
◆ The Watershed News ◆

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Winter & Spring 2015

A Quarterly Publication for the Ossipee Watershed Published by the Green Mountain Conservation Group

Raptor presentation will help celebrate GMCG's 17th Birthday

Green Mountain Conservation Group is proud to host the Vermont Institute of Natural Science (VINS) at the 17th GMCG Annual Meeting, and a presentation on "Raptor Encounter" complete with three live birds. Falcons, hawks and owls provide the lens through which scientists examine food webs, predator-prey relationships and the interdependence of the systems that support life. This first-hand encounter enables participants to understand the defining characteristics that make a bird a raptor and their adaptations for life as a predator on the wing. Touchable artifacts and hands-on materials round out this special experience.

VINS Education Staff members have varied backgrounds, and are skilled presenters that enjoy sharing the importance of raptors to the natural world with audiences of all kinds. Through displaying live birds and interacting with audience members, the VINS Educators make a Raptor Encounter an engaging and provoking presentation.

The Vermont Institute of Natural Science is a nonprofit, member-supported, environmental education, research and avian rehabilitation organization headquartered at their Nature Center in Quechee, Vermont. Open year-round, the 47-acre campus, adjacent to Quechee State Park, features 17 state-of-the-art raptor enclosures, 4 exhibit spaces, 2 classrooms, and ¾ miles of interpretive nature trails. VINS places a priority on making high-quality, compelling, and fun environmental education programs and learning opportunities accessible to more people and communities.

The GMCG 17th Annual Meeting will be held on Saturday, April 11th at the Sunny Villa restaurant on Route 16 in Ossipee,

starting at 4pm. The Raptor presentation will be first on the agenda, followed by hors d'oeuvres, a brief business meeting, dinner and annual awards during dessert. Tickets for the event including a turkey dinner with all the trimmings served family style are \$35.00 per person. A cash bar will be available.

The annual meeting is the time to publically celebrate the past year's program successes, to honor our staff, volunteers and board of directors, and to energize everyone in the Watershed for the year ahead. GMCG is growing in name recognition and reputation within the Watershed.

Through research, education, advocacy and land conservation, GMCG continues to demonstrate a commitment to the protection of the Watershed's natural resources and encourages youth and adults to learn more and take positive action.

Call GMCG today to make your reservation to attend the 17th Annual Meeting. 603-539-1859.



March is Membership Month

On April 11, GMCG will Celebrate its 17th Birthday. As we enter our 18th year of conservation work in the Ossipee Watershed we also want to extend a thank you to everyone who is a loyal member. Seeking "Membership" for the organization was a conscious decision made by its founders to encourage community participation and support. The minimum family or individual membership costs just \$25 per year. To date, GMCG can report broadly that 20% of the annual budget is raised through membership—70% grants and 10% community support. Every dollar raised is leveraged into a \$10 value to the community.

GMCG relies on membership not only financially, but also with the hope that each member embraces and carries the mission in some way to his or her Watershed Towns. Since GMCG's inception in 1997, it has continued to be a community driven organization. The catchphrase of "Healthy Waters = Healthy Communities" drives the mission and programs which are delivered through research, education, advocacy and land

conservation.

Celebrating 17 years of successes brings to mind the question: "Would you spend 17¢ per day to help protect water quality in the Ossipee Watershed?" That comes to \$62.50 annually. The benefit is peace of mind. With your dollars GMCG engages volunteers to perform year round water testing in the streams and rivers. Youth water literacy programs provide hands-on experience with water testing so vital to the future of their community. Events which bring town planners and residents together to craft water protection objectives and support for land trust efforts have helped conserve thousands of acres across the area.

Thanks to your continued support, GMCG is proud to celebrate 17 years of conservation success! Thank you all so much for your continued support.

Please renew your membership today!

The Watershed News

The Watershed News is a quarterly publication of the Green Mountain Conservation Group, a non-profit, 501(c) 3, charitable organization established in 1997 and dedicated to the preservation of the natural resources in the Ossipee Watershed. The towns of Effingham, Freedom, Madison, Ossipee, Sandwich and Tamworth make up the boundaries of the Ossipee Watershed. This watershed includes one of the largest and deepest stratified drift aquifers in New Hampshire.

