



Friends of Wilson Lake

Volume 14 Issue 2

May 2021

President's Statement

Spring is always a time of rebirth, renewal, and return; something we especially look forward to this Spring, given the challenges of the past year. Here at Wilson Lake and its Watershed, fiddleheads are starting to appear; the curled, edible, young fronds of the ostrich and cinnamon fern. Their taste has been described as a cross between asparagus and spinach.

"Big Night" occurs around mid-April, when amphibious creatures such as frogs and salamanders awake from their winter naps and start migrating en masse. It gets its name from the fact that there is a particular night when much of this happens. It is such an event that volunteers turn out to watch roadways to ensure their safe passage from one side to the other. Vernal ponds in our watershed host many of these amphibians, notably the small tree frog, or "peeper," known for its loud peeping mating call. Hearing them is a true sign of Spring.

And of course we await the return of the loons to Wilson Lake, which almost magically occurs immediately once there is some open water on the lake. Our loons winter along the coast, and the belief is they send out a scout who surveys the ice conditions on the lake. The males return first to establish their territories.

All of this, and much more, is affected by Climate Change, and our editor, Wynn Muller, has included some important articles on the subject in this newsletter.

This will also serve to announce that our guest speaker at our **July 18th Annual Meeting** will be environmental scientist Roberta Hill of Lake Stewards of Maine, who will speak on "**Climate Change and its Impact on Maine Lakes.**" The Annual Meeting will be held over Zoom. More information will follow.

Best wishes, and thanks for your continued support of FOWL.

Rob Lively



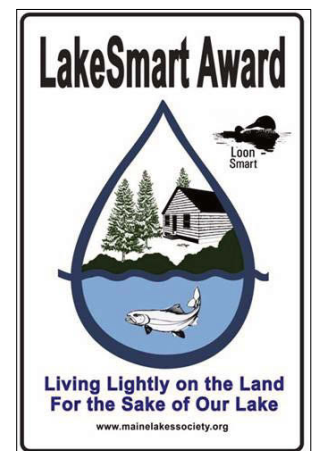
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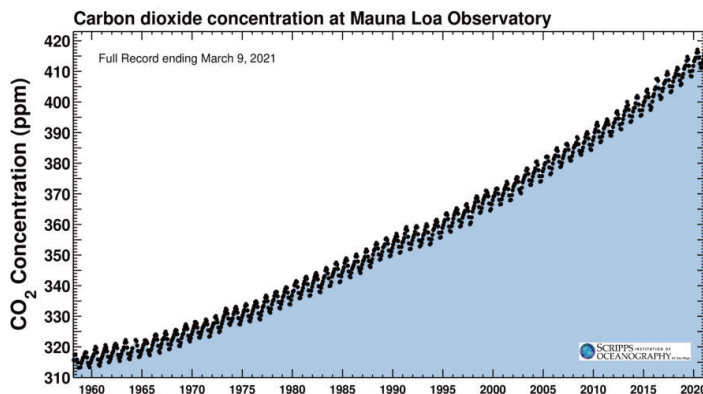
Climate Change (or Global Warming)

by Wynn Muller with considerable adaptation from materials from Linda Bacon, Maine DEP and Roberta Hill, Lake Stewards of Maine

Historical Information

What was once called Global Warming has now become Climate Change in an attempt to remove some of the political stigma that this concept had acquired. Many experts point to 1988 as a turning point toward bringing global warming to the forefront. The summer of 1988 was the hottest on record at the time and we also saw widespread drought and wildfires in the US. As a result, the United Nations created the International Panel on Climate Change (IPCC) in 1989. This led to the first global agreement to reduce greenhouse gases by 5.2% below the 1990 level by 2012, and the Kyoto Protocol was signed by President Clinton. Two years later President George W. Bush announced that the United States would not implement the Kyoto Protocol. In 2006 former VP Al Gore received the 2007 Nobel Peace Prize for his film on climate change, *An Inconvenient Truth*. The United States under Barack Obama joined the 2015 Paris Climate Agreement with 197 other countries. Again, the following year, President Trump withdrew the US from that agreement. And in 2021 President Biden reentered the agreement. It is no wonder that this appears to be political.

