CAYUGA LAKE WATERSHED

Network News

It takes a Network to protect a watershed.

2017 i1

2-year Update to Watershed Plan Nears Completion
Continuity, change, and protection of our water resources

Hilary Lambert *Steward/Executive Director, CLWN*

IT is a challenge to unify the administratively complex Cayuga Lake watershed for restoration, conservation and protection. This 785-square mile watershed includes:

- Three counties on the lakeshore (Cayuga, Seneca and Tompkins)—and smaller upland portions of three additional counties (Cortland, Tioga, and Schuyler).
- 45 municipalities (cities, towns and villages), full list: http://www.cayugawatershed.org/Cayuga%20Lake/RPP/caymun.htm).
- Numerous regional, state and federal agencies.
- Development pressures that draw the south end of the lake to focus on the Southern Tier and New York City, and pull the north end of the lake to focus on Syracuse, Rochester, and Lake Ontario.

Watershed unifiers include (among others) the Intermunicipal Organization of the Cayuga Lake Watershed (IO), the Cayuga Lake Watershed Network, and the updated Restoration & Protection Plan (2017). The IO and Plan enable the sharing of information, communication and resources across administrative boundaries, to protect the lake and water resources at the center of our lives.

The surface water resources of the Cayuga Lake Watershed include wetlands, streams, springs, waterfalls, creeks and the lake itself. The area is also rich in groundwater resources. These waters are used for drinking water, farming, wine-making, cheeses, beers, liquors; recreation; industrial uses and wastewater treatment; home and business uses; natural habitat for plants and animals; to replenish depletion due to pollution, drought and overuse; ecosystem functions, and other uses. All watershed residents, visitors, businesses, and municipalities share and benefit from these water resources. All share the responsibility of protecting them.

New watershed challenges have arisen since 2001

Since the first Plan was issued in 2001, new challenges have arisen that negatively affect water quality and quantity and the seemingly modest goal of a sustainable, healthy watershed. These challenges

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Gulls at Myers Point, Lansing

MICHAEL DUTTWEILER

Winter's Wonderful Wrath

Mel Russo *Finger Lakes area naturalist and life-long resident*

Most winters seem to grow exceedingly cold for many people. Except for the adverse consequences of cold on vinifera *grape root stock, our bodies, and the like, low temperatures are in some ways good for both land and water. Some of us go south during this time (probably a vestigial and primordial tropism originally triggered by the onset of the Pleistocene Period), while others remain in the Finger Lakes area to endure the cold season and its associated beauty.*

Soils that have been compacted during warm, rainy weather and tractor tires are nearly atomized by freezing and accompanying expansion of water by up to 10% per unit volume of moisture in the soil mixture. This creates a more hospitable and penetrable growing medium for seeds, roots, water, and air in spring time. In addition, freezing and expansion of moisture within the ground can also fracture solids thereby creating additional soil substrate as frost pushes more stones and nutrients towards the surface from the subsoil. This is why a farmer must pick rocks in the same field each year even though the ground was "picked clean" in many years prior.

For aquatic environments, cold temperatures of winter cause much loss of heat from a body of water. This results in the slowing down of life activities of organisms in the water. These activities include absorption, osmosis, ingestion, digestion, respiration, excretion, and reproduction by aquatic organisms as most are poikilothermic (body temperature changes with—and is about equal to—water temperature).

For use by humans and high quality aquatic fauna such as trout, salmon, and mayfly nymphs, cold induced low metabolic activity of life in water assists in sustaining the good and positive qualities of a lake. In addition, cold water increases the solubility of important life gases such as oxygen and carbon dioxide that support water's most desirable life forms while decreasing the solubility of undesirable nutrients. Thus, the frigid winters we normally experience in the Finger Lakes area help to keep our lakes ecologically young.

Another ecologically significant winter factor is the main form of precipitation: snow. This solid, fluffy form of water usually changes to liquid water intermittently and slowly. The slow phase change of water, along with the relatively low temperature of the resulting liquid (low temp decreases solubility of solids), provides a less nutrient laden run-off to replenish our lakes and streams than does the warmer, more solution friendly, straight forward, voluminous rain.

Amber Kronenwetter of Seneca Falls with her limit catch of 50 yellow perch and 5 chain pickerel caught in the winter of '14-'15 through the ice at the north end of Cayuga Lake. Amber studies fisheries and wildlife at Finger Lakes Community College while working part time jobs and going ice fishing.

