addressing operations, education and culture shift that recognizes the importance of connecting youth to nature. Individual members and like-minded organizations can also participate by joining the Alliance online at www.greenschoolsalliance.org.

NY Sun Works; Contact: Sidsel Robards; srobards@nysunworks.org; (212) 757-7650

NY Sun Works is a nonprofit organization that builds innovative science labs in urban schools, provides curriculum and training for teachers to teach science and sustainability, and engages the communities in which they work. The labs are located either in converted classrooms or in rooftop greenhouses.

Their greenhouse classrooms offer students the opportunity to grow food while providing hands-on learning about science, biology, chemistry, engineering, physics, earth sciences, and the living environment. NY Sun Works' science curriculum is aligned to science standards and is particularly effective for exploring modern-day issues of global concern, sustainability, health and nutrition, climate change, as well as water, waste, energy issues and other resource management.

Every Spring NY Sun Works hosts their Annual Youth Conference called *Discovering Sustainability Science*. A live stream event, the conference is for students and by students; it offers a platform to share their scientific creativity and research projects developed in their greenhouse classrooms. They also host three annual teacher training seminars through DOE's ASPDP program, offering a 36-hour workshop that focuses on a range of current topics in urban sustainability. These seminars were created to support teachers in their efforts to provide engaging STEM + sustainability education to their students. To find out about their school partners click here.

OTHER ORGANIZATIONS THAT HAVE ENVIRONMENTAL EDUCATION PROGRAMS

GrowNYC offers three programs dealing with environmental education:

- The *Education Initiative* (212-788-7900) aims to foster environmental and community stewardship and provide meaningful interaction with the natural environment. They offer programming to tens of thousands of youth through recycling and sustainability programs, school garden initiatives and support, Greenmarket school tours, and in-school curricula. GrowNYC prioritizes neighborhoods with high poverty rates, low consumption of and/or limited access to fresh produce, as well as those lacking green spaces.

- *Grow to Learn NYC / School Gardens* (212-788-7918), established in 2010, is a Citywide School Gardens Initiative with a mission to inspire, promote and facilitate the creation of sustainable gardens in public schools throughout New York City. They also offer mini-grant funding to start or expand school gardens; provide technical garden assistance; and host workshops and other educational opportunities. To accomplish this, they collaborate with government agencies, non-profits, private corporations, teachers, schools, parents, youth and other individuals who support public school gardens.

- The *School Recycling Champions Program (RCP)* (212-341-0169) has helped NYC public schools create effective recycling programs since 2010. In that time they've worked with over 400 schools and seen first hand the real change that can be effected when all members of the school community work together. Innovative outreach developed specifically for the K-12 community includes inquiry-based, experiential student programs aligned with the Common Core, and professional development workshops for faculty and staff. Currently, RCP is working with the first 100 Zero Waste Schools, a partnership between the NYC Department of Education Office of Sustainability, the NYC Department of Sanitation. RCP shares its own waste education resources, as well as materials created in direct response to the needs of the NYC K-12 community.

Lower East Side Ecology's Education Program (212-477-4022)

LESE's Education Program works to increase development, awareness, and access to interactive urban environmental education to all ages. The Ecology Center brings an immersive education approach to learning about the environment around us to schools (K-12), higher learning and cultural institutions annually across the city. Classes and workshops include: Seed balls; Animal Adaptations; East River Ecology; Urban Biodiversity; Our Sewer System & the Urban Water Cycle; and Water Quality Testing.

The Education Program uses the **C.O.R.E** values (**C**onservation, **O**bservation, **R**estoration, and **E**ducation) as part of the immersive learning approach to confront modern day environmental issues and make connections to other Ecology Center programs. Their educational workshops—offered to schools and community groups—emphasize the urban setting and its unique circumstances in order to help participants apply more sustainable living practices in their lives and communities. To make environmental science more accessible to students, in 2018 the Ecology Center is piloting an Urban Ecology immersive series in neighborhood schools in the Lower East Side, with the goal of engaging middle school students, while at the same time enhancing their knowledge and interactions with their surrounding environment.

The National Wildlife Federation Eco-Schools; Contant: Emily Fano fanoe@nwf.org, (646) 502-7096.

The National Wildlife Federation (NWF) is the U.S. host of the international Eco-Schools program. There are currently close to 6,000 Eco-Schools in the U.S., including 635 in New York City. NWF's Eco-Schools program provides a seven-step framework to help K-12 educators integrate sustainability principles throughout their schools and curriculum.

NWF's educational programs—including NWF Eco-Schools and Schoolyard Habitats, as well as publications like *Ranger Rick*—aim to connect students to nature where they live. In New York City, thousands of students have participated in NWF programs that take them outdoors to learn, engage in wildlife, gardening and habitat restoration for pollinators. In school, the Eco-Schools program engages student leaders in energy and water conservation, water and air quality, and waste reduction projects using a Pathways to Sustainability of their choice. Schools can become certified and win Bronze, Silver and Green Flag awards.

NWF is working with partners like the National Science Teachers Association, filmmakers, and policy makers to counter misinformation campaigns designed to confuse teachers about the science of climate change. It also provides climate and resiliency programming in schools. The NOAA-funded Resilient Schools Consortium (RiSC) program, launched in October 2017 in partnership with Brooklyn College and others, is giving middle and high school students a voice in resiliency planning. Teachers interested in the RiSC curriculum can fill out a pre-survey here.

UWSR Eco Letter September/October 2018
COMMENTARY:
LEDs and Smart Lighting

According to a recent NY Times article, 17 of the 18 warmest years on the Earth have occurred since 2001. Global warming is real, it's here now, and it's primarily caused by the burning of fossil fuels, including those used to produce electricity. A significant portion of this electricity is used to illuminate our homes and businesses. If you look at a nighttime photo of the Earth taken from space, you'll see that major metropolitan areas shine bright as a result of intense concentrations of lighting.

Lighting loads represent the third-largest energy use in New York City buildings, accounting for 13% of overall consumption. In commercial office buildings this figure rises to about 20%. Each day we consume about 1.5 million kilowatt hours of electricity for lighting alone, which (if generated by the burning of fossil fuels) produces a daily emission of roughly *2,000 tons* of the greenhouse gas carbon dioxide.

Many buildings in the City have very inefficient lighting. In 2016, the Urban Green Council determined that 40% of multifamily buildings and 25% of office buildings above 50,000 square feet in area are illuminated primarily by incandescent bulbs and first-generation fluorescent lamps. In addition to being inefficient themselves, these lighting systems are characterized by a high heat output, which burdens air conditioning equipment and thus increases the cost to cool these spaces.

But the good news is that reducing our lighting energy load is one of the simplest, most effective things we can do, the sort of low-hanging fruit of energy efficiency. Two technologies that have greatly improved recently -- LED Light Bulbs and Smart Lighting Systems -- can help us to significantly reduce the amount of electricity needed to light our city. Coupling LED lighting with fully integrated smart lighting systems can save up to 90% of the electricity consumed.

LED Lighting

LED lighting technology is based on the use of Light-Emitting Diodes (LEDs), which illuminate solely by the movement of electrons in a semiconductor material. LEDs have been around for some time in many familiar items: Early LEDs were primarily used as indicator lamps on electronic device displays; they form numbers on digital clocks, transmit information from remote controls, light up watches and tell you when your appliances are turned on. But recent developments have produced LEDs suitable for environmental and task lighting -- the focus of this Commentary.

In most applications multiple LEDs are used to form a single light bulb. LED lamps have many advantages over incandescent light sources, including much lower energy consumption, significantly longer lifetime, and improved physical robustness. In addition, LEDs come to full brightness without need for a warm-up time.

LED lighting alone has a high potential to improve overall energy efficiency, reducing electricity usage more than 80% compared to incandescent bulbs and more than 50% when replacing older types of fluorescent lighting. Efficiency gains are lower when newer fluorescent lighting systems are upgraded to LED, but still significant.

Although the initial cost of LED lighting is higher than that of older lamps and fixtures, its cost is coming down fast (see the cost comparison below), and its service life is far superior, which means one LED bulb actually replaces many incandescent bulbs. Con Ed sells a variety of LED light bulbs online at discounted prices. They periodically have promotional sales (recently they offered LED bulbs equivalent to a 60 Watt incandescent bulbs for $1.00 each); if you register on their site you'll be notified of future offers. LEDs are also available at Beacon Hardware, Home Depot, Best Buy and other appliance, hardware and electronics stores.

Cost Comparison for 60 Watt Incandescent Equivalent Light Bulbs

Purchase price - Incandescent: $.40-$.50; CFL: $1.00; *LED:* $2.00-$3.50
Watts - Incandescent: 60; CFL: 14; LED: 7-9
Lifespan (in hours) - Incandescent: 1,000; CFL: 5,000-10,000; *LED*: 10,000 - 25,000
Lamp lifetime (in years @ 6 hrs/day) - Incandescent: .5; CFL: 4-5; *LED*: 5-11
Total cost (20 years @ 12.5 cents/kwh) - Incandescent: $350; CFL: $80; *LED*: $45-$60

LEDs emit light in a specific direction. This makes them useful for recessed downlights and task lighting, but they also function quite well for general room lighting. Their directionality reduces the need for the reflectors and diffusers required by other types of lighting that can actually trap more than half the light being generated. LEDs run on DC current, which means that each light bulb has a miniature AC to DC converter inside it. The most common symptom of LED light bulb failure is the gradual lowering of light output and loss of efficiency; sudden failures (which often occur with incandescent bulbs) are rare.

LEDs only operate if they are kept from overheating. Manufacturers commonly specify a maximum junction temperature of about 125 degrees Celsius (180 degrees Fahrenheit), and lower temperatures are advisable for long bulb-life. However, LEDs emit very little heat as compared to incandescent bulbs, which release 90% of their energy as heat, and CFLs (compact fluorescents), which release about 80% of their energy as heat. This means that LED technology can reduce the overall heating load on your apartment or building, reducing the cost for space cooling in warmer weather.

For all these reasons and with continued performance improvements and dropping prices, LED lamps should be utilized to replace 40, 60, and even 75 Watt incandescent bulbs, as well as their CFL equivalents. But it's important to read the lighting facts label when you buy these bulbs to make sure the product is the right brightness and color for the intended location.

Although incandescent lighting has been largely phased out in office buildings (fluorescent lighting has not been), it's still very common in multi-family residential buildings, especially in smaller ones. Given the large efficiency gap between incandescent and LED lighting, it is possible to achieve a payback period of less than a year -- not to mention that the average LED bulb lasts up to 25 times longer than an incandescent bulb. Upgrading from incandescent or CFL lighting is quite simple in most cases, since LEDs often use the same lamp base. Upgrading from long-tube fluorescent bulbs is somewhat more complicated, but there are kits available to help do this.

Smart Lighting

Smart lighting consists of advanced controls that incorporate daylighting (using the sun to illuminate rooms), occupancy sensors, and plug and dimming controls to optimize the effectiveness of lighting and eliminate over-illuminated spaces. Networked sensors installed throughout a building can monitor multiple locations and collect minute-by-minute room conditions. Smart lighting solutions with wireless sensors and controls can be centrally managed through web-based platforms integrated into lighting management systems. Wireless controls facilitate easier retrofits, while lighting management platforms let users access controls through web-based dashboards.

This technology has many benefits. It enables us to save significant amounts of energy, increase light quality, regulate circadian rhythms, increase productivity, and make lighting more human-centric. When used for plants, it accelerates their growth.

Lighting energy consumption can be reduced by either drawing less power or using lighting systems for fewer hours. Traditional lighting controls relied entirely on the occupants to switch off or dim lights when not in use. However, too many people leave lights on when they leave a space or over-illuminate areas not in use. In response to this, many novel lighting control systems have been developed with the goal of reducing energy consumption while maintaining a high degree of occupant satisfaction and comfort through automatic or smart lighting controls.

Smart lighting may include high efficiency fixtures and automated controls and sensors that make adjustments based on conditions such as occupancy or daylight availability. The automated controls ensure that the system never operates for more hours than necessary. These controls, which can save from 20%-50% of electricity compared to conventional lighting systems, are widely used in Europe but are currently present in only 10% of NYC buildings above 50,000 square feet in area. In addition, most existing controls in our city consist of very basic timers and occupancy sensors, which means there are ample opportunities to utilize more advanced lighting controls for task lighting, accent lighting, and general lighting, such as the following:

- *Occupancy sensors* consist of a motion detector, an electronic control unit, and a controllable switch/relay. The detector senses motion and determines whether

there are occupants in the space. It includes a timer that signals the electronic control unit after a set period of inactivity. The control unit uses this signal to activate the switch/relay to turn equipment on or off. Occupancy sensing is a popular energy-saving technique due to its ease of implementation and effectiveness, and thus has been heavily promoted in North American and European building codes, but has yet to be widely implemented in our area.

- *Daylight-linked controls* further reduce energy consumption when the sun is shining into a room, and can operate single or multiple zones. Using photosensors to measure indoor ambient light levels and reduce the amount of artificial lighting needed to meet design requirements, these controls can switch lights on and off or use dimmable electronic circuits to provide artificial light when daylight is present.

  Increased utilization of daylight in buildings has been shown to have an overall positive effect on occupants' health and well-being. One such benefit is its effect on the regulation of human circadian rhythms, which can increase alertness during working hours. Research has also shown that people generally prefer daylight to artificial lighting in a building.

  Although daylight-linked controls can potentially result in even greater energy savings than occupancy sensors, they do have some shortcomings. For instance, rapid and frequent switching of the lights on and off can occur, particularly during unstable weather conditions or when daylight levels are changing. Glare can also be a problem. Newer technologies such as differential switching or automated window blinds are helping to address these issues. The effectiveness of daylight-sensing systems is also dependent on multiple factors, including latitude and orientation, window size and other characteristics, shading devices, reflectance of inner surfaces, ceiling height and partition height.

- *Plug loads* are the amount of energy drawn by a device plugged into an electrical outlet. In existing buildings, smart plug load controls consist of auto-controlled receptacles and power strips that rely on time scheduling, motion sensing, or load detection to completely cut off power to equipment that is not in use. Automatically controlled receptacles, known as smart plugs, can easily replace existing receptacles and communicate with a controller, such as a timer or occupancy switch. Some smart power strips can sense the primary load, such as a computer, and operate peripheral devices accordingly. They are also capable of turning off receptacles based on feedback from occupancy sensors located in tenant spaces. Advanced power strips (APS) resemble standard power strips but can cut the power to any individual plug or combination of plugs on the strip. The strip turns off devices when they are no longer being used. For centralized controls, plug load schedules can be programmed into lighting and building management systems.

In June 2016, NYSERDA launched its Real Time Energy Management (RTEM) program to encourage smart technology implementation in existing buildings by requiring the use of sensor and meter data and data analytics to show real-time building performance. The program requires building owners to acquire a qualified vendor for third-party monitoring of building data. Service providers are responsible for installing and managing hardware and software. Program incentives of up to $115,000 are available through June 2021 for system installation and five-year service contracts.

More Information

- Chew et al. (2017). Smart lighting: The way forward? Reviewing the past to shape the future. *Energy and Buildings*, vol. 149, pp. 180-191
- King & Perry (2018). Smart Buildings: Using Smart Technology to Save Energy in Existing Buildings. May 24 2018.
- American Council for an Energy Efficient Economy
- New York - State Energy Profile
- Energy.gov (US Department of Energy) review of LED lighting
- The Energy Saving Potential of Lighting Upgrades in New York City; New York Engineers
- Real Time Energy Management Program, NYSERDA

UWSR Eco Letter May/June 2018
COMMENTARY:
Growing and Eating Local Produce in Upper Manhattan

Growing vegetables, herbs, fruits, and nuts in Upper Manhattan might seem like something of a stretch, but it's increasingly taking place. And this really isn't new: When oil supplies were rationed during World War II, it was difficult and expensive to ship produce long distances. In response, over 20 million Victory Gardens took root between 1942 and 1944 in both public and private spaces. These gardens supplied nearly half the produce Americans ate. In Manhattan alone there were an estimated 400,000 of these gardens in spaces ranging from fire escapes to rooftops to large vacant lots. These days, as oil supplies dwindle and the effects of climate change steadily worsen, there's no reason we can't do something like this again.

The benefits of eating locally grown organic produce are many: air pollution reduction; CO_2 and global warming mitigation; fresher and more nutritious produce; as well as a boost to the local economy. On average, each food item we eat has travelled about 1,500 miles before it reaches our local grocer, consuming large amounts of gasoline and causing lots of extra CO_2 to be emitted into the earth's atmosphere. The large-scale farming that generates these market items also consumes significant amounts of fossil fuels in equipment for tilling, irrigation, baling and other agricultural processes. And the

production and application of synthetic fertilizers, pesticides and herbicides is both very energy intensive and harmful to us when we consume produce treated with them. In fact, the use of herbicides and pesticides isn't really effective in controlling insect pests in the long run since the insects with a natural resistance often survive and breed offspring which are much harder to eradicate.

All in all, close to one-fifth of our nation's energy use is attributable to agriculture, almost as much as we consume with our vehicular transportation. This usage is a significant contributor to global warming. Vegetables, herbs, nuts and fruits can be raised on ground-level spaces - such as vacant lots, portions of city parks or other public spaces - and on rooftops; they can also be grown within high-rise buildings (in what is termed vertical farming) or even on piers or floating platforms. You can also grow smaller crops in your own apartment or plant climbing vegetables (such as pole beans or tomatoes) in the tree bed in front of your building. You can find a good overview of the benefits of locally grown, organic produce in *Animal, Vegetable, Miracle* by Barbara Kingsolver and Steven Hopp (see additional sources of information at the end of this commentary).

Crop yields can be considerable. For instance, a vacant lot or rooftop measuring 40 x 50 feet (2,000 sq. ft.), with good sunlight, could theoretically produce about 950 pounds of carrots, or 500 pounds of lettuce or spinach, or 350 pounds of broccoli.
The main requirements of urban agriculture are adequate sunlight (or artificial light), water, and small amounts of certain nutrients. Energy consumption is a consideration, as is the weight of the soil if the garden is situated on top of or within buildings. It's also wise to have the soil checked for lead contamination before planting and to protect the growing plants from damage or consumption by animals such as pigeons or squirrels.

A number of groups are already growing vegetables, herbs and fruit in Manhattan. Many of these are in East Harlem or on the Lower East Side, but some are located on the Upper West Side. Click here for an inclusive list of community gardens.

The largest organization on the Upper West Side of Manhattan is Harlem Grown (212-870-0113), whose office is located at 127th Street & Malcolm X Boulevard. Harlem Grown is a non-profit organization whose mission is to inspire youth to lead healthy and ambitious lives through mentorship and hands-on education in urban farming, sustainability, and nutrition, and to promote knowledge of healthy food for Harlem residents. Founded in 2011, they operate eight local urban farms, six of which are in West or Central Harlem: 118 West 134th Street; 126 West 134th Street (greenhouse); 34 West 131st Street, 127 West 127th Street (farm and greenhouse), PS 154 School Garden at 250 West 127 Street, and the PS 125 School Garden at 425 West 123 Street. These sites are open to the public, but you should call in advance for an appointment. They also oversee the NYCHA Wagner Houses Farm in East Harlem (at 122nd Street between 1st and 2nd Avenues), which sells vegetables at its own farm stand.

Harlem Grown raises a variety of vegetables (greens, root crops, tomatoes, etc.) and

fruits (including apples, pears and cherries). All produce from the eight farms is donated to summer camp families or those who help with the project. This produce is seasonally available at a small market in front of the 118 West 134th Street garden. Using vegetable and fruit food scraps donated by local residents, they create their own compost at the 118 West 134th Street site using a three-bin system. That site also gets most of its irrigation water via a drainpipe leading down from the roof of an adjoining building into water collection barrels. Volunteer opportunities at Harlem Grown's urban farms are available, including jobs in producing compost or tending to the vegetables, fruits, or chickens (yes, they also raise chickens!). No prior farming or gardening experience is needed.

Other ground-level gardens that grow at least some vegetables, herbs or fruit include the following:

- Clayton Williams Garden, 303 West 126th Street. *Info*: Green Thumb, ClaytonwilliamsCG@yahoo.com
- Clinton Community Garden, 436 West 48th Street, (212) 586-2940
- Luigi's Garden, at 227 West 115th Street, specializes in vegetables and herbs. *Info*: Grow NYC
- La Perla Garden, 76 West 105th Street. Info: Green Thumb; (212) 602-5300
- Mobilization for Change Garden, 955 Columbus Avenue on the Southeast corner at 107th Street; 212-788-7900
- PS 76 Garden, 203 West 120th Street. *Info*: Grow NYC
- West 104th Street Garden, 75 West 104th Street. *Info*: Green Thumb, 212-788-7070
- West 124th Street Garden, on two lots between Manhattan Avenue and Central Park West. *Info*: Green Thumb, 212-788-7070
- West Side Community Garden, 142 West 89th Street. *Info*: (212) 316-5490

The only rooftop vegetable gardening project we're aware of in Upper Manhattan is the Hell's Kitchen Farm Project (info@hellskitchenfarmproject.org) located on the Metro Baptist Church Rooftop at 410 West 40th Street. They grow a variety of vegetables in 52 raised beds, using food scraps and dead plant material to produce compost that enriches the soil. All produce grown on the farm is donated directly to a food pantry.

Fruit trees and berry bushes could be planted in some areas of our parks instead of or in addition to ornamental or shade trees. (For instance, many orange trees are found lining the streets of Seville, Spain.) Since they're relatively small, fruits such as strawberries, blueberries and raspberries are suitable for rooftops or vertical gardens as well. Trees New York has partnered with community gardens and public schools to create a FruiTrees New York program, whose purpose is to plant urban orchards that produce apples, peaches, apricots or pears. One such orchard is located at the Pleasant Village Community Garden at 342 Pleasant Avenue in East Harlem. Others in Manhattan are the Peach Tree Garden and Orchard Alley on the Lower East Side. But this practice need not

be limited to fruit trees; nuts, such as filberts (hazelnuts) or black walnuts, grow perfectly well in this climate and are rich in protein.

For Help in Starting Your Garden

If you're inspired to start your own garden, the following organizations may be of help:

- Seeds and seedlings can be bought locally from the Urban Garden Center, 1640 Park Avenue (just north of 116th Street under the train tracks). *Info*: (646) 872-3991, sara@urbangardennyc.com

- GrowNYC's Garden Program constructs and sustains community gardens, urban farms, school gardens, and rainwater harvesting systems across New York City. To date, GrowNYC has built more than 90 gardens, and they support hundreds more through renovations, green infrastructure projects, technical assistance, volunteer days, annual plant sales, and education of children.
  GrowNYC's FARMroots program conducts a training course for both aspiring and experienced farmers.

- Green Thumb, the largest community gardening program in the nation, provides programming and material support to over 500 community gardens in New York City. Gardening tools and supplies are available at their monthly workshops.

- Just Food is another organization devoted to encouraging urban agriculture in New York City. It trains community gardeners and supports community leaders who advocate for healthy locally-grown food, especially in underserved neighborhoods. Their Farm School NYC program aims to spread knowledge about growing and marketing food in their neighborhoods.

- New York Restoration Project (NYRP) helps communities transform public spaces into community gardens through their Gardens for the City program. They lend materials, manpower and expertise in construction, horticulture, forestry and environmental education to help create these gardens, particularly in under-resourced neighborhoods.

Even if you can't grow your own vegetables, fruit or nuts, you can still make a difference and buy locally grown food by participating in Community Supported Agriculture (CSA) or Grow NYCs Fresh Food Box program.

- *CSAs* allow city residents to have direct access to high quality, fresh produce grown locally by regional farmers. When you become a member, you're helping support a regional farmer by purchasing a share of the farm's vegetables, weekly or bi-weekly, from June until October or November. Your farmer will deliver that share of produce to a convenient pick-up location in your neighborhood. CSA members pay their share of support up front for an entire season of produce

(typically $450-$650). This early bulk payment enables your farmer to plan for the season, purchase new seed, make equipment repairs, and more. Shares usually include seven to ten types of vegetables, enough for a family of two or three people. Most CSAs also offer half shares for smaller households or busy New Yorkers who frequently eat out, and have a variety of payment plans. More information about CSAs is available from Just Food.

- *GrowNYC*'s Fresh Food Box Program enables people in under-served communities to purchase fresh, regionally-grown produce at prices well below traditional retail prices. Through the power of collaborative purchasing, Fresh Food Box customers can buy for $14-15 what would normally cost $20-$30 in a store. There are four locations on the Upper East Side and East Harlem. Click here for more information.

  You can also buy your produce from local farmer's markets. Grow NYC operates three year-round farmer's markets on the Upper West Side (at 79th, 97th and 115th Streets), as well a several others in various uptown Manhattan neighborhoods. For more information, contact GrowNYC or see our Hard-to-Recycle List. In addition, Just Food supports community-run farmer's markets, including the Harlem Harvest People's Market at 219 West 122nd Street (212.662.2878; projectharmonycs@aol.com

Sources of Further Information

- *Animal, Vegetable, Miracle*. Barbara Kingsolver et al., New York, Harper Perennial, 2017, 416 pp.
- Green City Force; tel: 646-681-4700
- Green Thumb; tel: 212-602-5300; 311
- GrowNYC, 212-788-7900
- Harlem Grown; tel: 212-870-0113
- Just Food; tel: 212-645-9880; info@justfood.org
- New York Community Garden Coalition; tel: 347-699-6099
- New York Restoration Project Gardens for the City; tel: 212.333.2552; info@nyrp.org
- Trees New York; tel: (212) 227-1887

UWSR Eco Letter March/April 2018
COMMENTARY:
Trees in Our City

There are more than 5.2 million trees growing in New York City. As of 2016, about 670,000 of these were street trees, the rest being in parks, along waterways and in other open spaces. Many of these trees were planted between 2007 and 2017 as part of

the MillionTreesNYC Project; they were planted by the New York City Department of Parks, with help from the New York Restoration Project and other partners, and many volunteers. Maintaining proper care for these new trees helps ensure their long-term survival and continued benefits for all NYC residents.