In fact, the concept of climate change dates back to the ancient Greeks who felt that humans could influence climate by chopping down trees and plowing fields. In 1860, Irish scientist John Tyndall established that coal gas (containing carbon dioxide 'CO₂') was especially effective at absorbing energy and could absorb multiple wavelengths of sunlight. More recently, in 1958 Charles Keeling, a geochemist at the Scripps Institution of Oceanography arrived at a way to record CO₂ levels in the atmosphere. His findings became



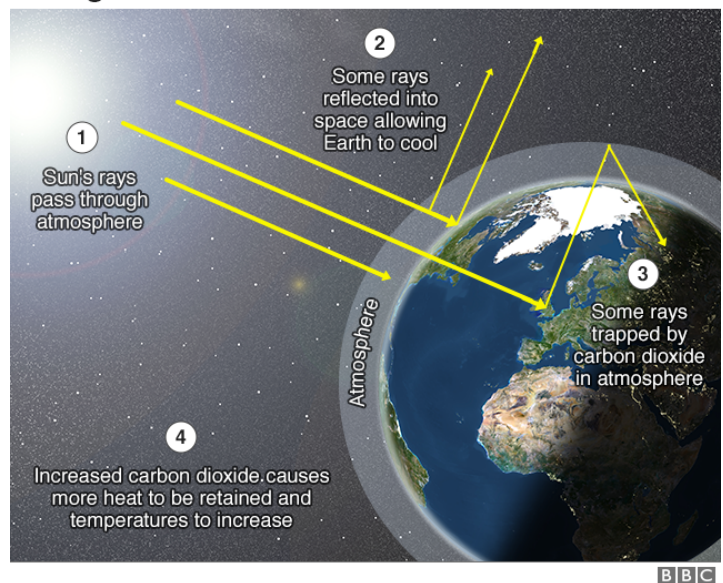
This shows how the CO₂ has increased over the past years.

known as the Keeling Curve showing the upward rise of gas produced daily in the Northern Hemisphere as shown below. This is the daily level of CO₂ in ppm (parts per million) growing from just over 310 in 1958 to over 410 in 2021.

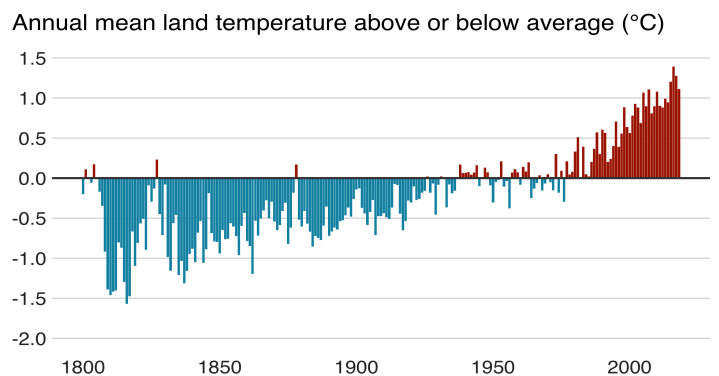
How Does Climate Change Occur?

Let's look at a very simple display of how this works. The below picture shows how the rays from the sun (#1) hit the atmosphere of the earth and some are reflected off that atmosphere into space and allow for the earth to avoid excessive heat (#2). Other rays enter through the atmosphere and are trapped within the atmosphere by the carbon dioxide in the atmosphere (#3). As the level of carbon dioxide increases, more heat is trapped in the atmosphere (#4) and temperatures increase. You can see how the annual mean temperature has increased over time from the below table. Note: Annual mean temperature is the sum of the average daily temperatures divided by the 365 days in a year.

The greenhouse effect



The world has been getting warmer



Note: Average is calculated from 1951-1980 land surface temperature data

Source: University of California Berkeley





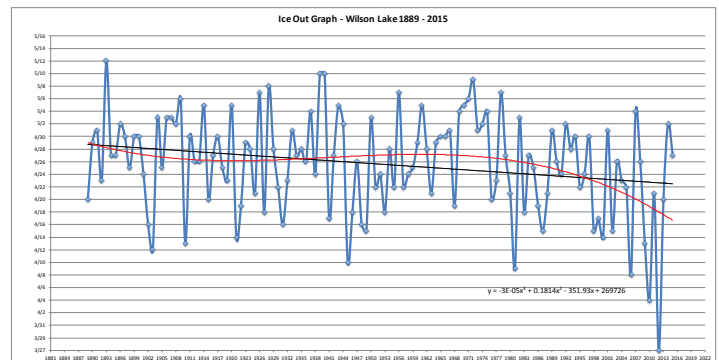
Why Should We Be Concerned with Climate Change?

