



# Belmont Citizens Forum

## Belmont: Town of Homes and Trees

*An overview of the status of town trees, past and present*

By Lucia Gates

In Belmont, we hold our trees in esteem for their beauty, shade, and the value they add to our property. Our magnificent copper beeches grow throughout town. A wonderful example of these trees stands just east of Cushing Square, along Trapelo Road. Moreover, Belmont has all of the standard Eastern urban trees—callery pears, ginkos, Norway maples—as well as the standard Eastern forest trees—maples, oaks, and pines. One of the most notable trees\* is the large dawn redwood growing in back of the town library parking lot. This tree has the potential to reach 165 feet, rising to become the tallest tree in Belmont.

What we often don't consider when admiring this bounty of trees is the current status of our town trees and what might impact them in the future. As chairman of the Shade Tree Committee, I have had the opportunity to learn some of the answers to these questions firsthand, beginning with how Belmont's tree history has informed our shade tree policies and canopied our streets.

### History

Belmont has a long and rich history of tree provenance. Local lore has it that in the early part of the 20th century, workmen from the

Arnold Arboretum drove wagons throughout Belmont hawking tree seedlings. Progeny of these trees can still be seen growing throughout town and in neighboring communities. Offspring of the original Waverley Oaks on the western border of town and in Waltham can be seen in the Beaver Brook Reservation. Branching out from there, the Olmsted workshop created plans for the original McLean property, introducing diverse urban and forest trees.

The Great New England Hurricane of 1938 had a powerful impact on Belmont and devastated the town's trees. Following the storm,



SARA MCCABE

The katsura trees that line both sides of Stone Street are included on the Shade Tree Committee's *Notable Trees in Belmont 2017* list.\*



## Belmont Citizens Forum

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**Belmont Citizens Forum Inc.** is a not-for-profit organization that strives to maintain the small-town atmosphere of Belmont, Massachusetts, by preserving its natural and historical resources, limiting traffic growth, and enhancing pedestrian safety. We do this by keeping residents informed about planning and zoning issues, by participating actively in public hearings, and by organizing forums.

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the town replaced many downed trees with Norway maples and American elms. By the 1950s, Belmont had a full and lush tree canopy. Many remember it as a time when town streets were shaded over. During this decade, the town halted tree replacement. Unfortunately, the first waves of Dutch elm disease took out many of the elm trees. Norway maples, in urban areas, proved to have short lifespans, often dying out after 60 years, and this die-off is currently affecting our tree canopy. For this reason, they are no longer planted as town trees.

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Currently we plant 130 new trees every spring, and in an average year we lose 90 trees to disease, aging, or storm damage.

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### Maintenance and Planting

Belmont has been a designated USA Tree City for over 40 years, and we were one of the first towns in our area to earn that designation. We have kept this honor by maintaining a Shade Tree Committee, providing an ordinance for tree care, funding an annual tree budget as voted by Town Meeting, and observing Arbor Day. We maintain this program through the hard work of the Highway Department, town committees, and the efforts of our town tree warden, Tom Walsh. Tom has been involved with Belmont trees nearly his entire life: his father owned a tree company with a contract to serve Belmont's trees since the 1940s.



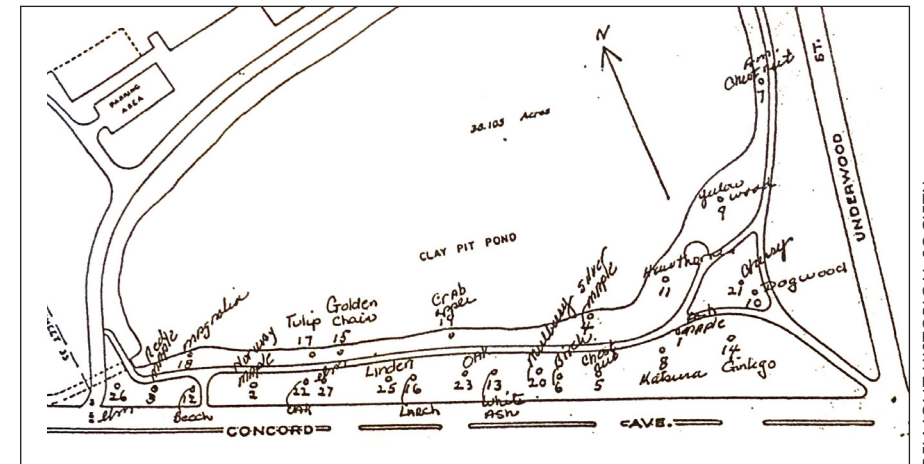
Belmont lost an estimated 1,500 trees on public property in the 1938 hurricane and countless others on private property.

In 1981, when Walsh took over as tree warden, he established a tree-planting program based on diversified tree selections. A common concern of residents was avoiding monoculture tree planting, where only one variety of tree is used. As witnessed with the elms, if this variety fails, the whole forest is lost. Belmont needed to apply a localized method, such as the 10-20-30 rule: no more than 10 percent of any single tree species; no more than 20 percent in any single tree genus; and no more than 30 percent in any single tree family. While this method was not followed in earlier days—as observed in the overplanting of elms and Norway maples—Walsh has planted for diversity. Every year he plants four to five different trees and plants 12 different types of trees over a three-year span.

### Current Status

Currently we plant 130 new trees every spring, and in an average year we lose 90 trees to disease, aging, or storm damage. Even with some loss of new trees, we are still increasing our tree stock annually. The March storms of 2018 did extensive damage, and 80 town trees had to be removed, increasing the 2018 tree loss to well over 90 trees. Public safety dictated which trees to remove first. Public Works Director Jay Marcotte requested an additional \$60,000 for tree removal by Asplundh (already under contract to the town), and this was approved by the Board of Selectmen as a reserve fund transfer.