GMCG's purpose is twofold:

1. To provide an organizational structure for a coalition of citizens and local officials interested in identifying sensitive areas within the Watershed in need of protection;
2. To offer public educational events about conservation issues and possible solutions regarding the preservation of unique natural resources.

Through research, education, advocacy and land conservation we strive to promote an awareness and appreciation of our watershed's natural resources and encourage a commitment to protect them.

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Water Quality, Corey Lane
Land Trust, Chris Young
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WQM— On Thin Ice

By Dave Downs
GMCG WQM Volunteer

Everyone involved with GMCG knows about the Water Quality Monitoring (WQM) program that has been going on for over a dozen years involving dozens of volunteers on the lakes, rivers and streams across the watershed. There is a high degree of activity from April through October in this effort.

But you may not know that this effort goes on year round where from November through March ten sites are monitored once a month instead of biweekly. Another volunteer, Rich Dandeneau, and I perform the field work while Corey preps the equipment and labels bottles prior and then processes the samples, cleans up the equipment and deciphers our paperwork once the day is finished.

We call this "WWQM" – Winter Water Quality Monitoring. We usually make a day of it. To do the ten sites is an 85 mile circuit and generally takes about seven hours depending on our efficiency and how long we take for lunch (we have a great lunch stop on the Ossipee River for wildlife viewing).

The Equipment and sample bottles are exchanged the day before. Early the next morning, I calibrate the meter and then Rich and I take off, but not too early. During the regular WQM season the sampling has to be completed before 9:00 AM due to issues with the impact of increasing heat on the readings and samples. **This is not a problem in winter.** We generally start about 8:30 AM after the temperature is above zero.

The actual field process is just like it is in the summer with a few modifications. Obviously, we dress for the weather and safety. Instead of bug head-nets we have microspikes and snowshoes and a ski pole to steady ourselves and check our footing in deeper snow. We use duck hunters' gloves for reaching into the water to fill sample and turbidity bottles. These gloves are waterproof neoprene with long sleeves. Barehanded in November and December isn't too bad but come January ...

But, one of the biggest problems many times is actually being able to reach the water due to snow banks and ice. A few years ago when we first got involved with this, we tried a process where Rich held my ankles and slid me down the snow bank to

where I could reach the water to fill bottles. Blair found this to be unacceptable safety-wise and questioned our sanity. Since then, we have come up with a bit of a Rube Goldberg contraption to more safely and elegantly procure our samples. It consists of a golf ball retriever (extendable to 15 feet) and rubber strapping and clamps to hold the bottles. If we can't reach the water with that then we don't sample the site as we couldn't get the meter probe to the water either.

There are times when we cannot sample a site if it is totally frozen over. Fortunately those times have been few. The worst challenge in WWQM is roadside snow banks. This may cause us to have to park farther away from the access to the sample site but worse is climbing the bank packed hard by the snow plows and then dropping into deep fluffy snow on the other side and floundering.

But, the pluses greatly outweigh the minuses. Aside from the warm feeling of supporting research for the environment and



helping GMCG is the pure beauty of the natural environment. Just looking at a stream running through snow covered woods is a great stress reliever. The quiet woods, the animal tracks in the snow, seeing bald eagles, beaver, otter, mink, muskrat and deer, seeing the various ice formations on rocks, logs and branches in the water – all of this makes each day spent in the service of GMCG very rewarding.

And, I'm sure, regular WQM volunteers would agree,, one of the biggest benefits of WWQM is – NO BUGS.

If you are interested in becoming a 2015 WQM volunteer please call Corey Lane to sign up for the April Training. 539-1859.

What goes up must come down—how air quality may be impacting water quality

On March 26, GMCG will celebrate World Water Day with a moderated forum on the probable connection between air quality and water quality. “What goes up must come down” forum will feature prominent scientists who have been researching air and water quality issues for decades.

Sherry Godlewski from New Hampshire Department of Environmental Sciences will present information about air quality in the state and discuss how NH’s air pollution is monitored and what trends we are seeing.

Georgia Murray, research scientist from Appalachian Mountain Club will educate attendees about the air, cloud and water research that has been going on both on the summit and in the valley around Mount Washington. (Please see related article by Georgia on page 4 & 5.)