We see them every time we travel around the City, and it's easy to take them for granted. But all these trees have a significant impact on the City's environment and help make it more healthy and livable. Living trees are a net absorber of carbon dioxide (CO_2) and thus help to mitigate the effects of climate change (although dead trees, when composted or burned, return CO_2 to the atmosphere). They lessen flooding by the absorption of storm water. They also absorb solar radiation and provide shade, both of which tend to lower the temperature during hot summer days. Their leaves cool by evaporation, transpiration (the "breathing" of the leaves) and shading, and their roots aerate compacted soil. Planting trees also improves air quality, helps reduce asthma rates and enhances public health and well being in other ways. They provide shelter for birds and other animals and increase the property values of human shelters.

Unfortunately, there are many neglected trees and tree beds in neighborhoods throughout the City. The garbage, dog waste, cigarette butts, and other litter that accumulate and remain in the tree beds are not only an eye-sore but are also unhealthy for the trees and to humans - and it all attracts rats. A variety of organizations help residents and community groups to plant and properly maintain trees, as well as to keep tree beds clean (see the list at the end of this Commentary).

One of these community groups, the West 80s Neighborhood Association, co-sponsors an annual Love Your Street Tree Day, a coalition of local organizations and volunteers focused on keeping us aware of the importance of NYC street trees and providing information on the care and maintenance of both trees and tree beds. Co-sponsors include the NYC Parks Department, Goddard Riverside Greenkeepers and Trees NY. This year's "Love Your Street Tree Day" is on May 20th (see Events/Urban Greening below). You can watch tree stewardship demonstrations, receive a gardening goodie bag with supplies and their popular curb-your-dog sign, and get mulch for your tree.

Types of Trees

It's generally best to plant more than one variety of tree on your block, as a single species presents the possibility that all of them could be affected by the same disease or insect pest. A list of street-tree species and their environmental tolerances for NYC is available here:

- Shade trees. Some of the most common deciduous street trees in NYC are London Plane, Linden, Norway Maple, Red Maple, Silver Maple, Pin Oak, Callery Pear, Honey Locust, Green Ash, and Ginkgo. These shade trees have proven to be suited to the NYC climate and to be resistant to the exhaust fumes released by vehicles around them. Evergreen trees currently comprise only a small minority

of street trees but are recently more frequently planted. They benefit us year-round, adding green tones and textures to our streets and cleaning the air by capturing airborne pollutants during the winter when particulate levels are often at their highest. Evergreens are available from Trees New York and some nurseries.

- Ornamental trees. If you're primarily interested in beautifying your block and providing areas of shade, you might want to plant ornamental trees such as Crabapple, Cherry or Eastern Redbud. These and other varieties are common in Riverside Park, and there's no reason why they can't become more prevalent on our streets as well. Ornamental trees approved for NYC are included in the list above, mainly under the small trees section.

- Nut or fruit trees are also suitable for street sides or community gardens, as well as in our parks. If space is limited, dwarf varieties can be planted, even on rooftops. Trees New York runs a FruiTrees New York program, whose purpose is to plant urban orchards that produce fruit such as apples, peaches, apricots, plums or pears. One such orchard is located at the Pleasant Village Community Garden at 342 Pleasant Avenue in East Harlem.

  This practice need not be limited to fruit trees; nuts such as filberts (hazelnuts), butternut (white walnut) or black walnut grow perfectly well in this climate and are rich in protein. Nut and fruit trees can be bought from a variety of nurseries, both within the NYC Metropolitan Area and outside of it. A local source is The Urban Garden Center, located at 1640 Park Avenue (116th Street). Make sure the variety you choose is sufficiently freeze tolerant to survive local winters. The hardiness of trees and other plants is rated according to zones in the United States, ranging from 3 (coldest = Adirondacks) to 10 (warmest = Southern Florida); New York City lies in zones 6 or 7.

Tree Beds

In order to plant a street tree, you must first have a soil tree bed created within the sidewalk. If one doesn't already exist, Parks Department foresters will survey the potential planting location to determine if it can accommodate the healthy growth of new trees. The NYC Parks Department will do this at no cost but it can take a long time; if you're in a hurry you can hire a private contractor for a fee.

Next, the utility companies mark the underground gas (yellow), electric (red), and telecommunication (orange) lines at the proposed planting location to ensure that the tree planting will not conflict with them or any other infrastructure. Then the forester and a planting contractor will mark the future tree bed location by painting a white "T" on the curb where the tree is to be planted. The contractor will later cut the sidewalk along the edges of the tree bed and remove the concrete, leaving an open tree planting area. It's important that tree pits be as large as possible (up to seven feet on each side) as a greater soil volume will generally result in a larger tree at maturity and one with

greater longevity.

Planting

Any property owner can request a free street tree by submitting a service request to the NYC Department of Parks or by calling 311. All requests are handled on a first come, first served basis. Requests can be made for planting trees in existing empty tree beds or for creating new tree beds in the sidewalk. The Parks Department does not plant on private property, and the tree bed is considered Parks Department property. Street trees are required to be planted at new buildings and major enlargement projects.

As mentioned above, each location you request is surveyed in person by a Parks forester to make sure there are no conflicts with the surrounding infrastructure and that the site is suitable for a tree to grow and thrive. If a site is found to be appropriate for a new tree, they will add it to a list to be planted during the next available planting season. Trees are only planted during Spring (March 1 to May 31) and Fall (October 1 to December 31) and are under guarantee for two years after planting. You can view the street tree planting guidelines here and request a specific tree species, but the Parks Forester in charge of the planting will make the final species determination.

You can also plant a tree on your own or with a local community group, but you must first obtain a tree planting permit and hire a landscape contractor. This can be done in the Spring and Fall planting seasons through the New York Restoration Project, which will either help community and corporate volunteers plant the trees or provide free trees to New Yorkers to plant themselves in their yards, courtyards or community gardens. For more questions about Tree Giveaways, please contact NYRP at info@nyrp.org or (212) 333-2552.

Maintenance and Care

Watering is the most important thing you can do for your street tree, but it may also be the most difficult. Transporting water from the source to the tree can be challenging. In general, you should water each young deciduous tree 15-20 gallons once a week during the growing season between May and October (that's 3-4 large buckets). Water should be poured slowly so it penetrates the soil and doesn't run off the surface. If it rains 1 inch or more in a week's time, you don't need to water. It's also necessary to cultivate or loosen the top 2-3 inches of soil to avoid soil compaction and help the water and air reach the tree roots.

Composting and mulching will also help the tree bed retain water (see more below under Compost and Mulching). Since street trees live in very small spaces that provide limited amounts of soil and nutrients, adding mulch to your tree bed during winter also helps keep roots warm, keeps the weeds down, and protects the tree from harm from de-icing salt. You can learn more about how to care for your tree(s) here.

Add protective fencing to discourage dogs form urinating on the soil around the tree (see more below under Tree Guards). Weeding your site using a hand cultivator or trowel is also essential as weeds are fast growing and fast reproducing plants that tend to sap both water and nutrients from the trees (make sure you go deep enough to pull out all their roots).

The NYC Parks Department will clean up all or part of a curbside tree that's damaged as a result of weather or other causes. Call 311 or see the Parks Department site to request tree pruning, to report a damaged tree or a fallen branch, or removal of other wood debris or a dead tree.

Aside from the Parks Department, at least two other non-profit organizations provide tree services for Upper Manhattan:

- Trees New York at 100 Gold Street offers, for a one-time fee, a Citizen Tree Pruning Course that teaches New York residents how to maintain their own trees. This type of pruning and other care can greatly reduce a tree's vulnerability to pervasive urban threats such as pedestrian and vehicular traffic, drought and storms. Trees New York also runs a Tree Stewardship Training Program, in which volunteers are trained to clean up and care for tree beds, as well as providing information on tree grates and storm water runoff.

- Green Keepers is Goddard Riverside's social enterprise business, which works with local residents and block associations in the beautification of the New York urban landscape. Green Keepers is a primary provider of tree bed renovation and reconditioning in the City. They also offer horticultural, sanitation and non-toxic pest control services for a variety of clients, including the Broadway Malls and Riverside Park.

Tree Guards

Tree guards are fences around the perimeter of a tree pit that provide a physical barrier between a tree and our sometimes-harsh urban environment. These tree guards reduce soil compaction, shield the trunk from physical damage, and discourage pet waste from entering the tree pit. Dog urine in a tree bed is not just smelly; it makes the soil too acidic for the tree roots, thereby potentially harming it. Tree guards have been proven to extend the longevity of trees and reduce mortality rates; they can also provide a small protected planting bed for gardening.

There are a number of ways you can install a tree guard around a tree pit in front of your home or business. A Tree Work Permit is required prior to installing any tree guard, and you can apply for one here. In some communities, local elected officials can provide tree guards around newly planted trees. Curb Allure (212-769-2872, 800-800-5100; info@curballure.com), located on the Upper West Side, sells metal tree guards,

tree fences, tree pit guards and decorative fence panels. Their interconnecting system of posts, rails, decorative panels and accessories can be used to create unique or classic looking tree guards. Curb Allure's products are sold directly by them, installed by the Urban Garden Center or installed free if you donate to the New York Tree Trust.

You can also hire a private contractor or look into other lower cost alternatives. To make this process easier, the Parks Department has pre-approved tree guard designs listed here. All permitted tree guards should be at least 18 inches tall, installed on the outer perimeter of the tree bed, and positioned at least one foot from the curb with the curbside open. Tree guards should allow for water to flow from the sidewalk into the tree pit, so avoid building a solid wall around the bed. Any water that flows into the tree bed not only nourishes the tree but helps to alleviate the storm water runoff/sewage problem we have here in the City.

Compost and Mulching

The soil alongside our streets is often compacted and full of clay, which makes it relatively impermeable to water. It's very helpful to put a generous amount of compost beneath the root ball when the tree is first planted. Trees roots need small open spaces to breathe, and the porosity of the compost facilitates this. Working some compost into the top 2 or 3 inches of the soil in the tree bed with a hand cultivator will also help water penetrate to the roots of the tree, making it more drought resistant. Some species, particularly fruit and nut trees, have very shallow roots; in this case it might be best to work the compost only into the top inch or so of the soil, keeping an eye out for the roots. Planting flower bulbs around trees can also help to loosen the soil.

Compost can be applied at any time of the year, though this is usually done in the Fall or Winter, when it helps insulate the tree roots and thus keeps them warmer. The added compost also supplies additional humus and other nutrients directly to the roots. In addition, it contains fungi, bacteria, worms and other small organisms that help maximize a plant's ability to utilize the nutrients and water already present in the soil. As these organisms decay they also release natural nitrogen, which is necessary for tree growth.

Covering compost with mulch in the winter helps keep water from evaporating, prevents weeds from growing, and stabilizes the soil temperature. Mulch can consist of wood or bark chips, twigs, evergreen boughs (a great way to recycle Christmas trees and other greenery), straw, hay, dried leaves, or pine needles. Wood or bark chips, evergreen boughs and twigs tend to add acidity to the soil, but decompose slowly so they need to be applied less often. Straw, hay and dried leaves are less acidic but rot more quickly so they need to be added more often. Keep the mulch away from the trunk of the tree; wet mulch in contact with the tree creates a hospitable environment for diseases and insect pests and can ultimately cause the bark to rot.

Sources of Compost

Lower East Side Ecology Center: 212-477-4022; info@lesecologycenter.org

DSNY: There are compost givebacks at Fresh Kills, Staten Island (in April) and Soundview Park, Bronx (in May). Preregistration is required. Check here for more specifics.

You can also obtain mulch at the Love Your Street Tree Day on May 20, 2018, along with a goodie bag with gardening supplies and curb-your-dog sign.

More information:

- Curb Allure, 212-769-2872, 800-800-5100; info@curballure.com
- Goddard Riverside Green Keepers, 577 Columbus Avenue, New York, NY 10024; tel: (646) 505-1088; greenkeepers@goddard.org
- Love Your Street Day. PO Box 732, NYC 10024; info@loveyourstreettreeday.com
- Nature Conservancy, The, 620 Eighth Avenue, New York, NY 10029; tel: (212) 556-1234
- New York City Department of Parks Tree Services, (tel) 311
- New York Restoration Project, 254 West 31st Street, #10, New York, NY 10001; tel: (212) 333- 2552
- Trees New York, 100 Gold Street, Suite 3100, New York, NY 10038; (212) 227-1887; info@treesny.org
- Urban Garden Center, 646-872-3991; info@urbangardennyc.com

UWSR Eco Letter January/February 2018
COMMENTARY:
Textile and Plastics Recycling - Updates

TEXTILES

Textiles constitute about 10% of our residential waste stream (by weight). This means that every year NYC residents discard approximately 200,000 tons of clothing, towels, blankets, curtains, shoes, handbags, belts, and other textiles and apparel. Although more post-consumer textiles are currently being recycled, they represent only about one-quarter of the total volume. Regrettably the remaining three-quarters end up in the trash.

Generally speaking, recyclers accept all clean textiles -- including clothing, sneakers, shoes, pocketbooks, curtains, sheets, blankets, and towels. They do *not* accept textile scraps, pillows, comforters, luggage or carpeting. You can recycle textiles in your own building (if a sufficient quantity is gathered) or bring them to a local Greenmarket or

thrift shop (see below). But don't forget that clothing can also be mended and re-used instead of discarding it.

A. Textile Recycling In Your Building - The following organizations pick up textiles at no charge:

- **Wearable Collections** (646-515-4387; info@wearablecollections.com) has been serving New York City for the past ten years. They offer free pick-up of the clean textiles listed above from residential buildings, schools and other non-profit organizations, as well as from street fairs. The minimum pickup is 5 large (30 gallon+) bags. In return for their co-operation, Wearable Collections will make a 5-cent-per-pound donation to participating community organizations. If you live in an apartment building with sufficient space, they can help organize periodic textile recycling drives or will site a bin in your building. If you do run a clothing drive in your building or school, it's best to specify a given period of time (e.g., two weeks) so people don't procrastinate in dropping off their textiles. Wearable Collections generally makes pickups on the Upper West Side and Harlem on Thursdays or Fridays.

- **re-fashioNYC** (call 311) is a nonprofit partnership between the NYC Department of Sanitation (DSNY) and Housing Works that offers free pick-up of textiles from residential buildings, commercial businesses and non-profit organizations with 10 or more units and space to site a bin. Clothing and accessories donated through re-fashioNYC are sorted at the Housing Works warehouse in Queens. All proceeds from donations support the charitable mission of Housing Works to end the dual crises of homelessness and AIDS.

- **Salvation Army** provides free pick-up of clothing, other textiles, shoes, etc. You can click here to donate goods or call (212) 757-2311 or (800) 728-7825. There is a two-bag minimum.

- **United War Veterans Council**, (212) 838-8982, (203) 434-4170; info@uwvcrecycling.org) will pick up clothing and other textiles, which can be mixed with other household items. There is no minimum quantity, though they prefer at least one full bag or box.

B. Textile Recycling Outside Your Building (see also Re-Clothe NY below under "More Information")

- **Grow NYC Greenmarkets** (212-788-7900, 212-788-7476) works with Wearable Collections, who manages the process. Receipts for donated material are available upon request. You can take textiles to the following local Greenmarkets year-round:
    - 79th Street Greenmarket [79th & Columbus Avenue], 9 a.m.-1 p.m., Sundays

    - 97th Street Greenmarket [97th & Columbus Avenue], 8 a.m.-2 p.m., Fridays
    - Columbia University Greenmarket [Broadway & 115th Street, 8 a.m.-3 p.m., Thursdays and Sundays
    - There are also collection sites in Inwood, the East Side and other Manhattan locations; check the Grow NYC website for locations and hours.
- **Local thrift shops:**
    - Cathedral of St. John the Divine Clothing Closet, 1047 Amsterdam Avenue (112th Street), (212) 316-7540; Tuesday and Thursday, 10:00 a.m.-12:30 p.m.
    - Center at the Red Oak, 135 West 106th Street, (212) 749-7015. Monday-Friday, 8:30 a.m.- 4:00 p.m.
    - Goodwill, 157 West 72nd Street, (212) 799-2723; 217 West 79th Street, (212) 874-5050.
    - Housing Works, 306 Columbus Avenue between 74th & 75th Streets, (212) 579-7566; 2569 Broadway between 96th & 97th Streets, (212) 222-3550.
    - NY Cares Coat Drive Warehouse, 157 W 31st St, 646-801-4022.
    - Salvation Army,. 268 West 96th Street, (212) 663-2258, (212) 337-7200.
    - St. Francis Thrift Store, 217 West 97th Street, (212) 932-8040; 11:00 a.m.-6:00 p.m., seven days/week

PLASTIC WASTE

Plastic recycling, waste reduction and re-use are extremely important. Since these materials don't usually biodegrade, just about every piece of plastic ever manufactured still exists today. Fortunately, the NYC Department of Sanitation (DSNY) collects and recycles nearly all solid plastic objects, except those made of expanded polystyrene (Styrofoam). However, they don't recycle plastic film (including plastic bags). These lightweight plastics (along with plastic straws) often blow or are washed into our waterways and are carried out to the Atlantic Ocean -- the City's vast amount of concrete or asphalt paving facilitates storm water flow into our rivers and bays, which carries the lightweight plastics along with it.

1. Plastic Straws:

About 500 million plastic straws (which are primarily composed of polypropylene) are used in the United States each year. Because there is essentially no recycling market for them, DSNY cannot collect and recycle them. Aside from littering our city, many end up in our oceans, contributing to the vast vortices of plastic waste that clutter them and interfere with or endanger aquatic life. Whenever possible, try to use paper straws, or better yet, don't use straws at all (see here for more information). It's perfectly easy for most of us to drink directly out of a glass or cup. When you're drinking something

outside your home, just ask that a straw not be included with your drink. Cities such as Seattle and Fort Myers have already banned single-use plastic straws.

2. Styrofoam (expanded polystyrene [EPS])**:**

Styrofoam is also not collected and recycled by DSNY. Although proponents of the polystyrene industry claim it is recyclable, an exhaustive two-year study by DSNY concluded Styrofoam could not be recycled in an economically efficient and environmentally feasible manner. Thus, it will just end up in landfills or in the ocean. Polystyrene creates pollution wherever it is produced, used and discarded. It can break down into micro-particles that work their way into the food chain and can result in human health problems. A UN Food and Agricultural Organization study reported that over 100 commercial seafood species ingest micro-plastic, which can be contaminated with toxins. Toxic polystyrene can also leach from containers (such as coffee cups) into beverages or food.

As we mentioned in a previous Eco Letter, single-use, expanded polystyrene will not be banned in New York City for the time being because of a decision from the New York State Supreme Court's Appellate Division. Fierce resistance to the ban by the polystyrene industry probably doomed it to failure. NYC Sanitation Commissioner, Kathryn Garcia, is now required to reconsider the City's EPS policy in conformity with the decision and issue a new determination. The New York City Council also has the option of taking up legislation once again.

However there have been some victories. An organization called Cafeteria Culture has built strategic coalitions, resulting in the 2013 decision to completely eliminate polystyrene foam trays from all NYC schools. The City's agreement to co-purchase compostable plates with the five other largest U.S. school districts will drive down costs and eliminate an impressive 3 million polystyrene trays used per day in schools across the U.S., significantly reducing greenhouse gas emissions.

Since they are very durable (one reason to keep them out of the garbage), Styrofoam peanuts can be re-used for packaging. Most Mail Boxes Etc. and UPS Stores (800-789-4623) accept Styrofoam peanuts and other packaging materials such as bubble wrap and plastic foam. This might also be true for other local businesses that do a lot of shipping. Cornstarch peanuts, which are dissolvable in water, are becoming more common, but they have yet to gain much of a toehold -- probably again due to the influence of the polystyrene industry. Also, whenever possible, buy eggs packed in recyclable paper cartons. If you must buy egg in Styrofoam cartons, try to donate them to local farmers for re-use, either directly or via your neighborhood greenmarket.

3. Plastic Bags and Film:

In New York City plastic film accounts for about 7.5% of the residential waste stream, and these materials are again not collected by DSNY. Try to avoid using plastic film (such as Saran Wrap) to cover or wrap food. Instead, store food in containers with covers or

reusable zip-lock bags or wrap it in recyclable aluminum foil. The plastic film that you do end up using can be rinsed and brought, along with plastic bags, to most large supermarkets.

The plastic bag was only invented about 50 years ago; for centuries people simply carried food items around in cloth bags, baskets and other containers. Because they're so lightweight, discarded plastic bags are easily blown about by the wind. We've all seen plastic bags stuck in trees, clogging storm and sewage drains, but they're also washed or blown out to sea. Plastic bags become even more toxic once they break down in a marine environment; fish can eat bag fragments and accumulate chemicals that can cause liver toxicity and other pathology.

On average, each of us discards an average of about twenty single-use plastic bags every week, which adds up to about 10 billion bags a year in NYC alone, the majority of which are not recycled and are not biodegradable. Plastic bags also clog up the sorting and processing equipment at the Sims recycling facility in Red Hook. It costs the City an additional $12.5 million dollars a year to dispose of these bags once they're removed from collected recyclables.

New York City recycling advocates and Council members drafted legislation (in lieu of imposing an outright ban) for a per-bag fee at markets to encourage shoppers to bring their own reusable bags. This plastic bag bill, Intro 209A, which was sponsored by Councilmembers Brad Lander and Margaret Chin, would place a five-cent fee on the most common single-use plastic and paper bags. The fee would be kept by the stores who sell the bags, not the City. Unfortunately, the plastic bag industry blocked the bill by claiming that a fee on plastic bags would be a burden on poorer individuals. This is quite unlikely to be true: Councilman Lander, a former anti-poverty advocate, included an exemption for people who make purchases either with SNAP (food stamps) or WIC; also, low-income New Yorkers would probably adapt more quickly to a plastic bag fee than wealthier City residents, who might consider it an inconvenience. Therefore, utilizing reusable bags would not be a major obstacle.

Other cities have enacted per-bag fees and have found this system works well. Bag It NYC is a coalition of non-profits and community organizations throughout New York State that's united in seeking to eliminate the needless waste and pollution created by single-use carryout bags. They support legislation that includes a fee on all carryout bags, or a ban on thin plastic bags with a fee on all other carryout bags. Another local group, Plastic Bag Laws was created by Jennie Romer, a national expert on carryout bag policy. This organization is a resource for legislators and other interested parties who are looking into laws limiting the use of plastic bags.

Here are some current options for replacing single-use plastic bags:

- Re-usable shopping bags made of cloth or other materials. You can collect these and bring them to the market. Some are even designed to fit into a pocket or

purse. Various organizations distribute re-usable cloth bags with their names on them for free or a minimal charge as a way to publicize themselves.

- Garbage bags need to be impermeable to liquids, so paper bags are generally not suitable. However, new biodegradable or compostable materials can be used to manufacture garbage bags. Some companies have developed bags composed of materials that are derived from agricultural waste (e.g., cornstarch) or hybrids of plastic and paper. The Biodegradable Products Institute provides certification services for compostable products. BPI-certified products meet ASTM testing standards to certify they will biodegrade in a managed compost facility and provide a list of companies that manufacture these products. Their compostable logo identifies products that will perform satisfactorily in facilities that achieve temperatures needed to assure rapid biodegradation; this is usually not true of home composters. Also, just because a product is "bio-based" doesn't necessarily mean that it will biodegrade in a composting facility. For example, the lignin and cellulose in wood products can take years to break down. Local stores that sell biodegradable bags include Food Emporium and Whole Foods. A citywide list can be found here.
- If you use a plastic bag to collect your own glass, metal and plastic recycling, empty it into your building's container and re-use the plastic bag. As we mentioned above, plastic bags clog up DSNY's sorting and processing equipment resulting in needless expense and garbage. If you must employ single-use plastic bags, try to minimize the number you take out of the market; if the check-out person gives you too many, request fewer or simply return them. At home re-use the plastic bags for future shopping, as trash bin liners, as compost containers, for dog or cat poop, and so on.

4. CDs and Cassettes

CDs are relatively easy to recycle; DSNY accepts them so you can put them in your glass, metal and plastic recycling container. Other recycling options include Best Buy Stores and the Salvation Army. Westsider Books at 233 West 72 Street buys and sells music CDs (212-874-1588).

Cassette and VHS tapes are not accepted by DSNY since they're composed of both film and rigid plastic. If you take the time to extract the tape from the cassette, the case only can be put in with your regular plastic recycling. Lower East Side Ecology (212-477-4022) accepts CDs, DVDs and cassette tapes for a per-pound fee at its collection events and warehouse.

More Information:

- Bag It NY (Plastic bag pollution)
- Biodegradable Products Institute; 888- 274-5646
- Cafeteria Culture, info@cafeteriaculture.com

- Food and Water Watch, 147 Prince Street, Brooklyn, NY 11201; tel: (347) 778-2743
- NYC Department of Sanitation (DSNY)
- Plastic Bag Laws, Jennie Romer; jennie@plasticbaglaws.org
- Re-Clothe NY Coalition

UWSR Eco Letter November/December 2017
COMMENTARY:
Air Quality

Nothing is more precious to us than the air we breathe. We can go without food or water for days, but we can only be deprived of oxygen for a few minutes. Breathing in and out has a close relationship to our physical and emotional well-being.

Air pollution can result in numerous human maladies, among them asthma, chronic obstructive pulmonary disease, stroke and other cardiovascular problems and neurological problems. It can also cause acid rain that makes lakes sterile, kills trees and leaches essential plant nutrients out of the soil. Yet air pollution levels seem to be rising in many areas around the world.

The good news is that it hasn't been rising recently in New York City because of local and federal environmental regulations. In fact, according to data from the NYC Health Department, air pollution in the City is at the lowest level ever recorded. Sulfur dioxide saw the biggest drop - 84% over seven years - after the City tightened heating oil rules.

