Friends of Wilson Lake

Volume 13 Issue 1
February 2020

From Your President, Rob Lively

Once again our Newsletter editor Wynn Muller has given us a rich array of articles that provide insight into the workings of our lake, along with recommendations on how we can help insure its health.

We have talked in previous Newsletters about the UMF/FOWL buoy at the "deep hole" that measures dissolved oxygen and water temperature at various depths. A common question we are asked is, "So, what are you finding?" UMF professors Julia Daly and Rachel Hovel give us an update on what they and their students are discovering through their analysis of the data; information never before available to us.

Another scientific article, written by our board member Peter Campion, addresses something I have noticed over the years and which I (incorrectly) attributed to pollutants being introduced into the lake; that of long, narrow, frothy strings on the lake's surface. I expect you have also seen them. It turns out it is not detergent, but rather what is known as wind lanes or Langmuir Circulation. It is the wind that is doing it!

Board member Ken Sawyer, who is also on the Wilton Conservation Commission, includes recommendations for a Lake Protection Plan that addresses the issues of phosphorus and erosion control. FOWL is working closely with the Commission in this effort.

And be sure to celebrate the Foothills Land Conservancy's 20th anniversary, celebrated in 2019 and highlighted in our pages.

I have referred to specific people and organizations in the above paragraphs, as it is committed individuals like them who make a difference. In that vein, I invite you to go to the website of Lake Stewards of Maine where you will see a celebration of Maine's Citizen Lake Stewards. Look closely at the cover of their Winter 2019–2020 newsletter, "The Water Column," and page 17, where there is an appreciation of three outstanding lake stewards, our own Mary Ryan, and Wynn and Sandy Muller. Well done!

lakestewardsofmaine.org; click on "Media"; click on "The Water Column".

While we all cannot be so directly involved in the health and well-being of Wilson Lake, we can support it through our FOWL membership and donations. The first questions I always ask when approached about a membership is, "Why should I become a member? What are you doing in support of your stated mission and goals?" I think the contents of this newsletter help answer those questions.

Wynn has enclosed a membership envelope. Thank you for your support.

Rob Lively

Visit our Website:
www.friendsofwilsonlake.org

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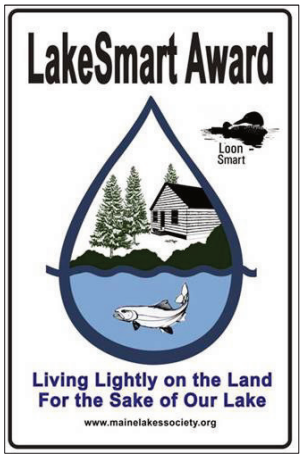
Inside this Issue:



Update on the FOWL Buoy

By Julia Daly & Rachel Hovel,
UMF Division of Natural Sciences

Winter & Spring 2019

Winter came early to our lakes, and we were able to visit the buoy several times while it was iced in. In January, we were able to auger through the ice and retrieve the equipment line to service the data loggers. We replaced the sensors in all three dissolved oxygen data loggers; each sensor is only good for six months, so replacing them in mid-winter is a good match with their summer launch. It seemed a little strange to be packing a cooler full of warm water bottles to bring out on the ice, but we needed to be able to keep the DO probes from freezing while we calibrated the newly-installed sensors. UMF students visited the buoy several times to collect zooplankton samples from beneath the ice as part of a class project.

In the spring, the buoy was dragged a bit (likely during ice breakup) to a slightly more shallow area of the lake. Although the position changed and the buoy was likely drifting a little bit more because of the additional slack in the line, the depth of the equipment line was within 5 meters of its original location. We believe that, in spite of the change in location, we were still able to successfully capture the temperature and dissolved oxygen throughout the water column in the late winter and spring.