Dr. Robert Newton, Geology Professor, Smith College has recently been collecting sediment cores on Cooks Pond in Madison and he and his students will present information about mercury.

Activist Wanda Allen from Bartlett will speak about the controversial proposals around solar radiation management—“attempts to offset effects of greenhouse gases by causing the Earth to absorb less solar



Students from Smith College extract sediment core from Cooks Pond in Madison.

radiation.” (Wikipedia.)

We hope to invite several other speakers so please visit our website for more information as the date approaches. The event will be moderated by Mike Pilkovsky, the town moderator for Effingham. Please join us March 26 at Runnells Hall in Chocorua 6:30-8:30 pm.

A history of Mercury deposition in the Ossipee Pine Barrens as indicated by sediment cores from Cook’s Pond, Madison, NH

By Emma Karnisch

Increased atmospheric deposition of mercury (Hg) from anthropogenic sources such as coal burning and gold mining is affecting high trophic level organisms far from the sources of pollution. In NH, large piscivorous fish and birds have been found to have dangerously high levels of Hg.

Lake sediments hold a detained record of environmental change and can be used to document the history of Hg deposition. Two cores were collected at locations separated by a partially submerged esker within Cook’s Pond located at the north end of the Ossipee Pine Barrens. Both 60 cm cores were collected at similar water depths (6m) using a Uwitec gravity corer with secondary hammer action. Samples were removed from the core in the field at 1 cm intervals. Each sample was air dried,

homogenized using a coffee grinder, and analyzed for totally Hg by Cold Vapor Atomic Adsorption using a Teledyne Leeman Labs Hydra IIC Mercury Analyzer.

Both Cores show a significant increase in Hg concentration toward the upper part of the core beginning at 20cm below the sediment water interface.

This increase is interpreted to be due to atmospheric deposition of Hg associated with coal burning during the industrial revolution. Although both show similar trends, their ranges vary with one core having higher preindustrial Hg levels while the other contains higher postindustrial levels. Below 20 cm both cores show a decrease in Hg concentrations from 170260ng/g to 2025ng/g. Loss on

ignition (LOI) was determined by comparing sample weights before and after analysis in the Hydra IIC, to be representative of the relative concentration of organic matter in the core. There appears to be a consistent relationship between LOI and Hg with higher LOI’s generally being associated with lower Hg concentrations.

Mining at the Madison Lead Mine, active 1910-18 could explain an anomalous decrease in Hg observed at a depth of 78cm in both cores. The unvegetated beach at the south shore of the pond is the result of mine tailings from an ore crushing operation. The influx of sediment into the pond may have diluted atmospheric Hg. In the early 1800s an increase in settlement in the area could explain the decrease in LOI at the tip of the core due to erosion associated with the land clearance for agriculture. Subsequent reforestation could also explain slight increases in LOI beginning at 10 cm.



This paper was co-authored by Emma Harnisch (Above), Robert Newton, Robert Merritt, Smith College and will be presented to the Northeast Section Meeting of the Geological Society of America at the Mount Washington Hotel. The conference is open to the public. FMI: <http://www.geosociety.org/Sections/ne/2015mtg/>

Are National Clean Air Laws Working for New Hampshire's Mountains

By Georgia Murray

Yes!

Air pollution can travel hundreds of miles from urban and industrial areas and affect NH's air quality even in our rural mountains to the north. Over the past 3 decades the Appalachian Mountain Club's measurements on Mount Washington have shown unhealthy levels of ozone (a respiratory irritant) as well as episodes of acid rain and haze pollution. Some of these pollutants are more concentrated at the upper elevations where the air can arrive aloft, carrying ozone smog or highly concentrated acidic clouds. However, we are happy to report that a number of programs under a bi-partisan law passed in Congress in 1970 called the Clean Air Act (CAA) have resulted in cleaning up a good portion of pollution at the sources (smoke stacks and tail pipes) and we have documented the differences in our mountains! Ozone is the lowest it has been since we began monitoring in the mid-80's and summertime rain

water acidity is now in the range of what is considered natural. There is still some work to be done, with clouds still acidic and ozone pollution still reaching levels that are considered unhealthy by physicians and public health scientists, but the progress we have made is something to celebrate. If the air is cleaner what about the water?

the shape of the watershed, and so much more!