Regardless of the historical genesis of climate change, the fact remains that our climate is changing and it is having serious impact on our earth. We have seen the increase in periods of drought. Many have suffered through the fires impacting the western states. There has been an increase in more serious hurricanes and storms impacting the entire continent. Concern has also been expressed with a rising sea level that could have serious impact on communities near the ocean level. Among these national concerns, we also need to be aware of the impact of climate change on the lakes of Maine including Wilson Lake. Over 10 years ago Dan Buckley, UMF Biologist and my science mentor, began to record the temperature of Wilson Lake at two data points throughout the summer. When I asked him why, his response was, “Even if we ignore the political implications of the cause of climate change, we know it is occurring. This will allow us to create a current bench mark for tracking future changes.” As you know in collaboration with UMF, we are continuing the same recording through our buoy off Kineowatha Park. That is recording temperature and dissolved oxygen every 30 minutes every day throughout the year—including the winter months.

The most obvious result of climate change on lakes is the water temperature and this is most readily observed by the “ice out” data. The sooner the ice is out (and also the later that ice is in) means that there is a longer growing season for the lake and a longer period of stratification. This results in 1) an impact on lake habitat. We will see 2) increase algal productivity and potential blooms. We will likely see 3) a change in the color and clarity of the lake due to change in its composition. There is the likely event of 4) growth of invasive species which are less able to survive in Maine’s relative cool temperatures.

Let’s look at the below graph of Wilson Lake’s ice out data from 1889 to present. The blue spikes represent the data from each year. You can see that they vary significantly. However, the black line in the center has a trend down showing how average ice out dates

have dropped from about April 28th to April 22nd over the last 130 years. When we factor in a similar trend in the ice in date, we can see that the growing season has increased by 12 days over this period. Perhaps even more significantly, the red line which represents the “polynomial” trendline accentuates the current data in the trend line. This shows a trend approximating April 17 at the current end line or a change of 11 days—coupled with the ice in estimates this could reflect a three week change over the past 130 years. This is highly significant and not unique to Wilson Lake. In fact, all Maine lakes show quite similar trends. The respective dates are different for northern more lakes and less for more southern lakes, but the trend lines are most similar.



Prepared by Wynn Muller 1

Habitat Alterations

An increase in the temperature of the lake will impact the composition of the fish population. Cold water fish like salmon and trout will find a decreasing area of cold water causing less habitat and a reduction of the species due to increased anoxia in the hypolimnion or lower stratification of the lake. As you may recall, Wilson Lake is stratified in the summer and winter months. In the summer the top layer, called the epilimnion, gets heated by the sun and carries that temperature in the top strata to about 4 meters down. The center strata, known as the metalimnion or thermocline, changes temperature rapidly over the course of about 2 to 3 meters. Finally, the lower layer, or hy-

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polimnion, remains nearly constant from the thermocline to the bottom of the lake. This lower level is home to the cold-water species of fish. As the water becomes warmer, a greater portion of the lake resides in the upper epilimnion resulting in less area for fish in the colder hypolimnion.

There may also be an increase in warm water species such as perch. However, it is also thought that there may well be fish kills of warm water species due to decreased duration of ice cover. We may also see this impact in composition change due to the lake ecosystems dependence on “phenology”; the timing of annual biological events, such as the routine level of spawning. One might experience a disruption of predator-prey interactions as a consequence. It is also thought that we may experience a phenomenon called “topic cascade” whereby a reduction of large predatory fish will result in an increase in smaller fish who prey on zooplankton which will reduce that population. The reduction of zooplankton will allow proliferation of algae which may decrease clarity and lead to algal blooms.

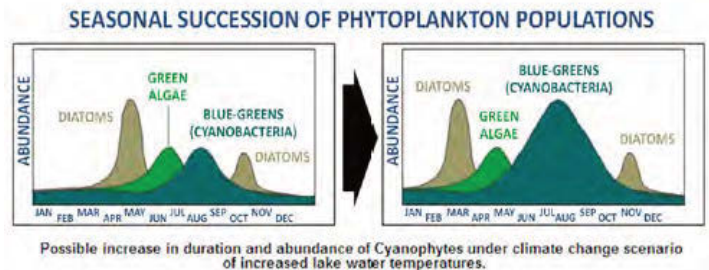
Algal Growth

An earlier ice out will result in an earlier warming of the shallow waters. This will allow for earlier growth of metaphyton which are normally found in these shallow waters. Many lake residents have expressed concern with finding patches of “cotton candy like” metaphyton in their shallow coves. While metaphyton poses no known threat to humans, it is certainly a nuisance and people are advised to avoid contact and swimming in the area of it as a precaution.

