



email: info@uwsr.org

Upper West Side Recycling

website: www.uwsr.org

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 bees 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 bee information