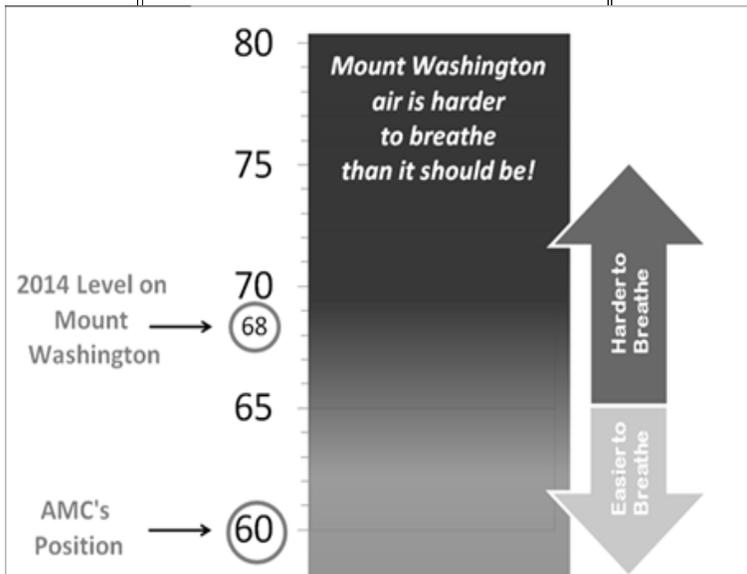
To make things even more complex water chemistry can change over the season, as plants alter the signal with their demands for water and nutrients for example. Even from one year to the next the water chemistry can be very different, for example a wet summer verses a warm dry one can change the base cation concentrations.

However, even with this variance by sampling the same location repeatedly over many years you can start to look at changes over time.

AMC has been monitoring two high elevation N.H. Wilderness area streams during summer for a number of years and we have found some differences that we, in part, attribute to the watersheds shapes and underlying geology. At the same time they also show some similar trends of decreasing

pollution, reflecting the changes we see in our rain samples.

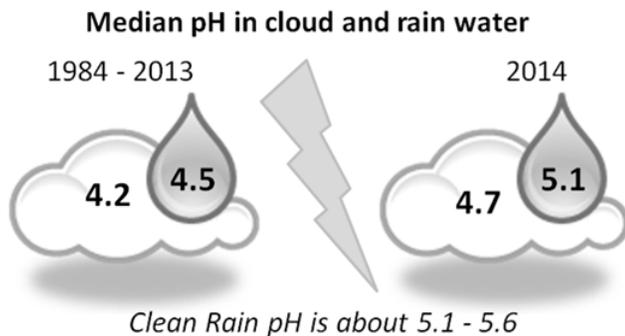
While the historical trend of base cation and acid anion concentrations are trending in the direction of recovery, in the most recent sampling year we found that Class I Wilderness streams are both below and above the acid neutralizing capacity (a measure of how well the watershed can buffer acidity) threshold of 25 µeq/L. This suggests these watersheds remain sensitive to acid rain.

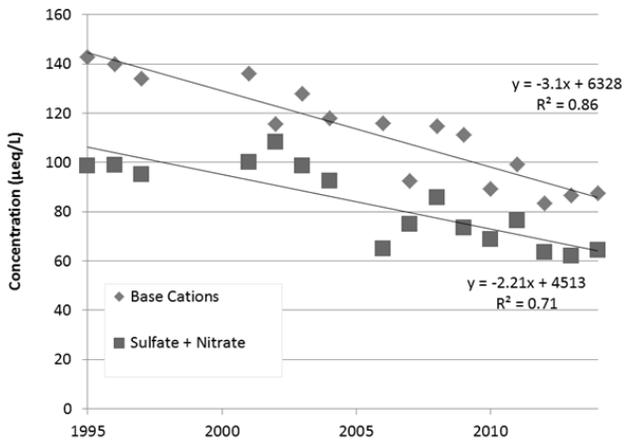


Graphic of ozone levels in ppb, highlighting the current levels on Mount Washington summit and AMC's policy position of where the national standard should be set to protect hiker health.

What goes in is not always what comes out!

