

Wonalancet Out Door Club Newsletter

April



2020

Caring for the Sandwich Range since 1892 - *or so*

Unlogged But not unaffected 40 years and more in the Bowl

Five years ago, I wrote my first article for the WODC Newsletter on the preliminary analysis of our 40-year remeasure in the Bowl (spring 2015 issue). This time I wanted to take a longer view of tree composition in the Bowl and then consider anthropogenic stressors and what current growth of the main species might tell us about the future.

From Charlie Cogbill's tireless work with witness tree data for New England, we have some idea that the pre-settlement forest composition was generally beech, spruce, maple, and birch by relative dominance with spruce importance increasing as you go northward or up in elevation. Presently, the top four tree species by any measure in the Bowl are: yellow birch, American beech, red spruce and sugar maple. Relatively close to pre-settlement, but why has the yellow birch come into the lead? Yellow birch, despite the large size of the older veterans (Fig. 1), has an average lifespan of 150 years, the shortest of the four species. The old Yellow Birch with large burl depicted in Fig 1 is a veteran of past wind disturbance. The other three species average 300-400 years with red spruce capable of over 450 years.



Figure 1

In addition, yellow birch is the only species of the four that requires large disturbances to establish. What does the abundance of yellow birch, including in the big tree category (trunk over 50 cm in diameter) suggest about tree dynamics?

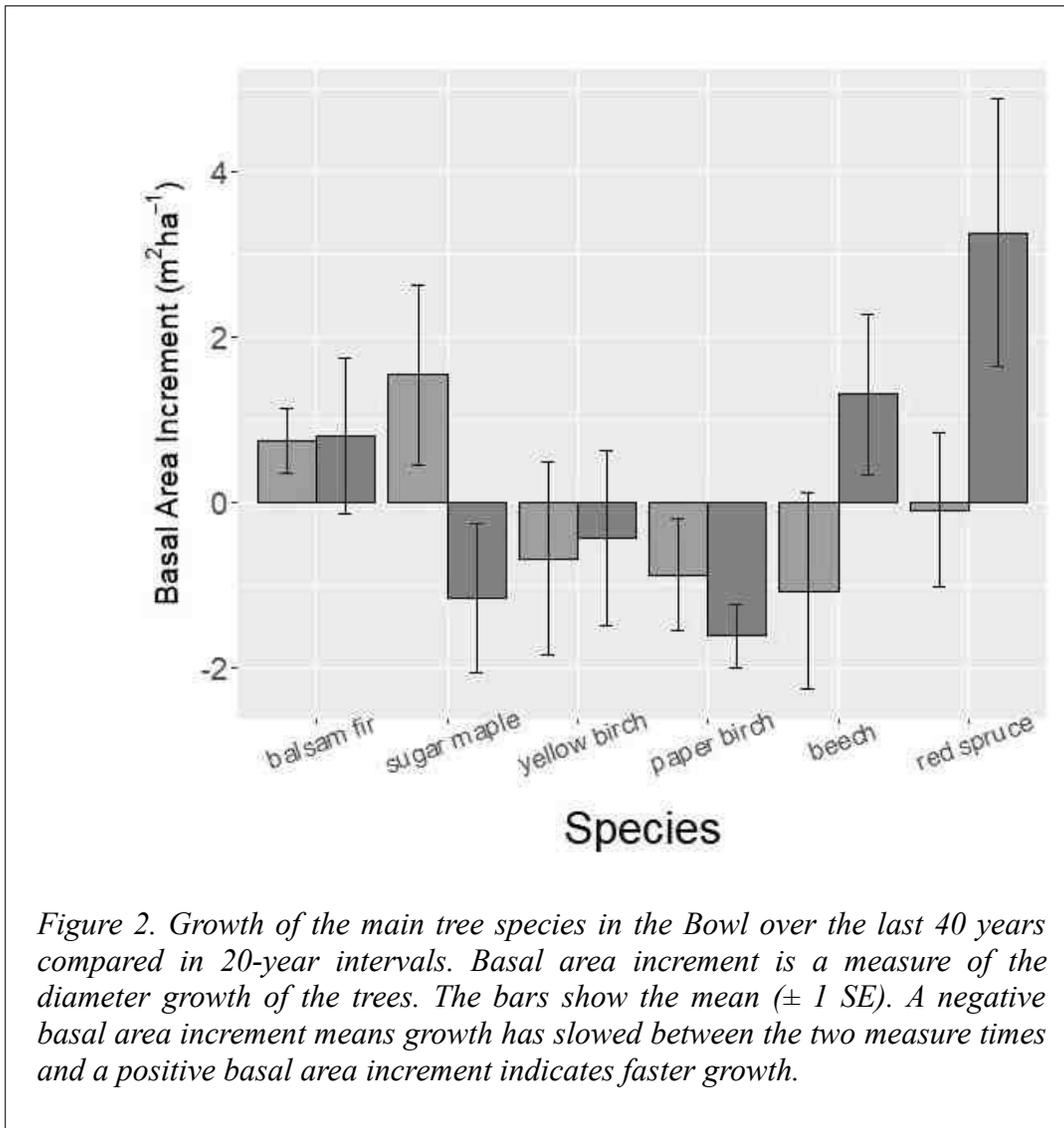
There must have been a big disturbance to the Bowl in the range of 150-200 years ago that allowed these light demanding trees to establish. Maybe a competitor had a period of high mortality? There were