Funding for forestry work has been included on town budgets for approximately 40 years. At the last Town Meeting, a total of \$270,495 was approved for forestry services in the Highway Department budget. Of this amount, \$222,205 is set aside for outside contractors to do the trimming, tree removals, and storm damage work. The remaining funds are used



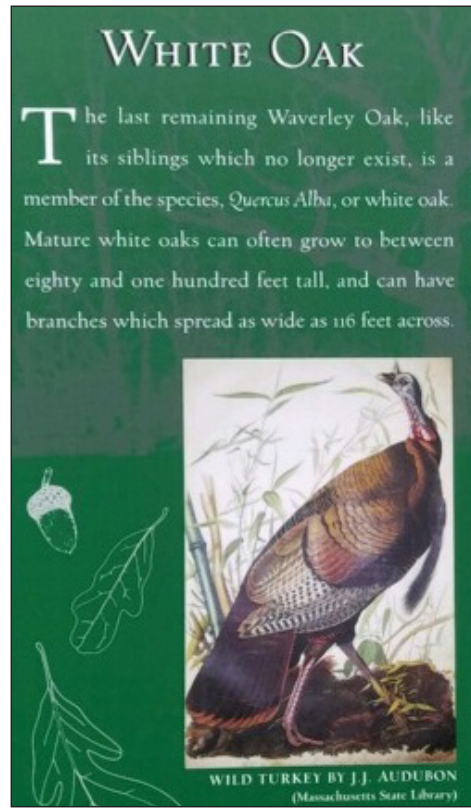
The Ruth Ippen Tree Walk honors Belmont resident Ippen for her dedication to trees and landscaping. It was created on the southeast side of Clay Pit Pond in 1971 when the high school was built. Copies of the map are available at Town Hall or the library.

to compensate the tree warden, employ police details, purchase new trees, and cover professional expenses. Because we use Highway Department employees to plant new trees, the available manpower is limited.

In addition to the town budget, new trees are planted in state road replacement projects, such as the Trapelo Road Corridor and the Belmont Center projects. Both Walsh and the Shade Tree Committee consulted extensively with state tree planners on these projects. We were able to veto trees that scatter fruits, nuts, and seeds on sidewalks. We also added trees to their lists, such as the crabapples planted on the north side of the Concord Avenue underpass.



The Waverley Trail at the Beaver Brook Reservation honors the original grove of Waverley Oaks, which in the 1890s inspired the creation of the world's first land trust and the country's first public regional park authority.



MARY BRADLEY

SARA MCCABE



The copper beech at the Beech Street Center is one of the notable trees from the 2017 list.\*

## Challenges

Developments such as the current Cushing Square project also affect our urban forest. Removal and replacement of trees in development areas are specified by the Building Department's permit process in consultation with Walsh.

Belmont trees still face many challenges. For example, white ash trees, which were once planted extensively throughout the northeast, have suffered from diseases such as ash decline. Remaining ash trees are currently under attack from the emerald ash borer, a beautifully named bug that is fatal to the tree.

To combat the ash borer, the town injected an environmentally safe pesticide into a test stand of trees. These trees, along with all the town ash trees, will be monitored. This is proving successful in other towns, but it is expensive. If the results are positive, the Highway Department, on Walsh's advice, will recommend that the Board of Selectmen adopt this strategy. The Board of Selectmen will have to decide whether to spend the money on treatments or on tree removal.

Norway maples continue to age throughout town and will continue to be removed as they die. We no longer plant these trees, but they will be with us for a very long time. They produce prolific seed pods, as any gardener can attest, and they will continue to replant themselves. Another pest, the winter moth, continues to be of concern. Belmont has not seen the extensive damage that other New England areas have and has a long-standing policy of not spraying town shade trees. This problem will continue to be monitored.

In spite of all these concerns, Belmont's trees, with town support, will continue to be one of our greatest assets into the future.

*Lucia Gates is chair of the Belmont Shade Tree Committee and a member of the Belmont Garden Club.*

\* The Shade Tree Committee's **Notable Trees in Belmont 2017** list can be found on the town website at [https://www.belmont-ma.gov/sites/belmontma/files/pages/venerable\\_trees\\_2017.pdf](https://www.belmont-ma.gov/sites/belmontma/files/pages/venerable_trees_2017.pdf).



When surrounded by beauty, we often take it for granted until we notice its decline. So it may be with our town trees. Many Belmont streets are distinguished by a canopy of large, gracious trees. But are we protecting this valuable asset? What silent threats should we be aware of to preserve this beauty?

Compacted soil and chemical leakage from cars parked off the pavement at the edge of the road, failure to water street trees during dry times, road salt, and improper pruning all weaken our trees, making them more susceptible to natural events, such as storms, aging, invasive pests, and diseases. Additionally, planting under power lines dooms many new trees to a short life.

### What can we do?

- Water our street trees as needed. This is a neighborhood responsibility; the town doesn't do it.
- Offer a front lawn for a new tree if a power line is a problem.
- Park in the street even when the street is narrow, not on the grass.
- Learn about various pests and how to fight them with non-toxic products.
- Clear mulch away from the tree's trunk.
- Consult experts as needed for healthy tree pruning.
- Be alert to posted tree removal hearings and attend with neighbors and Shade Tree Committee members.
- Adopt a "no salt" or salt/sand mix approach to your own sidewalk and driveway ice management in the winter. Calcium chloride is less environmentally damaging. Remove salt chunks left near the base of trees.

- Support and refer to research on products that target only the invasive species and are not harmful to pets, children, or pollinators.

### What can the town administration do?

- Minimize harmful exposure to natural gas by proactively addressing gas leak issues in town.
- Ensure a robust budget for planting trees. A few years ago the budget was so insufficient that a private citizen donated funds for planting trees.

Trees help reduce the impact of human activity on climate change by absorbing carbon dioxide and other pollutant particles as part of the photosynthesis process. A single tree can absorb up to 48 pounds of carbon dioxide per year, sequestering up to one ton of carbon dioxide by the time it reaches 40 years old. For a very small effort, trees offer a big payoff.

In short, be kind to trees. Let's all imagine our homes and streets without the shade and beauty of trees, and make a commitment to preserve our canopy. Contact the town tree warden, Tom Walsh, at 617-993-2680 with questions or concerns.

*Carolyn Bishop, a town resident for 44 years and longtime Town Meeting member, has served on multiple town committees, including the Conservation Commission, and on a State Advisory Committee on Pesticides.*





# LimeBikes: We Tested One for You

Two engineers analyze the pros and cons of Belmont's bike-share pilot program

By Sumner Brown and David Chase

LimeBikes are not great bicycles, but they may be the best bike for you. They came to Belmont this past July, seemingly in plentiful supply. You probably noticed them. They are bright green and yellow and designed to be noticed.

Anyone with a smartphone and a credit card can rent a LimeBike anytime. You locate an available bike with the LimeBike app, and when you finish your ride, you lock it and leave it. At \$1 per half hour, LimeBikes are almost certainly less expensive for an occasional rider than purchasing a new bicycle. They are owned and maintained by someone else. What can go wrong? Certainly not lack of support from Belmont's selectmen, who voted to be one of 15 communities in the Metropolitan Area Planning Council's regional dockless bike-share pilot program. At the Meet Belmont event on August 28, selectmen Mark Paolillo and Adam Dash were enthusiastic, calling the program a tremendous success, and Richard McLaughlin, chief of police, reported no LimeBike problems.

## Locating a Bike

David and I, both bicycle enthusiasts and engineers, rented a LimeBike to garner a sense of the mechanics and practicality of these bikes and where we see them fitting into our community.