Summer & Fall 2019

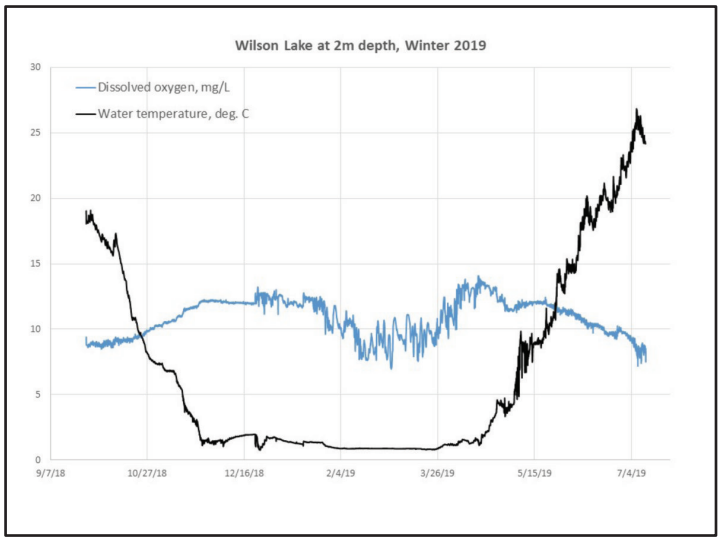
Summer brought us the opportunity to remove the buoy for some necessary maintenance and to add some additional sensors. Through a successful FOWL-authored grant, additional dissolved oxygen sensors were purchased and there are now five dissolved oxygen sensors on the line. The additional sensors will provide us with the opportunity to explore changes closer to the thermocline in more detail. The buoy was re-launched within a few days, returning it close to its original position. In order to facilitate maintenance work in the fall, we modified the amount of slack in the anchor lines. We hope that this will give us an improved ability to remove the equipment line for maintenance and swap in a winter buoy this year, rather than leave the large inflatable buoy on the line.

Results to date

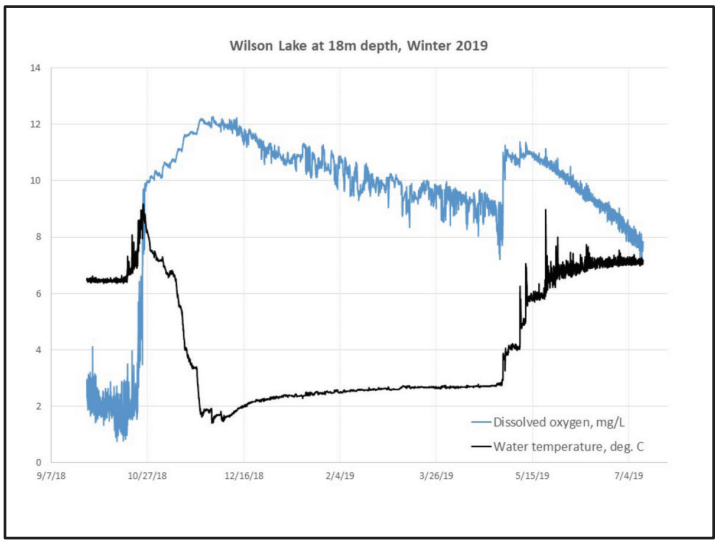
The dissolved oxygen and water temperature data from the buoy give us some useful insights into the behavior of Wilson Lake as it transitioned into and out of winter. Data from the 2m buoy show dissolved oxygen increasing slowly in late fall, then substantial variability in DO once the ice come in. The highest DO readings of the year near the surface of the lake actually seem to be measured in the weeks before ice out, possibly related to snowmelt contributions to the lake.

The DO sensor at 18m shows a different pattern. Dissolved oxygen declines through the summer as microbial activity consumes oxygen, followed by a rapid increase when fall turnover begins on the lake. From this high value, DO declines through the winter until near ice-out in the spring. Once the water opened up near the buoy, a series of mixing events show abrupt temperature increases at depth. The first mixing event also increased the dissolved oxygen (just before official ice-out).