records of a regional spruce die off in 1880s. Could this have been the disturbance? Wind, insect outbreaks, and disease are the three most common suspects of disturbance in the northern hardwood forest where large, natural fires are very rare. There are no signs of charcoal or charred trees in the Bowl. But birches typically need exposure of mineral soil for successful recruitment. This suggests tip-up mounds and wind throw, not just dead standing trees. The hurricane of 1815 has been suggested, which would put many of the larger yellow birch at 205 years old today. However, a more localized wind disturbance could also have been responsible. Let's attribute the old birches to a wind disturbance sometime several hundred years ago. A temporary (several hundred year) re-arrangement of the forest composition.

Have beech, spruce and sugar maple not undergone change since pre-settlement times? The agreement with pre-settlement ordering may seem to suggest these species marching through the past two centuries without changing their relative dominance to each other. But anthropogenic stressors have created challenges in more recent decades. Red spruce and sugar maple from air pollution and acid rain impacts. American beech from exotic scale insects, instigators of beech bark disease. Let's look at their plights in more detail in Fig 2.

change), decline of a major competitor (Sugar maple) and indifference to decreased soil fertility (resulting from acid rain leaching), have all maintained the growth of beech in spite of the disease. Beech is a strong presence in the regeneration layer and the second fastest growing tree in the Bowl (Fig. 2).

Red spruce suffered decline from acid rain leaching foliar base cations, which left the spruce vulnerable to winter injury. The work of John Battles demonstrated that spruce in the Bowl have certainly felt the sting of acid rain. Half or more of the spruce are standing



I wrote at some length about Beech bark disease (BBD) last time. It remains a chronic stress for the beech, but it may be that the combination of several factors: favorable increase in precipitation (climate

dead and are responsible for 64% of the gaps documented in the 1990s. The reduction in sulfate inputs to forest systems as a result of the Clean Air Act, have spawned a remarkable rebound in spruce

growth throughout the Northeast, including the Bowl where it is currently the fastest growing species (Fig. 2).