Our first experience with LimeBikes began with disappointment. We had to walk 0.8 miles to find an available bike. Once found and rented, the LimeBike did not feel natural. The only adjustment you can make is seat height, which may not go far enough for a person taller than six feet. I wanted to change the angle of the handlebars, I did not like the angle of the seat, and the seat itself bothered me, but these are minor complaints.



SARA MCCABE

LimeBikes can usually be found in Belmont Center but are not always available in convenient locations for those wishing to pick one up in their own neighborhood.

## Others "Weigh" In

I asked a woman riding a LimeBike on the Minuteman Bikeway how she liked it.

"They're okay. Kind of heavy," she said.

"Durable, I guess," I translated.

"Yes," she labored.

LimeBikes are heavy, tipping the scales at 49 pounds, as much as a tandem or cargo bike, twice as much as a typical commuting bike, and about triple a bicycle ridden in the Tour de France. Making something durable requires more weight and cost. LimeBikes are built to last.

## Safety and Features

Our LimeBike had a bell so you can signal others that you are passing. Ours also had a cell-phone holder so you can watch your progress on the LimeBike app's map and watch the app's tally of your calories burned. I recommend not doing that.

LimeBikes come in three-speed and eight-speed varieties. Ours was a three-speed, which is adequate. The low gear was low enough for me to ride up Belmont Hill. The handling was fine; it was easy to steer the bike in little loops in the street, and it felt quite stable throughout.

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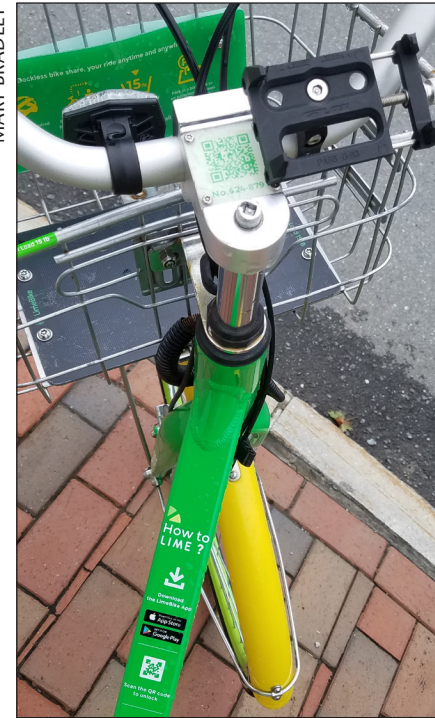
The most interesting technology in LimeBikes is the tires. They will never go flat. They do not have inner tubes or pressurized air inside.

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LimeBikes have front and rear lights that are powered by a generator in the front hub. They also have the expected reflectors: front, back, pedals, and on the front and rear spokes. In addition, the tires have reflective sidewalls—nice! The front light is not nearly bright enough to avoid rough pavement at speed in the dark. People who ride bicycles after dark should have far brighter lights. (Powerful, portable, and easily detachable lights are available at Wheelworks and other bike retailers.)

The most interesting technology in LimeBikes is the tires. They will never go flat. They do not have inner tubes or pressurized air inside. Solid tires such as these have more rolling resistance. Do not worry about that. We managed to test the resistance: after going down a slight, short slope from a very slow start, bicycles with pneumatic tires coasted about twice as far as our LimeBike. The ride still feels normal, and at normal bicycle speeds, rolling

MARY BRADLEY



Left: Instructions for LimeBikes are printed directly on the bicycle frame. In addition to a basket, most bikes have a cell-phone holder.

Below: LimeBike with reflective sidewalls and headlight (photo taken with a flash).

Bottom: LimeBike with electric assist.

SUMNER BROWN



DAVID CHASE





resistance is small compared with air drag. Enjoy the freedom from flats.

While we didn't try the more costly electric-assist versions that LimeBikes recently introduced, they are said to make short work of hills. The battery sits on top of the rear rack, and riders are cautioned not to carry passengers on top of the battery.

### LimeBike Territory

We got mixed signals about using a LimeBike outside of Belmont. My app only let me search in Belmont, although Arlington is also a LimeBike town. The app confusingly warned that part of Arlington is "out of territory" for locking a LimeBike.

Cambridge, Boston, Somerville, and Brookline have exclusive arrangements with Blue Bikes. The app shows some LimeBikes in Cambridge. Boston has confiscated some dockless share bicycles that compete with Blue Bikes.

### What Can Go Wrong?

If there are not enough LimeBikes in Belmont, finding one will be difficult, and the program will fail. The LimeBike we tested then sat unused for two weeks before someone took it away. Or if riders leave them just anywhere, people will begin to resent "Lime litter."

Parking instructions say to leave LimeBikes at bike racks or on pavement between the sidewalk and the street, but this can be problematic in areas which have none of these. One mitigating factor is that a locked LimeBike can be moved more easily than cars. Still, there is potential for trouble over parking. Lynn and Medford have both had issues with LimeBikes.

When you park your LimeBike, if there are no available bike racks, be sure not to leave it on private property, and try to minimize blocking the sidewalk, as illustrated below.

DAVID CHASE



Poorly parked bikes and "Lime litter" can become a major source of contention.

### A Work In Progress

A sign on the bicycles says, "First Ride Free." After the first free half hour, Lime gets a dollar for all or part of the next half hour, and the next, and . . . In addition, the LimeBike membership costs \$30 per month or part of a month. Paying \$360 per year for an occasional ride seems like a lot.

Stopping my LimeBike membership took over an hour of stressful aggravation. Deep within the user agreement, which goes on for many pages, are instructions for how to get out. My app, which did not let me resign without calling for help—and the mixed signals I got about using a Belmont LimeBike in Arlington—underscore that the LimeBike product is under development and is changing.

### Usefulness

We recommend LimeBikes for:

- Exercise
- Errands and light shopping
- Spontaneous adventures around town
- Leaving unattended without worry
- When your own bike is in questionable shape

We do not recommend LimeBikes for:

- Mountain biking and trail riding
- Group rides
- The thrill of riding a superb bicycle
- Commuting

There are several reasons why LimeBikes are not ideal for commuting. First, you will not want to risk walking a mile in the morning looking for a LimeBike. Second, most people carry more stuff to work than a LimeBike can fit. Third, if you bike every day, you're likely to want to customize your bike quit a bit—from pedals to hand grips to precise handlebar shape and height. Rental bikes are all quite generic. Further, winter riding is hazardous without modified gear, such as studded tires. And finally, you should not ride in the dark without real lights.

Someone else maintains LimeBikes. For those who don't like tools and getting their hands dirty, this may be their very best feature.