Although air quality in New York City has improved over the past several decades, concentrations of multiple air pollutants remain at harmful levels, particularly for seniors, children, and those with pre-existing health conditions. A recent study of more than 60 million Medicare recipients found that even pollution levels below those generally considered safe increase the risk for premature death, especially from particulate matter. In this study, Qian et al. followed the population for a median of seven years, recording 22,567,924 deaths. They found that each increase of 10 micrograms per cubic meter in particles smaller than 2.5 microns, or PM 2.5, was associated with a 7.3% increased mortality.

Types of Air Pollutants

A **primary pollutant** is an air pollutant emitted directly from a source. A **secondary pollutant** is not directly emitted as such, but forms when other gases (primary pollutants) react with it in the atmosphere. For example, sulfur dioxide and nitric oxide are primary gaseous air pollutants, and nitrogen dioxide is both a primary and secondary air pollutant. Another secondary pollutant is ozone, which is formed when hydrocarbons

(from fossil fuel emissions) and nitrogen oxides combine in the presence of sunlight. Air pollutants can also consist of fine particles.

Fine particles (including black carbon from diesel exhaust) are tiny airborne solid and liquid particles less than 2.5 microns in diameter. They are the most harmful urban air pollutant: they are small enough to penetrate deep into the lungs and enter the bloodstream, worsening lung and heart disease, and are also a human carcinogen. Fine particles are either directly emitted or formed in the atmosphere from other pollutants. Significant local sources include fuel combustion in vehicles, boilers in buildings, power plants, construction equipment, marine vessels, and commercial cooking. Although New York City air quality is improving, the Health Department estimates that fine particle pollution alone caused an average annually of more than 2,000 deaths, approximately 1,500 hospital admissions for lung and heart conditions, and 5,000 emergency department admissions for asthma.

Gaseous pollutants include the following:

- *Nitrogen dioxide* (NO_2) and nitric oxide (NO) are part of a group of pollutants called nitrogen oxides (NOx), which are formed when fossil fuels are burned. Almost 90% of the NOx consist of NO, which is then oxidized to NO_2 in the air. Sources of NOx include coal- and gas-fired power stations, motor vehicles, boilers in buildings, marine vessels, and construction equipment. Exposures to it are linked to increased emergency department visits and hospitalizations for respiratory conditions, particularly asthma. NOx also react with other compounds in the atmosphere to form fine particles and ozone.

- *Sulfur dioxide* (SO_2) is a colorless gas with a pungent, suffocating odor. It's a dangerous air pollutant because it's corrosive to organic matter and thus irritates the eyes, nose and lungs. It also creates acid rain. Some of it drifts east from coal-burning power plants primarily in the Midwest, but in NYC SO_2 is produced mainly from burning oils with high sulfur content, such as Number 4 and No. 6 oils. Fuel oil in NYC is used mainly to heat buildings and for hot water, but some high sulfur oil is also used to generate electric power and propel marine vessels. Some SO_2 also results from vehicle emissions. Excessive exposure to it can worsen lung diseases, causing hospitalizations and emergency department visits for asthma and other conditions. SO_2 also contributes to the formation of fine particles in the atmosphere, resulting in exposures downwind of where it is emitted.

- *Ozone* (O_3), a secondary air pollutant, is a colorless, poisonous gas with a sharp, cold, irritating odor. In the stratosphere ozone is considered beneficial -- it keeps harmful excessive ultraviolet sunlight from reaching the surface of the Earth. But it isn't so helpful at ground level; it's the main component of photochemical smog, which can cause irritation of the respiratory system, coughing, susceptibility to respiratory infections, damage to the lining of the lungs and

aggravation of asthma. O_3 is formed through reactions in the atmosphere when NOx emissions combine with other airborne pollutants (such as hydrocarbons) in the presence of sunlight. In areas where there are high concentrations of fresh combustion emissions, NOx can react with O_3 to actually reduce its concentrations. As a result, lower O_3 levels can be observed near roadways, in city centers, and in other areas of high emissions density.

- *Other gaseous pollutants* include: ammonia, carbon monoxide, volatile organic compounds (such as methane and other hydrocarbon compounds) and persistent organic pollutants. Exposure to very high concentrations of caustic ammonia in the air may result in lung damage and even death. Carbon monoxide is a colorless, odorless gas that's highly toxic to humans and can result in fatal poisoning in enclosed spaces when no oxygen can enter. Sources of other volatile organic compounds include solvents, dry cleaning and fossil-fuel burning; sources of persistent organic pollutants include pesticides as well as industrial processes used in the production of goods such as solvents, polyvinyl chloride and medicines.

Indoor vs. Outdoor Air Quality

Outdoor - Poor outdoor air quality can be an important threat to the health of NYC residents. In addition to the air pollutants already discussed, fires occur routinely in the City. These may break out in commercial buildings or homes, but they can also result from practices such as burning rubbish, leaves or brush. The smoke that is created is itself an air pollutant and includes fine particulate matter. Exposure to smoke can cause eye, nose and throat irritation. In healthy individuals, these symptoms are usually short-term and are unlikely to lead to ongoing health problems. However, you should consult your doctor if you experience more serious symptoms, such as shortness of breath or chest pains, or if you have asthma, heart disease or another medical condition that you feel is worsening.

Throughout the year, NYC may experience poor air quality due to high concentrations of fine particles found in ambient air. During the summertime, warm weather and strong sunshine can lead to increased levels of smog. If you have a health condition that makes you especially sensitive to air pollution, spend less time outdoors or in strenuous physical activity on poor air quality days. Plan your outdoor activities when pollution levels are lower, and try to avoid exercising near busy roadways. You can get a daily air quality forecast here.

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Indoor - Many things can affect indoor air quality including: temperature; humidity; indoor pollutants (including cigarette smoke, household products such as paints or cleaners and carpeting); or outdoor pollutants that have leaked in to your home,. Carpeting can contain some of the volatile organic compounds mentioned above. According to local law, building owners and tenants in NYC can only buy and install

carpet or carpet cushion that complies with the emission limits specified in the NYC Administrative Code.

You can improve the air quality in your home by opening windows to ventilate (particularly when cooking or using cleaning products) and avoiding harsh cleaners whenever possible, testing your smoke and carbon monoxide detectors monthly, and minimizing dust and allergens by regular vacuuming or mopping.

Air purifiers vary widely in their ability to remove air pollutants, though some may improve indoor air quality. Keep in mind that no air purifier can remove all pollutants from the air and that most common air purifiers are designed to remove only particles. Click here to report any indoor air quality problems.

New York City Community Air Survey

The Health Department and Queens College are conducting the New York City Community Air Survey (NYCCAS), the largest ongoing urban air monitoring program, to evaluate how outdoor air quality varies in New York City. This program studies how pollutants from traffic, buildings (boilers and furnaces), and other sources impact air quality in different neighborhoods. NYCCAS monitors pollutants that cause health problems including fine particles, nitrogen oxides, sulfur dioxide and ozone. Measurements are taken at about 100 locations throughout the city in each season. Monitors are mounted 10 to 12 feet off the ground on public light poles or utility poles along streets and in some parks and use a small battery-powered pump and filters to collect air samples.

The NYCCAS publishes yearly cumulative reports. The latest, covering the period from winter 2008-2009 through fall 2015, summarizes the trend in air pollutant levels, provides a summary of the air monitoring program and analysis methods, and describes the pollutants measured. It also identifies the sources that contribute to high levels of these pollutants in NYC neighborhoods and maps neighborhood air pollution levels, by year and by season (see links below under NYC Health).

Major City-wide findings include:

- The amount of dangerous fine particulate matter in the air, including black carbon, has fallen 18% since 2009.
- The average annual NO_2 and NO levels have declined 23% and 28% respectively, from the first year of monitoring (2009) to the most recent year reported (2015). However, higher levels of these pollutants continue to be observed in areas with greater density of large buildings, more vehicle traffic as well as in industrial areas.
- The largest declines were observed for SO_2 due to local and federal heating oil regulations. Wintertime average levels have declined by 84% over the 7-year period between the first winter of monitoring (2008-2009) and the most recent

winter (2014-2015), but they still remain relatively high in areas with residual oil boilers (those the burn Number 4 or 6 heating oil).
- Summertime average O_3 levels remained relatively stable across the seven years, but they remain higher in the outer boroughs, in areas that are downwind of high emissions density and in areas with fewer combustion emissions.

Mitigating Air Pollution

Strategies and measures implemented by the Health Department include:

- converting the remaining residual oil boilers to ones that use cleaner heating fuels (Number 2);
- transitioning to more efficient, less polluting light duty and heavy duty vehicles;
- reducing motor vehicle use by shifting to more sustainable modes of transportation;
- creating more efficient freight networks and expanding truck retrofit and replacement programs; and
- reducing fossil fuel combustion in buildings.

You can help by avoiding excessive use of air conditioners or other energy-gobbling devices (such as toaster ovens or electric blankets), since the electricity they run on is probably generated by the burning of fossil fuels. Also, set your air conditioner thermostat to 78 degrees or low cool. If you own a car, don't let your engine idle for long periods of time. Report any other vehicles that have been idling more than three minutes at http://www1.nyc.gov/nyc-resources/service/2684/vehicle-idling-complaint.

For more information:

- Qian et al. (2017). Air Pollution and Mortality in the Medicare Population.New England Journal of Medicine, June 29 2017. pp. 2513-2522
- Environmental Protection AirNow Agency Air Quality Index (AQI)
- NYC Health - Air Quality
- NYC Health - New York City Community Air Survey
- Types of pollutants: http://www.tropical-rainforest-animals.com/Air-Pollutants.html

UWSR Eco Letter September/October 2017
COMMENTARY:
Local Solar Energy Organizations

Solar power usage in New York City has more than tripled over the last three years. This is to a great extent the result of steadily dropping costs of generating electricity using photovoltaic solar panels. In fact, the price of solar power is now often competitive with

that of fossil fuels or nuclear energy when considered over a five- to ten-year time span, and it's expected that average global prices will drop another 25% in the next five years.

New York City now provides over 100 megawatts of photovoltaic electricity for residential and commercial use. This has the added benefit of creating about 2,700 jobs across the five boroughs. There are now more than 5,000 residential solar projects here, and the City's goal is to install one gigawatt (1,000 megawatts) of solar capacity citywide by 2030, or enough to power about 250,000 homes.

A number of local organizations are actively involved in solar energy, and following is an alphabetical list and brief descriptions of their respective work.

Google Project Sunroof (76 Ninth Avenue, New York, NY 10011) locates your home on Google Maps and combines that information with other databases to create an analysis of your roof's solar potential. It takes into account local shading, sun positions at various times of the year, as well as historical cloud and temperature patterns. Using current solar industry pricing data, Project Sunroof runs the numbers on leasing, taking a loan, or buying solar panels for your house to help you make the best choice. In calculating your final cost, it includes the following incentives: federal and state tax credits, utility rebates, renewable energy credits and net metering. *Info*: Google Project Sunroof; (212) 565-0000.

IPP Solar (140 West Street, New York, NY 10007) is an independent power provider of solar energy to electric vehicles (EVs) and commercial/industrial customers in the New York metropolitan area. They operate a network of DC Fast-Charge stations in New York, New Jersey and Connecticut where, often using solar power, you can charge your car in 15-30 minutes. *Info*: IPP Solar; (212) 791-2100.

New York Solar Energy Society [NYSES] (5270 Sycamore Avenue, Bronx, NY 10471) is a chapter of the American Solar Energy Society. Its mission is to encourage the understanding and use of various solar energy technologies through public outreach, to be a source of sound technical information, and to provide a forum in which to address critical regional and state issues relating to solar energy solutions. Since 2007 this volunteer, grassroots, membership organization has provided information on energy conservation and renewable energy; it also distributes the bi-monthly *Green Energy Times* throughout eastern New York State. They advise consumers on choosing cost-effective energy solutions via workshops, K-12 special events, solar demonstrations, and renewable energy finance seminars, and interact with city and state legislative staffs in analyzing legislation and state programs. They host a yearly conference; their 2017 conference, "Bridge to Action," is November 17 in Troy NY. *Info*: NYSES; Wyldon Fishman, wyldon1@gmail.com.

New York Sun Works (157 Columbus Avenue, New York, NY 10023) runs a Greenhouse Project dedicated to improving K through 12th grade Environmental Science Education

in urban schools through integrated facilities, hands-on curriculum, and professional development. Their greenhouse classroom labs offer students the opportunity to grow food while learning about nutrition, water resource management, efficient land use, climate change, biodiversity, conservation, contamination, pollution, waste management, and sustainable development. These labs can include solar panels, hydroponic growing systems, a fish farm, a rainwater catchment system, a weather station, integrated pest management and a worm composting station. New York Sunworks also sponsors an annual youth conference. *Info*: New York Sun Works; 212-757-7560; info@nysunworks.org.

Our Power (111 Eighth Avenue, New York, NY 10011) helps people throughout the state participate in NYSERDA's Community Solar Program, which involves communities in the development of new solar projects. Having solar energy on a building's rooftop is only practical for a minority of people living in NYC. However, a subscriber to Community Solar doesn't need to install panels themselves; instead, the subscriber commits to being a customer of a solar project in their utility's area for a set amount of time and benefits from the clean power it generates and, ultimately, reduced costs. Once the project has a sufficient number of subscribers, it gets constructed. After the project is connected to the grid the subscriber receives separate bills from both the community solar project and the utility. New York State legislation has enabled Community Solar subscribers to receive solar credits on their existing utility bill for the power generated by the community solar project, which reduces the subscriber's total cost by an average of 10% to 20% over the course of a year (see "Further Information" below). Savings are higher in summer months when the sun is shining and lower in winter months when projects generate less power. I*nfo*: Our Power; info@ourpower.solar.

Renewable Energy New York City [RENewYorkCity] (North Brooklyn, NY) is committed to organizing local communities to efficiently transition to a clean energy economy. A primary goal is to implement Community Choice Aggregation (CCA) in order to bring renewable energy to entire NYC neighborhoods at the same time. CCA gives municipalities control over their default energy supply, empowering them to aggregate and leverage the purchasing power to gain price stability. Both residents and small businesses are therefore able to obtain less expensive, cleaner and smarter energy. The City Council is currently drafting a bill that will determine how to partition the city in order to roll out CCA. *Info*: Charlotte Binns, RENewYorkCity; (347) 457-6362.

Solar One offers a number of environmental programs, including K-12 sustainability curriculum/education, green worker training, and technical assistance to NYC buildings that want to adopt energy efficiency and renewable energy. Their *Here Comes Solar* program envisions a city where solar energy is accessible and affordable for all New Yorkers. They help both affordable and market-rate multi-family buildings implement rooftop solar projects by consulting with co-op boards, providing realistic solar financial estimates, and assisting buildings to secure competitive proposals from local solar companies. In addition to residential buildings, Solar One is working with the Governor's Office of Storm Recovery to implement a pilot program that is installing solar

with battery backup on non-profit community centers in areas that were impacted by Superstorm Sandy so the facilities can provide backup power and improve community resilience in the event of a blackout. Solar One also operates Stuyvesant Cove Park, a sustainably-managed, all-native-species park, located on the East River between 18th and 23rd Streets. *Info*: Solar One; 212-505-6050.

Sustainable CUNY (205 East 42nd Street, New York, NY 10017) works in partnership with the NYC Sustainability Office, NYSERDA, and many organizations and municipalities around the state. Through the NYC Solar Partnership, Solarize NYC, NYSolar Smart, and the Solar Ombudsmen program, Sustainable CUNY leads the implementation of multiple city, state and federal solar initiatives, serving as an objective and trusted third party on behalf of the City and State. *Info*: Sustainable CUNY; (646) 664-3003.

- The NYC Solar Partnership was initially formed in 2006. They work collaboratively with the Mayor's Office of Sustainability and the New York City Economic Development Corporation in developing and implementing comprehensive plans for large-scale solar integration and associated economic development in NYC. The Partnership has received federal, state and city support for its key programs.
- Solarize NYC is a citywide program designed to serve the needs of both NYC communities and solar installers by increasing access to solar power through community group purchasing (see also Our Power and RENew York City above). To facilitate this -- and to demonstrate that solar power can make an impact in low- to moderate-income communities -- the City recently launched its first round of Solarize NYC campaigns in Harlem (with the cooperation of WEACT - see Events listings below in "Climate Change & Energy") and in downtown Brooklyn.
- NYSolar Smart is a strategic plan that supports federal, state and city initiatives to lower the soft costs (not panels or other hardware) of installing solar power. Their NY Solar State Map and Portal, launched in 2011 and updated in 2017, provides customers, installers, and municipal leaders with key solar information -- such as estimates of rooftop and ground level solar energy potential for electricity and other solar applications -- for about one-million buildings in NYC, as well as step-by-step guidance and information on permitting, financing, and other practical issues.

Sustainable CUNY also conducts Solar Installer Workshops around New York State where installers can learn area-specific best practices from building departments, utilities, finance programs and NYSERDA. They also convene city and state Installer Roundtablesthat are forums for exchanging information, workshop opportunities, RFP and RFI notices, and industry updates. An archive of workshops and more information for solar contractors can be found on the NY Solar Map.

Urban Green Energy [UGE] (330 West 38th Street, New York, NY 10018) is the New York subsidiary of a worldwide company. It's the second largest commercial solar developer in New York, and also works with residential buildings, providing end-to-end solutions,

including engineering and design as well as construction and management for both solar photovoltaic and wind energy projects. UGE is contracted to develop and build New York City's first community solar project at a multi-tenant commercial facility in Brooklyn in a neighborhood between Park Slope and Boerum Hill. The project will have a rated peak capacity of approximately 100 kilowatts. The clean energy produced by the project will be net metered and sold to residential off-takers at rates lower than the rates paid to their utility, providing tenants with both immediate and long-term savings. *Info:* UGE; (917) 720-5685; info@ugei.com.

Further Information:

- NYSERDA (general)
- NYSERDA tax credits

UWSR Eco Letter May/June 2017
COMMENTARY:
Lower East Side Ecology

Since the late 1980s, the environmental group with whom we've worked the most is the Lower East Side Ecology Center (212-477-4022). LESEC is the largest non-municipal provider of electronic-waste (e-waste) recycling services in New York City, currently collecting about a million pounds of e-waste each year, and they also created and oversee significant programs in composting and environmental education.

This year, LESEC is celebrating its 30th anniversary. In 1987 they began collecting and marketing newspaper, plastic, metal and glass from Upper West Side Recycling and other organizations. A couple of years later, when the NYC Department of Sanitation (DSNY) started a city-wide recycling program for these materials, they launched a composting program on the Lower East Side, then opened a composting booth at the Union Square Greenmarket in 1994.

In 2003 they ran the first e-waste collection event (also in Union Square) as part of a waste prevention education grant awarded them by the City. LESEC gradually expanded their operations to include an ongoing e-waste collection and marketing service. This operation was given a significant boost in 2011 when the New York State E-Waste Recycling and Reuse Act mandated recycling of most electronics, and again in 2015 when DSNY began issuing fines to residential buildings that didn't recycle their e-waste (see past Commentaries for "Electronic Waste" - January/February 2015).

Electronic Waste

LESEC now offers two ways for residents to participate in e-waste recycling: You can either bring your electronics to a scheduled one-day collection event or take them directly to their Gowanus E-Waste Warehouse.

Free Collection Events

LESEC hosts e-waste recycling events on a seasonal basis throughout Manhattan and the other four boroughs. Events occur as scheduled, rain or shine. There's no limit to how much you can bring, but LESEC only accepts goods or equipment from households, not-for-profit organizations (such as churches and schools) and small businesses. Since LESEC is a registered 501(c)3 organization, your donation is fully tax-deductible; just ask one of their staff for a tax-deduction form. They transport all the equipment collected at these events to their Gowanus Warehouse (see below).

The next collection event on the Upper West Side will be held on Sunday, May 21, 2017, 10:00 a.m.-4:00 p.m. at the Jewish Community Center on Amsterdam Avenue between 75th and 76th Streets. In addition, there's an event at Manhattan Plaza on West 43rd Street on May 6th (for more information, see the LESEC website or our Events Listing.

- *Goods Accepted* (unless otherwise noted): Computers and peripherals (monitors, printers, faxes/scanners, keyboards, mice, wires, etc.); TVs; stereo and A/V equipment, VCRs, DVD players; cell and land line phones (see the LESEC website for more details).
- *Goods Not Accepted*: Microwaves, refrigerators, air conditioners, smoke or carbon monoxide detectors.

Please let LESEC know if your equipment is in working order, as they will then refurbish these items and sell them for re-use. Re-use is preferable to recycling since it saves both energy and materials, so donate your equipment as soon as possible after you know you no longer need it. Goods more than a few years old (about 90% of the total materials currently received) are generally shredded and recycled in order to recover the constituent plastic metal and glass.

VHS tapes, CDs, DVDs, and cassettes, as well as copiers and printers over 100 pounds are accepted, but you must pay a small fee as LESEC has to pay to get these materials recycled. Additionally, batteries such as lead acid batteries from Uninterrupted Power Supplies (UPS) are accepted, but there is also a fee for this service. LESEC also accepts small batteries, but they ask that you please separate alkaline and rechargeable batteries. Either tape both terminals of rechargeable batteries or pack them in a separate bag. Another option is to bring household batteries to any DSNY Special Waste Drop-Off Site (for more information see Events below - "Other Recycling/Solid Waste" for April 30 and May 13). Rechargeable batteries can also be dropped off for recycling in any store that sells them. *It is illegal to throw rechargeable batteries in the trash*.

Gowanus E-Waste Warehouse

LESEC opened their Gowanus E-Waste Warehouse at 469 President Street, Brooklyn in 2012 (tel: 718-858-8777). It's New York City's only free, permanent e-waste drop-off facility. Here they accept all the consumer electronics listed above and see that these materials are either reused or recycled in an environmentally and socially responsible way. The Warehouse is open Tuesday, Thursday and Friday 10 a.m.-5 p.m.; Wednesday 12-7 p.m.; Saturday 10 a.m.-4 p.m.

All drop-offs are free and tax-deductible. Any New York resident, small business, or non-profit organization can drop-off their unwanted electronics. If your equipment works, let them know and they'll try to give it a second life. Emphasizing re-use wherever possible, LESEC tests, refurbishes and sells such items as laptops, desk top computers, monitors, keyboards, TV's, stereo and audio equipment, small printers, etc. - anything they feel someone can use again. They sell a variety of electronic goods at their Re-Use Store in the warehouse. For goods that can't be re-used, Sims Recycling Solutions sends a trailer truck to pick up the e-waste once or twice a week, and then transports it to an upstate facility, where it's shredded and the constituent materials recycled (see past Commentaries for "The Recycling Process: Where Do Your Materials Go?" - January/February 2017).

LESEC guarantees data security. In the case of older computers and other data storage devices like external hard drives, data will be physically shredded during the recycling process. While it isn't necessary to wipe your hard drive before recycling, you can do your own data removal by using KillDisk or Darik's Boot and Nuke. Both programs are free. Newer computers may be tested for reuse by in-house technicians; their data will be professionally wiped on-site with an electromagnet. Also, LESEC only works with recyclers who guarantee data security during transportation and processing.

LESEC also runs two other unique programs at the warehouse.

- Their one-of-a-kind Prop Library (718-858-8777, rentals@lesecologycenter.org), open by appointment only, rents a variety of vintage electronic equipment for use in TV, film and stage productions (e. g., cameras, projectors, phones, toasters, clocks, computers, TV's, audio equipment, meters and gauges, sewing machines, radios, even a slot machine, etc.). Just send them an email describing what you're looking for and when you need it. Rentals are for a minimum of one-week (no daily rentals), and pricing is determined by the item rented. A per-item deposit is required.
- The Artists-in-Residence Program supplies artists with electronic goods or other items for their creative projects (for example, one artist makes jewelry out of electrical wire).

Unfortunately, LESEC does not offer e-waste pick-ups. If necessary, you can ask family and friends with cars to help you bring your e-waste to their warehouse or to drop-off events.

Composting

Composting is a natural process of organic decomposition, in which living organisms break down material (such as food scraps or leaves) until only a beneficial soil amendment remains. Composting is an important sustainable waste management technique that diverts food waste from landfills where the food would decay anaerobically (in the absence of oxygen) and create the greenhouse gas methane.

The average New York City household currently discards over two pounds of food waste daily, which translates into 3,000 tons of organic matter that must be trucked every day to distant landfills. Composting replaces this inefficient system by allowing us to re-use food waste by processing it aerobically and then returning vital nutrients back into the earth to create healthier soil.

LESEC's composting program prevents hundreds of tons of organic material from entering landfills, and introduces countless New Yorkers to the benefits of composting. They currently operate eight food scrap drop-off sites, seven of which are in lower Manhattan (see also the Events Listing or GrowNYC for Greenmarket food scrap drop-off information).

- *Accepted*: Fruits and vegetable scraps; coffee grounds and filters, and paper tea bags; bread and grains; eggshells and nutshells; cut or dried flowers; houseplants and potting soil (disease free). LESEC suggests you put food scraps first in paper bags (which can also go into the compost bins), then transport these paper bags in plastic bags, which prevent leakage but which can usually be re-used.
- *Not Accepted*: Meat, fish, bones, shells; cheese or dairy products; fats, grease, or greasy foods; pet feces, litter or bedding; coal or charcoal; metal, glass, or plastic; biodegradable/compostable plastics

The two sites nearest to the Upper West Side are located at:

- 23rd Street just west of 8th Avenue on the south side, in front of the Vitamin Shoppe. Open Tuesday and Thursday, 8:00-11:00 a.m., year-round.
- 127th Street & Malcolm X Boulevard. Open Wednesday, 8:00-11:00 a.m., year-round.
  At this site LESEC partners with the non-profit Harlem Grown, and produces compost using a three-bin system (in which decomposing food scraps and other organic material are successively moved from on bin to another in order to expose the composting material to air as much as possible). Harlem Grown's mission is to inspire youth to lead healthy and ambitious lives through mentorship and hands-on education in urban farming, sustainability, and

nutrition (212-870-0113). Founded in 2011, they operate eight local urban farms and promote knowledge of healthy food for Harlem residents.