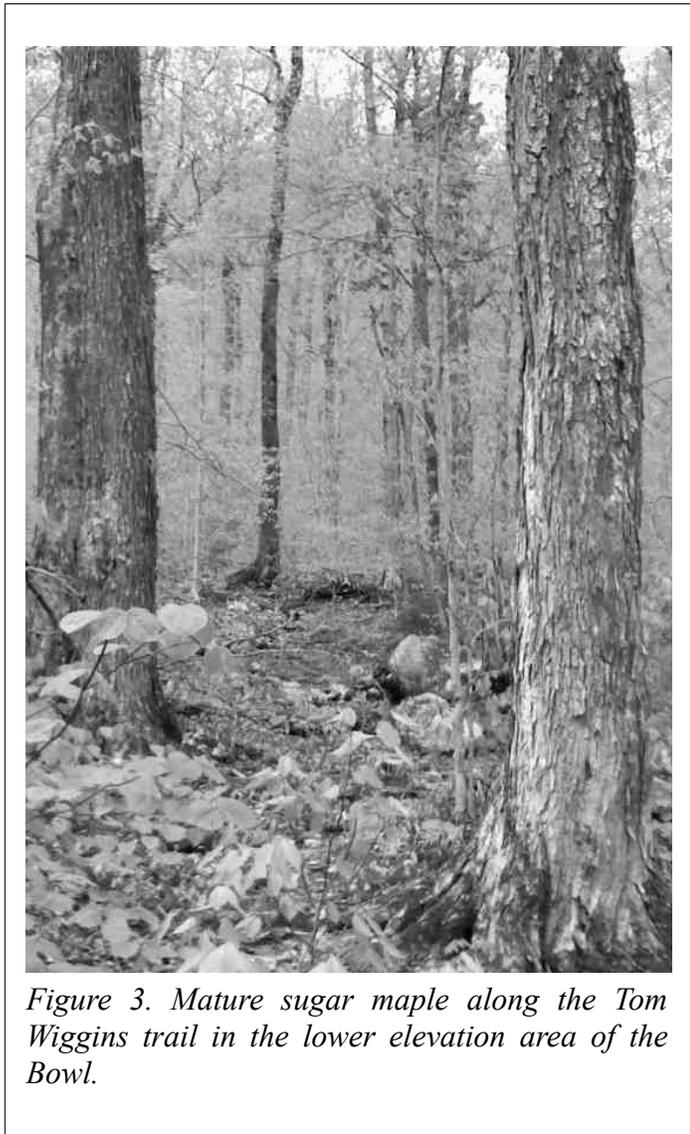


Figure 3. Mature sugar maple along the Tom Wiggins trail in the lower elevation area of the Bowl.

Sugar maple has also been in decline from the effect of acid rain, but unlike spruce, there has not been a recovery on impacted sites. This contrast results from differences in the mechanism of acid rain impacts. For red spruce the effects were through foliar leaching while for sugar maple the impacts are through soil leaching. The time for recovery of base cation levels in the soil is much slower than the time required for new needle growth. Sugar maple has seen a significant drop in both growth rates (Fig. 2) and regeneration in the Bowl. Sugar maple appears

destined to remain in fourth or perhaps even a lower place in the relative dominance of future forests on borderline soils most impacted by acid rain history. The seeming stability of the species ordering despite the many novel stresses may reflect the longevity of the trees which introduces inertia to the system and the consistently nutrient poor, thin rocky soils of the Bowl, which limit the tree species pool present to colonize. Some questions for the future are: What species will rise to the canopy in the gaps left by the large yellow birch? Will sugar maple be able to secure any spots in the future forest canopy or disappear once the current sugar maple canopy trees age out? Will any new species move in as the climate warms?

~Nat Cleavitt

Research Associate in the Dept. Natural Resources at Cornell University. Nat is a member of the team of scientists who monitor and measure changes in the Bowl.

Ralph Weymouth

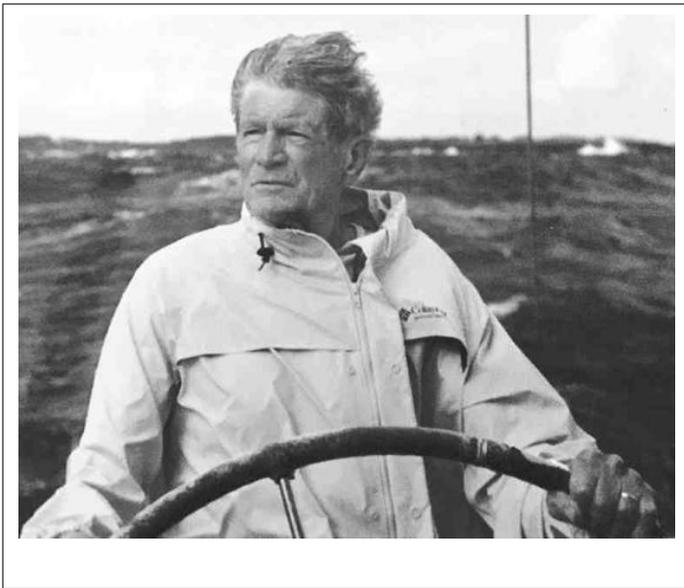
RIP

Ralph Weymouth, a retired Vice Admiral who was the oldest living graduate of the United States Naval Academy, a much-decorated officer who served in World War II, the Korean War, and the Vietnam War, and a peace activist, died at age 102 in Rockport, Maine, on Jan. 22, 2020.