When we look at water chemistry of streams and lakes we are not just seeing a reflection of what washed in with the rain. We are seeing a reflection of the rain, the clouds, the air, the trees, the soil,





Average base cations and sulfate plus nitrate in µeq/L for the Great Gulf Wilderness high elevation site

pollution on Class I Wilderness areas.

Atmospheric deposition of sulfate, nitrate and associated acidity cause vegetation and soil leaching of cations, changes to water quality, and potentially damage ecosystem health across the White Mountain National Forest. For example, these pollutants can



Photo of Georgia Murray setting up a weather station at the Lakes of the Clouds monitoring site.

Catching Clouds

The AMC has been catching clouds for more than 30 years every summer near our Lakes of the Clouds hut on Mount Washington. We monitor and analyze cloud and rain chemistry as part of tracking

alter the chemical balance in soils often causing accelerated leaching of cations and even aluminum, which is toxic to biota. Monitoring of precipitation chemistry and water quality is used to understand how the input of pollution from air emission

sources is affecting the AQRV of water quality.

leaky gas lines. EPA is poised to take action on climate change using the same tool that has resulted in cleaner air in NH, the Clean Air Act.

AMC Air Quality monitoring is

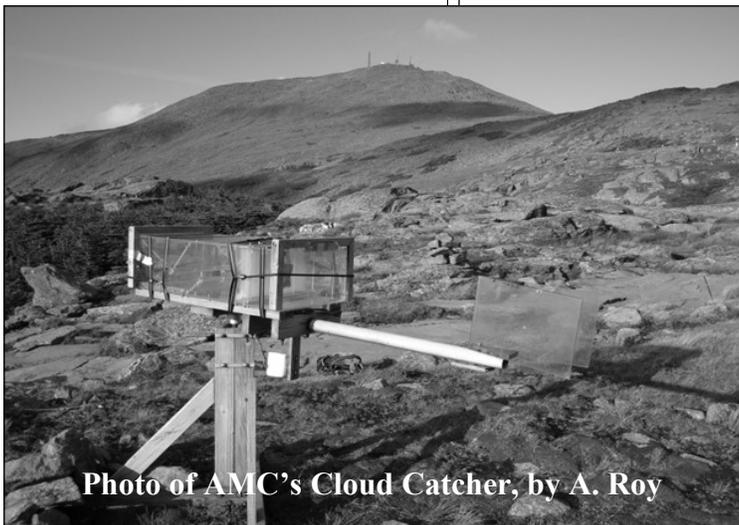


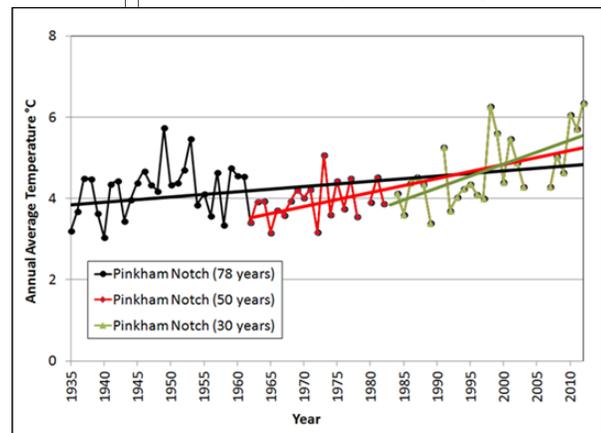
Photo of AMC's Cloud Catcher, by A. Roy

air quality related values

(AQRVs) in and near the Great Gulf Wilderness and Presidential Range-Dry River Wilderness Class I areas. Monitoring AQRVs has been identified in the WMNF Management Plan as baseline tracking necessary, in part, to fulfill the management objective of assessing the effects of major new or modified emission sources of air

Climate Change and Air Pollution

The issue of climate change is linked to air pollution because the sources of these problems are the same as for ozone and acid rain; fossil fuel use and the resulting emissions from smokestacks, tailpipes, oil and gas drilling, and



conducted with support of Cost-Share Agreements 09-CS-11092200-010 and 14-CS-11092200-001 with the White Mountain National Forest.

Georgia Murray is a research scientist with the Appalachian Mountain Club and will be a speaker at the March 26 forum.

Is geoengineering an option to stop global warming?