An additional winter event that is beneficial to our lakes is ice formation. Although the surfaces of Seneca and Cayuga rarely freeze over completely, temperatures of the liquid water near the surface can drop to the low thirties (°Fahrenheit) and sometimes form ice during our normally cold winters. As one moves deeper into a lake in late winter, the temperature gets less cool (warms) eventually reaching a maximum constant of 39.2° F (the most dense water) all the way down to the bottom. Any heat from this 39.2° F water down below is transferred upward to the coldest and lightest water, then released to the air, thus inducing ice/slush formation at 32° F starting from the surface down. This phenomenon (freezing) has been of rare occurrence over the vast majority of Cayuga or Seneca Lakes in recent times. Notwithstanding, there have been a few alleged complete freeze-overs in my many years of observation. The last "real," complete freeze for Cayuga was in 1912. Even then, two people drowned near Long Point while attempting to ice skate from Ithaca to Seneca Falls.

Meanwhile, ice formation—rather common in most winters but only at the north and south ends of the big lakes and along the shorelines—will greatly slow down the warming up of the lake in spring: this is because it takes eighty times more heat to melt a unit mass of ice than it does to heat the same mass of liquid water an equal increment of temperature. So in addition to providing some great ice fishing for perch, pike, and pickerel, as well as some precarious snowmobiling, skating, and skiing, freezing is good for our lakes.

Evaporation of surface waters from a lake is continuous through all seasons; however in winter, even though the process takes place more slowly, it is more dramatic. This is because the phase change becomes more visible as escaping individual water molecules condense to steam in much cooler air over water. Often, with significant winds, lake effect snow is formed on the leeward side of the lake from the instant freezing of the aerial condensate. Evaporation, whenever it takes place, removes 540 times more heat from

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COVER CROPS
What are farmers growing in the winter?

Penney Mapes Cook *Board member, CLWN*

As we drive the country roads this winter...

there are fields so lush they can make any lawn-tending homeowner, well, 'green' with envy. Many of these green acres are winter wheat and barley or hay crops like alfalfa and grass. Others are growing a 'cover crop,' planted solely to live over the winter and be replaced in the spring with a new crop of corn, soybeans, or maybe a vegetable crop like green beans and pumpkins.

While cover crops have great benefits for the farmer, the greatest benefit may be what they do for the environment, reducing erosion and protecting our waterways. With climate change comes more severe weather events bringing rains of 2 inches and more, making water run-off and erosion an increasing problem. Soil washing from the fields carries nitrogen and phosphorous to the lake causing excessive growth of algae as well as Cyanobacteria, also known erroneously as Blue-green algae. This bacteria has been found in many New York waterways during the very dry summer of 2016 including Owasco Lake, which is the drinking water source for Auburn and surrounding communities.

Farmers in the Finger Lakes strive to be good stewards of the land. More and more, many are planting cover crops which are a mainstay of sustainable agriculture, helping to reduce soil erosion, weeds and pests, hold moisture and improve fertility and soil quality. The number of acres planted to cover crops has increased dramatically over the last few years.

Cover crops are usually not harvested but worked into the soil adding nutrients and organic matter. The improved soil can absorb and hold more rain, making plants more drought resistant. Cover crops reduce runoff and evaporation of water from the soil and help to break up heavy soils that are prone to erosion.

Some of the cover crops you may see in the Finger Lakes include grasses, wheat, barley and crimson clover. Another might be tillage radishes, a giant white daikon-like radish that grows a deep root which helps break up or 'tills' the soil over the winter.

So as you travel the country roads of our beautiful Finger Lakes, take notice of what is growing in the fields. Appreciate the greenery that protects the soil as well as our lakes and streams, and thank a farmer.

Penney Cook is a member of the Cayuga Lake Watershed Network Board, and farms with her husband Bill in Aurora, NY. Those who are interested in the Cayuga Lake Watershed and protecting our water quality can find more information at www.cayugalake.org or contact Steward/Executive Director Hilary Lambert at steward@cayugalake.org .

Cate Burroughs, holding a tillage radish. Her dad is Jason Burroughs, partner and crops manager at Aurora Ridge Dairy.