A resident of Wonalancet, N.H., since 1975, Weymouth had recently relocated to Owls Head, Maine, to spend his final days near the sea, on Penobscot Bay.

For his service, Admiral Weymouth was awarded the Navy Cross, Distinguished Flying Cross (four times), French Legion of Honor, Legion of Merit (twice), Bronze Star, Icelandic White Falcon, several air medals, and many other decorations during a distinguished military career.

Graduating from the United States Naval Academy in 1938, Weymouth served as a pilot and as Commanding Officer of VB-16, a squadron of 36 dive bombers in the Pacific Theater of World War II. He flew carrier missions from Pearl Harbor to the First Battle of the Philippine Sea, a major naval battle in 1944. That conflict included the “Mission Beyond Darkness,” a daring aerial attack on the Japanese fleet that sank three carriers and several other ships. For his leadership during the battle, Weymouth was awarded the Navy Cross for extraordinary heroism.



During the Korean War, Weymouth commanded Carrier Air Group 11 and served as the naval representative to the Joint Operations Center of the Fifth Air Force and the Eighth Army. In the Vietnam War, he commanded Anti-Submarine Warfare Group 3 in support duties in the Tonkin Gulf.

Weymouth’s other military duties included post-graduate studies in aeronautical engineering at the Massachusetts Institute of Technology and two years as commander of the Iceland Defense Force. His final Navy post was as Director of Research, Development, Test, and Evaluation for the Chief of Naval Operations.

After retiring from the Navy in 1973, Weymouth pursued interests in political, civic, and military affairs. He was a founding member of Veterans for Peace, an organization which promotes alternatives to

war, and was a vocal anti-nuclear campaigner and environmental conservationist.

He spent much time sailing on Katrinka, his 48-foot sloop; preserving wilderness trails in and around his Wonalancet, N.H. home; and visiting his extended family, especially at a family home in Brittany, France. He was also known for working on numerous construction projects with his grandchildren and young neighbors, from building canoes to tree houses.

His many friends and family often said he left everything better than he found it, from hiking trails to a conversation. He was an inspiration to all who knew him with his example of thoughtful, gentle, and patient ways.

Ralph Weymouth was born on May 26, 1917, in Seattle, Wash. In 1940, he married Laure (Lo) Bouchage who preceded him in death in 2009. In 2012, he married Diana Beliard, who died in 2018.

He is survived by seven children, one stepdaughter, 18 grandchildren, and 10 great-grandchildren. A daughter, Reine-Anne, died in November 2019.

Ralph was an active member of WODC during his tenure in Wonalancet. Early on Ralph was a member of the WODC contingent who worked with the Forest Service to plan and create the Sandwich Range Wilderness. Ralph contributed to trail work and pioneered many ski routes in Wonalancet. Ralph was always thinking ahead. In the 80’s he started indicating distances on WODC Trail Signs in meters rather than miles. Unfortunately the hiking community was unwilling to accept meters and the associated international measures. Ralph had to reluctantly return to the parochial and antiquated mileages. Ralph contributed generously to the natural world, WODC, and the community. We will miss Ralph’s boundless curiosity, indefatigable good nature, and warm smile. Thank You Ralph.

WODC Annual Meeting

The 2020 WODC Annual Meeting is planned for Sunday, August 16 at 6:30PM in the Chapel. There will be a Potluck in the Grove at 5:00PM. This is subject to change based on the COVID-19 situation. Any change will be posted on the WODC website.

AS THE WORM TURNS

Maybe Charles Darwin is responsible for earthworms' admirable reputation. Certainly *The Formation of Vegetable Mould Through the Action of Worms, with Observations on their Habits*, his last book (and his best seller of that era) is a charmer, as are the anecdotes of the assignments he gave his children, who carried out some of the research. I've always assumed that the book described the soil engineering abilities of *Lumbricus terrestris*, the "common" earthworm; the one we all think of when earthworms are mentioned. Amazingly, since I own the book and actually read it some years back, I missed the fact that Darwin never named any earthworm species in it and, when more recent researchers went to Darwin's sites in Down, they found 19 species of earthworms.¹ *L. terrestris* is the worm depicted in most American worm tales, many of which speak of it as "the gardener's friend", for its work in aerating and fertilizing the soil. Alas, it's not the forest's friend.