LESEC collects, transports and processes food waste locally. With the exception of 127th Street, food scraps go to their compost yard in East River Park (just south of the Williamsburg Bridge), where they are first processed in an in-vessel composting system, then put outdoors to cure. The in-vessel system, initiated in 1998, consists of sixteen one-cubic-yard plastic containers, each filled with alternating layers of nitrogen-rich food waste and high-grade sawdust (a carbon source they collect from various local wood shops). Once a container is filled and inoculated with bacteria to start the composting process, the lid is sealed and the decomposition process begins. The containers are designed to facilitate an aerobic decomposition process, by allowing air to pass through vents on the bins. After 10-14 days, the materials in the bins are reduced to three-quarters of their original volume while going through a high temperature decomposition process (reaching up to 150 F) to ensure destruction of potential pathogens.

The second step, or curing process, begins when materials are transferred from the in-vessel containers into windrows (long rows of organic matter). Inside the windrows the responsibility of curing the composting materials is handed over to red wiggler worms - at this stage the material is cooling and brimming with microorganisms that worms find delicious. As the worms feast, they digest the partially composted materials along with microorganisms and produce worm castings, some of the most nutrient-rich, energy-packed plant food that exists.

After about three months the compost is ready. At this time it's screened to remove rocks, sticks, or other unprocessed material (like fruit pits) and to create fine compost. Screening also separates out the worms, which are returned to feast on other windrows. The finished compost makes its way back to the consumer, either as compost or as part of their potting soil mix. LESEC sells the resulting compost in one-, five- and twenty-pound bags at their Gowanus warehouse and at their Union Square Compost site; they also donate it to local community greening organizations and the NYC Parks Department for use in gardens, lawns, tree pits, etc.

To learn more, join one of their workshops that explore home composting and teach advanced composting techniques. Upcoming workshops can be found on their calendar or call the Compost Hotline at (212) 477-3155.

Environmental Education

Through their environmental education programs, LESEC works to increase community awareness, involvement and youth development by promoting access to and knowledge of our urban environment. Workshops are offered for children and adults about the urban environment, open space preservation, street tree care, and park stewardship.

Education programs are developed with the specific needs of each set of participants in mind, and many of the programs are free to the public. These are provided to classroom teachers, after-school programs, and community groups. LESEC also conducts public workshops and internships for high school and college students. Most of these programs are offered from March through November only.

UWSR Eco Letter March/April 2017
COMMENTARY:
Raising Food in New York City

In a time of population growth, loss of arable land and climate change, the food issue is becoming increasingly important in urban areas. A large potential exists for growing vegetables, herbs, fruits, and nuts in our own city, rather than shipping them in from growers hundreds or thousands of miles away. We can even raise our own fish and eggs or cultivate bees for honey. The benefits of heading in this direction are huge: air pollution reduction, CO_2 mitigation, fresher and more nutritious produce, as well as a boost to the local economy. The main requirements of urban agriculture are adequate sunlight (or artificial light), water, and small amounts of certain nutrients. Energy consumption is a consideration, as is weight if the garden is situated on top of or within buildings. It's also wise to have the soil checked for lead contamination before planting anything edible and to protect the growing plants from damage or consumption by animals such as pigeons or squirrels.

Several organizations in NYC are already working to promote urban agriculture. For instance:

- *GrowNYC's Garden Program* constructs and sustains community gardens, urban farms, school gardens, and rainwater harvesting systems across New York City. To date, GrowNYC has built more than 90 gardens, and they support hundreds more through renovations, green infrastructure projects, technical assistance, volunteer days, annual plant sales, and education of children.
- *Green Thumb*, the largest community gardening program in the nation, provides programming and material support to over 500 community gardens in New York City. Gardening tools and supplies are available at their monthly workshops.
- *Just Food* is another organization devoted to encouraging urban agriculture in New York City. It supports community leaders who advocate for healthy locally-grown food, especially in underserved neighborhoods. Their Urban Agriculture and Markets Program trains, connects, and empowers New York City community gardeners to spread knowledge about growing and marketing food in their neighborhoods.

Crop yields can be considerable. For instance a vacant lot or rooftop measuring 40 x 50 feet (2,000 square feet), with good sunlight, could theoretically produce about 950

pounds of carrots, 500 pounds of lettuce or spinach, and 350 pounds of broccoli per year. New York City covers about 300 square miles, or about 8 billion square feet of horizontal space. If only 5% of that space were devoted to food production, an amazing volume of produce could be grown. In addition, crops grown vertically in high-rise buildings can potentially produce far greater yields per square foot than crops raised horizontally in lots, rooftops and other open spaces.

A fledgling urban agriculture infrastructure already exists in our city. Crops can be raised on horizontal spaces - such as vacant lots, portions of city parks or other public spaces - and on rooftops; they can also be grown within high-rise buildings (in what is termed vertical farming) or even on piers or floating platforms. You can grow smaller vegetables, herbs and fruits in your own apartment, although some - such as tomatoes - require pollination by hand (a small paintbrush will do). All these options have advantages and disadvantages, and it's important to bear in mind that urban agriculture at the current time should be seen as complementary to rural agriculture - particularly that which is carried out in our local region.

Types of Vegetable and Herb Gardens

On Rooftops

There are several sizable urban vegetable- and/or herb-growing gardens or greenhouses in New York City, many of which are on rooftops. Currently, most rooftop gardens consist of hydroponic systems in greenhouses (where primarily leafy greens, tomatoes, and herbs are grown) or soil-based open-air farms (which can grow a larger variety of vegetables). Prospective rooftop gardeners should take several things into consideration: building codes; the potential for leakage; and the weight loads of garden beds, soil and water. To be environmentally friendly photovoltaics could be used to provide the power for water pumping, the water could be re-circulated and the nutrients recycled via composting or other methods. Irrigation can be provided by rooftop water collection or recirculation of building greywater.

In soil-based rooftop gardens, the weight of both the soil and water is a major consideration. The inert component of the soil (about 95% of its weight) is normally composed of heavy compounds, mainly clay and sand. These inert components can be replaced by lightweight materials such as pulverized Styrofoam (which is a problem for the city to dispose of), to which you would add 5-10% of an organic material such as compost. The Gaia Institute has been working on lightweight soils for over 20 years; these soils have been incorporated in green roofs such as the one on Albert Einstein Medical College in the Bronx. They could also be used in rooftop vegetable or herb gardens around the city. Drip-irrigation systems would also help to minimize weight loads on the building structure.

In Manhattan, the Hell's Kitchen Farm Project (info@hellskitchenfarmproject.org) on the Metro Baptist Church Rooftop at 410 West 40th Street, grows a variety of vegetables in

52 raised beds, comprising about 1,000 square feet of growing area. They use food scraps and dead plant material in a combination of anaerobic and aerobic composting to enrich the soil. All produce grown on the farm goes directly to the Rauschenbush Metro Ministries Food Pantry. On a larger scale, The Brooklyn Grange, a leading U.S. rooftop farming and intensive green-roofing business, raises over 50,000 pounds of organically-cultivated produce per year. Another large rooftop grower is Gotham Greens, who have built large, 100% clean-energy powered greenhouses that produce vegetables and herbs in Brooklyn and Queens.

Ground-Level Farms

GrowNYC's FARMroots program conducts a training course for aspiring as well as experienced farmers. Their 21,000 square foot Governors Island Teaching Garden aims to engage, excite, and educate its visitors in all aspects of urban farming. In this garden, students learn the skills and business acumen necessary to start their own farm businesses. In addition to scheduled school visits, the garden is open to the public on weekends during the Governors Island open season. The garden contains over 20 vegetable beds made from recycled plastic lumber, an outdoor kitchen, a large solar oven, a high tunnel greenhouse, fruit trees, and rainwater harvesting systems.

On the Upper West Side, gardens that grow vegetables include:

- *The 227 Garden*, at 227 West 115th Street, specializes in vegetables and herbs. This 1,900-square-foot community garden in the heart of West Harlem is used by neighbors and community groups for growing food, holiday events and communal gatherings.
- *La Perla Garden*, 76-80 West 105th Street. Info: info@laperlagarden.org.
- *Mobilization for Change Community Garden*, 955 Columbus Avenue on the southeast corner at 107th Street; 212-788-7900.
- *PS 76 Garden*, 203 West 120th Street.
- *West 104th Street Garden*, on two lots between Manhattan Avenue and Central Park West, is supported by Green Thumb. Info: 212-788-7070.
- *West Side Community Garden*, 123 West 89th Street. Info: (212) 316-5490.

Public Spaces

Fourteen percent of the area of New York City consists of parkland, almost 30,000 acres in all. About 1,100 acres of this is in Riverside and Central Parks alone. Riverside volunteer groups and nonprofit organizations already maintain numerous flower plantings and gardens; this could also be done for vegetable and herb gardens. In the Bronx, the New York Botanical Garden has for many years operated the large Howell Family Garden, in which a variety of vegetables and some herbs are grown. This 1.5 acre (65,000 square foot) garden offers hands-on gardening activities, children's education and tours from April through October. Their Children's Gardening Program gives kids the chance to tend their very own garden. Vegetables are eaten by people in the program or

donated to local food pantries.

Vertical Gardens

Vertical farming - growing crops up rather than out in a closed stacked system - is another promising approach to urban agriculture in New York City. This technique was first investigated in this area by Dickson Despommier, a professor emeritus in Columbia's Mailman School of Public Health, as part of what he terms controlled environment agriculture (CEA). Indoor vertical farming has the advantage of producing a higher yield in a controlled, pest- and contaminant-free environment. In the case of hydroponically grown leafy greens (such as lettuce, spinach, kale or basil), as many as eight crops per year can be harvested. Compared to traditional agriculture, vertical farming uses less water and significantly less land. Since these gardens are climate controlled and normally employ artificial light, they allow farmers to produce crops year-round, day or night.
These vertical hydroponic systems present some challenges: crops have generally been limited to leafy greens, tomatoes, and some herbs; and initial costs and energy usage are high. The energy usage (and consequent carbon dioxide emissions) could be reduced by PV-powered LED lighting augmented by focused natural light and PV-powered water pumping. A basic question remains: Is the energy consumed in CEA vertical farming (including building the structure, growing the crops, transporting them, etc.) greater or less than the energy consumed when crops are grown in regional farms, then trucked to local markets?

Vertical farms have been created primarily in new buildings or in retrofits. In a former steel supply company building in Newark, NJ, AeroFarms has constructed what they claim to be the largest indoor vertical farm in the world (in terms of annual growing capacity). The building's high ceiling allows for grow tables to be stacked twelve layers tall, to a height of thirty-six feet, in rows eighty feet long. The 70,000 sq. ft. hydroponic facility has the capability of raising up to 2 million pounds of lettuce, kale and other salad greens per year. They use a hydroponic system, but the actual growing medium (instead of soil) is a patented reusable fleece-type fabric created from recycled PET water bottles. The cloth fabric holds the seeds in place while they germinate, then the roots extend below the cloth to receive water and nutrients. The L.E.D. grow lights are in plastic tubing above each level of the grow tower. They limit the light frequency to parts of the spectrum needed for plant growth, thus saving a considerable amount of energy.

Piers and Floating Gardens

The only facility of this kind we could find in the NYC Metro Area is the Science Barge, a floating urban farm and environmental education center that has been docked in Yonkers since late 2008. The Barge grows crops using a hydroponic greenhouse powered by solar panels, wind turbines, and biofuels (tel: 914-375-2151). However,

there seems to be a lot of potential for this in our watery city. Manhattan alone has 32 miles of shoreline and about 40 piers, some of which already have park-like spaces on them. Also, if 20-foot wide agricultural barges or other floating gardens were moored along the Hudson from 86th to 100th Streets, they could produce thousands of pounds of fresh vegetables or herbs each year. Water could be supplied using photovoltaic pumping and solar desalination, with drip irrigation. Floating vertical gardens could also be constructed on moored barges, which could be later towed to market (a very fuel efficient method of transportation).

Fruits and Nuts

Fruit trees and berry bushes could be planted in some areas of our parks instead of just ornamental or shade trees. Since they are relatively small, fruits such as strawberries, blueberries and raspberries are suitable for rooftops or vertical gardens as well. Trees New York has started a FruiTrees New York program, whose purpose is to plant urban orchards that produce fruit such as apples, peaches, apricots or pears. One such orchard is located at the Pleasant Village Community Garden in East Harlem. This practice need not be limited to fruit trees; nuts such as filberts (hazelnuts) or black walnut grow perfectly well in this climate and are rich in protein. Whether they are in an orchard or nut-tree grove, these trees utilize space efficiently, provide shade and help to mitigate the rise in CO_2.

Other Food

Aquaculture

There are hundreds of miles of land-sea water interface in the NYC metropolitan areas. New York City residents eat more fish than the US average, and many varieties of sea fish inhabit the NYC harbor area - such as flounder, striped bass, albacore, mackerel or bluefish. Freshwater tilapia, now sold in many fish markets, could be cultivated onshore. Also, New York Harbor was once home to billions of shell fish, including oysters, mussels and scallops, and these can be reintroduced. As we clean up our waters, we should be able to scale up our efforts in aquaculture.

The Brooklyn Aquaculture Project, led by Martin Schreibman and Chester Zarrnoch of Brooklyn College, has conducted a pioneering study of the feasibility of raising both fresh- and salt-water fish in the Brooklyn area. They concluded that large-scale aquaculture in this area is not only feasible, but could result in economic development in shoreline areas.

It's estimated that 400 years ago there were 220,000 acres of oyster reefs in the harbor.The Billion Oyster Project, an initiative of the New York Harbor Foundation, aims to restore live oysters to New York Harbor. Students at New York Harbor School have been growing oysters in New York Harbor for the last six years and, to date, have restored over nineteen million oysters. Fifty-four schools have partnered with the project. Also, the Sims Brooklyn MRF facility (discussed in the January/February

2017 *Eco Letter*) has created small, artificial marine habitat reefs for growing mussels, and this could be replicated on a larger scale throughout the NYC harbor area.

Eggs

Gardeners all over the city keep chickens that provide fresh eggs, fertilizer for the garden, aerated soil and food scrap recycling. Just Food's City Chicken Project is working with experienced chicken keepers in New York City to create model projects from which gardeners can learn how to keep happy, healthy, and productive chickens.

Beekeeping

Since very little space is required to raise honeybees, and there are plenty of flowering plants in our city, it seems natural that this avocation (or vocation) will grow in the coming years, and we'll be able to enjoy fresh, locally produced honey. The New York City Beekeepers Association, which currently has about 2,000 members, was formed to "pollinate" mutual interest in beekeeping, and to educate and promote the benefits of beekeeping in our urban environment.

Further Sources of Information

- Aerofarms
- Frazier, Ian (2017). "High-Rise Greens: The Vertical Farm." *The New Yorker*, January 9, 2017, pp. 52-59.
- Green Thumb, 100 Gold Street, Suite 3100, New York, New York 10038; tel. (212) 602-5300, or 311; greenthumbinfo@parks.nyc.gov
- Grow NYC, 51 Chambers Street, 212-788-7900
- Just Food, 114 West 47th Street, 212-645-9880; info@justfood.org
- New York Community Garden Coalition, 232 East 11th Street, (347) 699-6099
- Trees New York, 100 Gold Street, (212) 227-1887; info@treesny.org

UWSR Eco Letter January/February 2017
COMMENTARY:
The Recycling Process: Where Do Your Materials Go?

We want to do the right thing and recycle as much as possible. But what actually happens to all that stuff? And why can't we recycle everything?

The fact is that the recycling process is quite complicated and driven by the marketplace. It entails a number of steps, including the collection of materials, their separation and sorting, amassing sufficient quantities, re-processing of materials, and the final manufacture of new goods from these materials. Each of these steps is important and has its own complexities that result from both the physical nature of the materials and fluctuations in the marketplace. Energy-efficient and economical transportation plays a key role in this process and is yet another variable.

In New York City, we separate paper and cardboard from plastic, metal and glass. These latter three materials are all mixed together and compacted on the Sanitation Department (DSNY) collection trucks. They are only separated from each other after arriving at the Sims Materials Recovery Facility (MRF) on the Brooklyn waterfront, where they are also bundled and transported to processors. This sorting facilitates the marketing of materials later on in the cycle.

This state-of-the art Brooklyn MRF facility opened in December 2013 on an 11-acre site in Sunset Park. More than 500 tons of glass fragments were mixed with crushed rock to elevate the pier on which the MRF sits to allow for sea-level rise. The land is owned by the City, and Sims has a 20-year contract to operate the facility and options to renew for two additional ten-year periods. A 100kW wind turbine and rooftop photovoltaic modules generate about 20% of their electricity and other ecological features include a bioswale for storm water drainage and small, artificial marine habitat reefs. Tours of the MRF and adjacent education center are available, including for schoolchildren.

DSNY delivers most of the recyclable materials to the MRF by barge. Using barges is highly energy-efficient because each barge can hold as much as 100 DSNY trucks. Once at the MRF, different types of glass, metal and plastic are sorted and separated from each other. This MRF acts only as a transfer station for paper and cardboard (see below).
The sorting process is quite efficient: To avoid shut-down during maintenance, the MRF employs two sets of parallel conveyor belts (two miles long in total) as well as multiple devices such as magnets, trommel cylinders, optical scanners and eddy-current separators (described below). Some manual sorting is also done at the end of the process.

GLASS:

When the mixed metal, glass and plastic arrive at the MRF, they go through a shredder that rips open any plastic and paper bags and further breaks up the glass (much of the glass has been broken during transport). Along with the other materials, it goes over a series of steel rotors and all the small pieces of glass fall through screens with 2½-inch gaps and are collected below. Please don't put your plastic, metal and glass in individual plastic bags before placing them in other recycling containers in your building, as these bags make this separation process much more difficult.

This broken glass, along with other items that are smaller than two inches, is shipped across the harbor by barge to the Sims Glass Plant in Jersey City, NJ, where any fragments of metal, paper and plastic are separated from the glass using air knives (that blow or vacuum small pieces of paper away), magnets and eddy-current separators (that create a magnetic field that repels non-ferrous objects). Optical sorters are next used to separate clear glass from green, brown and blue glass, as well as non-bottle glass. Any pieces of aluminum, steel or other metals pulled out of the glass are transferred to the Sims Glass Plant scrap yard and later marketed.

Clear glass, also called "flint", is sold to glass bottle manufacturers. Most of the colored glass is typically re-used as a sub-base aggregate in construction and infrastructure projects. Many of the brown or green bottles we use originally contained beer and are subject to the NY State deposit law (how these are processed and recycled will be discussed in a later issue).

All the glass bottle manufacturers (such as Ardagh) are located in the NY metropolitan area because the weight of glass results in high transportation costs. At the manufacturer, this recycled flint can be combined with sand, soda ash and limestone, then heated in a furnace to about 2700 deg. F, turning the mixture into a molten liquid that is then molded to make new bottles.

METAL:

Metals can be recycled repeatedly without losing any of their basic qualities. For the sake of simplicity, we'll only consider steel and aluminum, which constitute most metal in the household waste stream.

Steel includes cans as well as other large and small objects. More than 80 million tons of steel are recycled each year in North America, including the steel used to build the Sims MRF. After the glass is separated out, a large rotating magnet and a vibrating conveyor are used to pull out metals containing steel or iron (called "ferrous metals"), which fall onto a second conveyor below.

The ferrous metals then pass through a contraption called a Trommel, which is essentially a very large cylinder with 8-inch circular holes in its sides. Steel cans and other smaller pieces of ferrous materials pass through these holes and are then compacted into large bales. Approximately 300 tons of baled tin cans are shipped out weekly by rail and barge from the Sunset Park MRF to Sims Glass Plant in Jersey City, from where the bales are transported by train directly to steel mills (such as Nucor), most of which are located in the Midwestern U.S. At the mills the bales are de-tinned, then fed into furnaces and heated to 2800 deg. F. At that temperature the metal becomes molten and can be molded into new products through casting, hot rolling or cold rolling.

Chunks of ferrous materials too big to fit through the Trommel's 8-inch holes, including large items like refrigerators or car parts, proceed on the MRF's conveyor line to be loaded later onto barges and shipped to Sims in New Jersey; here they're passed through a huge shredder that can actually shred an entire car in ten seconds! Much of this second stream of steel is transported by train to domestic markets or to Port Elizabeth, from where it's shipped overseas.

Aluminum (cans, foil, miscellaneous): After glass and ferrous metals have been removed from the mixed recyclables, non-ferrous metals and plastic proceed on the conveyor to other eddy-current separators, which induce a magnetic force in the non-ferrous metals and allow them to be pulled from the waste stream. Any other non-ferrous metals and large chunks of aluminum are later removed from the conveyor belt by hand, then loaded on barges along with iron and steel, and shipped to Sims Glass Plant scrap yard in New Jersey.

A baler compacts aluminum cans and foil, which are then picked up by trucks and brought to domestic smelters in states such as Indiana, Missouri and Tennessee, or sent to Port Elizabeth for shipping to overseas processors. At the smelters the aluminum is heated to 1350 deg. F, converting it to a liquid. (To do the same with bauxite, or aluminum ore, requires a much higher temperature and thus uses much more energy -- a primary reason why recycling aluminum is so important. The molten aluminum is poured into molds to make aluminum bars called ingots,

most of which are transported to a rolling mill, which produces sheets of aluminum that are ultimately re-manufactured into new cans and other objects.

PLASTIC:

Plastic can only be recycled a limited number of times since it tends to degrade or yellow over time. Plastic polymers have been classified into seven different types, with #7 being a miscellaneous category. The number of the polymer is usually found on the bottom of the container, bottle or jug. As noted in previous commentaries, recycling of film plastics in the NYC metro area remains problematic; check plasticbaglaws.org for updated information.

For the sake of simplicity, we'll only discuss recycling of the two most common container plastics: PET (#1, polyethylene terephthalate) and HDPE (#2, high-density polyethylene), although the MRF also recycles LDPE (#4, low-density polyethylene), which is manually sorted, polypropylene (#5, most yogurt containers), and some #7 plastics.

Regarding the other two types of plastic: PVC (#3, polyvinyl chloride) bottles are no longer manufactured because melting them during the recycling process released quantities of poisonous chlorine. Unfortunately, Sims doesn't have a current market for polystyrene (#6), although it constitutes only a small fraction of the residential plastic waste steam.

After being separated from the other materials the PET and HDPE containers are sorted by type of material using optical sorters, which scan the molecular structure of the plastic and then trigger a blast of air to send each of them onto the appropriate conveyor belt.

PET (#1): Post-consumer containers (most water, juice and soda bottles) are sorted at the MRF from other types of plastic. Clear and colored PET are then baled together to be shipped by truck to processors in the Eastern United States and Canada.

After breaking open the bales the PET processors shred the bottles into small flakes. The flakes are washed to remove labels and dirt, and a "float-sink" tank is next used to separate the caps (which float) from the PET flakes (which sink). These flakes are then melted and extruded into plastic pellets. If the pellets are going to be made into drink bottles, they must also be sterilized by being heated. The recycled PET flakes are also used to produce fiber-fill insulation or spun into thread and yard to produce fabric for outer clothing, shoes, bags, hats, strapping tape, injection-molded engineering components and building materials.

HDPE (#2) (colored or translucent) is another commonly recycled plastic, being the material of most milk jugs, detergent containers, and some yogurt containers or tubs. Natural (translucent) HDPE is more valuable for the MRF to recover, since it can be re-manufactured into either natural or colored containers, whereas colored HDPE can only be recycled into similarly colored or darker colored containers. The MRF separates HDPE containers from other plastic resins using the same type of optical sorter that removes PET from the recyclables flow. In addition, natural HDPE is separated from colored HDPE containers by the use of another optical scanner that reacts to the near-infrared light spectrum. Once separated and sorted by color, HDPE containers are checked by quality control workers, mixed with manually recovered LDPE and baled. The bales are then transported by truck to plastic processors, primarily in Pennsylvania, North Carolina and Alabama.

The plastic processor breaks open the bales and washes the containers to remove labels. Bales containing colored HDPE are further sorted into individual colors. In the same manner as PET, the containers are next shredded to produce flakes, which are washed again to remove remaining labels and dirt, and then melted and extruded into pellets. These pellets are then manufactured into new containers which are again sterilized if they will be re-formed into bottles or jugs that contain drinks. Some HDPE is also down-cycled (wherein the recycled material is of lower quality on functionality than the original) into plastic lumber, benches, trash receptacles, and other products.

A different plastic-recycling process that's increasingly popular utilizes heat compression in large rotating drums. In this process all types of mixed cleaned plastic are accepted, from containers to soft plastic bags to hard industrial waste. The most obvious benefit to this method is the fact that all plastic can be recycled together. However, the resultant material is usually of a lower quality and only suitable for applications such as plastic lumber.

PAPER:

Paper is easily recycled, although the paper fibers shorten over time, so some virgin material must occasionally be added to improve the quality of the material, particularly if the paper mill is producing high-grade office paper or corrugated cardboard (box board egg cartons are typically made of recycled material with shorter fibers). In spite of the relative ease of recycling, a great many of NYC's newspapers are still thrown into the trash rather than recycled. Recycling just a single run of the Sunday New York Times would save about 75,000 trees.

DSNY barges about half of its recycled paper and cardboard directly to Visy/Pratt in Staten Island and half to the Sunset Park MRF or other Sims locations in the Bronx or Queens. Most of the paper products originating in Manhattan are shipped from a pier on West 59th Street. Sims acts only as a transfer station for paper products; about half of the paper it receives is also sent to Visy/Pratt, this time by truck (they don't have space to accumulate quantities sufficient to barge). The rest is sold to various vendors, all in the New York City Metro area, some of whom sort it out into various grades, including office paper, newsprint and cardboard.