Find a LimeBike near you and try it. Take a moment to get the seat height about right, give the brake levers a good squeeze just in case, and you should be all set. Then send us a note at [bcfprogramdirector@gmail.com](mailto:bcfprogramdirector@gmail.com) to let us know what you think.

*Sumner Brown and David Chase are directors of the Belmont Citizens Forum. Sumner rides an old bicycle with a large plastic bucket on the back. For years he commuted to Cambridge by bicycle through Belmont Center, turning left under the railroad bridge. David rides cargo bikes on which he once carried a 20-foot extension ladder to do tree work on Channing Road, which would not be possible on a LimeBike. He commutes by bicycle to work in Cambridge.*

### Park like this...



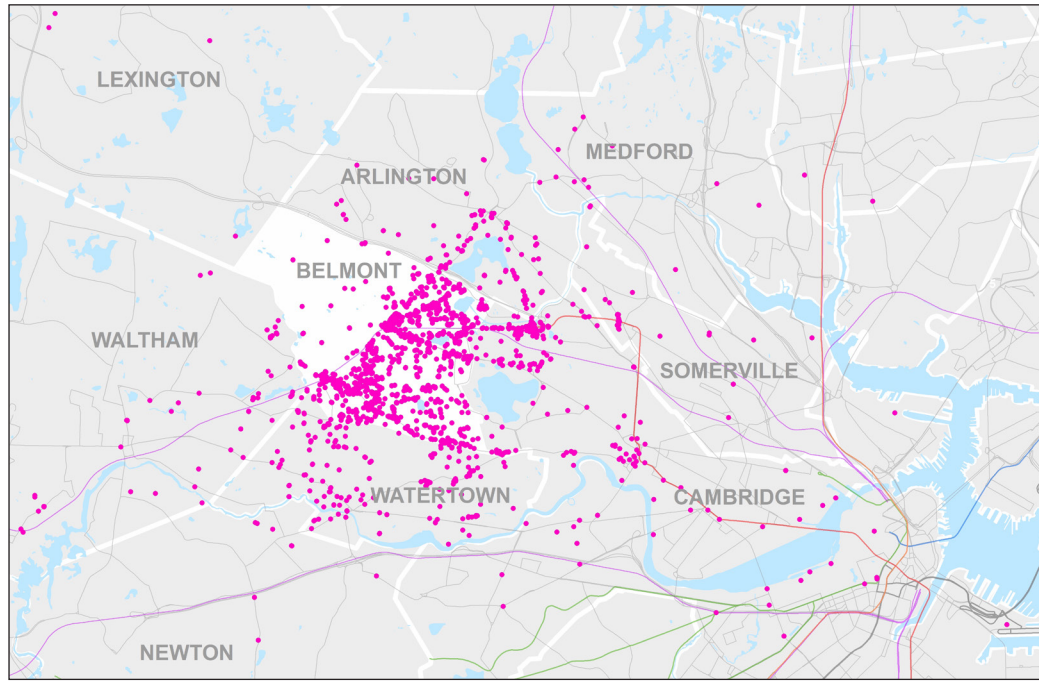
BOTH PHOTOS COURTESY OF SUMNER BROWN AND DAVID CHASE

### Not like this...



Considerate and effective parking is one of the biggest responsibilities for LimeBike riders and one of the biggest challenges for the program. It's important not to block the sidewalk, especially to allow people in wheelchairs or pushing strollers to pass easily.





Using raw data provided by Lime, the Office of Community Development, Planning Division, created this map of regional destinations, with dots marking the end points of trips that originated in Belmont from July 20 through October 23. Dark lines indicate T routes and commuter rail lines. Some riders went as far as Newton, downtown Boston, and East Medford.

# Bike-Share Comes to Belmont:

*A Conversation with Belmont Town Planner Spencer Gober*

*Questions by Mary Bradley; responses by Spencer Gober*

## What was the impetus behind bringing LimeBikes to Belmont?

As a little background, the program is led by the Metropolitan Area Planning Council (MAPC), who approached Belmont in the fall of 2017 to gauge interest in participating in a regional, dockless bike-share system. There are 14 other municipalities participating: Arlington, Bedford, Chelsea, Everett, Malden, Medford, Melrose, Milton, Needham, Newton, Revere, Waltham, Watertown, and Winthrop. MAPC observed numerous municipalities within the region piloting their own dockless bike-share programs and believed that if dockless bike-share was going to be successful and effective, it needed to be executed at the regional level. Through a public procurement process, Lime was ultimately selected to be the vendor that operated the system.

In the spring of 2018, the selectmen voted to confirm Belmont’s participation, and the first LimeBikes were launched in town in July. The program is intended to last for three years, with

the contract between MAPC and the vendor (Lime) set for annual renewal.

As part of their contractual obligation, Lime provides each participating municipality with a data dashboard that provides insights into town-wide ridership. They also provide each municipality with raw data that can then be used by the town to conduct our own analysis.

## What are some ridership highlights for Belmont, as of October 23?

- Total rides: 2,291 (2,445 if you count rides that occurred prior to Belmont’s launch in July)
- Average rides per day: 24
- Total unique riders: 1,065
- Total distance traveled: 1,895.7 miles
- Average distance: 0.83 miles
- Average time per ride: 18 minutes
- Average number of bikes in town per day: 24 (Belmont allows Lime to deploy no more than 34 bikes)

## How do you envision people using LimeBikes?

One of the primary goals of bike-share is to provide what’s called the “first mile/last mile connection.” Essentially, people living/working within a quarter-mile of a transit stop are more likely to walk, but those living just beyond typically need some sort of connection to incentivize/enable their public transit ridership. In Belmont, the average distance traveled is 0.89 miles, which indicates that many riders are using it as a “first mile/last mile” option. This is more evident on the map to the left, showing the concentration of rides ending along the Trapelo Road (MBTA Route 73) and Concord Avenue (MBTA 74/75) corridors, and at the Waverley Square and Belmont Center train stations.

Conversely, it is interesting to note the number of rides that are more regional in nature. This indicates that people are utilizing bike-share as an inter-municipal mode of transit, as MAPC anticipated. In fact, we observed bikes being ridden into town from neighboring municipalities weeks before Belmont launched.

## Is Belmont generating any revenue from our relationship with LimeBike?

The town is not currently charging a fee to Lime, and the town does not pay Lime anything to

provide their service. The town reserved the right to negotiate a fee upon the one-year anniversary date of the launch. A dollar amount has not been set.