By Wanda Allen

For years, there have been Environmental studies done on our water, air and soils. Ever increasing is the amount of heavy metals and air born particulates that are thought to come from power plants, coal refineries, automobiles, and other sources of pollutants. Over a year ago, I discovered another contributing factor that many are not even aware of.

I went outside to play with my dog but what was different on this particular day was that I noticed our beautiful sky was filled with long white milky plumes that went from horizon to horizon and were expanding and changing the sky from blue to white. In the following months, I researched day in and day out to find out what could cause this phenomena and in doing so have discovered troubling information.

One part of this is called Geoengineering/ climate engineering/ Solar Radiation Management or Stratospheric Aerosol Injection. The programs are designed to spray 20 million tons of nano-sized particulates of Aluminum Oxide, Barium Oxide and Strontium via aircraft into the atmosphere to reflect sunlight back into space. The stated purpose of these programs is to block the sun's rays from hitting the Earth

and reflecting it back into space and help reduce global warming.

There are so many side effects, where does one begin? We need sunlight to grow food, to keep a natural balance to our own health. There is ozone depletion which is our natural protection from the sun; soil acidification from the metal oxides making it harder for forests to grow; trees shut down when their root systems get clogged with heavy metals, and their leaves shut down their stomata not wanting to absorb the particulates. Growing food becomes difficult as well.

Our water resources are compromised and metals acidify the oceans, lakes, rivers and streams. For decades, we have fought to clean up our air and combat acid rain problems. Why would we even consider this option to combat global warming?

There are many controversies surrounding solar mitigation and geoengineering. However, evidence of these programs is becoming more and more clear. People from around the world have been reporting observations of planes flying back and forth across the sky and leaving traces of cloud patterns that bloom and block out the sun. More and more citizens and organizations are asking questions and seeking air, soil and water quality data.

I live upstream just below Saco Lake and

the birth of the Saco Watershed and I have been witnessing this plane activity. Rare is the day that the sun is shining and not covered by a layer of clouds. What happened to those bluebird northern New Hampshire days? What are these planes and are they spraying water or something else? How is this impacting our water and natural resources? I hope this article will inspire readers to "look up" and begin to question what is going on.

Wanda Allen is an activist from Bartlett NH. In response to her concerns, GMCG will partner with Smith College to collect and analyze snow samples as well as tributary samples during snow melt. We will sample for Aluminum Oxide, Barium and Strontium.

For more information on climate change one site to visit is: <http://nadp.sws.uiuc.edu/>

An article from Switzerland on the subject can be found at: <http://www.swissinfo.ch/eng/manipulating-climate-to-fight-global-warming/408>

Five Watershed Schools begin Raising Trout in the Classroom

GMCG is beginning another exciting season of raising Trout in the Classroom (TIC) with assistance from Elementary school students in Madison, Effingham, Moultonborough, Conway and new to the program this year, Freedom Elementary.

Because they are very sensitive to the environment around them, eastern brook trout are an indicator species and their abundance directly reflects the quality of water in which they live. TIC teaches our students how to raise trout from eggs to fry, monitor tank water quality, engage in stream habitat studies and appreciate water resources.

The trout eggs are picked up from NH Fish and Game's Powder Mill Hatchery and delivered to the various schools. This year, each school will be receiving 80 trout eggs to nurture and raise in the classroom from mid February until around May when the eggs have grown into fingerlings, all while communicating their discoveries across the watershed on a kid's blog.

TIC compliments the work that many of the schools do with VBAP (Volunteer Biological Assessment Program) in the fall which helps determine where the water quality parameters are suitable for their survival. Once students determine if their stream fits the needs of the trout, (NH Fish and Game approves all release sites) they monitor the temperature and

when spring arrives, they warm the water in their tank with the river so the fingerlings will be acclimated. When the river is above 45 F and the fingerlings are ready for release, the students take a trip to their chosen site and get to experience the excitement of watching the trout they so carefully raised swim off to start their new life.

TIC is made possible by The Quimby Foundation, Dorr Foundation, YMCA Camp Huckins, Pequawket Foundation, Advised Fund of the New Hampshire Charitable Foundation, NH Fish and Game, and Trout Unlimited.