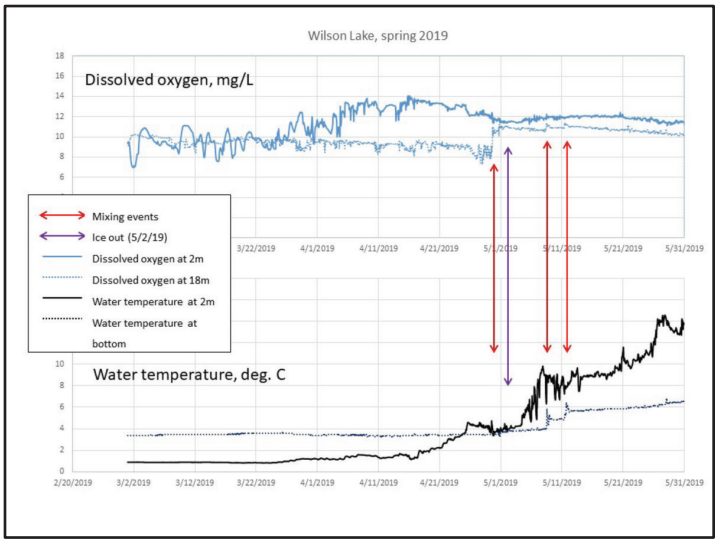
A closer look at the spring data shows that the lake mixing events shortly after ice-out result in the water temperature at depth incrementally increasing with each event. In the deeper part of the lake, the highest dissolved oxygen values of the spring and summer occur right around ice-out, due to the contributions of oxygen-rich surface water, and steadily decline in the following months.



Measurements from 2m depth:
Temperature declines through the fall and remains steady through the winter beneath the ice. The dissolved oxygen data show increased variability beneath the ice, and rise toward the end of the winter to a high value before starting to decline through the spring. Some of this decline is likely a function of warming water and decreased saturation of dissolved gasses. Under the ice, photosynthesis of winter algae may also contribute to increases in dissolved oxygen.



Measurements from 18m depth:
Water temperature and dissolved oxygen from 18m depth are representative of the deep waters of the lake. This record shows the dramatic increase in dissolved oxygen when fall turnover begins and surface waters are mixed to the bottom, followed by a long decline starting when the lake ices over. In the spring, dissolved oxygen gets another increase at depth from one short turnover event, then declines steadily through late spring and into summer. The temperature at this depth shows several short spikes in the spring that are mixing events; each mixing events results in a slightly warmer temperature at this depth.



Spring data:This closer look at dissolved oxygen (top) and water temperature data (bottom) for March 1–May 31, 2019. The top chart shows that dissolved oxygen values are slightly higher near the surface, and DO near the surface increases in the weeks prior to ice-out. At 18m depth, DO doesn't increase until the first mixing event once this part of the lake is ice-free. The official date of ice-out is slightly later than the first mixing event, and is followed by two more short mixing events that are recognized in the temperature data. During each mixing event, there is an abrupt increase in water temperature at the bottom, indicating that warm water closer to the surface is being mixed throughout the water column.

The Long Term Care of Kineowatha Park

– A report in two parts by Ken Sawyer, board member and also member of the Wilton Conservation Commission. Note: The second part is a summary taken from the draft Comprehensive Plan being developed by the town and will be displayed when the town so approves it.

PART ONE - Lake Protection Plan

(Phosphorus and Erosion Control)

by Ken Sawyer, board member
(Adapted from Minnesota Pollution Control, Water Quality/Impaired Waters #3.22 • May 2008)

Wilton's two key natural assets are Kineowatha Park and Wilson Lake. The main concern for lake health throughout Maine is phosphorus pollution, which can lead to toxic algae blooms necessitating closing the lake to swimming, fishing and other usual activities. An ongoing phosphorus problem can result in seasonal algae blooms, thus making the lake essentially useless and destroying property values and public recreation. Such is the case for China Lake near Augusta, Maine, which went from pristine to unusable in the 1980's as a result of over development and lake level mismanagement. Since then, the affected towns have spent millions of dollars in a futile attempt to reclaim the lake. Put simply, lakes are fragile ecosystems which need to be carefully treated and monitored to ensure that public activity doesn't cause them harm. In Maine, approximately 22 lakes are on the state watchlist for decreasing water quality, of which Wilson Lake is one.

Phosphorus is called a "limiting nutrient" for algae growth in lakes, so even small amounts of phosphorus pollution (parts per billion) can result in algae blooms. Naturally, phosphorus is typically scarce in water, but scientists now know that phosphorus contributed by human activity can be a major cause of excessive algae growth and degraded lake water quality. Sources from human activity include water flowing over cleared gravel surfaces (erosion), runoff from fertilized lawns and fields, and phosphate soaps and detergents which end up in septic systems and ground water.

Phosphorus builds up in the sediments of a lake, where it is usually not available for use by algae. However, various physical, chemical and biological processes such as dredging, turbulence from motor boats, and decreased oxygen levels can allow sedimentary phosphorus to be released back into the water, thus increasing the chances of algae blooms.