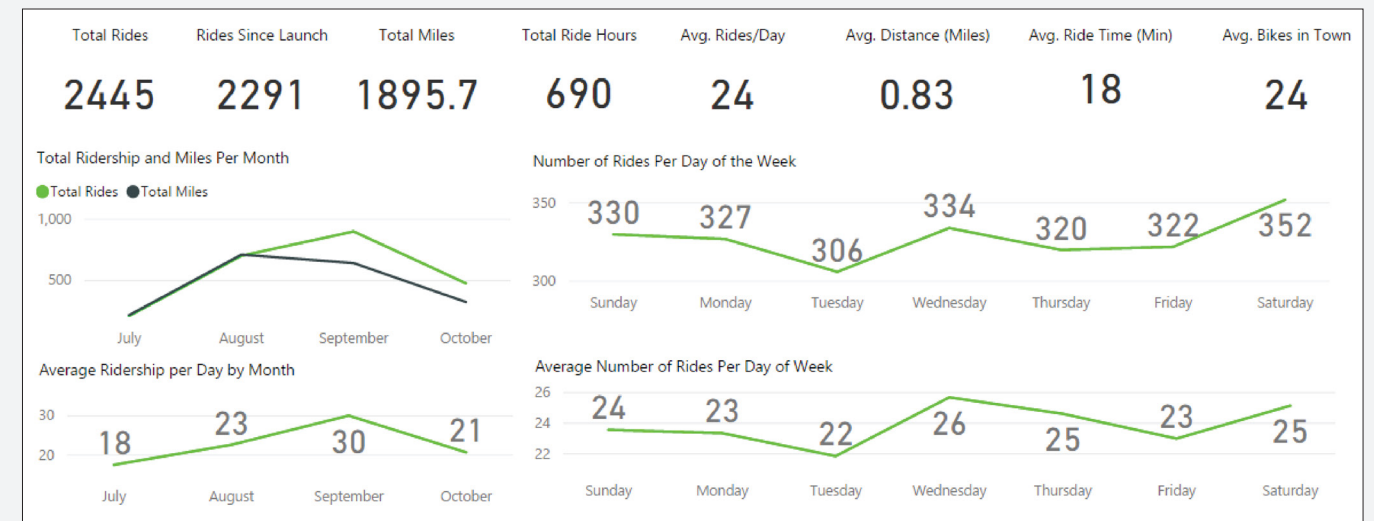
## Have there been any complaints about LimeBike?

The town is averaging less than one complaint per week, and most complaints are in regard to a bike being parked incorrectly—typically blocking the sidewalk. When we receive complaints, the town contacts Lime via their customer service as well as their local operations team. Lime is contractually obligated to remedy the issue within three hours of receiving a complaint.

I encourage residents to report bikes that are parked incorrectly and include the bicycle number. Lime is able to track the previous rider, and repeat offenders are banned from utilizing Lime in the future and may be charged additional fees. Additionally, Lime offered to provide the town with a customer service report so that we can properly monitor their response times to customer service complaints.

*Guest Editor Mary Bradley is a Town Meeting member and the founder of Belmont Porchfest.*

## Average Ridership



From July 20 to October 23, LimeBikes originating in Belmont were used for 690 hours by 1,065 unique riders who, on average, rode for 18 minutes and traveled just under a mile.





# Where Your Drinking Water Comes From

By Ria Convery

All photos, maps, and illustrations courtesy of the Massachusetts Water Resources Authority unless otherwise noted.

Have you ever wondered where your water comes from? Well, it's kind of a long story. The short answer is that Belmont, like most of eastern and central Massachusetts, gets its water from two reservoirs of the Massachusetts Water Resources Authority (MWRA): the Quabbin Reservoir in Belchertown and the Wachusett Reservoir in Clinton.

## General Plan of the MWRA Water System

Our region's water system is one of the oldest in the country. Its long history started with local wells in the 1700s, then progressed to engineering feats like the Cochituate system and the Sudbury system as metropolitan Boston looked further westward to satisfy its growing water needs.

By the late 1880s, planning began for the Wachusett Reservoir, 35 miles west of Boston. At

65 million gallons, it was the largest man-made reservoir of its time. The Wachusett Reservoir was created in the 1890s by the impoundment of the Nashua River and it is still in daily use today.

When the Wachusett could no longer meet the demands of the metropolitan area, the Quabbin Reservoir was built in the 1930s in the Swift River Valley, about 65 miles west of Boston. This reservoir famously required the destruction of four towns taken for the project—Dana, Enfield, Greenwich, and Prescott. It holds 412 billion gallons of water, which is about five years' worth.

The Quabbin and Wachusett Reservoirs are filled naturally by rain and snow that are collected by the watersheds and form streams that eventually flow into the reservoirs. More than 85% of the lands surrounding the reservoirs are covered in forest and wetlands, and about 75% of the total watershed land can't be developed because of MWRA protections. Since 1985, MWRA has invested more than \$130 million in watershed land purchases and restrictions. These natural areas help keep the water



The Wachusett Reservoir, opposite page, was the largest man-made reservoir when it was constructed in the 1890s, left, by damming the Nashua River in the Worcester County town of Clinton, 35 miles west of Boston.

Below: Ozone generators, left, and a UV reactor, right, are both effective disinfectants in the water treatment process.

clean and clear. Rangers from the Department of Conservation and Recreation (DCR) test the streams and the reservoirs often to ensure safety, and patrol them daily.

## Modernizing the Water System

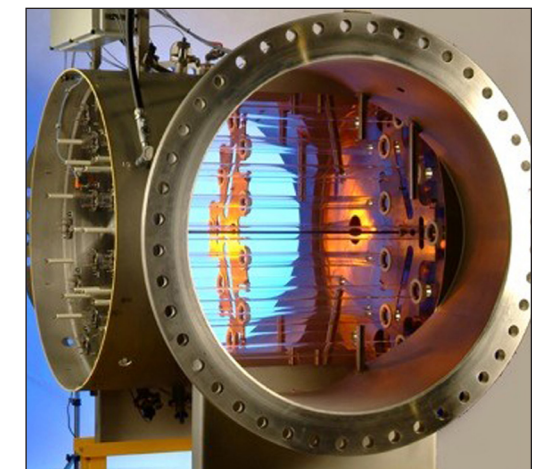
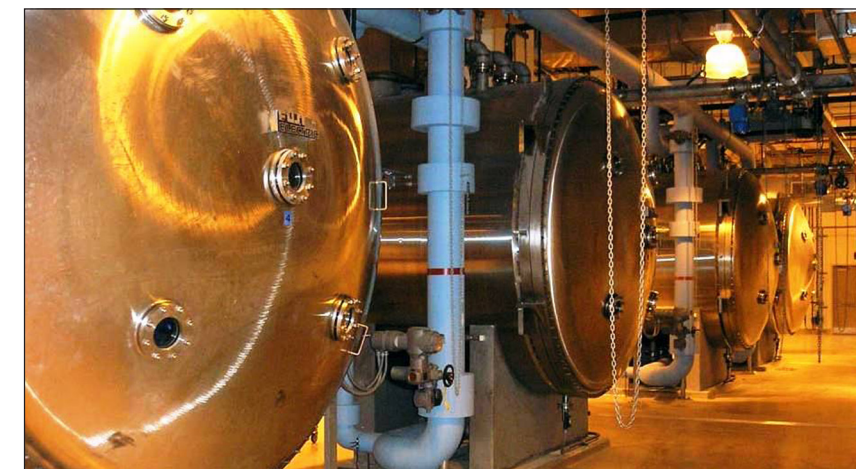
When the MWRA was created in 1985, we inherited a well-designed and well-constructed 19th-century water system that had been neglected for decades. Since then, we have invested more than \$2 billion to modernize the region's water system, largely financed by member municipalities' user rates, with some state assistance for deferred bond payments.