At Visy/Pratt on Staten Island, the recycled paper they receive isn't sorted into various grades. Mixed grades of paper and cardboard are loaded into huge vats, where they're made into a slurry. This slurry is dried and converted into large rolls of paper known as container board. Some of this container board is re-sold to manufacturers, and some is folded and glued into corrugated cardboard at Visy/Pratt. Corrugated cardboard consists of a fluted corrugated sheet that lies between two flat linerboards, all made of container board. The fluted sheet is created on flute lamination machines, also called corrugators. The corrugated sheets are then re-formed into corrugated cardboard boxes and containers of all sizes.

For more Information:

- Eadaoin Quinn, Education & Outreach, Sims Municipal Recycling
- Ars Technica video and article on Sims
- Sims tours
- Pratt Industries; tel-718-370-1114.

UWSR Eco Letter November/December 2016
COMMENTARY:
NYC Sanitation Department (DSNY) Recycling Programs

The New York City Department of Sanitation (DSNY) runs five separate programs for collecting and recycling materials or goods. Below is a brief review of these programs.

A. RESIDENTIAL COLLECTION (paper and cardboard, metal, plastic, glass):

All residential buildings and many non-profit organizations are eligible for pickup of paper, cardboard, plastic, metal and glass by DSNY. However, if a non-profit rents space in a commercially-owned building, a commercial carter will do the pickup. You can check your collection schedule on the DSNY site.

Containers and Signs
DSNY does not supply recycling bins (unless the building is part of a pilot organics program) and so buildings are responsible for providing their own bins. Blue bins should be used for plastic, metal and glass recycling; white bins for paper and cardboard recycling; and black bins for garbage.

Signs should be posted above or on top of the bins. These signs can be ordered from DSNY.

1. Plastic, Metal and Glass (in blue plastic containers)

Plastic *Accepted*:
- plastic bottles, jugs, and jars; caps and lids
- rigid plastic food containers (such as yogurt, clamshell and other plastic take-out containers)
- rigid plastic non-food containers
- rigid plastic packaging (such as " blister-pack " and " clamshell " consumer packaging, acetate boxes)
- rigid plastic housewares (such as flower pots, mixing bowls, and plastic appliances)
- bulk rigid plastic (like crates, buckets, pails, furniture, large toys, and large appliances)
- food and beverage cartons (such as milk cartons); drink boxes
- CDs, DVDs, vinyl records, disks, and CD and DVD cases

Plastic *Not Accepted*:
- batteries (remove before recycling toys and small appliances)
- plastic bags, wrappers, pouches, squeeze tubes, foam
- video and audio cassettes

Metal *Accepted* (must be at least 50% metal):
- metal cans, caps and lids
- aluminum foil wrap and trays
- wires and connectors
- small metal items (such as wire hangers, pots, tools, curtain rods, etc.)

- large metal items (such as furniture, cabinets, and appliances)

Metal *Not Accepted*:
- batteries

Glass *Accepted*:
- bottles and jars

Glass *Not Accepted*:
- window glass, light bulbs

2. Paper and Cardboard (in white plastic containers)

Paper *Accepted:*
- newspapers, magazines, catalogs, white and colored paper (including paper with staples), envelopes (including window envelopes), paper bags, cardboard, wrapping paper, paperback books (discard hard cover books in the container with your regular trash, unless you take off the cover and binding)

Cardboard *Accepted:*
- cardboard egg cartons and trays; smooth and corrugated cardboard (including boxes); pizza boxes, paper cups (waxy lining is acceptable if the cups are empty and clean; plastic lids go in the blue bin)

***Not Accepted*:**
- paper with heavy wax or plastic coating, soiled or soft paper (such as toilet paper)

B. ELECTRONICS COLLECTION

Apartment buildings with 10 or more residential units are eligible for a free DSNY pickup in a program called e-cycleNYC. The first step in this process is to schedule a site visit.

Materials for collection can be stored in a closet or in an indoor container that DSNY will supply. DSNY will not place the containers in outside areas unless they are covered and secure. For pickups, the building manager or staff member can call (212) 437-4647 or email e-cycleNYC@dsny.nyc.gov. DSNY guarantees pickup within five business days.

***Accepted*:**
- TVs; VCRs, DVRs, and DVD players
- cable and satellite boxes; video game consoles
- computers, including small servers; monitors, laptops and their peripherals, such as keyboards, hard drives, mice, cables, etc.
- printers and scanners; fax machines
- small electronics, including tablets, mobile phones and MP3 players

***Not Accepted*:**
- appliances, batteries, and light bulbs

C. TEXTILE COLLECTION

re-fashioNYC is a nonprofit partnership between DSNY and Housing Works. They provide free pick-up of textiles from residential buildings (with 10 or more units), commercial businesses and non-profit organizations. Clothing and accessories donated through re-fashioNYC are sorted at the Housing Works warehouse in Queens. All proceeds from donations support the charitable mission of Housing Works to end the dual crises of homelessness and AIDS.

To request textile recycling in your building, click here.

DSNY will visit your building to discuss how many bins you need, what sizes are best, and where they should be placed. When your bin is full, call (212)-437-4678 for pickup (guaranteed within five business days). Tax receipts (for up to $250) are available.

***Accepted*:**

- clothing, including shoes, purses, gloves, scarves, hats and belts; towels, curtains, bedding and linens.

***Not Accepted*:**

- rags and scraps, pillows, comforters, luggage or carpeting

D. ORGANICS/FOOD WASTE COLLECTION

Food scraps, spoiled food, food-soiled paper, and yard trimmings and plants - collectively known as "organics" or "organic waste" - comprise almost one-third of the waste that the DSNY collects. New Yorkers can recycle organic waste by being part of the Organics Collection Pilot Program (which applies to only certain districts of New York City) or by applying to DSNY for collection from your individual building. You can also take your food scraps to a residential drop-off site such as your local Greenmarket (see the attached Hard-to-Recycle List) or even compost in your own backyard or at a community garden site (see Urban Greening Commentary).

There are currently no organics pilot collection programs in Northern Manhattan, but individual buildings (consisting of ten or more units) or building complexes are eligible for organics pick-up. Morningside Gardens, a six-building, 980-unit coop just south of 125th Street, was one of the first high rise complexes to join the organics program. In this program, organic waste is dropped off by residents at a single collection point on the coop's property outside one of the buildings, and subsequently picked up by DSNY. After implementation of this program in 2013, GrowNYC and DSNY both performed waste audits at this complex and found significant rates of diversion from the NYC waste stream. Click here for more information.

E. OTHER DSNY PROGRAMS

1. SAFE Disposal Events and Sites:

SAFE Disposal Events usually occur once a year in each borough. At these events DSNY accepts all potentially harmful products including paint, oil, pharmaceuticals, pesticides, light bulbs,

cleaners and other related materials and goods. Events are held, rain or shine, from 10 a.m. to 4 p.m. Only NYC residential waste is accepted at SAFE Disposal Events, and no commercial vehicles are allowed. Residents must provide proof of NYC residency, such as a NYS driver's license or utility bill (for more specific information check the website below).

The Special Waste Site in Manhattan at 74 Pike Slip (between Cherry and South Sts. under the Manhattan Bridge) accepts latex paint, motor oil and filters, fluorescent bulbs, batteries, thermostats and mercury-containing devices on a weekly basis. The site is open from 10 a.m. to 5 p.m. every Saturday, except on the last weekend of the month when it is only open on Friday. It is closed during legal holidays. There is also another special waste drop-off site in the South Bronx.

2. NYC Stuff Exchange

This program, called donateNYC, helps New Yorkers give or find various goods. Residents can use donateNYC to give or find second-hand goods; businesses and nonprofits can exchange used goods; and local reuse organizations can join the donateNYC Partnership. This program also provides support for New York City's reuse community, including nonprofit organizations and local reuse businesses.

Additional Information:

- DSNY Zero Waste, or call 311
- DSNY donateNYC
- DSNY re-fashioNYC
- DSNY Electronics for Residents
- DSNY SAFE Disposal Events

UWSR Eco Letter September/October 2016
COMMENTARY:
Water Quality

Our Drinking Water

The New York City Water Supply System is quite extraordinary: Every day it provides one billion gallons of safe drinking water to more than 8.5 million residents of New York City as well as another 110 million gallons a day to about one million people living in outlying counties. In all, the New York City Water Supply System provides nearly half the population of New York State with high-quality drinking water.

Ninety percent of that water supply comes from six large reservoirs in the Catskill/Delaware watershed, which extends 125 miles northwest of the city and covers over one million acres; the rest comes from the Croton watershed in Westchester County. Two main water tunnels (or aqueducts) from the Catskill/Delaware system plunge far underneath the Hudson River in what is essentially a huge siphon, then join the Croton system at the Kensico Reservoir.

Because these tunnels were built a century ago, the City is now constructing a third water supply tunnel; when this is completed maintenance can be done on the first two. The City plans to spend $3.4 billion over the next five years for this as well as hundreds of other projects to fix water infrastructure.

The city's water main system is a 6,800-mile-long network of pipes, some of which are large enough for a man to stand inside. There is at least one water main underneath almost every street in New York City. Buildings in the City are then connected to the municipal system through smaller pipes called service lines.

As water travels over the surface of the land or through the ground, it can pick up a variety of potential contaminants, including dissolved naturally occurring minerals, microbial contaminants, inorganic contaminants, pesticides and herbicides, organic chemical contaminants, and radioactive contaminants. Therefore, the NYC Department of Environmental Protection (DEP) carefully tests the water in the distribution system, in upstate feeder streams, and in reservoirs and wells. Certain water quality parameters are monitored continuously as the water enters the distribution system, and the DEP regularly tests drinking water quality at nearly 1,000 water quality sampling stations throughout New York City.

At the Kensico Reservoir robotic buoys transmit information about water quality. Chlorine, which kills bacteria, and fluoride, for dental health, are added at that point. The DEP also conducts analyses for a broad spectrum of microbiological, chemical, and physical measures of quality, including organic compounds, bacteria, heavy metals, chlorine, Florine, temperature, alkalinity, and a variety of other parameters. According to the City's annual water quality report for 2015, New York City complied with all state and federal chemical limits.

The City also regularly tests for lead in its water mains. It is estimated that 45,000 of the more than 836,000 service lines were made of lead; other service lines may have pipes that were joined using lead soldering. Piping in older buildings is also suspect. According to the DEP, all known lead service lines to City-owned properties -- including schools, libraries and parks -- were replaced from 2008 to 2010. The DEP continues to work to identify and replace any lead that remains in NYC buildings. If you're concerned about lead or other contaminants in your drinking water, get information from the DEP's site or call the Safe Drinking Water Hotline at 1-800-426-4791.

The Hudson River and Other NYC Waters

As we all know, the Hudson River has historically been quite polluted, although the situation on the West Side of Manhattan has improved since the construction of North River Sewage Treatment Plant. However, the situation is somewhat complex, and some sewage still enters the Hudson. Rainfall is channeled into a combined sewer system that also includes food waste, greywater and sewage, all of which is then treated along with raw sewage before being discharged into the river. When the system becomes overwhelmed with storm water, it triggers Combined Sewer Overflow (CSO) events. Concentrations of bacteria such as E. coli and Enterococcus, which are indicators of fecal contamination, have been shown to increase dramatically following storm events. Reducing the volume of CSO events is part of the long-term Mayoral plan and is critical to improving the environmental quality of City rivers and bays and to expanding their future recreational use.

Hudson River water is tested by government agencies, non-profit organizations, colleges and universities, and citizen volunteers. Testing sites on the Upper West Side include: Pier 1 at 70th Street; 79th Street (mid-channel), 100th Street; 125th Street Pier; 133rd Street Kayak Dock; North River Sewage Treatment Plant (145th Street), George Washington Bridge (mid-channel), and the Dyckman Street Beach/Inwood Kayak Club. The NYC Water Trail Association publishes water testing results every Friday evening throughout the boating season.

Riverkeeper, an organization dedicated to defending the Hudson River and its tributaries and protecting our drinking water supply, oversees the largest number of water testing sites in the New York City area. Working with Columbia and Sarah Lawrence Universities, as well as a network of volunteers, they test for Enterococcus, the leading indicator of fecal contamination, as well as dissolved oxygen content. To volunteer to test Hudson River water quality, contact Jen Benson at Riverkeeper (914-478-4501 x234; jbenson@riverkeeper.org) or e-mail water-quality@nycwatertrails.org. Sampling is generally done from May to October.

Fresh Water Watch is another organization that investigates the health of NYC waterways as well as others around the world. They have worked with Dr. Wade McGillis of Lamont-Doherty Earth Observatory and corporate partners such as HSBC to monitor the quality New York City waterways, including the Hudson River. For more information see the Fresh Water Watch site or call 800-776-0188.

Because the Hudson River is a tidal estuary -- meaning it ebbs and flows with the ocean tide as well as running downstream from upstate -- it supports a biologically rich environment, making it an important ecosystem for a variety of aquatic species. For many key species it provides critical habitats and essential spawning and breeding grounds. The sea-level rise caused by global warming impacts this rich Hudson estuary. Sea level in the New York harbor is already 15 inches higher now than it was in 1850 and it is expected to rise another 11-21 inches by 2050, causing the potential for more flooding and habitat destruction.

The Hudson River's annual average water temperature has also increased by more than 2 degrees F since the late 1940's. This affects aquatic biodiversity and at times causes local species extinctions and may have other consequences as well. For example, it can alter stream metabolism and rates of nutrient cycling, reduce dissolved oxygen concentrations, and result in increased toxicity of certain environmental contaminants.

Another threat to water quality as well as the species that inhabit it is the proliferation of plastic waste, particularly bags, straws and Styrofoam. There are tens of millions of tons of plastic waste in and on our lakes, rivers and oceans. On average each of us discards about 20 single-use plastic bags every week, which totals about *9 billion bags a year in New York City alone* -- the majority of which are not recycled and are not biodegradable. Because they are so lightweight, discarded plastic bags, straws and Styrofoam are easily blown about by the wind and often washed to the shores of our waterways and then out to sea. This and other waste ends up both on top of and under the water and is time consuming and often expensive to clean up. To help alleviate this situation, there will be a volunteer shoreline cleanup on Saturday, September 17, from 10:30 a.m. to 3:30 p.m. (see Events, Other Environmental). For further information see New York Restoration Project, 254 West 31st Street, 212-333-2552.

Most of this plastic waste contamination could be avoided if people recycled more and used straws, Styrofoam and disposable plastic bags as little as possible. As mentioned in the *UWSR*

May/June Eco Letter "Commentary", a bill mandating a 5-cent surcharge on single-use plastic bags was passed this spring by the NYC City Council, but unfortunately it's currently stalled at the state level.

Rainfall

Most rainfall is naturally somewhat acidic because of the carbon dioxide in the atmosphere, having an average pH of 5.6-5.7 (neutral water has a pH of 7). The rain that falls on Manhattan is actually even more acidic, with a pH of between 4 and 5. However, current Columbia University research demonstrates that water filtered through green-roof systems ends up being considerably less acidic. This is also true of water filtered by parks, community gardens and trees -- all these having the added benefits of improving air quality, absorbing the greenhouse gas CO2 and reducing summer temperatures. The soil itself reduces acidity (buffers it) because of the limestone and other alkaline rock particles in it. Plants growing in these natural systems provide further benefit by absorbing water and hence lessening the storm water drainage problem, particularly the above-mentioned Combined Sewer Overflow (CSO) events.

The Gaia Institute in the Bronx has been developing urban storm-water capture systems that utilize soil buffers and street-side plantings that are directly connected to the standard storm drains on city streets. Because of this direct connection, road and sidewalk drainage infrastructure moves storm water into contact with natural biological and geochemical filters and also adds to the water for plantings and keep it out of the combined storm/sewer system.

A guiding principle behind this and similar systems is to intercept and utilize water as close as possible to where it falls. This is particularly important during thunderstorms, which occur primarily during summer months. Various other strategies have been conceived to accomplish this. For example, one local community garden uses a collection system that captures and stores water that falls on the roof of an adjoining building. Also, as in the Gaia system, sidewalks could be designed to intercept rainfall and funnel water into tree pits, rather than around them and into drains. And dog barriers around these pits could be constructed from perforated or permeable materials.

What You Can Do

- Test your own drinking water. Both the Cornell Cooperative Extension and the New York State Department of Health (bpwsp@health.state.ny.us; 646-632-6403) can give advice or refer you to approved testing labs. Also, water testing kits are available from companies such as Hach Chemical.
- Report rust, or other discoloration in your water to the DEP at 718-595-7000.
- Report water pollution to Riverkeeper or call 1-800-21-RIVER, ext. 231.
- Minimize your use of plastic bags, straws and Styrofoam.
- Help the New York Restoration Project clean up our shoreline on September 17th.
- Volunteer with Riverkeeper or NYC Water Trail.

Additional Information:

- The State of the Hudson 2015

- Ground and drinking water (EPA)
- Fresh Water Watch
- New York City 2015 Drinking Water Supply and Quality Report
- New York City Watersheds: An Overview with Activities
- New York City Water Trail Association
- Riverkeeper Hudson River Data
- The River Project NYC
- Safe Drinking Water Hotline, 800-426-4791.
- Ocean Conservancy

UWSR Eco Letter July/August 2016
COMMENTARY
Solar Energy Utilization

Introduction:

The same solar heat that can burn your skin at the beach radiates a daily average of four to five kilowatts of energy on each square meter of the earth's surface. Taken as a whole, our planet's surface receives quadrillions of kilowatts of solar energy each day, far more than we need for all our energy needs. It's impractical to capture all this energy, and there are conversion inefficiencies that reduce the amount available, but there's still plenty left. This solar energy can be used directly to heat water or building spaces, but today it's most commonly converted into electricity via photovoltaic (PV) cells. It can also be utilized indirectly in the form of wind or water power since both of these result from solar thermal processes. In this commentary we'll discuss only the direct uses of solar energy.

Because they were initially quite expensive, PV cells were first used in remote locations - where other sources of electricity were not readily available - for applications such as water pumping, highway lighting or signs, weather stations, maritime signals, and forest lookouts. As their cost decreased, these cells proved to be practical in small scale applications, such as powering watches, calculators, radios and other electronic devices. PV cells can also be assembled into modules or arrays of modules to produce domestic electricity or charge electric automobiles. Over the last 30 years or so, the cost has steadily declined while the efficiency of solar cells has risen. These days large PV power plants (composed of arrays of dozens or even hundreds of modules) are now cost-competitive with fossil fuel or nuclear generation of electric power.

Solar energy has been utilized to heat water primarily in residences or commercial buildings in more southerly regions. However, even in New York's relatively cold climate, solar water heaters can help provide hot water year-round. The economics of solar water heaters depends largely on the available incentives and on the type of fuel being replaced. Also, passive solar design has been increasingly employed around the country. Passive solar architecture includes placement of buildings to take the greatest advantage of solar energy, advanced window systems, use of thermal mass for heat storage, strategically located overhangs or setbacks, as well as other construction methods that increase or decrease the absorption or blocking of solar heat, depending on the season. These methods are intended to minimize outside energy usage for heating, cooling or lighting.

As solar energy has grown in popularity, it's had an increasing effect on our economy. Last year, the number of U.S. jobs in solar energy overtook those in oil and natural gas extraction for the first time. According to the International Renewable Energy Agency, employment in the U.S. solar business has recently risen 12 times faster than overall job creation.

On a Local Level

Through Governor Andrew Cuomo's NY-Sun initiative, New York State has already conducted several successful campaigns for community solarization. Almost 500 megawatts of photovoltaic panels have already been installed statewide, and three or four times that amount is in the works. The Governor plans to have half the state's power produced by renewable energy in 2030 (this would also include wind and hydro power).

The New York Solar Energy Society, based in the Bronx with membership across NY State, educates children and families about energy efficiency and renewable energy and also distributes *Green Energy Times* throughout NYC. Articles in this newsletter cover solar hot water, solar homes, retrofitting existing buildings and saving energy.

Although much of the installed photovoltaic power currently exists in upstate New York, there's a lot of horizontal (as well as vertical) space that could be used to capture solar energy in New York City. This include roof tops, vacant lots, landfills, industrial or commercial sites, public plazas, parking lots, piers and waterways, building walls, lampposts, signs, and so on. However, utilization of solar heat for energy production was minimal before the early 2000s. This was a result of barriers created by technical difficulties. inadequate policy initiatives, lack of coordination among City agencies and utilities, limited financial incentives, and insufficient standardization.

With this is mind, City University of New York (CUNY) developed a strategic solar plan for NYC in 2006. In creating the NYC Solar Partnership, they collaborated with the U.S. Department of Energy as well as with more than 30 other organizations and agencies, and conducted numerous workshops on these topics. Their work includes multiple reports, new tools such as the world's largest interactive solar map for NYC's one million rooftops and development of uniform permitting procedures for installing photovoltaics. They also provide information on financing, incentives, and zoning and net metering (net metering allows residential and commercial customers who generate their own electricity from solar power to feed electricity they do not use back into the grid and get credit for it).

Their NYC Solar Map estimates rooftop solar potential using a computer model that calculates the incoming direct and diffuse solar radiation for every square meter of the City of New York. This model is based on the position of the sun, overall atmospheric conditions, latitude and shading. This strategic solar plan also created Solar Empowerment Zones (now known as Strategic Zones) where solar power generation would provide the greatest benefits to utility electric distribution systems. In addition, CUNY worked with the NYC Solar Thermal Roundtable to produce "The NYC Solar Water Heating Roadmap," a report that creates a strategic plan for the future growth of a solar thermal market in the city. The result to date has been an exponential increase in solar production and solar jobs.

In April 2016 Mayor de Blasio introduced the Solarize NYC plan to help make solar energy more affordable. This new program allows communities to purchase solar power in blocs, saving up to 20 percent of the cost. Solarize NYC also plans to lend financial support, marketing advice and technical assistance to interested communities. The City has set a target of 250 solar panel installations on private property by 2025. The initiative is also intended to encourage developers to sell PV panels to community groups, as individual property owners often face difficulties when they try to install them on their own. This will apply to new construction as well as retrofitting existing buildings. The City has also been working with both solar developers and local utilities to resolve difficulties concerning pricing issues such as net metering (current net metering policies require utilities to buy surplus power from rooftop solar systems at retail rates).

City agencies are also getting on the solar bandwagon. The New York City Housing Authority, which provides apartments for over 400,000 low-income residents, announced that it would place PV panels on its roofs as early as next year. By 2025, the agency hopes to have added a sufficient number of solar panels to power 6,600 apartments. The Department of Education (DOE) plans to collaborate with the Department of Citywide Administrative Services to install solar panels on DOE buildings across the City. They'll also be partnering with Solar One (a local environmental education organization - see below) to instruct teachers, students and other community members about solar installations through workshops and training sessions.

As of 2016, hundreds of sites in NYC had utilized some form of solar energy; the cumulative capacity for installed photovoltaic projects was about 50 megawatts. Most of these installations are in the outer boroughs; there is currently only one in Manhattan, a 1.59 megawatt PV facility at NYC Lab Middle School For Collaborative Studies, 333 West 17th Street.

A sample of other nearby installations includes:

- Jetro Cash and Carry Restaurant Depot, Hunts Point section of the Bronx (1.56 megawatt rooftop solar PV project)
- Anheuser-Busch Warehouse, Hunts Point section of the Bronx (711 kilowatt rooftop solar PV project)
- Cornell Tech Campus on Roosevelt Island, scheduled to open in 2017, will include a 26-story passive solar residential tower as well as PV panels on the roofs of academic buildings.
- 951 Pacific Street, Brooklyn is the first passive-solar residence in NYC to be certified Net-Zero-Energy capable. It includes a rooftop PV system and many energy-efficient features, such as triple-glazed 'tilt and turn' windows and doors (more commonly used in Europe).

Click here for a list and map of NY State photovoltaic facilities currently in NYSERDA's database.

Some solar organizations based in Manhattan:

- Alt.Technica, 242 East 19th Street, New York, NY 10003; tel: (212) 260-0806;AAmon@alt-technica.com. Solar designer with an aesthetic approach to integrating sustainable energy into our built environment.

- Green Map System, 220A East 4th Street, New York, NY 10009; tel: (212) 674-1631. Mobile maps designed for smart phones or computers used to identify nearby renewable energy or environmental sites.
- Green Power Solutions, 121 East 24th Street, New York, NY 10010; tel: (718) 744-7625. Coordinates photovoltaic and solar thermal projects throughout the Northeast.
- Mpowered, 221 West 29th Street, #1105, New York, NY 10001; tel: 844-MPOWERD. Produces portable PV-powered lights that are inflatable.
- Solar One, 111 Eighth Avenue, New York, NY 10011; tel: (212) 505-6050. Clean energy and other environmental education.
- Urban Green Energy, 330 West 38th Street & 160 West End Avenue, New York, NY; tel: (917) 720-5685; info@urbangreenenergy.com. Full-service renewable energy systems, PV and wind-powered products, site assessment and design).

A list of other solar energy companies in the NYC area can be obtained athttp://www.yellowpages.com/new-york-ny/solar-power-companies.

What You Can Do

- Support any renewable energy legislation
- Buy PV-powered small electronics, e.g., calculators, watches, radios, lights
- Buy insulated window shades or drapes to control solar radiation and reduce both heating and air-conditioning loads. For more information, see our Energy Conservation Commentary.
- Get your electricity from a supplier that uses wind or hydro power (e.g., Con Ed Solutions, Green Mountain Power). For more information, see our Energy Conservation Commentary.
- Join the New York Solar Energy Society or the Northeast Sustainable Energy Association (NESEA) to learn about and support solar energy.