Save the Date! 2015 Winter/Spring Calendar

Saturday February 21 10:30 am -1 pm, Community School, Bunker Hill Rd. Tamworth, “What lives in your backyard.” Join GMCG for a fun talk and snowshoe walk with naturalist Barbara Bald. This event includes a short lecture to examine casts of tracks, track patterns, pelts, quills, and more, and then the group will head out into the forest for a field examination. Dress appropriately and bring water and a snack. Free. Donations accepted to support use of The Community School facility. **Please RSVP 603-539-1859.**

Thursday, February 26 6-8 pm Water Quality History of Ossipee Lake through Coring. Runnells Hall Chocorua. Lisa Donner, Plymouth State University research fellow will give a presentation on the history of Water Quality on Ossipee Lake from her research using sediment coring and interpreting years of the sediment layers. She will also speak about the results of the monitoring buoy and how this data will be incorporated into the Ossipee Lake Watershed Management. Free. **Please RSVP. 603-539-1859**

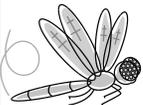
Thursday, March 26, 6-8pm “What goes up must come down” a moderated forum to celebrate World Water Day, Runnells Hall, Chocorua. GMCG is hosting a moderated forum about the effects of air quality on water quality. Speakers will include: Dr. Robert Newton, Smith College who will speak about sediment coring on Cooks Pond and mercury; Georgia Murray, Appalachian Mountain Club who will speak about cloud, water and air research over the past few decades on Mount Washington; Sherry Godlweski from NH DES who will speak about air quality in NH and how pollution is being monitored and what trends are being seen and Wanda Allen, geoenvironmental activist from upper Saco Watershed who will introduce questions about technology that is aimed to mitigate climate change. Free. For more information please call GMCG 603 539-1859.

Saturday April 11 4-8 pm GMCG ANNUAL MEETING—”Raptor Encounter” Sunny Villa Restaurant, Route 16 Ossipee. Live falcons, hawks and owls provide the lens through which we examine food webs, predator-prey relationships and the interdependence of the systems that support life. Live birds. There will be a family Style Turkey dinner with all the trimmings. Tickets are \$35 per person. **Call 603-539-1859 or email info@gmccg.org to make your reservations. Seating is limited.**

Thursday May 12th 6 pm—Natural Resource Planning—Healthy Septic Systems, Runnells Hall, Chocorua. This workshop will include a lively presentation by Russ Lanoie followed by a work session lead by planner Steve Whitman. Steve will present information about what other towns are doing to promote more awareness about the importance of maintaining healthy septic systems, the impact on aquifers and local water bodies, and what you can do in your town. Planning Boards are encouraged to attend and be prepared to work.

Saturday June 6—Community Kick-off meeting for the “Big Lake” phase of Ossipee Watershed Management Planning Process!

***Your Support Makes a Difference.
Every drop counts! Thank you!***



*(Please make checks payable to Green Mountain Conservation Group Box 95, Effingham, NH 03882)
You may also renew your membership online at www.gmccg.org/we-need-your-help/*

**Vernal Pool__\$25 Stream__\$50 River__\$75__ Pond__\$100 Bay__\$250 Lake__\$500 Aquifer__\$1000
Other: \$62.50_____ .17 a day to celebrate GMCG’s 17th Birthday!**

NAME _____

ADDRESS _____

PHONE _____ **EMAIL** _____

Are you interested in being a GMCG Volunteer? YES

March is membership renewal month!

PLEASE RENEW YOUR SUPPORT TODAY and encourage your family, friends and neighbors to join GMCG.
GMCG is a non-profit 501 (C)3 tax-exempt organization.
We are funded by grants, memberships, and donations.

**Send in your March Membership
at the \$62.50 level by March 31st
and
Receive a \$5 discount**



off one ticket for the 17th Annual Meeting in April, 2015 Dinner/Auction Fundraiser in August, **AND** Fall Music Festival in September.

GMCG’s Federal Tax Identification number is: 02-0498020.



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The Watershed News

Save the Date

**April 11
GMCG Annual
Meeting
4-8 PM**

**Deadline for
Summer Newsletter
submissions is June 10**

EVERY PERSON CAN MAKE A DIFFERENCE AND EACH PERSON SHOULD TRY.



Sign up for event updates with *Watershed Happenings* and stay in the flow! Sign-up at www.gmcg.org