## John J. Carroll Water Treatment Plant

The Carroll Water Treatment Plant in Marlborough, completed in 2005, uses ozone as a primary disinfectant. (Ozone is a form of oxygen gas with an odor reminiscent of chlorine.) Ozone consists of three atoms of

oxygen and is created by applying an electrical current to pure oxygen in a specially designed stainless steel chamber. Ozone disinfects more effectively than chlorine alone, reduces the amount of potentially harmful disinfection by-products, and improves the clarity and taste of the water. Since the plant has been online, it has always met or exceeded regulatory requirements for water treatment.

In 2014, ultraviolet (UV) light treatment was added to meet a new EPA regulation that requires a second form of disinfection. UV light is essentially a more potent form of the natural disinfection from sunlight. It inactivates bacteria, viruses and other pathogens that could potentially be in the source water and that are the most difficult to kill, without adding more chemicals. The UV process, combined with high-quality source water from the watersheds, allows MWRA to meet regulatory requirements more cost effectively.





In addition to these disinfections, other treatments include ammonia derivatives (chloramine) to keep the water clean as it travels through miles of pipes; sodium carbonate to adjust the pH of the water, making it less likely to leach lead from pipes; and fluoride for dental health as recommended by the Centers for Disease Control and the World Health Organization.

### MetroWest Water Supply Tunnel

For decades, water was brought east into the city through the single-barrel Hultman Aqueduct, which became riddled with leaks. Plans for a second pipeline were shelved at the start of World War II and all but forgotten. Finally, in 1996, MWRA began the first of three contracts to mine a 17.6-mile, deep rock tunnel 200-to-500 feet below the communities of Southborough, Marlborough, Framingham, Wayland, and Weston. The \$728 million MetroWest Water Supply Tunnel was fully online by March 2004, allowing the Hultman Aqueduct

to be shut down for repair. By 2013, the two pipelines were working in tandem.

### Covered Storage Projects

Since 1996, MWRA has replaced a century-old system of open reservoirs with seven new covered storage facilities, built to comply with the Federal Safe Drinking Water Act of 1974 (amended 1986 and 1996). With covered storage, the treated water doesn't see the light of day until it gets to your tap. Covered storage protects drinking water from contamination by natural sources, including algae, bacteria, birds, and other animals. The tanks are located at key elevation points to help maintain the right pressure levels across the system.

The 200 million gallons of treated water in MWRA's storage tanks are continuously used and continuously replenished. Distributing the water in storage tanks across the system keeps a supply of treated water available for communities in the event of an emergency.

### Ongoing Pipeline Rehabilitation

MWRA continues to rehabilitate and replace our 300 miles of pipelines throughout the water system to improve both reliability and water quality. MWRA has also provided zero-interest loans to communities for local pipeline projects. Since 1998, \$370.5 million in 10-year interest-free loans have been distributed to finance 407 projects to help maintain water quality in local distribution systems.

### What's Next?

Now and for the foreseeable future, MWRA will continue to focus on ensuring redundancy for each water service area. That means providing a second means of getting water to an area if something happens to the primary pipeline such as a major water main break like the catastrophic rupture in Weston in 2010.

Redundancy work is steadily underway to the north in Stoneham, Reading, and Woburn, and to the south in Boston and Dedham. Also a new emergency pump station in Marlborough will ensure the delivery of adequate water to the treatment plant in the event of a problem with the existing system.

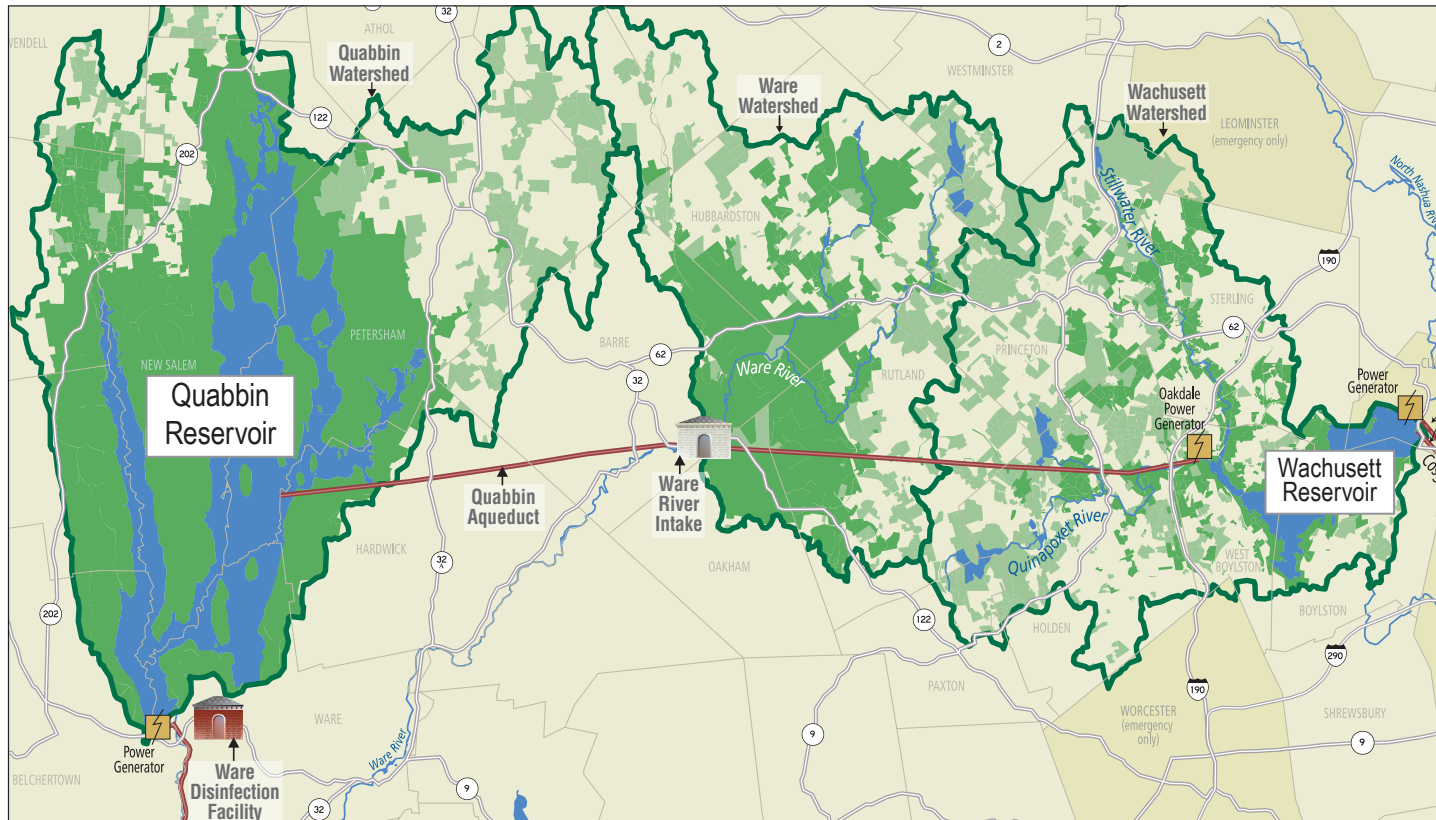
For the first time, we have full redundancy from the water treatment plant in Marlborough to the tunnels that carry water into the metro-