Further Information:

- City University of New York/Sustainable CUNY.
- Database of State Incentives for Renewables & Efficiency (DSIRE).
- Environmental Defense Fund, 257 Park Avenue South, New York, NY 10010; tel: (212) 505-2100; fax: (212) 505-2375.
- Natural Resources Defense Council, 40 West 20th Street, New York, NY 10011; tel: (212) 727- 2700; fax: (212) 727-1773; nrdcinfo@nrdc.org.
- NREL's PVWatts® Calculator.
- New York Solar Energy Society, 5270 Sycamore Avenue, Bronx, NY 10471.
- Northeast Sustainable Energy Association.
- Sane Energy Project; contact@saneenergyproject.org.
- Solar One, tel: (212) 505-6050.
- Solarize LES.

UWSR Eco Letter May/June 2016
COMMENTARY:
Waste Reduction / Zero Waste

On Earth Day 2015, Mayor de Blasio announced the city's first Zero Waste plan, an effort to rein in the costs and risks associated with disposing of the more than 10,000 tons of discards generated each day in New York that are exported -- at great expense -- to out-of-state landfills and incinerators. Since about 40% of all fossil fuel usage and its climate impact result from the production of goods in the first place, we need to fundamentally change our consumption, re-use and repair habits so we reduce the volume and toxicity of the waste we generate. Reducing waste should be our first course of action - it's simpler and less expensive than the overall process of recycling, and it also gives us significant environmental and health benefits.

FOOD WASTE

Retailers and consumers discard about 140 billion pounds of food waste each year in the United States. Locally, about one-third (by weight) of the New York City residential waste stream is composed of organic material, mostly food waste. As this waste food rots in our landfills, it releases methane, a powerful greenhouse gas. But, even before food reaches our tables, its current production and distribution require consumption of large amounts of fossil fuel; animal manure lying in fields releases a significant amount of methane gas. These and other related factors contribute even more greenhouse gas to our atmosphere. *If we consider the whole farm-to-landfill cycle, the food waste generated on our planet releases more greenhouse gas to the atmosphere than any single country other than the U.S. and China.*

This cycle also creates additional air and water pollution and depletes nutrients from our soils. Furthermore, it's an economic issue: On average, a family of four in this country spends about $1,500 a year on food that they don't eat. Thus we have a sobering scenario in which 40% of our food is wasted at the same time that millions of poor people are going hungry in our own wealthy country.

Instead of being thrown away and becoming a source of global warming and pollution, this "waste" can be put to good use. In order to do this, we need to create incentives to reduce food waste and to utilize it for other purposes, such as animal feed or compost. We should also make sure that landfill owners capture the emitted gas and utilize it for energy, rather than just allowing it to be released into the atmosphere.

What can you do in the meantime?

- When buying fresh food, buy only what you can use - or pass it along to friends and neighbors - before it goes bad.
- Use the 'first-in-first-out' principle when stocking your refrigerator to minimize spoilage.
- Use leftovers to create new meals or soup stock.
- If food does go bad, compost food scraps in your local community garden or in your own backyard. If there is no convenient back yard or community garden (see our March/April Eco Letter for locations on the Upper West Side), it's likely you're now in walking distance from a local greenmarket where you can drop off scraps for compost.

For more information on local composting or greenmarkets contact:

- Grow NYC (http://www.grownyc.org/compost), 212-788-7964);
- Lower East Side Ecology (http://www.lesecologycenter.org/; 212-477-4022);
- NYC Compost Project (www.nyc.gov/wasteless/compost).

PACKAGING

Styrofoam

As we mentioned in our January/February *Eco Letter*, single-use, expanded polystyrene (also known as Styrofoam) will *not* be banned in New York City in the near future after a December third decision from the New York State Supreme Court's Appellate Division. Fierce resistance to the ban by the polystyrene industry probably doomed it to failure. NYC Sanitation Commissioner, Kathryn Garcia, is now required to reconsider the city's Styrofoam policy in conformity with the decision and issue a new determination. The New York City Council also has the option of taking up legislation once again.

Since they are very durable (a reason to keep them out of the garbage), Styrofoam peanuts can be re-used for packaging. Most Mail Boxes Etc. and UPS Stores (800-789-4623) accept Styrofoam peanuts and other packaging materials such as bubble wrap and plastic foam. This might also be true for other local businesses that do a lot of shipping. Cornstarch peanuts, which are dissolvable in water, are becoming more common, but they have yet to gain much of a toehold -- probably again due to the influence of the polystyrene industry.

It can be difficult to recycle larger, rigid pieces of Styrofoam packaging. There is no local Styrofoam recycling facility, but it's possible to ship them back to the Alliance of Foam Packaging Recyclers at 1298 Cronson Blvd, Suite 201, Crofton, MD 21114;http://www.epspackaging.org/; 410- 451-8340). Egg cartons are another big offender when it comes to non-recyclable Styrofoam. Whenever possible, buy eggs packed in recyclable paper cartons. If you must buy egg in Styrofoam cartons, try to donate them to local farmers either directly or via your local greenmarket.

Ecovative Design, an innovative company in upstate New York, has recently developed a mushroom-based product that can be grown to fit any space, much like Styrofoam, but with completely biodegradable materials (http://www.ecovativedesign.com/; 518-273-3753). This material is just as lightweight and customizable as Styrofoam, but with much less negative environmental impact.

Plastic film

Whenever possible, avoid using plastic film (such as Saran Wrap) to cover or wrap food. Instead, store food in containers with covers or reusable zip-lock bags or wrap it in aluminum foil, which can then be washed and recycled. If you must use plastic film, you can recycle it along with plastic bags at most supermarkets. If your local supermarket is 5,000 or more square feet in size but doesn't display receptacles for plastic bags and film recycling, you can email recycling@dec.ny.gov or call (518) 402-8706; be sure to give the store name and location. For more information, seehttp://www.plasticfilmrecycling.org/ or http://www.dec.ny.gov/chemical/50042.html.

PLASTIC BAGS

Each of us discards an average of about twenty single-use plastic bags every week, which adds up to about *9 billion bags a year in New York City alone* - the majority of which are not recycled and are not biodegradable. Because they're so lightweight, discarded plastic bags are easily blown about by the wind -- we've all seen plastic bags stuck in trees or clogging storm and sewage drains, but they're also washed to the shores of our waterways and often out to sea and thus can cause harm to animals, fish and other marine-life. Supermarket plastic bags represent 2% of the city's waste stream and cost us millions of dollars each year to dispose of. Fortunately (as stated above), large NYC supermarkets are required by law to display recycling bins for bags and other plastic film in a prominent place in the store. (When you bring them, please remove any strings). Unfortunately, there's currently a very small market for recycled bags, and they can clog up the equipment used to process recyclable materials, so some plastic bags probably end up in the trash anyway.

After reviewing various legal and other challenges to getting rid of plastic bags, New York City recycling advocates and Council members drafted legislation for a per-bag fee at markets (in lieu of imposing an outright ban) to encourage shoppers to bring their own reusable bags. In the City Council, a plastic bag bill was sponsored by Councilmembers Brad Lander and Margaret Chin. The bill, *Intro 209A*, has been awaiting a vote by the New York City Council since 2014. In its current version, it would place a five-cent fee on the most common plastic and paper bags. The fee would be kept by the stores who sell the bags, not the city (so it's therefore not legally a tax, which would require state legislative approval). Other cities that have enacted a per-bag fee have found that it works well. This legislation has been held up in the City Council but will likely be considered again in early May.

Unfortunately, the plastic bag industry and their supporters have increasingly used poor people as a line of defense against the plastic bag bill, claiming that a fee on plastic bags would be a regressive, burdensome tax on them. I believe this is just a red herring. First of all, Councilman Lander, a former anti-poverty advocate, included an exemption for people who make purchases either with SNAP (food stamps) or WIC. Thus, most low-income New Yorkers would be exempt from the 5-cent fee. Also, low-income New Yorkers would likely adapt more quickly to a plastic bag fee than wealthier city residents (who might consider it an inconvenience); they're far more likely to bring their own shopping cart to the store since they can't afford a car or taxi, and adding a few reusable bags would not be a major change. If a per-bag fee truly became a burden for some low-income residents, then local churches, political offices and other community organizations could distribute re-usable cloth bags for free; these cloth bags could even have the names of companies that want to advertise on them.

With a bit of imagination, this could be quite an easy transition. Even now, it's simple to save plastic bags after unloading groceries, then bring them along to re-use them again and again at the market. The plastic bag was only invented about 50 years ago; for thousands of years prior to that, people carried food items around in cloth bags and other containers. With climate change heralding an end to the era of fossil fuels, it might also be time to send most plastic bags the way of the dinosaurs. If you must use plastic bags, try to minimize the number you take out of the market; if the check-out person gives you too many, request fewer or simply return them. At home re-use the plastic bags for future shopping, as trash bin liners, as compost containers, for dog or cat poop, and so on.

WASTE REDUCTION IN SCHOOLS

It's also important to reduce the waste in our schools, while simultaneously educating future generations to do the same. This September, over 100 New York City public schools will help launch the Zero Waste Schools Initiative, a partnership between the NYC Department of Education (DOE), the NYC Department of Sanitation, and GrowNYC's Recycling Champions Program. In the first phase of the initiative's zero waste goals, the DOE's Office of Sustainability will work with these district schools to improve their recycling and organics separation, which is already required by New York City law. The schools chosen for the first round of the Zero Waste Schools initiative are already part of the Department of Sanitation's NYC Organics Collection program (for more information, look at past Commentaries on "Organic Waste" and "Recycling in Schools".

Students in the first group of Zero Waste Schools will receive lessons and instructional materials about the environment and the importance of maintaining environmentally sustainable lifestyles. The initiative will later focus on energy conservation, renewable energy and urban greening. For more information about the DOE's Sustainability Initiative, visit: http://schools.nyc.gov/community/facilities/sustainability/home/DOEHome/.

REPAIR, DONATE OR SWAP

Repair You can also reduce waste by repairing tools, kitchen utensils, small appliances, audio-video equipment and other items rather than discarding or recycling them.

- The itinerant Pop-Up Repair is situated from time to time in greenmarkets on the Upper West Side and Inwood. For more details contact them atfixit@popuprepair.com, http://popuprepair.com/**.**
- Local retail repair stores, such as Crown Services (2792 Broadway, 212-663-8968;http://www.crownsalesandservice.com/) can fix electronics, appliances and a variety of other goods.
- For those who like to repair things themselves, IFixit provides advice, components and repair manuals for almost anything, including computers and other electronic devices. Info: (866) 613-4948; https://www.ifixit.com/Info.

Donate used goods whenever possible. At least two organizations will pick-up from your home:

- The Salvation Army (https://satruck.org/; 212-757-2311)
- United War Veterans Council (http://www.uwvcrecycling.org/: 212-838-8982).

Big Reuse (http://www.bigreuse.org/) is a non-profit retail outlet for salvaged or surplus building materials, lighting and appliances. Their re-use centers, located in Brooklyn and Queens, accept donations seven days a week as well offering free pick up and deconstruction services for large donations. Computers and other electronic devices can also be donated.

nycRecycleMe.com accepts electronic goods for re-use or recycling (http://www.nycrecycleme.com/), including flat screen monitors or TVs, CD/DVD (audio/video/software) media and portable electronics such as phones or tablets (no CRT

monitors or TV's please). Call or e-mail to schedule a pickup or get more information, 347-690-5670; nycrecycleme@gmail.com.

See our Hard-to-Recycle List for more information about thrifts stores, recyclers, and other organizations that accept used textiles, electronic items, small appliances and other goods for donation.

Swap or Loan

- GrowNYC hosts free Stop 'N' Swap events-at local greenmarkets and schools-where people can drop off unwanted clothes, books, shoes, toys and housewares, and others can grab them on a first come, first served basis.
- Check out The NYC Stuff Exchange (www.nyc.gov/stuffexchange) to find out where to get durable items sold, donated or repaired.
- Lincoln Square on the Upper West Side has a "Buy Nothing" Facebook page, a project of the Buy Nothing Project, (www.buynothingproject.org) that promotes the free exchange of items.
- You can also borrow and share tools, party supplies, board games and more from neighbors at Peerby.com or Neighborgoods.net (see below for links) or directly exchange goods among residents in your building or on your block.

OTHER IDEAS

- Avoid unnecessary purchasing of plastic items, as they're generally harder to recycle or discard than metal or glass, and plastic also decomposes very slowly. A recent local study found that there are at least 165 million particles of plastic floating in the waters surrounding NYC at any given time.
- If you have to buy plastic cups, plates or utensils, wash and then re-use them.
- Pass on children's plastic toys and clothing to relatives and friends or donate them to an organization that will assure their re-use.
- Bring any hazardous waste or otherwise non-recyclable items to the annual Safe Disposal Eventin your borough. The next one in Manhattan is on Sunday, June 26, 2016, 10 a.m.-4 p.m. at Columbia University Teachers College, 120th Street between Broadway & Amsterdam Avenue.
  Info:http://www1.nyc.gov/assets/dsny/zerowaste/residents/safe-disposal-events.shtml.

For Additional Information

- www.buynothingproject.org
- http://citylimits.org/2016/02/09/cityviewshow-new-yorkers-can-reach-towards-zero-waste-this-year/
- www.grownyc.org
- http://www.newyorker.com/magazine/2016/05/02/saving-america-from-plastic-bags
- www.nyc.gov/stuffexchange
- www.peerby.com

UWSR Eco Letter March/April 2016
COMMENTARY:
Urban Greening & Neighborhood Beautification

Sections: Tree planting & Maintenance | Neighborhood Beautification | Community Gardens
Green Roofs | Urban Agriculture & Vertical Gardens

Introduction
Urban greening and neighborhood beautification are beneficial to our community in many ways. Growing trees and other plants absorb carbon dioxide (CO2) and water and thus help mitigate the effects of climate change and flooding. They also absorb solar radiation and, in the case of trees, provide shade, both of which tend to lower the temperature in our city during hot summer days. Vegetation can provide aerial cooling through the plant-specific process of evapotranspiration (water loss through leaf pores); it also improves air quality and thereby enhances public health. Gardens add color to otherwise drab urban neighborhoods and can also be a source of locally grown food (again mitigating the effects of climate change by reducing the use of fuels to transport produce from distant locations). Beautification also discourages littering, as people are less likely to toss their refuse onto a clean street than one that's messy, and increases property values. Following is an overview of these topics as well as providing ways you can contribute to the greening and beautification of your neighborhood.

1. Tree Planting and Maintenance
There are currently over five million trees growing in NYC (almost one for each person). In addition to the above benefits, planting trees makes the city more livable and is one of the most cost-effective ways to support and advance our infrastructure. Growing trees are a net absorber of CO2 (although dead trees, when composted or burned, return CO2to the atmosphere). They cool by evaporation, transpiration (the "breathing" of the leaves of the plant) and shading, and their roots aerate compacted soil.

The MillionTreesNYC initiative was conceived with the goal of planting new street trees wherever possible on the public right-of-way. Any property owner can request a free street tree by submitting a service request to the New York City Department of Parks. For more questions about Tree Giveaways, please contact NYRP at info@nyrp.org, visit the New York Restoration Project's site at https://www.nyrp.org/ or call (212) 333-2552. You can also plant a tree on your own by obtaining a tree planting permit and hiring a landscape contractor. Street trees are required to be planted at new building and major enlargement projects. Make sure you water regularly during the growing season and add some protective fencing to discourage dogs form urinating on the soil around the tree. Add mulch to your local street tree during winter to help protect roots from harm from de-icing salt. You can learn more about how to care for your tree(s) athttp://www.milliontreesnyc.org.

The NYC Parks Department will clean up all or part of a curbside tree that is damaged as a result of weather related activity or other causes. Call 311 to report a damaged tree, to request the removal of wood debris or to request tree pruning. Alternatively, visithttp://www.nycgovparks.org/services/forestry.

According to New York City law, property owners are responsible for maintaining the sidewalks adjacent to their properties. The Parks Department will provide advice on how to construct a sidewalk to prevent buckling caused by tree roots.

Aside from the Parks Department, at least two other organizations offer tree services for Upper Manhattan:

- Trees New York (100 Gold Street, www.treesny.org) offers (for a one-time fee) a Citizen Tree Pruning Course that teaches New York City residents how to maintain their own trees. This type of stewardship can greatly reduce a tree's vulnerability to pervasive urban threats such as pedestrian and vehicular traffic, drought and storms. They also provide information about tree grates and storm water runoff.
- Green Keepers (577 Columbus Avenue, greenkeepers@goddard.org) is Goddard Riverside's social purpose business, which works with local residential and block associations in the beautification of the New York urban landscape. Green Keepers are the primary providers of tree pit renovation and reconditioning in the city, as well as improving our local environment. They also provide horticultural, sanitation and non-toxic pest control services for a list of clients that includes the Broadway Malls and Riverside Park.

2. Neighborhood Beautification

Founded in 1980, the Broadway Mall Association (www.broadwaymall.org) became a not-for-profit organization in 1987. For over 30 years it has worked with community members, other nonprofits, and the NYC Department of Parks to beautify the malls and make Broadway a healthier, greener, and more beautiful place. The malls they maintain run from 70th to 168th Streets and, taken together, essentially create a 10.6-acre parkland. BMA contracts with landscape professionals and community partners to plant annuals in the Spring, bulbs in the Fall, and provides bimonthly maintenance for trees and other plants, supplementing services provided by the NYC Department of Parks & Recreation.

The West 80s Neighborhood Association (www.west80s.org), along with other environmental and political groups, sponsors an annual Neighborhood Cleanup and Tree Bed Beautification Event where you can get mulch and a tree-care tools gift bag (one per family) that includes a beautiful double-sided "curb your dog" tree bed sign. See the Events Listing below under Urban Greening for details about the time and location of this year's event.

3. Community Gardens

Community gardens control urban temperatures, protecting us from extreme heat and cold, and help prevent flooding since the porous soil in gardens absorbs run-off rainwater. They also provide urban biodiversity and habitats for wildlife, and improve human health both psychologically and physically. Most of the gardens are located on vacant lots formerly occupied by brownstones and other smaller buildings. Two major organizations are involved in developing and maintaining local community gardens, Green Thumb and GrowNYC.

1. Green Thumb (http://www.greenthumbnyc.org/) is part of the NYC Parks Department and has been providing programming and material support to community gardens in New York City since 1970. The majority of the 600 Green Thumb gardens, once derelict vacant lots, have been renovated by volunteers. Workshops covering gardening basics as well as advanced farming techniques are held monthly throughout the year.

2. GrowNYC (http://www.grownyc.org/openspace) builds and sustains community gardens, urban farms, school gardens, and rainwater harvesting systems across New York City. To date, GrowNYC has built over 80 gardens and supported many more through tool loans, volunteers days, fact sheets, technical assistance and an annual plant sale (in late April 2016 in the Bronx and Brooklyn; see the GrowNYC website for details). GrowNYC's Green Infrastructure Toolkit is designed to educate homeowners, community gardeners and others interested in storm water management techniques that can help minimize the effects of rainfall on our combined storm/sewage system and other places that experience flooding and storm water problems. The Grow Truck Program loans out both specialized and common manual garden tools and delivers them along with plants, soil, or other garden supplies.

Grow to Learn is GrowNYC's citywide school garden initiative that was established in partnership with The Mayor's Fund to Advance NYC in 2010. Working alongside partners from NYC Parks Department's Green Thumb division and the Department of Education's Office of School Food, Grow to Learn inspires, facilitates and promotes the creation of a sustainable school garden in every public school across New York City.

Community Gardens on the Upper West Side include:

- West 87th Street Community Garden was founded in 1997 and occupies over 4,000 square feet at 55-57 West 87th Street. This flower garden, located between Central Park West and Columbus Avenue, has a toolshed, round tables, benches and a play area for children; movies are shown in warmer months. It's hosted by Green Thumb, http://www.greenthumbnyc.org/.
- West Side Community Garden, 142 West 89th Street, was founded in 1976 on a formerly trash-strewn 89,000-square-foot vacant lot on Columbus Avenue that had been slated for an urban renewal project. Groundbreaking took place in October 1987, and the land for the current site was deeded to the garden in 1989. The current design incorporates a floral amphitheater and public seating area, as well as individual plots cared for by local residents. Vegetables, herbs and flowers are grown here. Info: (212) 316-5490; http://www.westsidecommunitygarden.org.
- 91st Street Community Garden is located in Riverside Park at the north end of the Promenade (below the Soldiers and Sailors Monument). This 7,000-square-foot garden was started in 1981 by many of the same people involved in the Lotus Garden (see below). A variety of perennial and annul flowering plants grow here, as well as some herbs and shrubs. There is an open house each Saturday during the warmer months from 10 a.m. until noon, and toilet facilities are located nearby. Since 1984 this garden has been maintained by a group called the Garden People, who assign plots to people who are willing to cultivate and water them regularly. For information, see http://www.thegardenpeople.org/. To volunteer, send a note with your phone number to The Garden People, PO Box 367, New York, NY 10024 or email them at thegardenpeople@hotmail.org.
- Lotus Garden, about 7,000 square feet, is now located on the roof of a parking garage just west of Broadway on 97th Street. The garage occupies the former of the Broadway Community Garden (started in 1977). When local residents learned that this garden was slated for development, they joined with block associations to form a committee, led by community activists Carrie Maher and Mark Greenwald. They worked with would-be real estate developer William Zeckendorf, Jr. and persuaded him to transform this neighborhood green space into a rooftop garden. The Lotus Garden is open to the public

every Sunday afternoon, from the second week in April through the first week November, between 1 and 4 p.m., weather permitting. However, volunteer members have keys and access to the garden during daylight hours, seven days a week. For information seehttp://www.thelotusgarden.org.

- West 104th Street Garden, founded in 1993, is located between Manhattan Avenue and Central Park West. It is composed of two lots, both about 70 feet wide and 100 feet deep. In addition to flower and vegetable beds, the garden offers a shady gazebo, two productive peach trees, and open space for meetings, social events and performances. There's also a large communal herb garden, a patio for barbecuing and a rose arbor dedicated to the memory of Jesse Crawford, one of the chief organizers of the garden. Some of the communal beds are cooperatively tended by members, and some are assigned to individual members. The garden is overseen by Green Thumb. For information, see http://west104garden.org andhttp://www.greenthumbnyc.org/.
- La Perla Garden, named after a ghetto in San Juan, Puerto Rico, is located on a lotat 76-80 West 105th Street. Flowers, vegetables and trees are grown on a space of roughly 5,000 square feet. It contains personal gardening plots, tables and benches, as well as a stage for musical performance and an outdoor gallery. For information, see www.laperlagarden.org or email info@laperlagarden.org.
- Mobilization for Change Garden, founded in 1995 at 955 Columbus Avenue on the southeast corner at 107th Street, occupies a vacant lot about 75 feet wide and 25 feet deep. Vegetables, herbs and flowers are grown in this space, which also offers concerts during the summer. Hosted by Green Thumbhttp://www.greenthumbnyc.org/.
- West 111th Street People's Garden, founded in 1988, is on the northwest corner of 111th Street and Amsterdam Avenue. This garden, which grows flowers and shrubs, is hosted by Green Thumb, http://www.greenthumbnyc.org/.
- 227 West 115th Street Garden specializes in vegetables and herbs. A 1,900- square foot community garden in the heart of West Harlem, it was founded in 2015 with the help of GrowNYC (http://www.grownyc.org/openspace). The garden is used by neighbors, children, and community groups for growing food, celebrating holiday events and other communal gatherings.
- PS 76 Garden at 203 West 120th Street has vegetables, herbs, and flower beds in the front of the garden, an arbor with storage bins, perennials along the fences, picnic tables and a mural, and a small stage and lawn in the back. School teachers bring students into the garden as often as possible. The garden, supported by GrowNYC (http://www.grownyc.org/openspace), was built in 2002 as a replacement for the Garden of Love, formerly on 119th Street, which was bulldozed by the City in 1998.

4. Green Roofs

Green roofs are defined as vegetation-covered roof surfaces. Rooftops constitute about 20% of NYC's horizontal surface area - a surface area roughly equivalent to the total area of all of our city parks. Utilizing this surface to create green roofs has many advantages: Green roofs

- absorb carbon dioxide;
- hold water that would otherwise run off and, during periods of heavy precipitation, can overload our storm/sewer system;
- reduce the heat load on buildings during the summer and provide insulation to keep them warmer during the winter; and
- enhance biodiversity by providing a habitat for creatures such as birds, insects and worms.

Stuart Gaffin, a scientist at the Columbia University Earth Institute, has been developing green roofs in NYC for the past 10 years as well as conducting research on their effects on the ambient climate and their potential mitigation of global warming. These green roofs are in many NYC locations, including one at Lincoln Center and on local schools. For more information or advice in this area, contact Stuart at srg43@columbia.edu.

The Green Roof Tax Abatement Program (part of the NYC Department of Buildings) provides a one-time property tax abatement for properties in NYC that have green roofs. The tax abatement is equal to $4.50 per square foot of green roof space-capped at whichever is less: $100,000 or the amount of property taxes due for the building that tax year. Construction must have begun on or after August 5, 2008, and at least 50% of the roof space must be covered by green roof. For further information seehttp://www.nyc.gov/html/gbee/html/incentives/roof.shtml.

If you're thinking about starting a green roof, be sure to take into consideration building codes, the potential for leakage, and the weight loads of garden beds, soil and water. Some research has been done in which the inert component of the soil (about 95% of its weight) is composed of lightweight materials such as pulverized Styrofoam, rather than clay or sand. Paul Mankiewicz of The Gaia Institute (www.thegaiainstitute.org) has been working on lightweight soils for over twenty years, and these lightweight soils have been incorporated into green roofs on Albert Einstein Medical College and on St. Simon Stock School, both in the Bronx.

5. Urban Agriculture/Vertical Gardens

In our opinion, it's time to break our habit of purchasing fruits, vegetables and herbs that are grown thousands of miles away when many of them can be raised just as well in our own city. The benefits of moving in this direction are huge: air pollution reduction, CO2 mitigation, fresher and more nutritious produce, as well as a boost to our local economy. With this in mind, GrowNYC's FARMroots program conducts a training course for aspiring as well as experienced farmers. Students learn the skills and business acumen necessary to start their own farm businesses. You can get more information atwww.grownyc.org/farmroots.