Lake warming also provides fertile ground for the growth of various algae over the course of the summer. This has the potential for algal blooms and their negative impact. The warming temperature alone will provide this potential for growth without any additional nutrients. However, we will also likely see an increase in nutrients from the wet regions of the watershed and from additional pollution from runoff. There is further concern in loss of oxygen in the hypolimnion due to the longer stratification period. This also can lead to an increase in algal growth. Finally, this oxygen reduction can generate nutrient recycling from the sediment at the bottom of the lake. To avoid this occurrence many lakes are resorting to treatment of the lake bottom with alum to resist the recycling of the phosphorus from the sediment at the lake bottom. See the article in our November 2019 issue on this treatment done on East Pond in Belgrade.

We spent a great deal of time in the last issue of this newsletter discussing the serious concern with

blue-green algae known as cyanotoxins. Some likely effects of unusually warm temperature include shifts in phytoplankton (algae) assemblage dominance, which most notably favor the metabolism and growth of cyanobacteria (blue green algae). Cyanobacteria are well adapted to rapid growth as water temperatures increase. It has been said that “Cyanobacteria likes it hot”, compared to true algae, which grow better at lower temperatures. This increases the potential for “Harmful Algal Blooms” (HAB’s) and associated “cyanotoxin” production to occur. See the chart below.



From Lake Stewards of Maine 1

Loss of Water Clarity

As lakes grow warmer, one will notice a change in the color of the lake. Decaying vegetation can change the clear lake to a tea color. This decay can come from within the lake as well as the surrounding wetlands. A longer growing season results in a longer decaying season. Color also influences the lake stratification. Sunlight warms the water and penetration of sunlight is a prime factor in the stratification depth. Sunlight reaches shallower depths in lakes with high color content. The stratification affects the species of plankton. You begin to see the complex interaction of all these factors. Climate change also seems to create changes in precipitation. More precipitation more stormwater runoff, more shoreline erosion, more flooding and more nutrients into the lake. A final area of concern is the potential growth of invasive plants. Many of these have not gravitated to Maine due to Maine’s relatively cool temperature. As the temperature increases, this negative influence is less of a detriment. Hence, we need to remain more diligent in avoidance of these invasive aquatic plants. As you know, this is the thrust of our Courtesy Boat Inspection program which grows in importance as our climate warms.

The Long Evolution of the Clean Water Act from Maine Lakes publication For the Sake of Maine’s Lakes Fall 2020

We saw in the first section of this article the political implications of Climate Change. The main reason given against this seemingly important environmental concern is the impact it might have on business. That

has been a serious concern back to the middle of the past century when serious concern was expressed with the impact on the water and air coming from businesses, mainly from burning of coal. This concern led to the Clean Water Act in 1972 which has done much to preserve the lakes of Maine. The historical derivation of this act is described below as written in the Maine Lakes Newsletter, *For the Sake of Maine Lakes*, Fall 2020.

“Our planet is beset with a cancer which threatens our very existence and which will not respond to the kind of treatment that has been prescribed in the past. The cancer of water pollution was engendered by our abuse of our lakes, streams, rivers, and oceans; it has thrived on our half-hearted attempts to control it; and like any other disease, it can kill us.”

— Senator Edmund Muskie, 1972

The Clean Water Act of 1972 has deep Maine roots. As Governor from 1955 to 1959, Edmund Muskie recognized the connection between our economy and our natural resources. He identified water quality improvements as a component of an economic development plan, since improved environmental conditions would attract new businesses to the state. Muskie created a Water Improvement Commission to work on classification standards for Maine’s freshwater rivers and lakes, but industries’ undue influence on water quality legislation stalled their work.