A recent study showed that there are currently about 7,000 species of earthworms globally, and none of them are native to the northeast. Until explorers and settlers sailed ships here, we didn't have earthworms (you can blame the glacier) and our forest ecosystems formed in their absence, which allowed the buildup of a deep humus layer (the famous "duff" on the forest floor). This duff layer turns out to be the key that allows many of our native plants to thrive, and it also provides an easily digestible substrate for fungi that hang out on the surface, some of whom use those nutrients to create the mushrooms we know and love.

¹ Darwin's earthworms revisited. *European J. Soil Biol.* 44: 255 KRButt et al. (2008)

With help from fishermen, discarding bait (*L. terrestris* is also known as the night crawler), as well as the rest of us transporting bits of soil on our boots, etc., *L. terrestris* (as well as many other species of earthworm) has moved into our forests in a big way where it's behaving like the invasive exotic it really is.

Darwin was amazed by the ability of earthworms to ingest and turn over large quantities of soil. Nowadays, ecologists are amazed by the ability of *L. terrestris* to digest large quantities of duff; quantities too large to be absorbed by our soils, thus giving rise to runoff that pollutes streams and rivers. And everyone is amazed by *L. terrestris*'s ability to invade new areas and to prosper there — the current jaw dropper being its success in Alaska, where thawing permafrost has offered an opening for *L. terrestris* to multiply until its biomass in some areas is greater than the biomass of moose.

There's an interesting paradox that we learned about only a few months ago. We're used to species richness being highest in the tropics, although quantities of any particular species might be greatest in temperate zones. But with earthworms we see the opposite; the tropics are relatively poor in local earthworm species, with mid-latitudes (which includes the northeastern US) showing high local species richness.² This matches the pattern in ectomycorrhizal fungal species richness, and in bacteria. (Note: the tropics may still have more species overall, but many of them are very localized; we've just beat them in number of species and individuals sharing a location.) Our richness in earthworms is undoubtedly the result of all that delectable duff so easily exploited by alien invaders. And, driven by climate change, that empty niche is moving northward; hence the situation in parts of Alaska.

I think that the surprise for all of us has been just how voracious these alien species are. I haven't (thank goodness) seen this in our forest yet, but in some northern forests there is no longer a duff layer; it's all been eaten. Researchers working in Minnesota wrote that plants and small tree seedlings die "when

² Global distribution of earthworm diversity. *Science* 366: 480 HRP Phillips et al. (2019)

earthworms eat the forest floor out from under them”³. Because our native plants are adapted to duff/humus, this has left a vacuum which is filled by such alien plants as garlic mustard, which actually kills off mycorrhizal fungi which, in turn, weakens the tree partners of those fungi. In Minnesota and Wisconsin, the alteration in duff and native plant cover has been shown to impact not only those amphibians that need moisture and protection, but also ground nesting birds, with a recent survey showing a direct link between large populations of invasive species of *Lumbricus* and reduced species of ovenbirds.⁴