An Interview with Dave Bouldin

Patricia Haines-Gooding *Chair CLWN Board of Directors*

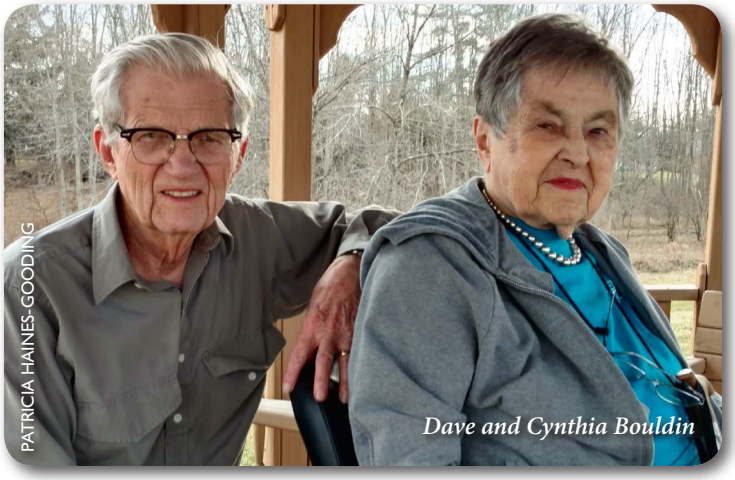
From Missouri farm boy to Cornell Professor Emeritus, at age 90 David Ritchey Bouldin has had his eye on Cayuga Lake since the early 1970s, when his field—soil science—began to look seriously at the effects of farm drainage on water quality. While his Cornell years focused on crop production and water quality in rural watersheds, when he retired, "to keep my brain occupied" he began synthesizing 50 years of research on stream and lake chemistry. A report of his findings, correlating stream phosphorus levels with lake chemistry, has been compiled and is being prepared for publication. Dave's insights and long-term data are essential to the updated Watershed Plan and Whole Lake Phosphorus TMDL (see other articles, this issue).

In some ways Bouldin's story is a reminder of how the more concerns change, the more they stay the same. "Before retirement," he reflects, "my dual educational responsibilities were to ensure that the crop yields were maintained at an economic level consistent with environmentally acceptable water quality. The primary nutrient elements were nitrogen and phosphorus, the tools were fertilizers, manures and organic residues." When he began his career, paying attention to the environment was hardly on the radar, but in the early 1970s, Cornell received funding for a project entitled "Food Production and the Environment." A multidisciplinary team representing perspectives from Natural Resources, Agricultural Economics, Agricultural Engineering, Rural Sociology and Agronomy/Soil Science was told "in no uncertain terms" that future promotions would be based on their performance. Underscoring the study's importance, each team member was given a post-doctoral fellow and 2-3 graduate students, and everyone was expected to attend regular meetings.

For Bouldin and his colleagues, "this was a remarkable experience … (and) each of us was soon convinced of the importance of the environment and that we were embarking on a major opportunity for being part of the future." However, early on one team member remarked "I just learned how to spell 'environment'!" This collaboration resulted in a now out-of-print book, and a 1977 information bulletin, *Lakes and Phosphorus Inputs, A Focus on Management*, available on ecommons <http://hdl.handle.net/1813/30560>

The bulletin melds summaries from each of the five academic disciplines. Resonating with today's concerns, observations include "...phosphorus is the element that most influences lakes;" and "human activities are (responsible for) ...75 to 80% of phosphates reaching lakes." Also, wryly: addressing resulting issues is complex in part because "administrative boundaries do not correspond with watershed boundaries." From the lens of 1977: "With the updated guidelines of the Federal Water Pollution Control Act of 1972… it will be interesting whether... clean waters can be achieved. ***Public interest and participation can make significant contributions."***

Bouldin views Cayuga Lake as an environmental test case. Most still agree, he observes, "that phosphate is a key element and algal chlorophyll is one indicator of lake health." One of the first lessons he cautions about lake/stream interaction,



Dave and Cynthia Bouldin

however, is that the annual volume of stream inflow is small in relation to lake volume. His 50 years of data readily suggest that high phosphorus from field runoff means high phosphorus for Cayuga Lake, fueling increasing macrophytes (weeds). While providing good habitats for fish, increasing weeds affect drinking water quality, clog water intake valves, snarl boat motors, and plague lake-shore homeowners. The solution would seem to be to address field runoff.

Dave, however, counsels a broader perspective. "We have to remember that the Lake is very large and very deep," and even if agricultural runoff were to suddenly stop "it would take 10-12 years to see any impact. Discouraging, but that's the way the Lake is." That's not to say that working to slow runoff isn't important, only that it will take a very long time to make any appreciable difference.