Muskie became a U.S. Senator in 1959, serving on the Public Works Committee and as chair of the subcommittee on Air and Water Pollution. Senator Muskie worked tirelessly throughout the 1960s, submitting multiple unsuccessful bills as he refined what would eventually become The Clean Water Act. He focused on compliance rather than enforcement, and one of his primary goals was the creation of federal water quality standards for interstate waters. After more than ten years, Muskie introduced the Clean Water Act on October 28, 1971. The bill then spent ten months in conference, with a final vote of 366 to 11 in the House and unanimous passage in the Senate. Despite his own administration urging him to sign the bill, Nixon vetoed the bill. Just two hours later that veto was overridden overwhelmingly (and with bipartisan support) in both the house and senate. While the Clean Water Act remains a vital tool for lake and river protection, constant vigilance is needed. Maine Lakes helped mobilize grassroots advocacy during the 2019 “Dirty Water Rule”, which unfortunately passed despite overwhelming opposition from the public and from scientists and water quality experts. There will always be more work

to be done to keep landmark legislation like the Clean Water Act strong, and Maine Lakes and our grassroots activists will be here to act. FMI, see Take Action on p. 15.

(Edited from DEP/ARC GIS story map: Maine: 50 Years of Water Quality Restoration and Protection. See link at www.lakes.me.)



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Happenings Around Wilson Lake over the Winter

by Wynn Muller & Rob Lively

Revised Lake Map

With this letter you will find a revised version of the Wilson Lake Map. It includes 9 changes in the listings. See if you can find them. I do thank Rob Rodgers for continuing to provide these updates. This is not an easy task as it requires computer skills and programs beyond my abilities. Thank you, Rob.

Membership 2021

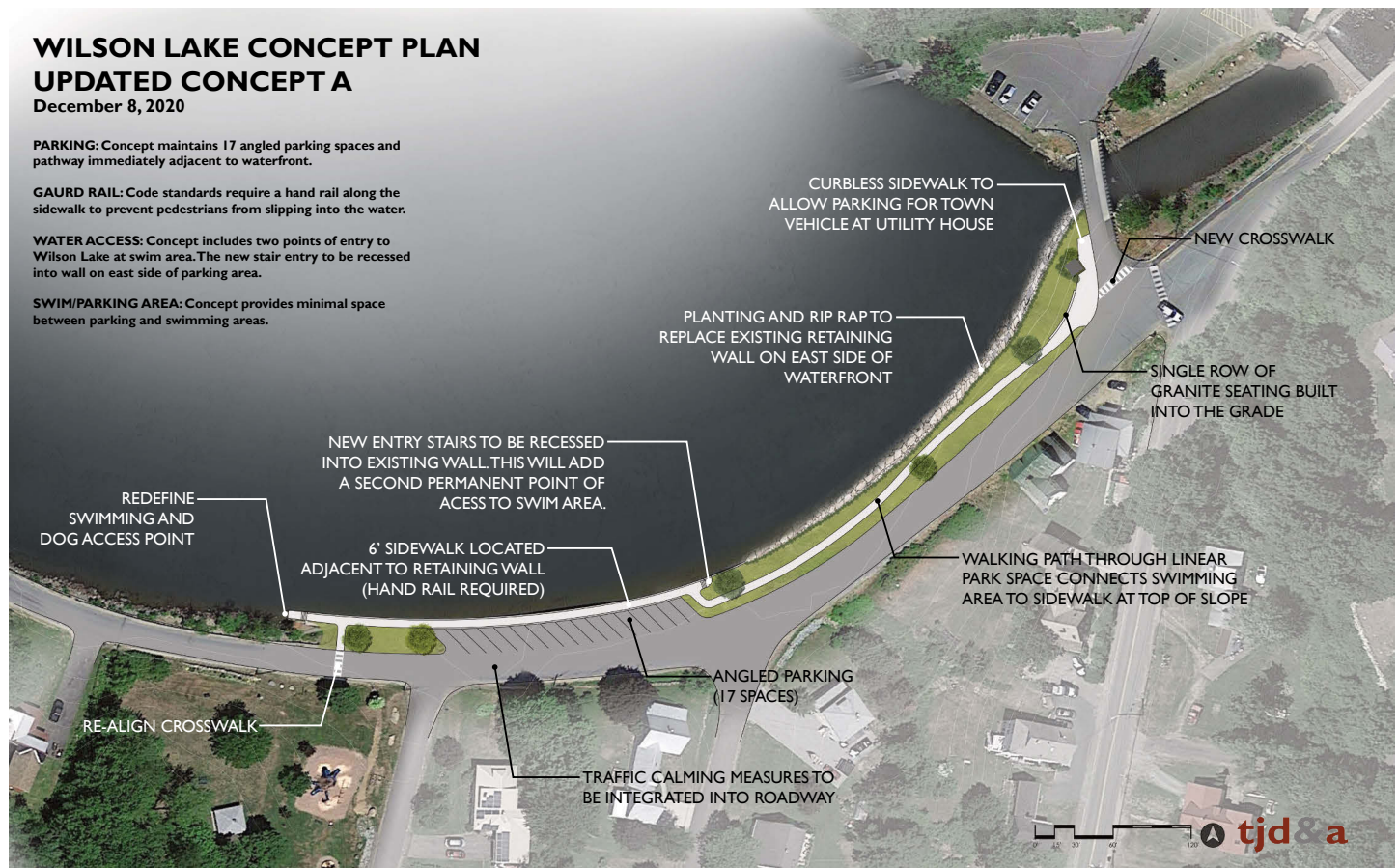
You might have thought that with the COVID virus we would be losing members. That has not been the case. Last year we remained over 300, just barely at 301 and our donations were at an all-time high of \$6900. Already this year our membership numbers are at 206 and climbing while our donations are over \$5000. Thank you, members, for your renewals and donations. If you cannot remember if you have renewed, if you find a reply envelope with this newsletter, that means our records do not currently show you as paid. If there is no renewal envelop, Thank You once more.