politan area. However, there is no redundancy for those tunnels. MWRA plans to construct two new tunnels beginning in Weston—one to the north and one to the south—to address this issue. Construction will not begin for several years, but in the interim, several smaller projects will be completed to bolster this system. One such project, currently in design, is to repair and improve the 11-mile-long Weston Aqueduct Supply Main 3 through Weston, Waltham, Belmont, Arlington, and Medford. In 2017, the MWRA hired CDM Smith and other firms to perform soil boring at 25 sites in Belmont, mostly along Pleasant Street, in preparation for this project.

MWRA also makes an effort to be green along the way. Because the Quabbin and Wachusett Reservoirs are located in the more elevated areas of central Massachusetts, more than 85% of the water we deliver is by gravity. In addition, three hydroelectric generators capture the energy of the water as it makes its way east.

### Using Less Water

When MWRA was created, water system demand routinely exceeded the safe yield of the reservoirs (the amount you can take out without causing a shortage). In the early 1990s, MWRA began a conservation program that included finding and



Belmont drinking water travels east, using gravity, from either the Quabbin or Wachusett Reservoirs to 1) the John J. Carroll Treatment Plant, 2) the Norumbega covered storage tank, and 3) the Weston Aqueduct Supply Mains at River Road and Loring Road in Weston. The Weston Aqueduct Supply Main 3 (water main) carries it through Waltham into Belmont.







Left: In 1848, more than 100,000 people celebrated the opening of the Cochituate Aqueduct at the Frog Pond on Boston Common. The aqueduct conveyed water for 14 miles from Lake Cochituate to the Brookline Reservoir, after which small pipelines distributed it throughout Boston.

Below: Water service areas are determined by elevation. Higher locations require pumping.

repairing large leaks that had been ignored for years, distributing low-flow plumbing fixtures to all homes in the service area, and educating homeowners on water-saving measures. Since then, water usage levels have continued to drop year after year from over 325 million gallons per day (mgd) in the late 1980s to around 200 mgd today. Several other factors have played an important role in conservation, such as new plumbing codes that require low-flow toilets and water-saving appliances, and the steady rise in household water bills that motivates people to stop wasting water.

How can you use less water? MWRA's website, [www.mwra.com](http://www.mwra.com), has lots of tips on saving water both indoors and outdoors.

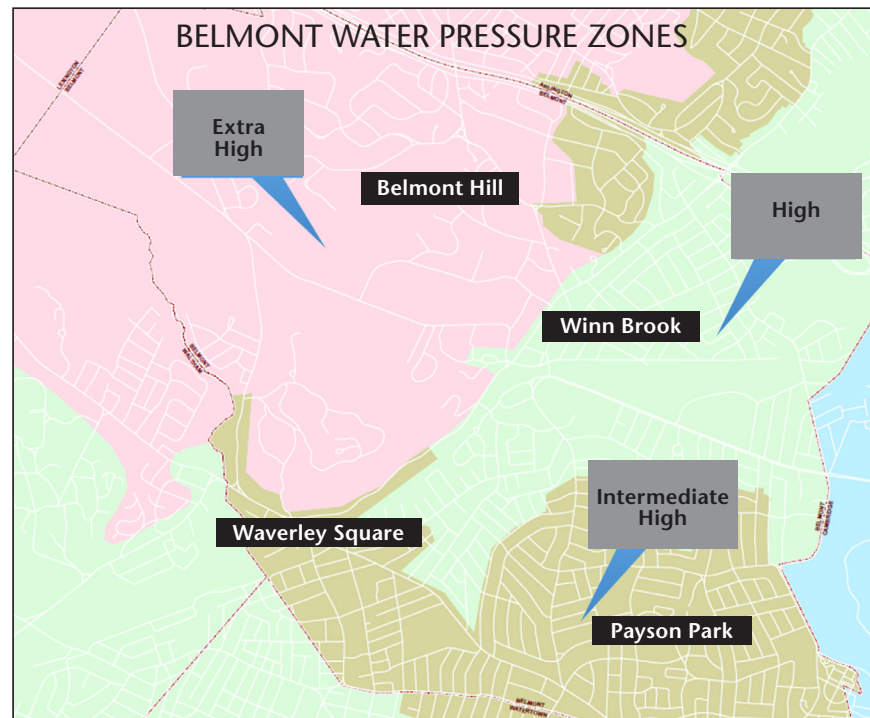
### Getting Water to Belmont

In 2017, Belmont used an average of 1.97 million gallons of water a day. From the Norumbega covered storage tank, water travels east to the Weston Aqueduct Supply Mains at River Road and Loring Road in Weston. Water travels through Weston, Waltham, and into Belmont through Weston Aqueduct Supply Main 3. Belmont receives water from three different MWRA pressure zones (depending on the elevation), and then delivers it to customers via three separate pressure zones in town.

MWRA's Belmont pumping station on Alexander Avenue is the main source of water for the Intermediate High service area. It pumps up to the Arlington Covered Reservoir, feeding portions of Belmont, Arlington, and Watertown. The pump station was constructed in 1937 and most recently upgraded in 2009.

### How Do You Know the Water is Safe?

MWRA tests the water at every step on the way to your neighborhood—from the reservoirs, to the treatment plant, to the covered storage facilities, to the pump stations and tanks. We test for a number of different water quality parameters



in real time, so anything out of the ordinary sets off an alarm for staff to investigate.