In Bouldin's estimation, the rising threat to Cayuga Lake now is invasive species. In addition to hydrilla and water chestnut, there is blue-green algae. Not yet rampant in Cayuga, it is starting to show up across the Finger Lakes. The thing to pay attention to is the "ring around the Lake," the shallows that welcome stream deposits, where macrophytes flourish. While higher phosphorus levels from agricultural runoff may correlate with increasing macrophytes, another important factor to consider is increasing temperatures via climate change, with accompanying acidification. Though it may seem a stretch, it's useful to look at coral reefs—like the Lake, calcium carbonate phosphate systems—where chemists record rising temperatures and CO2 levels. For Cayuga, this may be only a summer issue—most of the Lake remains very cold throughout the year—but it's something for climate change watchers to consider.

This is especially important for the north end of the Lake. Not only is the 'ring' shallower there, but "the real gorilla in the room," Bouldin points out, is drainage from Keuka and Seneca Lakes. No data exists to characterize it; collecting it would be very expensive; and "we can't do everything." The important thing is the chemistry, and keeping track of changes, something that the Watershed Network and its partners are doing well. And as Dave and his 1977 colleagues observed, "Public interest and participation can make significant contributions."

Public information meetings to be held in May 2017
The Whole Lake Phosphorus TMDL

John Mawdsley *CLWN Board member*

The southern part of Cayuga Lake has been listed as impaired since 1998 due primarily to sediment and phosphorous concentrations in the shallow area known as the shelf. The DEC was required, at some stage, to develop a plan to overcome these problems, if at all possible. The plan had to be based on a study called a TMDL study—that is a Total Maximum Daily Load study.

Cornell University was required to develop models for Cayuga Lake that would allow the daily loadings of the pollutants to the lake to be estimated, as well as the concentrations of these pollutants in the lake. Cornell was required by DEC to do this study as part of the renewal of the SPDES permit (State Pollutant Discharge Elimination System) for their Lake Source Cooling withdrawal and discharge to the southern end of the lake. The study has cost several million dollars and has been going on for five years, using a number of environmental consulting companies and academics to monitor the lake and develop a number of mathematical models. These were all completed in late 2016 and a detailed report was submitted to the DEC, along with copies of the mathematical models.

The DEC will now run these models to develop ways to reduce the pollutants to the lake, primarily phosphorous in its dissolved state, to levels that the lake can accommodate without causing an impairment, if at all feasible. The models can also be used to help to identify concentrations of chemicals in the lake at many locations where data are not currently available, and perhaps pick up problems that at present are unknown. The lake is very large and there are few data samples outside the southern shelf of the lake. The TMDL study is for the whole lake and not just for the southern shelf.

Proposals to reduce loadings that the DEC will recommend may require changes in agricultural, construction or road maintenance procedures, creek bank stabilization procedures, limits on home use of fertilizers, and many others.

The DEC has to consult the public on their proposals before the TMDL plan is finalized. They are expecting to do this in May this year. We will be watching for this consultation period and will submit our comments, whether supportive or critical. We urge you to join us or to make your own comments to the DEC. We will give details of the consultation on our web site www.cayugalake.org and our Facebook page. More information is available at NY DEC's Cayuga Lake Watershed Management page http://www.dec.ny.gov/lands/88250.html

Agrarian view of Cayuga Lake.

MIKE DUTTWEILER

Upcoming Events *in the Cayuga Lake Watershed*

MARCH: Hemlock Wooly Adelgid workshops/field trips! Contact Hilary Lambert steward@cayugalake.org for the dates and locations of our outdoor workshops/ field trips into woodlands along Cayuga Lake, to survey for the pest Hemlock Wooly Adelgid. Learn more about this destructive pest at the New York State Hemlock Initiative website: https://blogs.cornell.edu/nyshemlockinitiative/

MARCH 25: 25th Annual Ithaca Fishing and Conservation Day 9 am-4 pm Ithaca High School Cafeteria. 1401 North Cayuga Street, Ithaca NY. Admission and programs free—donations appreciated.

- Sponsored by the Leon Chandler Chapter of Trout Unlimited, with vendors, exhibitors & workshops.
- Caring for Cayuga presentations by the Network, the Floating Classroom, and the US Coast Guard Auxiliary Flotilla 2.

THE NETWORK'S SPRING CONFERENCE, May 6: This half-day community conference will be held in Seneca Falls (TBD). Topics: the state of the lake; the final updated Cayuga Lake watershed plan; Cargill Salt's expansion proposal; and 2017 water quality monitoring at the north end.