The best solution to the human lake phosphorus problem is prevention. Although each lakeside or watershed owner may only contribute a small amount to the phosphorus problem, the sum total of all is significant. Therefore, it is imperative that all owners do their share to prevent this problem.

In 2016, the Town of Wilton and the Friends of Wilson Lake (FOWL) completed a major watershed survey to identify erosion sources within the watershed, and are now moving forward to address as many of these as possible. Kineowatha, with its steep slopes to the lake, was identified as one possible source. Consequently, several issues, including the retaining wall, mulching and replanting bare areas near the lakefront, and slowing downhill water flow are all being addressed.

Phosphorus Control Plan – Continued attention to phosphorus control needs to be part of the park long-term management plan. Prevention is the best strategy so specific steps include:

(1) Maintain a **natural buffer** between uplands and the lake. Natural buffers are areas next to the shoreline with deep-rooted shrubs and trees and natural mulch (deposits of leaves and pine needles called a "duff"), which catch and hold upslope water from flowing to the lake. This is nature's way of controlling water runoff and phosphorus. Cleared areas and fertilized lawns leading to the lake create problems, as is

the case for much of China Lake. (See Shoreline Landscaping in the Appendix)

(2) **Erosion Control** – Continue to work with FOWL, WCC, and the DEP to address places of erosion concern, such as the gravel path leading to the lake and the spring runoff behind the swim cabins.

CALENDAR OF EVENTS

April 2020: Milfoil Summit, University of Southern Maine, Lewiston, Me.

May 3, 2020: Foothills Clean Up Day, Foothills Land Trust, Pond Rd., Wilton, 9:00am

June 20, 2020: Maine Lakes Conference, Hutchinson Center, Belfast, Me. 8:30 am

July 19, 2020: FOWL Annual Meeting, Lions Club Building, 1:00 pm

July 25, 2020: Lake Monitors Conference, The Great Outdoors, Turner, Me. 8:30 am

August 7–8: Wilton Blueberry Festival, Wilton Boat Launch 12:30 pm 8/7/20 for Boat Rides

Join FOWL for a boat tour of completed LakeSmart sites!

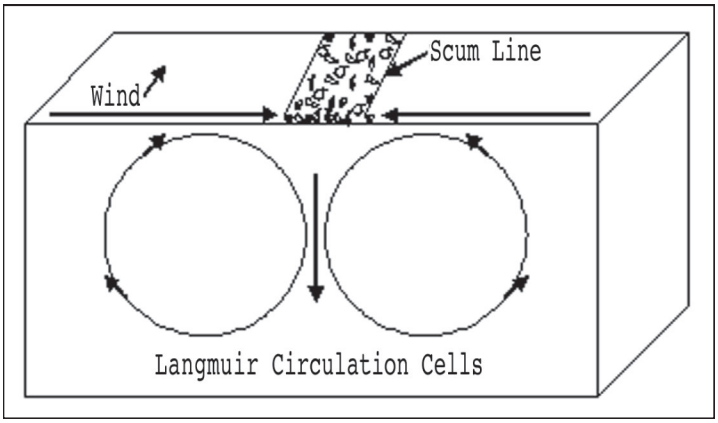
For more information or to schedule a site visit to your property please contact:

Rob Lively, Friends of Wilson Lake
(207) 645-2982
friendsofwilsonlake@gmail.com

Wind Lanes or Langmuir Circulation

— by board member Peter Campion and Wynn Muller

Have you ever noticed foamy streaks of scum on Wilson Lake? These are not caused by detergent in the lake but instead represent a natural phenomenon called Langmuir Circulation, named after its discoverer, Irving Langmuir, in 1938. Langmuir did numerous experiments on Lake George and discovered that as wind blows across the surface of the water, convection cells begin to take shape as the shearing forces of the wind push the surface water. As the surface water is pushed, a perpendicular circulation is created below the surface that creates cylinders of water in the same direction as the wind is blowing. These cylinders rotate in directions perpendicular to the wind directions with each cylinder rotating in an opposite directions. This causes the cylinders to create a “trough” at the point where the cylinders meet. As the cylinders circulate



Schematic of Langmuir Circulation *(credit Web)*

over the surface of the water, they catch any floating material from the surface and bring it to this “trough”. The buoyancy of the floating materials counteracts the down-welling velocity and thus the floating materials remain floating in this “trough” which is in the same direction as the wind is blowing.