In addition, MWRA performs hundreds of thousands of tests each year for 120 different contaminants. MWRA water routinely meets every state and federal water quality standard.

These test results are reported to each household every June in MWRA'S annual Water Quality Report, required by the US EPA (Environmental Protection Agency). Also, a monthly Water Quality Report is available online or by subscription (details at [mwra.com](http://mwra.com)).

### What about lead?

First, it's important to note that there is no lead in MWRA's source water or the pipes that carry it. However, it can be found in lead service lines to some older homes (although Belmont has very few) and in some newer brass fixtures. We treat the water to make it less likely to leach the lead out of these pipes. As a whole, the water system has been below the regulatory action level for lead for the past 15 years, and Belmont regularly passes the annual lead sampling.



SARA MCCABE

The Belmont Pump Station abuts the Claffin Street parking lot in Belmont Center.

The bottom line is that your tap water is clean, safe, and tastes great. Drink up! (And where does it go when you flush? We take care of that, too. But that's another long story for another day.)

Ria Convery is MWRA's Communications Director. MWRA provides wholesale water and sewer services to 61 cities and towns in eastern and central Massachusetts. You can sign up for notifications about projects in your area at [mwra.com](http://mwra.com)

## Thank you for your continued support.

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## Environmental Events

### Owl Prowl and Sunrise Birding

**Saturday, November 10, 5:30–8 AM**

Take advantage of the early start time, when it's much easier to listen for great horned and screech owls and other night sounds. With first light, we will continue birding and hope for some unusual stray or lingering migrants at Rock Meadow. (Rain date is Sunday, November 11.) Fee: \$16 member/\$20 nonmember. Register at [massaudubon.org](http://massaudubon.org) or call 617-489-5050. [habitat@massaudubon.org](mailto:habitat@massaudubon.org). *Habitat Education Center and Wildlife Sanctuary, 10 Juniper Road, Belmont.*

### Audubon Night Hike

**Saturday, November 10, 6–7:30 PM**

Have you been out in the woods at night? Everything seems so different! Spend a little time with Habitat staff as we enjoy the sounds of a New

England night. We'll begin inside with an activity or two, before heading out to see what the night has in store. Dress warmly and bring a flashlight. Ages 5 and up with an adult partner. Fee: \$7 member/\$9 nonmember for each child or adult. Register at [massaudubon.org](http://massaudubon.org) or call 617-489-5050. [habitat@massaudubon.org](mailto:habitat@massaudubon.org). *Habitat Education Center and Wildlife Sanctuary, 10 Juniper Road, Belmont.*

### Fells' Biobliss: Biodiversity & Citizen Science

**Sunday, November 11, 10 AM–Noon**

This monthly series fosters awareness of species and habitat biodiversity and develops an understanding of the importance of ecology, phenology, and ethics. Over the year, we rotate among Middlesex Fells habitats that we observe and document for the Fells and its scientists. Ages 14 and up. Free. Registration required at <http://earthwiseaware.eventbrite.com>. [earthwiseaware.org](http://earthwiseaware.org). *Bear Hill Parking Lot, Stoneham.*

### Turkey Time

**Tuesday, November 13, 10–11 AM**

Take a walk on the wild side as we learn about turkeys in the wild. Do you know the difference between the wily wild turkey and the tame one? Learn new bird words, play a gobble game, and sing some turkey songs. We'll discover why Habitat has what a turkey would like most. And we might even see some real ones! Meet at the log circle. Ages 5 and up with an adult partner. Fee: \$6 member/\$8 nonmember for each child or adult. Register at [massaudubon.org](http://massaudubon.org) or call 617-489-5050. [habitat@massaudubon.org](mailto:habitat@massaudubon.org). *Habitat Education Center and Wildlife Sanctuary, 10 Juniper Road, Belmont.*

### CORRECTION

"The Future of the McLean Barn" in the September/October 2018 issue of the *BCF Newsletter* included a photo of the Walden Visitor Center. We removed the photo from our online version so that we can keep the focus on our barn as a resource. The center's function and reported success are inspirational.

### Worried About Climate Change?

**Wednesday, November 14, 6:30–8 PM**

Are you wondering if there's something you can do about climate change? Join us for a presentation with Elders Climate Action and Mothers Out Front on things individuals can do to make a difference. Free. For more information, call 781-314-3441. [waltham.lib.ma.us](http://waltham.lib.ma.us). *Lecture Hall, Waltham Public Library, 735 Main Street, Waltham.*

### The Fells Naturalists and Sketchers Circle

**Wednesday, November 21, 10 AM–12 PM**

This series teaches how to create, illustrate, and maintain a naturalist and field journal, including learning to sketch and record field observations. The monthly circle is a collaboration between Earthwise Aware and the Friends of the Fells. Over the year, we explore Middlesex Fells and cover forest ecology, phenology, birds, and mammals. Ages 14 and up. Free. Registration required at <http://earthwiseaware.eventbrite.com>. [earthwiseaware.org](http://earthwiseaware.org). *Long Pond Parking Lot, S Border Road, Winchester.*

### 8th Annual StreetTalk, 10-in-1

**Tuesday, December 4, 5:30–8:30 PM**

Ten innovative transportation and community thinkers will take the stage and share their big ideas in rapid-fire "TED"-style talks. Previous topics have included pop-up bus lanes, socially engaged art, and

open spaces for women and children. It's one of Livable Streets' most popular events of the year. Free. RSVP required. 617-621-1746, [info@livablestreets.info](mailto:info@livablestreets.info). *Old South Meeting House, 310 Washington Street, Boston.*

### Mass Rivers Annual Meeting and Dinner

**Wednesday, December 5, 6–9 PM**

Mass Rivers's annual tradition brings together friends and colleagues for a warm and lively evening celebrating our rivers and the year's achievements. Great company, good food, and lots of talk about water. The guest speaker is nationally known author and photographer Tim Palmer. Fee: \$25–\$60. [massriversalliance.org](http://massriversalliance.org). Register at [massriversalliance.org/2018annualmeeting](http://massriversalliance.org/2018annualmeeting). *Beech Street Center, 266 Beech Street, Belmont.*

### Sustainable Belmont Meetings

**Wednesday, December 5, 7–8:30 PM**

Reducing household solid waste and recycling contamination during winter holidays.

**Wednesday, January 9, 7–8:30 PM**

Planning/working meeting to organize advertising for 2019 incentives for solar, heat pumps, energy efficiency, etc. [sustainablebelmont.net](http://sustainablebelmont.net). *Belmont Public Library, Assembly Room, 336 Concord Avenue, Belmont.*

## Thank You to Our Contributors

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