SUMMER LAKE SAMPLING FOR PHOSPHORUS: Want to be part of this important new project we are sharing with the Community Science Institute? Contact steward@cayugalake.org to learn more.

HYDRILLA HUNTING: Late summer and autumn Hydrilla Hunting: We need your eyes on the lake looking for hydrilla along the Tompkins, Cayuga and Seneca county shorelines from late July to when the weather turns cold. Contact steward@cayugalake.org to get information and sign up to monitor a stretch of shoreline on a regular basis.

AUGUST 16: The Network's Annual Meeting & Picnic, 5 - 9 pm. All are welcome. Lakeside location TBA! Check the Calendar of Events and News on our website http://www.cayugalake.org/news/events.html

We have deep concerns that water protections may be weakened as a result of changes to US EPA and other federal environmental protection agencies. Please note listserv messages and check our website and Facebook page for action alerts, asking you to send comments, make calls, etc. Your support is needed more than ever this year.

It's time to Renew/Join for 2017!

NOT YET A MEMBER? This year, ALL new member dues will be matched dollar-for-dollar with a grant from the Park Foundation. So if your membership costs $50, the CLWN receives an additional $50 from Park!

Please make a tax-deductible 2017 donation to CLWN, your watershed protection organization. Renewal forms were sent to members last November, so please return. You can also use the form below to join or renew. Mail completed form w/check to CLWN, PO Box 348, Aurora, NY 13026

DONATIONS can also be made via paypal at our website www.cayugalake.org
Your support is needed more than ever this year. *Thank you.*

Name _____

Address _____ City _____ State _____ Zip _____

Email _____ May we add you to our listserv? ❍ Yes ❍ No

We have membership levels to suit everyone's needs. Please check one of the levels below.

❍ $10 Student/Senior ❍ $25 Individual ❍ $35 Family ❍ $50 Organization/Agency ❍ $50 Business/Farm ❍ $100 Headwaters Donor ❍ $250 Lake Sponsor ❍ $500 Watershed Benefactor

We are growing and expanding our effective programs. Would you like to make an extra donation to support this work?

$_____ Unrestricted – for general operations.
$_____ To support water quality tests on Canoga, Burroughs, Yawger and Milliken Creeks.
$_____ To support improved outreach to YOUTH, our watershed's future protectors.
$_____ To expand our springtime Embrace the Lake creek, lakefront & ditches cleanups.

TOTAL ENCLOSED: $_____ Check # _____ (payable to *Cayuga Lake Watershed Network* please)
Payment can also be made via Paypal at our website www.cayugalake.org
Your Contributions to the Cayuga Lake Watershed Network are Tax Deductible.

Would you like ❍ 1 or ❍ 2 full-color CLWN logo window stickies (4 x 6″)

2-year Update to Watershed Plan Nears Completion *continued from cover*

include climate change and extreme weather, resulting in the need for farmers and other producers to adapt; shifting patterns and seasons for wildlife, birds, tree species, other plants and biota; and shifting political priorities that can quickly affect our ability to protect natural resources.

These changes affect human use and enjoyment of land and water, and introduce new hazards, including invasive species, large-scale energy development, drought, and emerging contaminants to the 2001 Plan list of concerns that focused around sources of polluting runoff to the lake.

We enhance the economic vitality of the region while protecting the environment by working together, via the Intermunicipal Organization (IO) and its allies and partners in local communities, and at county, state and federal levels. The IO and allies first developed a collaborative management plan and planning process for the Cayuga Lake watershed in the late 1990s. The original Restoration & Protection Plan was issued in 2001, and can be viewed here: http://www.cayugawatershed.org/. The accompanying encyclopedic Watershed Characterization document can be viewed here: http://www.cayugawatershed.org/characterization/

Updating the plan: A public process, 2015-2017

In 2015-2017, the IO and Cayuga Lake Watershed Network joined forces to update the plan, drawing in hundreds of people, dozens of agencies, and numerous experts to update the plan and recommendations for action to better protect our water resources. CLWN Steward Hilary Lambert is the project manager. The central 2017 goals of the Cayuga Lake Watershed Restoration and Protection Plan (RPP) are:

To inspire, to prioritize actions and strategies, and to bring about legislative change vital to protecting and preserving Cayuga Lake and its watershed. By supporting this plan, the Intermunicipal Organization (IO), municipalities, farmers, residents, private and public partners, and watershed stakeholder nonprofit organizations can build a productive economy which sustains a healthy watershed.