Restoration of the Rock Wall at the Foot of the Lake

We presented an extensive article on the plans for restoration of the rock wall at the foot of the lake in our Fall 2020 Newsletter. Please review that for background at our website:

https://static1.squarespace.com/static/5261a2b8e4b068320e3c7116/t/6012d6e110a4ad69f8a16ed2/1611847417118/FOWL+Nwsltr+2010_v01_201023prs%288.5x11+OPTIMIZED+FOR+WEB%29.pdf

Since then, we have had further updates by the engineering firm Sevee & Maher Engineers and the Wilton Select Board is working with them to finalize a plan to send out for bidding on costs. The Select Board has decided on Plan A which appears below. This concept shows a change in the parking to be 17 angled spaces. This will keep the parking area within six feet of the lake and require that a fence be installed at the lake shore. The existing retaining wall will be retained and it will include two water access points and a walkway from the swimming area to the bridge. Plantings and rip rap will create a “living shoreline” from the end of the retaining wall to the bridge. The design appears below. The other concept under consideration would have converted the parking to parallel in the interest of greater safety for pedestrians in the area, but the consensus was the town’s people indicated overwhelm-



WILSON LAKE CONCEPT PLAN UPDATED CONCEPT A December 8, 2020

PARKING: Concept maintains 17 angled parking spaces and pathway immediately adjacent to waterfront.

GAURD RAIL: Code standards require a hand rail along the sidewalk to prevent pedestrians from slipping into the water.

WATER ACCESS: Concept includes two points of entry to Wilson Lake at swim area. The new stair entry to be recessed into wall on east side of parking area.

SWIM/PARKING AREA: Concept provides minimal space between parking and swimming areas.



ingly in favor of retaining the diagonal parking. The finalized design will go out for bids sometime in the future. There is no cost estimate for this plan.

Marina Proposed
Adjacent to the Town Boat Launch

In March the owners of 10 Rowell Street, Wilton submitted an application with the Planning Board for Wilson Lake Marina, LLC, a 12-slip floating marina at their property at the start of Stinchcomb Lane. The Planning Board at their March 17th meeting voted “that the Planning Board request the Board of Selectpersons to hold a special town meeting in order to place a moratorium on any commercial development in the LR&R zone surrounding Wilson Pond (Lake) for six months. The need for this moratorium is imperative because existing ordinances are inadequate to handle the proposed marina, and any future

lake developments. This will provide the PB an opportunity to review and revise the current ordinances relevant to this LR&R zone, as well as to the propose additional ordinances, if indicated. The purpose of this moratorium is to ensure that any new development is not deleterious to the health, ecology and safety of the Lake, as is in the best interest of the people of the Town of Wilton. If the moratorium is passed, the Site Plan Review Application of the Wilson Lake Marina will be included in the moratorium.” As of this printing, the special meeting has not yet been scheduled. Information on this meeting will be posted at the town’s website: <https://wiltonmaine.org>.

An aerial copy of the plan as presented by Main-Land Development Consultants, Inc. is attached below. While this display was designed to show nearby parking, it provides a very good representation of the



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location of the planned marina (look to the right of the blue arrow).