Peter mentioned, “you may not see wind lanes as much of at the windward end of the lake. Apparently, these are caused by a phenomenon known as Langmuir Circulation.” This concept is more apparent at the foot of the lake near the town due to the prevailing wind down the lake. “This is of interest to fishermen because fish will congregate just under the surface beneath the debris, waiting for the insects that get concentrated here. I've seen an expert fly fisher in high winds; catch unbelievable numbers of trout from wind lanes on a lake. See the below picture taken at the foot of Wilson Lake.”

Next time you see evidence of this phenomena on Wilson Lake, look for other similar lines on the lake. The distance between the two “scum” lines represents the size of the two circulating cylinders creating the affect. Langmuir Circulation can be observed on any body of water and can form vary quickly and last from several minutes to several hours, depending on the wind. See the below graphic display of this phenomena. The circles are rotating in opposite directions creating a “trough” where they meet causing floating materials to congregate in this “trough”. Incidentally, this concept was mentioned in less detail in our newsletter of November 2010.

Wind Lines on unknown lake *(credit Web)*

Wind Lines on Wilson Lake *(photo Peter Campion)*

Odonata, the Sign of a Clean Lake

– Adapted from an article by Susan Gallo, Executive Director, Maine Lakes – Newsletter Volume #45, Winter 2018–2019

Susan has had a long career as a wildlife ecologist studying where wildlife live and why they live there. She most recently was in charge of the Loon Program with Maine Audubon. Many of you have had contact with her in that capacity. A year ago she assumed the position of Executive Director of Maine Lakes (formerly Maine COLA or Congress of Lake Associations).

While loons are important to Susan and all of us, her article is about odonata (better known to us as dragonflies and damselflies). They are a group that best shows the link between clean water and healthy wildlife. Odonata spend most of their lives under water. They hatch from eggs dropped in the water or on lake vegetation. They hatch into nymphs and continuously molt for up to four years. This all occurs under water. They finally molt into adults and will spend the few months of their adult life above water seeking a mate to start the process anew.

Why is this important to us? Odenata help us by living on many insects; especially mosquitoes and they serve as a part of the food cycle for birds, frogs, fish and others. To complete their life cycle, they require clean water full of oxygen, healthy vegetation and cover so they can disguise themselves in their adult life from predators. They are mainly intolerant of pollution and hence they serve as a group as indicators of a healthy lake. Fortunately, we have many odonata on Wilson Lake.

How can we help to assure a healthy environment for odonata? Planting diverse native vegetation strips along the edge of the lake as a buffer zone provides great habitat for odonata and other wildlife. You will note that this is a major requirement for LakeSmart properties. This is one of the reasons for that and the other is that the buffer also serves as a filter for runoff keeping pollutants out of the lake. It is also important to not use pesticides in these areas since the adult population of odonata is critical to the continuation of the eggs that are such a valuable food source to the lake's ecosystem.

What is the difference between Dragonflies and Damselflies? Both are separate members of the order of carnivorous insects called ononata. The dragonflies have larger, chunkier bodies (think opera singers) and rest with their wings open and extended. The damselflies have longer, slimmer bodies (think ballerinas) and hold their wings closed at rest. There are many subspecies of both dragonflies and damselflies found throughout Maine and the US.

Damselfly (credit Web)

Dragonfly (credit Web)

Are You a Part of Our Team?

My dictionary defines membership as “the state of being a member”. A member is defined as “a person who belongs to a group or organization”. These are somewhat circular and unexciting. My encyclopedia skips from Melville to membrane providing no help whatsoever. Perhaps that is why Google was created. However, Google is also disappointing with two definitions for membership: “1. the state of being a member, 2, the body of members of an organization with a large membership”. Guess I am on my own to discuss what membership means to me.

Membership represents being part of a team with varying roles being played by those different members as per their respective talents and interests. If we look at the football teams vying for the Super Bowl, we note that they have an offensive unit, a defensive unit and “special” teams. At FOWL, our board represents our starting team with many of our committees as those “special’ teams. Significantly, we have a very strong Courteous Boat Inspection (CBI) team, a solid water monitoring team and a LakeSmart team. There are others but these are those who are designated to fulfill the water quality goals of our mission statement.