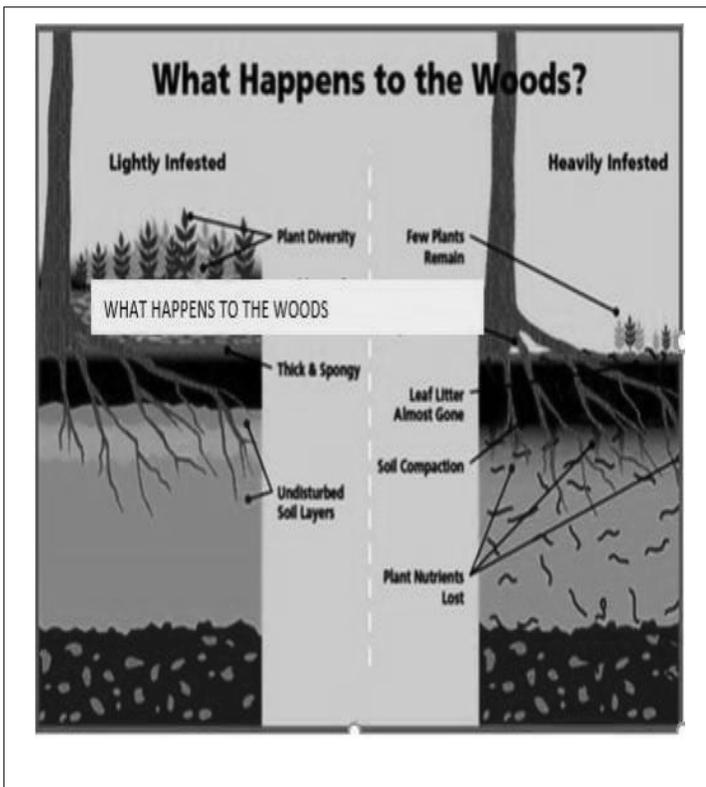
affected by increasing biomass of the earthworm species *Lumbricus rubellus*. The absence or presence of *L. rubellus* was the key to how dramatically the native plants were affected. So, although all invading earthworms are evil, some invading earthworms are more evil than other invading earthworms.

We seem to be living in times when today’s terror will look mild compared to tomorrow’s. So here’s the really scary news: *Lumbricus* species are bad enough, but we have something much worse to contend with: jumping worms. Also called Asian crazy worm (they hail from Japan and Korea) and snake worm, *Amyntas agrestis* is bigger, more active, more voracious, more rapidly spreading and more rapidly multiplying than any other earthworm we know. They’re actually nightmarish; if their takeover of any bit of forest floor could be filmed and speeded up (and it wouldn’t have to be *that* speeded up), the resulting movie would fit right into the horror archive. A terrifying article about them is online from The Atlantic:

<https://www.theatlantic.com/science/archive/2020/01/jumping-worms-are-taking-over-north-american-forests/605257/>. They’re all over; they leave the forest floor looking like coffee grounds, and they kill every native species except a few tough survivors, like poison ivy. The trees may not die, but their replacement seedlings do. And there’s no way to stop them other than to prevent them from arriving in the first place.

We’ve long blamed fishermen, who dumped their bait cans out, for spreading *L. terrestris* (aka night crawlers). But that’s not how jumping worms are spreading. Most of their spread is via all of us: hikers, bikers, and loggers carrying their little cocoons in the cleats of our boots and tires; gardeners purchasing plants, mulch and compost that contain worms or cocoons; nurseries unwittingly selling those items. . . you can see how it spreads. Like that virus we’re currently facing, but with much longer term consequences.

How can you tell a jumping worm when you see one? You know what the clitellum is? That inflated section of the worm’s body that contains its reproductive organs? Well, in the jumping worm it’s white and

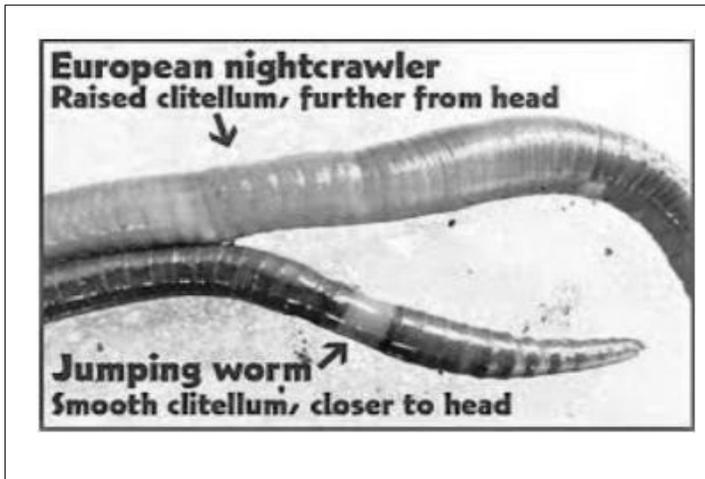


Note that I wrote invasive *species* (plural) of *Lumbricus*. Working in Minnesota’s forests, researchers found that although increasing earthworm biomass and increasing earthworm diversity were both associated with decreased diversity and abundance of herbaceous plants in their study sites, changes in understory plant community composition were most

3 Changes in hardwood forest understory plant communities in response to European earthworm invasions. *Ecology*, 87:1637-1649 CM Hale et al. (2006)

4 The worms are coming! *Fungi* 9: 52. BA Bunyard (2016)

near the head. In European worms it's pink and closer to the center of the body. (Actually, according to what I've been reading, you won't have any trouble identifying them; they're the ones moving like snakes, rather than worms; the ones you won't want to grab — even if you could.)