Top priorities for next-steps action

Water protection and improvement strategies that address public concerns, expert recommendations, and municipal needs have been prioritized by the IO. A list will be available online at the Network's website and revised IO website during April. A next-steps grant was awarded to the IO and Town of Ithaca by the NYS Department of State last fall to fund part-time IO staff and get going on developing water-protective projects for engaged municipalities. A top priority project will be working with municipalities, the Cornell Roads Program, our Soil and Water Conservation District offices, and others to develop and share best management practices for highway ditches. The Network will have an active networking, research, and educational role.

Water quality and quantity improvements and protections cannot happen overnight. Not every municipality will see the benefits of implementation at the same time. Implementation of the plan will occur on a project-by-project basis, focused on the prioritized water quality threats and issues identified in the RPP.

What is the bottom line for this plan to work? Cooperation between municipalities and active citizen participation are the critical components for the success of the Cayuga Lake Watershed Restoration and Protection Plan, and for the future good health of our lake, creeks, streams, springs, waterfalls, and wetlands. As stated in the IO's 2017 Purpose and Charge:

The purpose of the Intermunicipal Organization is to bring the watershed municipalities together to work collectively and collaboratively on monitoring, protecting, and restoring the health of the watershed.

This article is an excerpt from the Preface to the 2017 Plan.

March—May cleanups *Embrace the Lake!*

Has the winter trash buildup been bugging you? Is your group interested in doing a two-hour lakeshore cleanup, or a creek cleanup on one of the 35 major creeks that drain to Cayuga Lake, or along one of the many hundreds of smaller creeklets and streams that give their waters to Cayuga Lake? How about your neighborhood ditches? They are waterways too! We can help with trash bags, gloves, signs, and more! Free of charge. If you would like to organize a spring cleanup or take part in one, contact us at programs@cayugalake.org.

The St Laurent family embraced Virgil Creek in Dryden.

The mission...

The Cayuga Lake Watershed Network identifies key threats to Cayuga Lake and its watershed, and it advocates for solutions that support a healthy environment and vibrant, sustainable communities.

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- Education
- Advocacy
- Protection

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The Cayuga Lake Watershed Network thanks Leigh Dezelan of Dezelan Dezign and Pioneer Printing of Lodi for newsletter production excellence.

The Littoral Zone

Winter's Wonderful Wrath

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the water than changing an equal amount of liquid water the same increment of temperature while remaining within the liquid phase. Cloud formation above the water is a fantastic physical winter affair that is a wonder to witness. It is another event that verifies the continual escape of water molecules to the atmosphere and the consequential heat loss from our lakes—a good thing.

Meanwhile, because of the unique properties of water, winter time is not so hard on the terrestrial life activities in the close vicinity of the lakes. Many of the organisms that would otherwise be sensitive to extreme cold are protected by a slower loss of heat from the body of a lake compared to that of the air and land. In fall and winter, the latent release of heat from the warmer lake water moderates air temperatures proximal to the lake thereby allowing the high quality nearby Finger Lakes grapevines and grapes to better develop in fall and later survive the colder months. More importantly, in spring, because water gains heat much more slowly than air, the lakes provide natural air conditioning to the surrounding land, thereby delaying premature budding, protecting our sensitive Finger Lakes area fruits and flowers from an early frost. This is contrary to upland plants that can be "fooled" by a late winter/early spring "heat wave." The cooling lake effect is evident to such an extent that returning small migratory birds such as red-winged blackbirds *(Agelaius phoeniceus)*and warblers *(Passeriformes)* are seen inland several days earlier than near the lakes. Even upland wild flowers and trees bud before those in closer proximity to the lake.

So, without cold we would have compacted soils, a lot more pea soup events (algae blooms) in our Finger Lakes during summer, and a lower quality of water, among other things. Although we *complain* (verbiage used as substitute for a less civil word) about cold winters, cold weather is beneficial for the lakes, the land and all of us. Thanks to the lakes and their micro-climates, our prized fruits and wines can flourish and cure with excellence. Indeed, winter time protects and renews the earth and many things. Furthermore, it makes the arrival of spring even more invigorating for all—especially for those of us who stay in the Finger Lakes to endure the wonderful wrath of winter.

Edited by Susan Backlund.