If you are a member, and since you are reading this newsletter, it seems likely that you are, you may want to consider joining one of the above teams. If your talents lie elsewhere, perhaps you would rather consider helping us out with our administrative team duties of fund raising, newsletter, annual meeting or some other task. Or perhaps you are content to assist us financially without expecting to spend any time commitment – that is fine too. We need all kinds of members to make our team solid and versatile just like a football team.

Our membership level has hovered around 300 for the past number of years. You will find a list of our last year’s members elsewhere in this newsletter. While a constant membership is wonderful, it would be even better were we to see an increase by say 10% to about 330. You can help by first renewing your family membership and second by inviting your friends who may not appear on this list to become members and help us to keep Wilson Lake as the jewel of Wilton we all know it to be. Our membership dues are only $12 per family, and because many of you provide additional donation dollars of $50, $100 or even more, we are able to keep that low level and still provide the services you expect from FOWL. You will find a dues reply envelope also enclosed for your convenience.

Friends of Wilson Lake 2019 Membership

Ambelang, Charles & Joanne Shibles
Anderson, Carol
Aseltine, Ron & Deb
Backus,Wally & Annette
Ballsrud, Natalie
Ballsrud, Wendy & Robert
Bass, Betsy
Bass, II, John & Pricilla
Bean, Gerald & Kelly
Biegaj, Richard & Suzanne
Black, Russel and Sue
Blake, Laurie & Scott Young
Bleyle, George
Bleyle, Mike & Carol
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Brann, Kenneth & Frances
Brann, Terry & Sherill
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Brown, Pam
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Burke, Michael & Patricia O'Donnell
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Civiello, Gabriel & Jennifer
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Coombs, Whitney & Kevin
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Cushman, Doris
Cushman, Ruth
Davis, Dick & Shelly
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Rogers, Rob
Ross, Carol & Joe
Roth, Ellen
Rounds, Nancy
Rounds, Kim & Rich Bachmann
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Rowse, Robert & Colette
Ryan, Mary & Sarah Bleyle
Sabin, Christine & Steven
Santo, Bob & Bridgette
Sawyer, Ken & Terry
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Shibles, Mark
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Smith, Wayne C. III & Tina Ross
Smith, Wayne C. Jr & Elizabeth
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Kyes Insurance
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Otis Federal Credit Union
Paling, Gary, Real Estate"
Skowhegen Savings
Steve's Family Market
United Insurance Shiretown Agency
Walmart
Wilson Lake Inn
Wilton Blueberry Festival
Wilton Fish & Game

Foothills Land Conservancy

— by Rob Lively, President

While FOWL was celebrating its 30th anniversary in 2019, our sister organization Foothills Land Conservancy was celebrating its 20th. Comprised of 233 acres in the watershed at the head of Wilson Lake, it encompasses bottomland, woodlands, and grasslands, and it serves as a protector of Wilson Stream, which flows through it. The Conservancy's creation as a Land Trust was the result of the herculean efforts of many people and charitable organizations in the late 1990s, and its goal was to utilize best management practices at a time when the land was being mismanaged, with the consequent polluting of Wilson Stream and ultimately Wilson Lake.

The area lives up to the original goal of its founders as a place open to the public, providing wildlife habitat, walking trails, and working to ensure water quality. The Conservancy is also the research site for UMF biologists, ecologists, geographers and their students; studying its natural resources, while also working to protect it.

You are invited to enjoy the open fields and scenic trails of what is considered to be one of the most beautiful recreational areas in Western Maine. Access is on the Pond Road. You will see their kiosk near the intersection of Pond Road and Weld Road.

You can check out their website at
http://foothillslandconservancy.org
and their Facebook page at
https://www.facebook.com/flcwiltonmaine/

The Conservancy depends on a volunteer board of directors and volunteers from the community. Each year they hold an Annual Clean-Up Day and this year it will be on Sunday, May 3, 2020, at 9:00 am. with a rain date of May 10. Please plan to join them!

Below is last year's cleanup crew. A pink kiddy pool was the most unique find, while tires seem to grow on their own.

Foothills Land Cleanup (photo Rob Lively)

FOWL
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