The owner/developer shared their plans with FOWL, seeking our comments and concerns. In addition to the general public concern regarding how close the marina is to the public boat launch—less than 100 feet—we expressed concern regarding the potential impact on the water quality of Wilson Lake. Our consultant, Jen Jespersen of Ecological Instincts has provided the below list of possible concerns; concerns we shared with the developer, Town Manager, Code Enforcement Officer, and the Planning Board:

1. Invasive species (plants, or animals (zebra mussels from out-of-state boats)). Will the boats all come through your CBI inspection at the public boat launch? Or could some arrive before CBI is up and running, or during off hours? Can it be required that they come through a CBI inspection each time the boat enters or leaves the lake?
 2. Gas/Oil—while there will be no fuel tanks on site, boaters will be using their own cans to fuel their boats at the docks and likely carrying gas in on foot. There should be some signage that talks about how to manage gas and oil and a labeled spill kit on site in case there is a spill. The spill kit could be in a plastic tote under a small roof to keep it dry (like a kiosk), or on the dock. Signage should include who to call in case of a spill (owner/DEP if large spill).
 3. Trash—will there be trash cans/recycling bins for people to put their trash in? If so, how will the trash be managed? If not, how do you ensure that people are not leaving trash behind that will end up in the lake?
 4. Bilge water—How is bilge water going to be managed? Will it be collected and picked up regularly by a company that manages these wastes? Bilge water can be a source of invasive plants and animals if a boat comes from another lake. The marina I am working with charges an environmental fee to cover the cost of bilge water disposal which is picked up by Cyn Environmental. Cyn comes in and cleans out bilge water routinely for all boats with slips.
 5. Boat washing—How do you ensure that people are not washing their boats at the docks?
 6. Large Boats—Southern Maine is becoming notorious for people with large boats including wake boats. How do you ensure that wake boats don't become commonplace at Wilson Lake? These boats are causing issues at lakes across the
- state by churning up sediment in shallow areas (suspending phosphorus into the water column) and contributing to shoreline erosion as a result of the large waves. In addition, these boats recycle water that may have come from another lake creating a pathway for invasive plants/animals.
 7. Erosion—For foot traffic coming and going—what BMPs will be in place to prevent soil compaction on walkways, or keep people from compacting large areas in the absence of a defined trail? Is it impossible to drive a vehicle in there?
 8. Outhouse—the public port-a-john is quite a way away from the boat slips. How do you ensure that people aren't using the woods—should a port-a-john be required on site?
 9. Other boat storage—do you expect that other types of boats (kayaks, canoes, etc.) will be stored on land? If so, will there be a defined storage area and will the boat be stored off the ground? (Thinking erosion here from bare soil under these boats).
 10. Cleaning the Docks—How will dock cleaning be handled? Will they be cleaned routinely, or once/year in the fall before the docks come in? Will they be swept rather than hosed off to minimize washing oil/gas into the water?
 11. Pet Waste—boaters love their pooches. How will they ensure that pet waste is not going to build up along the shoreline and then wash into the lake? Will there be doggy disposal bags available on site?
 12. Sewage—Assuming that none of these boats will have on-board bathrooms that require pump-out? The owner should include language in the lease agreement about a “no-discharge” policy. This includes bilge water, sewer, trash, pet waste, gasoline, etc.
 13. Environmental Stewardship—Will the owner take necessary steps to talk to customers about environmental stewardship, provide good signage, fact sheets, and a clearly worded contract or list of





rules to prevent pollution. Perhaps even provide FOWL materials?

- 14. Confirm where and how the docks will be stored to minimize impacts the shoreline buffer; maybe store up on the hill?
- 15. Consider requiring LakeSmart level landscaping to prevent disturbance to the buffer and/or shoreline erosion as a result of buffer modifications. 📍



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Nearly 30% of All Birds Have Been Lost in the Past 50 Years

by Wynn Muller, adapted from material from Audubon and Cornell Lab of Ornithology.

In 1962, Rachel Carson published the groundbreaking book *Silent Spring*. One of its chapter headings was called “And No Birds Sang”. Think of it. Leaving your house every day and not hearing a single bird singing. It’s difficult to imagine, but the possibility looms before us.

A recent study conducted by the journal *Science* shows that over 3 billion birds have been lost on the North American Continent since 1970—about 30% of the entire bird population. Related studies by Audubon and Cornell Lab of Ornithology show similar results. An Audubon study called: *Survival by Degrees: 389 Bird Species on the Brink*, concluded in 2014 after 7 years of studying that 314 of the 588 bird species could face extinction by 2080. This was done through the study of over 44,000 records from the Audubon Christmas Bird Count and the North American Bird Survey to determine where birds live. They then pinpointed the range of temperatures, rainfall and other climatic conditions to predict future ranges with suitable climate conditions for each species. A more recent study continued this work but expanded it to look at not only the climate but also other factors that would make the range suitable to the birds – removing areas converted to agriculture or housing or other areas not suitable to habitat.