Grow NYC's Governors Island Teaching Garden (8,000 sq. ft.) is open to students in the warmer months and gives them the opportunity to plant, water, harvest and cook the garden's wide array of vegetables, herbs and fruit. It's also open to the general public when Governors Island is. It features over 20 vegetable beds made from recycled plastic lumber, an outdoor kitchen, a large solar oven, a high tunnel greenhouse, fruit trees and rainwater harvesting systems.

Citywide, a fledgling urban agriculture infrastructure already exists. There are several urban, vegetable- and/or herb-growing gardens or greenhouses in NYC, some of which are on roof tops. For example, Brooklyn Grange (http://brooklyngrangefarm.com/), the leading rooftop farming and intensive green roofing business in the US, grows over 50,000 pounds of organically-cultivated produce each year. Another large rooftop grower is Gotham Greens (www.gothamgreens.com), which has built large, 100- percent-clean-energy-powered greenhouses that produce vegetables and herbs in Brooklyn and Queens.

Vertical farming - the growing of crops up rather than out in a closed stacked system- is another promising solution to the drawbacks of traditional agriculture in NYC. Compared to traditional agriculture, vertical farming uses less water and much less land, while harvesting up to 80% more per unit of land area. It allows farmers to produce crops year-round because

environmental factors are more controlled, including the change of seasons. This is a new technology, however, so some questions remain unanswered; e.g., how much additional energy is required; how does using lightweight soils compare to using hydroponics; does it produce additional water or soil pollution?

Trees New York (see below) has started a FruitTrees New York program, whose purpose is to plant urban orchards. They've created one at the Pleasant Village Community Garden in East Harlem. But this doesn't need to be limited to fruit trees; for example, nuts such as Hazel or Black Walnut grow perfectly well in this climate and are rich in protein. Whether they are in an orchard or nut-tree grove, these trees utilize space efficiently, provide shade and help to mitigate the rise in CO2.

Sources of Information

- Broadway Malls Association, 2095 Broadway, 212-491-6470;www.broadwaymall.org; info@broadwaymall.org
- Gaia Institute, Bronx NY, www.thegaiainstitute.org, 718-885-1906
- Green Guerillas, 232 East 11th Street, 212-594-2115;http://www.greenguerillas.org; info@nycgreens.org
- Green Keepers, 577 Columbus Avenue, 646-505-1088; greenkeepers@goddard.org
- Green Thumb, 100 Gold Street, 212-602-5300; http://www.greenthumbnyc.org/;greenthumbinfo@parks.nyc.gov
- Grow NYC, 51 Chambers Street, 212-788-7900; www.grownyc.org;http://www.grownyc.org/openspace
- Lower East Side Ecology, PO Box 20488, New York, NY 10009; 212-477-4022;http://www.lesecologycenter.org/
- New York City Department of Parks & Recreation, The Arsenal, Central Park, 830 Fifth Avenue; 311; http://www.nycgovparks.org/
- Riverside Park Conservancy, 475 Riverside Drive, 212-870-3070;https://riversideparknyc.org; mail@riversideparknyc.org
- Trees New York, 100 Gold Street, Suite 3100, 212-227-1887; www.treesny.org;info@treesny.org
- Urban Green Council, 20 Broad Street, (212) 514-9385;http://urbangreencouncil.org/; info@urbangreencouncil.org

UWSR Eco Letter January/February 2016
COMMENTARY:
Recycling Updates

Recycling in New York City continues to progress, and the following summary is intended to help you stay abreast of what's happened in the past year and to remind you of some other important developments we've mentioned previously.

Electronics

Although they constitute a small portion of the waste stream by volume, computers and electronics contribute about 70% of the heavy metals added to landfills. Since April 1, 2015, residential buildings can be fined $100 every time electronic goods are put into the building's trash. According to New York State Law (see http://www.dec.ny.gov/), the following items are specifically banned from disposal in trash in New York State:

- Televisions, including cathode ray tubes
- TV peripherals, including any permanently attached cable or wiring
- Computer peripherals, including any permanently attached cable or wiring
- Monitors
- Laptops
- Electronic keyboards
- Mice and other pointing devices
- Fax machines, document scanners, and printers that are meant for use with a computer and weigh less than 100 lbs.
- VCRs
- Digital video recorders, DVD players, digital converter boxes
- Cable or satellite receivers
- Electronic or video game consoles
- Small-scale servers
- Portable devices, including any permanently attached cable or wiring
- Portable digital music players

Fortunately, you have several options for recycling or donating used electronic goods.

- *Lower East Side Ecology*, (212-477-4022; www.lesecologycenter.org) hosts community E-waste recycling events during the year throughout Manhattan. They also operate a permanent E-waste collection center at 469 President Street in Brooklyn on Tuesdays through Saturdays. Call the collection center at (718) 858-8777 in advance for hours, materials accepted and other relevant information. All told, they collected over one million pounds of used electronic goods in 2015.
- Residential buildings with ten or more units are eligible for a free pickup of E-waste as part of the *Department of Sanitation's (DSNY) e-cycle NYC program*, which is now accessible to one million city residents. Electronic goods (including batteries) can also be dropped off at the Manhattan hazardous waste site at 74 Pike Slip between Cherry Street and South Street under the Manhattan Bridge. This site is open from 10 a.m. to 5 p.m. every Saturday and the last Friday of the month. Sites are closed on legal holidays. (tel) 311; www.nyc.gov/ecycle.)
- Some *retail stores* accept computers and other electronic goods for recycling, including Best Buy, Staples, Goodwill and Salvation Army. For example, Best Buy (www.bestbuy.com/recycling) takes a wide variety of electronic equipment. This includes computers and peripherals, video and audio equipment, ink and toner cartridges, rechargeable batteries, cameras, audio and visual equipment, as well as some appliances such as fans, vacuum cleaners and hairdryers. Call your local store before you bring in any items to find out specifically what they accept.
- *Electronic recycling options online* are www.amazon.com/trade-in (where you can get a store credit) and www.gazelle.com (which both buys and sells electronic equipment).

For more information and other options, see our attached Hard-to-Recycle List or visitwww.nyc.gov/zerowaste.

In addition, New York State law requires all stores selling cell phones to accept up to 10 cell phones from any person. You can also support a cause by recycling or refurbishing your old phone through many charitable organizations.

Rechargeable batteries are also prohibited from being put in household garbage. Instead, return them to any local store that sells the same type of battery. For information on how to recycle CFLs, non-rechargeable batteries, and other household hazardous waste, see our attached Hard-to-Recycle List.

Textiles

Every year NYC residents throw out approximately 200,000 tons of clothing, towels, blankets, curtains, shoes, handbags, belts, and other textiles. Although more and more of these materials are gradually being recycled, they still only constitute about 15% of post-consumer textile waste. The remaining 85% continues to go into the trash, so there's still a lot of work to be done.

The two major textile pick-up services in NYC are Wearable Collections (www.wearablecollections.com) and re-fashion NYC (www.nyc.gov/refashion). Wearable Collections picks up textiles from over 200 residential buildings, 31 Greenmarket sites, as well as collection drives at street fairs, schools, churches and other community organizations. They have collected over nine million pounds of clothing from Greenmarket sites alone since 2009. Clothing and accessories donated through re-fashion NYC's building recycling program are sorted at the Housing Works warehouse in Queens and help to support this non-profit organization's mission. More information about options for textile recycling (such as thrift stores and web-based services) is listed in the attached Hard-to-Recycle List.

Organics

DSNY's annual Christmas tree curbside collection begins Monday, January 4th, and runs through Friday, January 15th. City residents should remove all tree stands, tinsel, lights and ornaments from trees before putting them out for collection. Clean, non-bagged Christmas trees left on the curb will be chipped, mixed with leaves, and recycled into rich compost for the City's parks, institutions, and community gardens.

There has been a dramatic increase in the amount of NYC's organic waste that's recycled (usually composted) in recent years, although most of it is still put out with our garbage. The organics generated include food waste and yard waste, as well as Christmas trees. Three primary organizations recycle organic waste in NYC:

- Lower East Side Ecology has been involved in composting since 1990. In addition to some compost collection, they run programs that educate New Yorkers of all ages about composting through workshops, site tours, and classes, information tables, and speaking opportunities. This includes the Master Composter Certificate program, which trains a

core group of ambassadors every year to develop, maintain, and revitalize community composting projects. For more information, see www.lesecologycenter.org.

- Grow NYC (http://www.grownyc.org) collects 20 tons of food scraps each week at its Greenmarket drop-off sites (see the attached Hard-to-Recycle List for nearby locations. Much of this is picked up by the Department of Sanitation.
- DSNY now picks up organic waste in residential buildings that have 10 or more units in Upper Manhattan and throughout NYC. In addition to the materials listed above collected at the Greenmarkets, DSNY will accept eggs, dairy products, meat, fish, bones, food-soiled paper, and yard waste (leaves, grass clippings, etc.) (http://www1.nyc.gov/assets/dsny/zerowaste/residents/food-scraps-and-yard-waste.shtml).
- The de Blasio administration has announced a proposal to require large-scale commercial food establishments to separate organic waste. Materials diverted from landfills will be composted or used to create methane for fuel through anaerobic digestion. Businesses required to participate in this program will include:
    - All food service establishments in hotels with 150 or more rooms;
    - All food service vendors in arenas and stadiums with seating capacity of at least 15,000 people;
    - Food manufacturers with a floor area of at least 25,000 square feet; and
    - Food wholesalers with a floor area of at least 20,000 square feet.

The proposed rules will be subject to a public hearing and comment period and would take effect six months after they are adopted. From that point, there will be a six-month grace period before any fines can be imposed.

Paper, Plastic, Metal and Glass

The Morningside Heights /West Harlem Sanitation Coalition will work with supers, tenants or community groups to give a short, hands-on recycling workshop based on what DSNY currently accepts. Contact Joan Levine: jslevine100@msn.com.

In September 2015 the NYC Department of Education replaced styrofoam cafeteria trays with compostable paper trays in all of its schools. However, there will be no ban on expanded polystyrene foam (EPS) in New York City for the foreseeable future after a December 3rd decision from the New York State Supreme Court's Appellate Division. New York City Sanitation Commissioner, Kathryn Garcia, is now required to reconsider the city's EPS policy in conformity with the decision and issue a new determination. The New York City Council also has the option of taking up legislation once again.

We urge you to support City Council Bill, Intro. 209-2014, which would place 10-cent fees on single-use paper and plastic bags (with certain exemptions). More information is available at www.bagitnyc.org.

Miscellaneous

- Roughly speaking, the New York City residential waste stream (by weight) is composed of one-third paper goods; one-third organic material; 10% textiles, furniture and electronic goods; and the remainder construction, hazardous and miscellaneous waste. Thus it is theoretically possible to recycle well over half of the waste we produce, but factors such as a lack of individual participation or sufficient infrastructure have limited

actual recycling and reuse to a far lower percentage. Our diversity of residential building types presents a particular challenge. In order to make the necessary changes we need more legislation, more collective and individual involvement, and more money spent by the City on recycling and re-use.

DSNY is the world's largest sanitation department, collecting more than 10,500 tons of residential and institutional garbage and 1,760 tons of recyclables every day. NYC businesses generate another 13,000 tons of garbage daily, which is collected by private carting companies. This amounts to a staggering total of about nine million tons per year, about half of which is collected by DSNY. Since waste and recyclables originate from buildings ranging from single-family homes to huge residential towers, the collection of waste and recyclables is not only a huge job but a very complex one. In addition, DSNY is responsible for clearing litter, snow and ice from some 6,000 miles of our streets, as well as removing debris from vacant lots and clearing abandoned vehicles.

New York City now spends about $350 million per year on waste disposal, much of which is exported to landfills outside the city. To lessen this expense and keep our city cleaner, Mayor de Blasio has announced a goal of sending zero waste to any landfills by 2030. To achieve this, DSNY is expanding programs, enhancing outreach, and exploring new diversion strategies. NYC Recycles is now called NYC Zero Waste. More information will be released later. To find out more, see http://www1.nyc.gov/assets/dsny/zerowaste/residents.shtml.

- An article entitled :"How and Why to Get to Zero Waste," by Lisa DiCaprio and Melissa Elstein" was published in the November 24th issue of the *West Side Spirit*. This article summarizes the proceedings of a November 10th forum and can be read at www.west80s.org and clicking on the In The News tab.

- All NYC schools are mandated to recycle by Local Law 19 (passed in 1989). For the fiscal year from July 2014 to June 2015, about 13,260 tons of school waste were recycled. 53% of that total consisted of paper products, 37% of organic waste (mainly food), and the remaining 10% of plastic metal and glass. Organic waste is the fastest-growing component of this recycling program.

- Pop-up-Repair can fix, shine, polish, alter, sharpen almost anything-knives, chairs, necklaces, gloves, etc. For more information see www.popuprepair.com or e-mail them at fixit@popuprepair.com.

Other Resources (see also links in text above)
www.nyc.gov/zerowaste
http://www.grownyc.org/
www.lesecologycenter.org

UWSR Eco Letter November/December 2015
COMMENTARY:

Recycling in Schools

Since residential and school recycling are at times co-mingled in NYC Sanitation (DSNY) collection trucks, it's possible to only estimate the amount of waste produced in our schools. But that amount is considerable. A recent DSNY waste composition study reported the following distribution in the NYC school waste stream: 40% paper, 40% food waste and soiled paper; 10% metal-glass-plastic, and 10% garbage. Unfortunately, electronics, fluorescent bulbs, rechargeable batteries, and other hazardous waste items require special handling and disposal, and can't go into regular recycling or trash (see our Hard-to-Recycle List for more information on this). The good news is that an increasing amount of that school garbage is being diverted from the NYC waste stream and subsequently recycled. For the fiscal year from July 2014 to June 2015 about 13,260 tons of school waste were recycled. 53% of that total consisted of paper products, 37% of organic waste (mainly food), and the remaining 10% of plastic, metal and glass. This commentary focuses on how the DSNY and other groups are working to increase the amount of school waste diverted for recycling as well as how you might participate in this effort.

The D3 Green Schools Group was formed in late 2009 by like-minded parents who meet regularly to share ideas about sustainability issues in Upper West Side schools including recycling, energy reduction, gardens and other environmental areas. D3 Green Schools Group was responsible for developing the school organic waste pilot program described below ("D3" stands for "District 3," the school district that runs from West 59th to West 121st Street). They also conduct tours of environmental facilities, which have included the Sims/DSNY plant in Sunset Park, Brooklyn, the DEP Digester Eggs in Greenpoint, Brooklyn, as well as green roofs and photovoltaic installations on top of schools. For more information or to learn about meetings, tours and other resources, contact co-chairs Megan Nordgren (megnor72@yahoo.com) or Lisa Maller (lmaller.nyc@gmail.com). If you'd like to join the group's list-serve, send an email to d3greenschools-subscribe@yahoogroups.com.

At the initiation of the D3 Green Schools Group, eight New York City public schools housed in four buildings in District 3 on Manhattan's Upper West Side launched a four-month composting pilot program on February 27, 2012 to divert food waste (including meat and dairy), kitchen scraps, and sugar cane (bagasse) food service trays from their cafeterias and separate the organic waste from other recyclables such as plastic utensils and cups. The eight schools, with a total of 3,628 students, included:

- PS 199 (270 West 70th Street);
- PS 166 (132 West 89 Street);
- PS 334, PS 452, and MS 245 (all located at 100 West 77 Street); and
- PS 333, MS 256, and MS 258 (on the Joan of Arc campus, 154 West 93 Street).

Edward A. Reynolds West Side High School (140 West 102nd Street), which had been composting food waste and paper plates since November 2011, was not officially part of the pilot.

IESI, a private waste hauler, agreed to collect the materials daily and deliver the organic waste to the Peninsula industrial composting facility in Delaware at no cost during the four-month pilot program. By switching to compostable sugar cane trays, the schools eliminated more than 1,900 styrofoam trays from the waste stream daily. From February 27 to June 27, 2012, the diversion of trays and food waste resulted in an 85% overall reduction of cafeteria garbage by volume. Through intensive education, the schools also dramatically increased the capture of recyclables in the cafeteria. After this pilot program was completed, the D3 group convinced the DSNY to collect organics from schools. The following school year the DSNY expanded the number of schools in the organics collection program and sent DSNY trucks to collect the organic waste.

For more information on the original D3 organics pilot program, please seewww.greenschoolsny.com .

All Manhattan public schools and about 40% of public schools citywide now receive organics collection. Private schools are also eligible if they are in a current organics collection area, currently receive DSNY pickup, are non-profit, are not located in a commercial building, and don't use a private food vendor. For more information, visit the DSNY websites listed below.

In 2014 and 2015, the **DSNY Organic Waste Program** conducted three separate audits of 26 NYC schools, nine of which are in Manhattan**.** Since this program was initiated, the fraction of organics recycled (as a percentage of total recycling tonnage) has increased rapidly and will likely soon comprise the largest portion of school recycling. As a matter of fact, organics already constituted about 51% of the material recycled from the nine Manhattan schools in the latest audit. This program received a boost in September 2015 when the NYC Department of Education replaced styrofoam cafeteria trays with compostable paper trays in all of its NYC schools. In schools that receive NYC organics collection, the trays go right in the organics bin, along with food scraps. Custodial and kitchen-staff tip sheets and checklists for organic waste are included in the school recycling guide discussed below.

To work correctly, this program requires strong backing from the school principals and custodians. It also necessarily involves vigilant supervision of students as they separate organics from garbage or other recyclables (e.g., plastic utensils - sadly, most schools no longer have dishwashers so utensils can't be washed). Outside help from parents or other adults is very important to supplement the efforts of a busy staff. You can make a difference here in ensuring that this program continues and expands. To volunteer contact the principal at your local school.

DSNY School Recycling Guide: The Sanitation Department also offers collection of other recyclable material for all NYC schools and colleges (public or private). Materials picked up are plastic, metal, glass and paper. The School Recycling Guide can be seen online at the address below. It provides information about what schools are required to recycle; how to set up a school for recycling; who needs to be involved; how to communicate and educate the school's administration, custodial staff, teachers, parents and students; ideas for student activities; setting up a "green team"; and other relevant topics.

The following gives a brief summary of what is contained in the recycling guide:
All NYC schools are mandated to recycle by Local Law 19 (passed in 1989), Local Law 41 (2010), DSNY Recycling Rules, and the NYC Department of Education Chancellor's Regulation A-850 (2013). Schools must recycle in cafeterias, classrooms, offices, entrance ways, common areas, and anywhere else waste is discarded. Recyclables must be sorted into separate bins that are clearly labeled and principals are required to appoint a school Sustainability Coordinator responsible for promoting correct recycling procedures among staff and students. These requirements took a long time to be put into practice, but recycling in schools seems to have accelerated in recent years.

Setting up recycling at your school starts with planning meetings that address (among other issues) legal requirements, materials to be recycled, recycling bins and storage areas, establishment of a sustainability plan, staff responsibilities, and the integration of recycling onto the school's curriculum. Recycling areas should be set up wherever waste is discarded in your school. This includes all classrooms, offices, and common areas (hallways, auditorium, gym, library, lobbies, and outdoor areas). All classrooms need a trash bin and a clean paper/cardboard recycling bin. Some schools also set up a labeled recycling bin for metal, glass, plastic, and cartons in classrooms, or arrange to bring these materials daily to a hallway recycling bin. Schools are responsible for purchasing their own bins; public schools can purchase bins through the SDI catalog. Always place recycling and trash bins directly next to one another.

Paper and cardboard are collected by DSNY from schools on Mondays, Wednesdays and Fridays; plastic, metal and glass are collected on Tuesdays and Thursdays. Food waste is collected every school day. The percentage of a given school's waste that is actually recycled depends on the commitment of its staff, students and parents. Here again you can have an impact. One incentive for schools to recycle is the DSNY Golden Apple awards program. This program offers substantial cash prizes in three contests for NYC DOE schools: Super Recyclers, Reduce & Reuse, and Team Up to Clean Up. Several Upper West Side (D3) schools have won Golden Apple awards in the past. For information on how to enter and to look at prior winners' projects, visit www.nyc.gov/goldenapple.

GrowNYC's Recycling Champions Program (RCP) develops model recycling programs at over 100 NYC public schools each year, educating 100,000 students, staff, and, custodians about recycling. Innovative outreach developed specifically for the K-12 community includes inquiry-based, experiential student programs aligned with the Common Core, and professional development workshops for faculty and staff. Via partnerships with the NYC Department of Education Sustainability Initiative and the NYC Department of Sanitation, RCP is able to spread best practices to schools throughout the City. To learn more e-mail to the address given below or visit http://www.grownyc.org/recyclingchampions.

For more information, see:

- http://greenschoolsny.com

- http://www1.nyc.gov/site/dsny/resources/reports/organics-collection-pilot-reports-2014-2015.page
- http://www1.nyc.gov/assets/dsny/downloads/pdf/promotional-materials/school-recycling-guide-k-srg.pdf
- http://www1.nyc.gov/site/dsny/resources/initiatives/golden-apple-awards.page
- schoolrecycling@grownyc.org

UWSR Eco Letter September/October 2015
COMMENTARY:
Energy Conservation

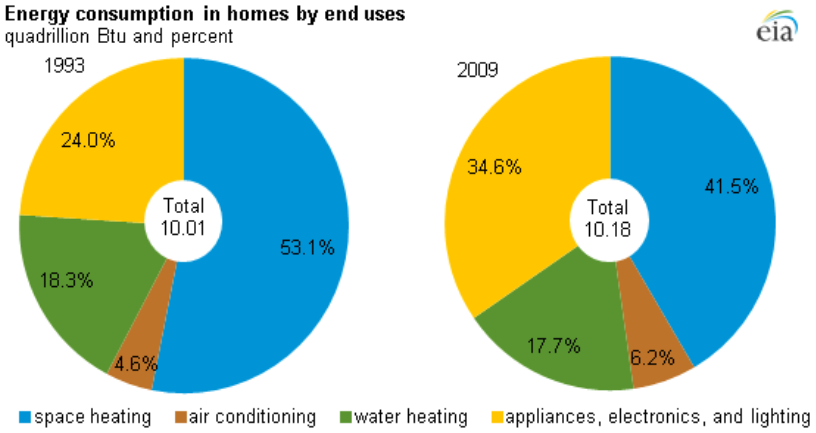
1. Introduction

An important way we can mitigate climate change is to reduce our use of energy in our homes, offices and travel. The United States is one the most profligate energy consumers among large countries on a per-capita basis. As a country, we're responsible for about one-quarter of the total carbon dioxide (CO_2) released into the Earth's atmosphere -- emitting about 7 billion tons of this greenhouse gas each year.

Much of the wasted energy stems from patterns established long before global warming became an issue: For example, shipping food and other products thousands of miles instead of relying on more locally based production; using cars with one passenger rather that public transportation; living in energy gobbling "McMansions," etc. A lot of this behavior is based on habit and perception; it doesn't require a huge effort or change in our lifestyles to gradually make a significant contribution to lowering our energy usage.

This is crunch time; it's very important that we take significant steps to reduce fossil-fuel energy consumption in the next decade to prevent the climate change scenario from becoming dire.

2. Average Energy Usage Chart in the 16 Largest States, including New York
(Source: US Energy Information Administration; www.eia.gov/consumption/residential)



Energy used for space conditioning (space and water heating, air conditioning) has declined, but *energy consumption for appliances and electronics continues to rise*. Most appliances have become more efficient, but the increased number of these devices has offset the efficiency gains. Non-weather-related energy use for appliances, electronics, water heating, and lighting now accounts for 52% of total consumption, up from 42% in 1993. The average U.S. household consumed 11,320 kilowatt hours (kWh) of electricity in 2009.

New York City is more energy efficient than most of the rest of the country in terms of per capita use. As a rule, New Yorkers consume less energy driving and consume more energy in buildings than Americans on average. Most of the electricity used in NYC is generated by the burning of fossil fuels. Since the cost of electricity per kWh is nearly 50% higher in NYC than the average for the United States, it's quite cost effective to reduce your consumption of electricity. Every kWh of electricity that you avoid using prevents about two pounds of CO_2 from being emitted into our atmosphere. This might not sound like much but, if each New Yorker used 10 kWh less electricity a year, the total of CO_2 prevented from going into the atmosphere would be about 160 million pounds.

The good news is that energy consumption in New York City declined by 7.9 percent from 2005 to 2011 (latest data available) and that our electricity is becoming somewhat cleaner. Its per capita greenhouse gas emissions level is the second lowest among major U.S. cities and is about one-third of the U.S. average. The bad news is that there is still an enormous amount of excess energy usage in NYC, resulting in a vast quantity of CO_2 being spewed into the atmosphere (48 million tons of carbon in 2013). About 70% of our NYC greenhouse gas emissions come from in-building activities such as lighting, heating, cooling, appliances, etc.

3. What You Can Do to Help in Your Home or Transportation

Year-round options:
Electrical usage

- Opt to have your electricity produced by wind power or hydroelectricity via suppliers such as Con Ed Solutions (www.conedsolutions.com, 914-286-7000) or Green Mountain Power (www.greenmountainenergy.com, 855-991-9416). This will cost you a few cents more per kWh, but it will prevent a considerable amount of CO_2 from being released into the atmosphere each year.

- Turn off lights in empty rooms and buy energy efficient light bulbs (e.g., LEDs); LEDs might be more expensive now, but they last a lot longer than either incandescent or fluorescent bulbs (including CFLs) and use a lot less energy.
- Minimize the use of small appliances based on electrical resistance heating (e.g., toasters).
- Minimize the use of TVs and computer devices, and turn them off when not in use.
- When possible, upgrade to a flat screen TV; it will use only about one-third as much electricity as your old cathode-ray-tube TV.
- Don't hold your refrigerator door open for longer than necessary; if possible, buy a new, energy-efficient refrigerator (it will pay for itself in a few years).