The concern with climate is with the changes already occurring as climate change. Already global warming temperatures have risen between .8 and 1.2 degrees since 1880 and 8 of the 9 warmest days on record have occurred since 2001. The United Nations International Panel on Climate Change (IPCC—see above article) has projected that carbon emissions continue at current rates, the planet will likely warm by 2 degrees centigrade by 2050 and by 3 degrees by 2080. Were carbon emissions to flatline the warming would decrease to 1.5 degrees by 2050, a level that is considered workable. Some things that need be done for this to occur are:

- Back economy-wide federal legislation to drive large-scale emission reductions
- Support policies like energy-efficiency standards that reduce demand for electricity
- Expand and incentivize clean-energy sources like wind and solar while reducing dependence on oil

- Reduce tailpipe emissions from vehicles by improving fuel economy
- Preserve and restore landscapes like wetland and forest that sequester carbon
- Invest in developing technologies that accelerate clean energy transition and carbon capture

The studies by Cornell Lab of Ornithology also deals with the loss of species. Their studies conclude that in just the past 50 years, we have lost 2.9 billion birds (most similar to the 3 billion above). That represents nearly 30% of all birds. Of this the following species have produced 2.25 of the 2.9 billion: finch, larks, blackbirds, sparrows and wood-warblers. Some of the most common birds to be lost to the US habitat are Bobolinks, Evening Grosbeaks, Horned Larks, Blue Jays, Baltimore Orioles, and **Loons—whose habitat will move entirely to cooler Canadian climate.**

According to Ken Rosenberg, conservation scientist at Cornell Lab of Ornithology, “These bird losses are a strong signal that our human-altered landscapes are losing their ability to support birdlife. And that is an indicator of a coming collapse of the overall environment.” The *Science* article states: “Some of the causes may be subtle. Last week toxicologists described how low doses of neonicotinoids—a common pesticide – made sparrows lose weight and delay their migration, which hurts their chances of surviving and reproducing. Climate change, habitat loss, shifts in food webs, even cats may all be adding to the problem.” Scientists were able to use data collected by newer technology like weather radar that can track large groups of birds as they migrate, which indicated a 14% decrease in nocturnal spring-migrating birds in the last decade alone. Using models that incorporated all the data they estimated the net number of birds lost over time and across various bird groupings. As you might expect, the greatest bird losses were in the most vulnerable habitats like grasslands. While there are many causes beyond our immediate control, here are a few things we as people can do to help support birds:

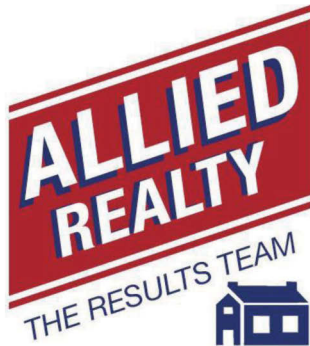
1. Make windows safer to birds, both day and night. Collisions with windows kill millions of birds every year. Install screens, curtains or even stickers to break up reflections.
2. Keep cats indoors. Outdoor cats are the second greatest cause of bird death. Second only to habitat loss.
3. Reduce lawns and instead plant native shrubs and trees which provide nectar, seeds, berries and insects to sustain hungry birds.



4. Avoid pesticides including household weed killers. Purchase organic foods. Nearly 70% of produce sold contains pesticides.
5. Drink coffee that supports birds. 75% of the coffee farms destroy forest habitat to grow coffee in the sun. Use coffees with Rainforest Alliance certification which provides incentives for conserving.
6. Help protect us from plastics. At least 80 seabird species ingest plastics from the ocean.
7. Watch birds and share what you see. Join citizen groups such as Project FeederWatch or the Christmas Bird Count. Join local Breeding Bird Studies in your state. 🐦

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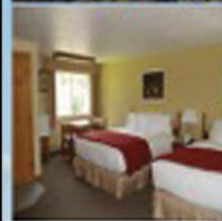
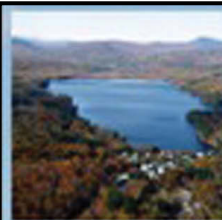


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