Heating/Hot Water

- Check the temperature of the hot water in your building with your super; if it's set at 140 degrees F, have the super reduce the setting to 120 degrees F (still plenty hot for showering or washing dishes and less likely to burn you).
- Make sure your building has insulated steam and water pipes.
- Make sure your building has its boiler tuned up or cleaned once a year. If the existing boiler is old, encourage your landlord or co-op board to buy a newer, more-efficient one; it will gradually pay for itself as it uses less heating oil.
- Make sure your building has energy-efficient clothes washers and dryers.
- Consider an energy audit of your house or apartment. You can also encourage your landlord or co-op board to have an energy audit of your whole apartment building.
- Detect leaks in your own windows by carefully using a candle on a windy day. These leaks can be inexpensively caulked or weather-stripped. If there are numerous leaks, encourage your landlord to replace the windows with new double-paned, metal-framed ones, which can significantly reduce the fuel bill every year.

Transportation

- Walk and use bikes or mass transit as much as you can.
- If you drive your own car, don't automatically turn on the air-conditioner. When you need to buy a new vehicle, make sure it gets good gas mileage.
- Share rides whenever possible.
- Buy locally-grown food and locally manufactured products as often as possible.

Summer months primarily:

- Minimize the use of your air conditioner(s) and keep it/them on a moderate setting (excessive use of air conditioners set at low temperatures can hamper your body's ability to adjust its metabolic rate). Turn your air conditioner(s) off when you're not home.
- Use fans instead of air conditioners whenever possible.
- Use insulated drapes or blinds during the day on windows exposed to direct sunlight to avoid extra heat gain.

- Open your windows at the top at night to allow heat to escape and permit cross ventilation.
- Drink water frequently; your body will feel cooler if fully hydrated.

Winter months primarily:

- Use insulated drapes or blinds during the night on all windows to reduce heat loss; open them during the day on windows exposed to the sun for extra heat gain.
- If the radiators in your apartment produce too much heat, turn down the valves rather than open windows.
- Encourage your landlord or co-op board to install thermostatic heating controls in each apartment; if that's not feasible, ask them to install multipoint-averaging thermostats.

4. Some Ideas for Reducing Energy Usage City-Wide (some may be more feasible than others)

- Require that tour buses sharply curtail idling their engines at tourist stops; mandate use of hybrids for tour buses.
- Install regenerative braking systems on NYC buses and subway cars (these recapture some of the energy expended when braking and are now available in some autos).
- Replace many of our single-passenger taxis and car services with ride-sharing and destination minibuses.
- Require that all new commercial buildings meet strict energy conservation standards; gradually implement these standards in existing buildings.
- In commercial buildings, replace windows that don't open with those that do; make sure lights operate in different areas of a floor space, rather than lighting or darkening the entire floor.
- Encourage the use of PV arrays on the roofs of residential and commercial buildings to reduce the electrical load.
- Encourage the use of green or white roofs on residential and commercial buildings to reduce the air conditioning and heating loads.
- Require Con Edison to install energy storage devices -- such as those based on very large batteries or flywheels -- to enable them to provide more energy during peak load times without having to burn extra fossil fuels.

Additional Sources of Information or Products

1. Alliance to Save Energy, Washington DC, http://www.ase.org; 202-857-0666
2. American Council for an Energy-Efficient Economy, Washington DC,www.acee.org; 202-507-4000
3. Center for Energy and Environment, Minneapolis, MN, http://www.mncee.org; (612) 335-5858
4. www.coned.com/energyefficiency
5. Home Depot (sells custom-made, plastic honeycomb insulated drapes, LED lightbulbs, etc.), www.homedepot.com
6. New York City Economic Development Corporation, www.nycedc.com
7. US Energy Information Administration, Washington DC, Residential Energy Consumption Survey, www.eia.gov/consumption/residential

UWSR Eco Letter July/August 2015
COMMENTARY:
Climate Change and Global Warming

1. Introduction

Climate change is like the elephant in the room that many people avoid looking at or, if they do, feel it's so large that little can be done about it. But that elephant is real - regardless of whether some extremists vociferously deny its existence - and it will have profound effects on our planet if we continue on our current course of action, particularly in regard to the burning of fossil fuels. The Earth's climate has been relatively stable for the past 12,000 years; this stability has been crucial for the development of our modern civilization and life as we know it. Our stability is now threatened, and the faster the climate changes, the harder it could be to adapt to the new conditions.

At the root of the current global warming trend is the "greenhouse effect" - warming that results when the Earth's atmosphere traps heat radiating back out from the Earth's surface toward space. The heat-trapping nature of carbon dioxide, methane and other gases was demonstrated long ago in the mid-19th century. More recently, ice cores drawn from Greenland, Antarctica, and tropical mountain glaciers confirm that the Earth's climate is responding to changes in greenhouse gas levels. Over the last century the burning of fossil fuels like coal and oil has resulted in an increase in atmospheric greenhouse gases such as carbon dioxide (CO_2) and methane (CH_4). For example, measured CO_2 levels have risen from about 280 parts per million (ppm) in pre-industrial times to about 400 ppm now. To underscore the significance of this rise it is important to note that scientific evidence indicates that CO_2 has not been above about 300 ppm at any other time in the past 600.000 years.

There is now no doubt that increased levels of greenhouse gases cause the Earth to warm in response, and additional effects seem likely in the future:

- On average, the Earth will become warmer, even if some regions do not. Since 1880 the mean global temperature has increased by 1.4 degrees Fahrenheit. This might not seem like much, but the rise in temperature is already having a number of adverse effects, some of which might become irreversible.
- A greater greenhouse effect will warm the oceans and melt glaciers and ice sheets, thereby increasing sea levels. Ocean water will also expand as it warms, contributing further to sea level rise.
- Warmer conditions may lead to increased evaporation and subsequently more precipitation overall. Thus, it is likely there will be more extreme precipitation events. However, individual regions will vary, some becoming wetter and others drier.
- While some crops and other plants may respond favorably to increased atmospheric CO_2, plants in other areas will be adversely affected. Of particular concern in the United States are the large food-producing regions in the Southwest and in California, which climate models predict will become hotter and drier.

2. Evidence for Climate Change

- Most of the above-mentioned global warming has occurred since the 1970s, during a period of greatly increased global usage of fossil fuels. The 20 warmest years in recorded history have all occurred since 1981, with the 10 warmest taking place within just the last 12 years.
- Global sea level rose about 17 centimeters (6.7 inches) during the past century. This rate, however, has nearly doubled in only the last decade.
- The Greenland and Antarctic ice sheets have decreased in mass, recently losing about 15 to 20 cubic miles of ice per year. The future rate of this melting is uncertain, but there is significant evidence that it is happening at a faster rate than was previously predicted.
- Glaciers are also disappearing at an alarming rate. The glaciers and snowpack in the Himalayas are of particular concern, since they, along with the annual monsoons, supply almost all of the water in South-Central and Southeast Asia, home to about one-third of the world's population. The high Himalayas receive relatively little precipitation, meaning that the ice will regenerate at a slow rate.

Ninety-seven percent of climate scientists now agree that climate-warming trends over the past century are very likely the result of human activities. It seems useful to apply a benefit/loss analysis to this situation. Who benefits most from continuing to burn fossil fuels at the current rate, instead of accelerating a transition to renewable energy and energy conservation? Primarily the tycoons of the oil and coal industries. Who loses? All of us, particularly the billions of people living in low-lying coastal areas or those dependent on spring snow or glacial run-off for much of their water supply. And we will all suffer to a greater or lesser degree because of the probable effects on agriculture.

3. How Climate Change Will Likely Affect NYC

While climate change is a global issue, it is felt on a local scale. Heat waves, heavy downpours, and sea level rise pose growing challenges to many aspects of life in the Northeast. Infrastructure, agriculture, fisheries, and ecosystems will be increasingly compromised.

The climate of the New York City metropolitan region is changing as well - average annual temperatures are hotter, heavy downpours are increasingly frequent, and the sea is rising. For example, mean annual air temperature has increased at a rate of 0.3°F per decade (a total of 3.4°F) from 1900 to 2013 in Central Park, although the trend has varied substantially over shorter periods. Mean annual precipitation has increased at a rate of approximately 0.8 inches per decade (a total of 8 inches) from 1900 to 2013 in Central Park. Year-to-year (and multi-year) variability of precipitation has also become more pronounced, especially since the 1970s.

These trends are projected to continue and even worsen in the coming decades, increasing the risks for the people, economy, and infrastructure of New York City:

- Current mean annual temperatures are projected to increase by 4.1-5.7 °F in the 2050s; and by 5.3-8.8°F in the 2080s. Heat waves are also very likely to increase in intensity.
- Total annual precipitation will likely increase.
- The frequency of extreme precipitation events is also projected to increase.

A vivid example of an extreme weather event in our area was Hurricane Sandy in October 2012. In the last 100 years no hurricane-strength storm has come into the NYC area on a track from

east to west. Although it cannot be said with certainty that global warming was a cause of Sandy, it may have created circumstances where events like this are more likely to occur. At the very least, Sandy was a dramatic reminder of the extreme vulnerability of populations living in coastal and low-lying areas.

4. Solutions (Mitigation or Adaptation)

Because we have already experienced some degree of climate change, responding to future climate change involves a two-pronged approach, utilizing both *mitigation* and *adaptation*:

The first, and most desirable, is mitigation, which consists of reducing the amount of heat-trapping greenhouse gases streaming into the atmosphere, either by limiting the production of these gases at their sources (primarily the burning of fossil fuels to generate electricity or produce heat; or the use of gasoline for transportation). We can also mitigate climate change by accelerating our usage of renewable energy sources and energy conservation measures. A third course of action is to facilitate greenhouse gas absorption by "sinks" that accumulate and store these gases (such as the oceans, forests and soil). Mitigation also includes schemes such as carbon sequestration, which some regard as a primarily stop-gap measure and at least a partial capitulation to the fossil fuel industry

Adaptation involves adjusting to actual or expected future climate. The goal is to reduce our vulnerability to the harmful effects of climate change (like sea-level encroachment, more intense extreme weather events or food insecurity) rather than trying to reduce the emissions of the greenhouse gases themselves.

Many states and cities are beginning to incorporate climate change issues into their planning. In response to these climate challenges, New York City itself is developing a broad range of climate resiliency policies and programs as well as the knowledge base to support them.

5. What You Can Do to Help

Each of us, by making small changes in our daily lives, can have an impact. Taken collectively, these small changes can have a significant difference. Much of what you can do revolves around your personal consumption of energy from fossil fuels. Steps you can take include:

- Energy conservation options include the following: Turn off lights in empty rooms; buy energy-efficient appliances and light bulbs (e.g., LEDs); minimize the use of your air conditioner (don't leave it on when you're not home and use fans instead when possible); don't hold your refrigerator door open for longer than necessary; keep your thermostat down during the winter; and walk, use bikes or mass transit as much as you can. More information is available atwww.coned.com/energyefficiency.
- Use renewable energy such as solar, wind or hydropower. You can opt to use electricity produced by wind power or hydroelectricity via suppliers such as Con Ed Solutions (www.conedsolutions.com, 914-286-7000) or Green Mountain Power (www.greenmountainenergy.com, 855-991-9416). For a complete list of energy suppliers in New York State see www.chooseenergy.com/NewYork. If possible, have photovoltaic panels or solar water heating installed in your building (contact Urban Grown Energy, www.ugei.com).

- You can also help reduce atmospheric CO2 and CH4 by planting trees or gardens (which absorb CO2), installing a green roof, or eating less beef (cows are a major methane source)

Additional Sources of Information

- National Research Council (2006). *Surface Temperature Reconstructions for the Last 2,000 Years*. National Academy Press, Washington, DC.
- Rosenzweig et al. (2015). Building the Knowledge Base for Climate Resiliency: New York City Panel on Climate Change 2015 Report. *Annals of the New York Academy of Sciences*, Jan 2015, New York, Wiley, 150 pp. Available online athttp://onlinelibrary.wiley.com/doi/10.1111/nyas.2015.1336.issue-1/issuetoc.
- Sobel, Adam (2014). *Storm Surge: Hurricane Sandy, Our Changing Climate, and Extreme Weather of the Past and Future*. New York, Harper, 314 pp.

UWSR Eco Letter May/June 2015
COMMENTARY:
Textile Recycling

According to the Council for Textile Recycling, the clothing recycling industry diverts 3.8 billion pounds of post-consumer textile waste from the solid waste stream each year, primarily through wearable clothing dropped off at charities such as Goodwill Industries, Housing Works or The Salvation Army (see our attached Hard-to Recycle List for nearby locations).

However, an increasing number of organizations -- such as Wearable Collections and re-fashioNYC in New York City (see below) -- collect textiles from residential buildings or organizations. These textiles are distributed to various vendors in the NYC metropolitan area, sorted by the vendors into wearable or unwearable categories, and then resold for further use or recycled. Wearable or re-useable clothing (about 50%) is then distributed to markets where there is a demand for secondhand clothing; much of it goes overseas. Textiles that are not wearable are sorted by fabric type and then recycled either for industrial use (e. g., wiping rags) or scrap that will be shredded and re-constituted into lower grade fiber products such as car door panels and insulation.

Despite all this, only 15% of post-consumer textile waste is actually recycled; the remaining 85% goes into the trash. The U.S. EPA estimates that textile waste occupies nearly 5% of all landfill space in this country. The average New Yorker tosses 46 pounds of clothing and other textiles into the trash each year. All told, every year NYC residents alone discard about 200,000 tons of textiles (400 million pounds)**.** So there's still a lot of work to be done here, and you can help make a difference.

HOW TO RECYCLE YOUR TEXTILES

In Your Building

(1) ***Wearable Collections***(a for-profit organization); (646) 515-4387; www.wearablecollections.com.Free pick-up of all clothing, shoes and textiles from residences

and non-profit organizations, which are then marketed to different vendors. To date they've recycled over 5,000 tons (10 million pounds) of textiles that would have otherwise gone into landfills.

If you are in a building with 75 units or more and there is sufficient space, Wearable Collections can site a container in your building and pick it up when it's full. They can also help organize periodic textile recycling drives. Community organizations can receive a per-pound donation in return for collecting the textiles. If your building has a textile recycling drive, it's best to limit the collection to a specific time period (e. g., two weeks) so people don't procrastinate. Call or email them at info@wearablecollections.com for a quick pickup when the drive is over.

Minimum pickup: 5 large black garbage bags full of textiles.

Accepted: all clean clothing including shoes, pocketbooks, curtains, sheets, blankets, comforters, and towels.
Not Accepted: scraps, pillows, comforters, luggage or carpeting.

Types of bins or bags:
(a) *Permanent containers*: 2 types, both with a footprint of about 2 x 4 ft.
- plastic bins on wheels, about 5 ft. high, with an open top.
- stationary metal bins with a chute for depositing textiles (cannot be opened on premises once textiles have been deposited)

(b) *For textile recycling drives*: Wearable Collections will provide a metal rack and bags for textile collection (large, black plastic garbage bags can also be used).

(2) ***re-fashioNYC*** (a non-profit partnership between the NYC Department of Sanitation [DSNY] and Housing Works - see below); call 311; www.nyc.gov/refashion. Free pick-up of textiles from residential buildings, commercial businesses and non-profit organizations with 10 or more units. Clothing and accessories donated through re-fashioNYC are sorted at the Housing Works warehouse in Queens. All proceeds from donations support the charitable mission of Housing Works to end the dual crises of homelessness and AIDS.

Accepted: clothing, including shoes, purses, gloves, scarves, hats and belts; towels, curtains, bedding and linens; clean rags and clothing scraps.
Not Accepted: pillows, comforters, luggage or carpeting.

Types of bins:
DSNY will visit your building to discuss how many bins you need, what sizes are best, and where they should be placed. The re-fashioNYC donation bin is available in two sizes:
- small (2 ft. deep x 4 ft. wide x 6 ft. high) or
- large (3.5 ft. deep x 4 ft. wide x 6 ft. high).

When the bin is full, call 212-437-4678 or email re-fashionNYC@dsny.nyc.gov for a pickup (guaranteed within five business days). Tax receipts (for up to $250) are available on the bin.

Outside Your Building

(1) ***Grow NYC Greenmarkets***; (212) 788-7964, (212) 788-7476; www.grownyc.org; works with Wearable Collections, which manages the collections. Over 3 million pounds have been collected since 2007. Receipts for donated material are available upon request.

Accepted: clean and dry clothing, paired shoes, linens, handbags, belts, and other reusable textiles.
Not Accepted: scraps, rugs, carpeting, pillows, comforters, or luggage.

Take textiles to the following Greenmarkets year-round:

- 79th Street Greenmarket [79th & Columbus Avenue], 9 a.m.-1 p.m. Sundays
- 97th Street Greenmarket [97th & Columbus Avenue], 8 a.m.-2 p.m., Fridays
- Columbia University Greenmarket [Broadway between 114th-115th Sts.], 8 a.m.-3 p.m., Thursdays and Sundays
- There are also collection sites in Inwood and other Manhattan locations; check the *Grow NYC* website for locations and hours.

(2) ***Local Thrift Shops, including***:

- *Goodwill*, 217 West 79th Street, New York, NY 10024, (212) 874-5050; www.goodwill.org. (wearable clothing only)
- *Housing Works*, 306 Columbus Avenue between 74th & 75th Streets, (212) 579-7566; and 2569 Broadway between 96th & 97th Streets, (212) 222-3550; www.housingworks.org (accepts any of the items re-fashioNYC does, including non-wearable items)
- *Salvation Army*, 268 West 96th Street, New York, NY 10025; (212) 663-2258; (212) 337-7200; www.salvationarmy-newyork.org (wearable clothing only)

Other Resources

(1) Buffalo Exchange, 114 West 26th Street, New York, NY 10001. (212) 675-3535; contact@bufex.com (buys, sells and trades good used clothing and shoes; call first)

(2) Council for Textile Recycling, 3465 Box Hill Corporate Center Drive, Suite H, Abingdon, MD 21009; Phone: (443) 640-1050; Fax: (443) 640-1086; http://www.weardonaterecycle.org

UWSR Eco Letter March/April 2015
COMMENTARY:
Organic Waste

The amount of organic waste that's recycled (usually composted) in NYC has increased dramatically in recent years, though most of it is still put out with our garbage. The organics

collected include food waste and chipped trees, as well as yard waste such as grass clippings or fallen leaves (mostly done in the outer boroughs). Here we'll primarily discuss options for food waste recycling, which is most pertinent to Upper Manhattan.

Why is Organic-Waste Recycling Important?

It might seem that recycling of food waste is not particularly important since it's biodegradable and will, in theory, be turned back into soil someday. However, there are at least three very good reasons to recycle organics:

1. Any soil that's eventually produced in a landfill will be contaminated, especially by materials such as plastics and toxic heavy metals from e-waste.
2. Food waste packed into a landfill biodegrades extremely slowly since it's not exposed to the oxygen that's necessary for aerobic bacteria to break it down. An apple in this condition can remain intact for hundreds of years.
3. Organics account for almost a third of the waste produced by NYC residents. Recycling them would reduce the amount of garbage the City has to export to other municipalities around the country (and which will sit dormant in their own landfills)

If you decide to recycle food scraps, they can be collected in large yogurt containers or other covered plastic containers, plastic bags, milk cartons or in commercially-available compost pails. To reduce odors at home, store items in your freezer or refrigerator. A layer of shredded newspaper at the bottom of your storage container helps absorb moisture.

Options for Recycling Organic Waste Outside Your Building

A small number of buildings in Upper Manhattan have signed up to have their food waste collected by the Department of Sanitation (DSNY), but most of us now bring it to local Greenmarkets, from whence it's later composted by Grow NYC or DSNY. Year-round Greenmarkets operated by Grow NYC in Upper Manhattan that accept food waste include locations at: 79th Street and Columbus Avenue; 82nd Street and York Avenue; 97th Street and Columbus Avenue; 115th Street and Broadway; 175th Street and Wadsworth Avenue; and Isham Street between Seaman Avenue and Cooper Street (see www.grownyc.org/ or our Hard-to-Recycle List for more information).

Materials accepted by Grow NYC include: fruit and vegetable scraps, non-greasy food scraps (rice, pasta, bread, cereal, etc.), coffee grounds and filters, tea bags, egg and nut shells, pits, cut or dried flowers, houseplants and potting soil. (Grow NYC discourages people from bringing meat, fish, or other animal waste. Check with your local Greenmarket before bringing any animal waste to see what their policy is). Please don't put plastic or paper bags in the compost bin. Also, commercial businesses are not allowed to bring food scraps to these sites.

Since 1990, Lower East Side Ecology (see our Hard-to-Recycle List) has been a pioneer in recycling organic waste in NYC. They now collect food scraps (no animal waste) at the Union Square Greenmarket four times a week and conduct composting workshops, primarily in Lower Manhattan. See below for a March composting workshop on West 30th Street. (For information, call 212-477-4022 or go to www.lesecologycenter.org.)

How You Can Recycle Organic Waste in Your Own Building

As previously mentioned, DSNY now picks up organic waste in a few residential buildings having 10 or more units in Upper Manhattan and throughout NYC. In addition to the materials listed above collected at the Greenmarkets, DSNY will accept eggs, dairy products, meat, fish, bones, food-soiled paper, and yard waste (leaves, grass clippings, etc.). Please separate organics from your plastic, glass, and paper recycling. To enroll your building, contact DSNY at http://www1.nyc.gov/site/dsny/recycling-and-garbage/residents.page or call 311.

Residential buildings of fewer than 10 units are also eligible for DSNY pickup if they're within certain pilot districts, but none of these districts are currently in Upper Manhattan.

Organic Waste Recycling in Schools and Other Non-Profits

A pilot program for composting in public schools took place recently in Manhattan School District 3. That program was such a success that it has been expanded to all Manhattan public elementary and middle schools. Private schools and other non-profits that meet certain requirements also qualify for organic waste collection by DSNY. Participating schools are eligible for cash prizes in DSNY's Golden Apple Awards Program. For information, go to http://www1.nyc.gov/site/dsny/recycling-and-garbage/schools.page. In addition, composting grants of $100-$750 are available to local community groups through The Citizens Committee of New York (proposals must be submitted by March 27, 2015). For information, go to http://www.citizensnyc.org/grants/composting-grant.

Councilmember Helen Rosenthal is an ardent supporter of composting, and she is working with the Department of Sanitation to increase organic waste recycling opportunities on the Upper West Side. Another source of help concerning organic waste recycling is the District 3 Green Schools Committee, a coalition of parents who focus on composting and other recycling as well as on various other environmental issues. For information, go to www.greenschoolsny.com.

UWSR Eco Letter January/February 2015
COMMENTARY:
Electronic Waste

Although this is a relatively quiet time for environmental activities, we want to bring your attention to one very important change that is effective January 1, 2015: According to NY State Law, **all computers and other electronic waste from all NYC residential buildings must now be recycled**. You are now no longer permitted to throw E-Waste into the trash. To implement this law, the NYC Sanitation Department (DSNY) will no longer collect electronics left at the curb.

There is a four-month grace period before fines will be levied, but it's important to start the process now, particularly if your building is eligible for DSNY E-Waste pickup (it must have 10 or more units; see below for details).

How Can You Recycle E-Waste in Your Own Building?

This depends on the size of the building:

(1) *Apartment buildings with 10 or more residential units* are eligible for a free DSNY pickup. The first step in this process is to schedule a site visit. Check with your building management or super to confirm who will initiate the process. More information can be found and site visits scheduled via the DSNY's website; click on http://www.nyc.gov/html/nycwasteless/html/contact/enrollmentform.shtml.
There is a waiting time of several weeks before your building will receive the site visit, so it's prudent to begin as soon as possible. Materials for collection can be stored in a closet or in a container that DSNY will supply. DSNY will not place the containers in outside areas unless they are covered and secure.

Another organization that picks up E-Waste is the The Fourth Bin, but they charge a small fee to do this (tel: 646-747-5985; www.4thbin.com; ecyclenow@4thbin.com).

(2) *Apartment buildings with fewer than 10 residential units*, including single-family houses, are a bit more difficult:
- Your building might be eligible for a pickup from The Fourth Bin; contact them directly (tel: 646-747-5985; www.4thbin.com; ecyclenow@4thbin.com).
- You can use one of the options listed below for recycling electronics outside your building.
- You can work with block associations, churches or other local community groups in order to amass a sufficient quantity of E-Waste to qualify for a pick-up. UWSR will be investigating this during the spring of 2015.

Options for Recycling Electronics Outside your Building

- Electronics Recycling Events:
As most of you already know, Lower East Side Ecology operates community E-Waste collection events throughout NYC. These are always listed in our *Eco Letter*, or you can contact them directly (tel: 212-477-4022; http://lesecologycenter.org/.
- Retail Drop-Off Programs:
You can drop off used electronics (no purchase necessary) at Goodwill, Salvation Army, Best Buy, and Staples (no TVs), or at the Lower East Side Ecology Warehouse in Brooklyn. See our Hard-to-Recycle List or the Google map of NYC electronics drop-off locations https://www.google.com/maps/search/nyc+electronics+drop-off+locations/@40.7056258,-73.97968,10z/data=!3m1!4b1.
- Mail-Back Programs:
Many manufacturers of electronic goods offer these programs. Check your specific brand's website for details.
- Donate or Sell Electronics:
If they still work, you can donate or sell electronic goods. See our Hard-to-Recycle Listor click on www.nyc.gov/stuffexchange for options in your neighborhood.

Why is E-Waste Recycling Important?

Electronic waste comprises a relatively small percentage of NYC's waste stream, but it's the fastest growing part; all this new stuff is inexorably clogging landfills around the country. These materials do not biodegrade quickly; many of them will still be in the ground hundreds of years from now. Perhaps most importantly, electronic devices contain small amounts of heavy metals, some of them quite toxic (e.g., lead, cadmium). Small quantities added bit by bit over time produce a net effect that can be cumulatively destructive to our soil and water.

Please obey the new NY State law to the best of your ability. For more information on its specifics see http://www.dec.ny.gov/