If you'd like to be able to identify more species of earthworms, the Canadians have an excellent Worm Watch (<https://www.naturewatch.ca/wormwatch/>), part of their Nature Watch website, and there is also a fine Great Lakes Worm Watch (greatlakeswormwatch.org.)

How can you tell if jumping worms are actually in the bit of forest you're looking at? They probably won't be hanging around on the surface unless they're at apocalyptic population densities. Luckily, there's a tried and true method for getting all earthworms to come to the surface: mustard. All you have to do is to mix dry mustard with water in the proportions of a third of a cup of ground mustard powder to 1 gallon of water, and apply it to the ground at two minute intervals for six minutes. The entire protocol for assessing numbers is online at <http://erenweb.org/wp-content/uploads/2012/08/EREN-Worm-Protocol1.pdf> This mustard bath will bring all earthworms up to the surface; if you're lucky, they'll be the only mildly evil night crawlers and your plot will be free of the truly evil jumping worms.

We've certainly come a long way from the Gardener's Friend. And maybe the damn things were never our friends to begin with. The Atlantic article quotes soil ecologist Peter Groffman saying, "The earthworms are

in the soil because the soil is healthy. They are not necessarily doing anything for it." In fact, they may be doing things for it, like allowing pesticides and fertilizer to run off into waterways, and increasing carbon loss.

Too bad the glacier isn't coming back.

N.B For those of you who'd rather hear a lecture than read (sorry you had to read so far to learn this), try: https://www.youtube.com/watch?v=Ya5_EY621WY

~ Susan Goldhor

Spring Trails Report

We don't have hard and fast plans for the 2020 trails season. We go into the season with trails in good shape because of the dedicated efforts of a number of volunteers. The COVID-19 situation will be the determining factor in how our season unfolds. We'll plan to host our usual 4 Volunteer Trailwork days. We'll post information on our website to indicate whether we will host each specific day.

The White Mountains Trail Collective(WMTC) is planning to sponsor some major trail reconstruction projects in the 2021 on the southern side of the White Mountains including Wonalancet. Unfortunately we had to cancel a meeting scheduled to discuss various projects with the WMTC. We hope to participate in this project in the 2021 season.

Our Tentative schedule of Trail Days:

- May 16 (WODC Spring Trails Day),
- June 6 (National Trails Day),
- July 18(New Hampshire Trails Day),
- September 26 (National Public Lands Day).

We'll meet at the Ferncroft Parking Lot at 8:30AM on all our Trailwork Saturdays. Bring water, food, gloves, and clothing appropriate for the weather. Most of all, be prepared to spend a day outdoors deriving satisfaction from a job well done.

If you want more information on any of our trail projects contact Jack 323-8913, jackw@myfairpoint.net.com.

~Trails Chair, Jack Waldron

ARON BERNSTEIN: 1931-2020

A Remembrance

Aron Bernstein, my husband and faithful hiking companion, was not a star athlete, a trail adapter or trail worker. He held no office in the WODC, although he faithfully attended the annual meetings and paid more than what the dues demanded, in order to help support those who did do the work. But his experiences (which are pretty much our shared experiences) of hiking WODC's trails over a quarter of a century, are probably typical of a number of ordinary hikers who develop emotional attachments to our trails, broaden their understanding of nature from them, and gauge their own life histories by them.

Aron started hiking in the higher Whites, and did the 4,000 footers (some many many times over), although he never bothered actually joining the club, and didn't discover WODC until he was well into his 50s when we bought a house in Tamworth, and the ease of access to Wonalancet's trails proved seductive. One of his favorite hikes in those days was the Wonalancet Range trail, which Aron regarded as a good warmup for the real (i.e., 4,000 footer) hikes, and I regarded as quite a tough little hike in its own right. But WODC's trails are seductive not simply by virtue of proximity, but for their ability to offer something in every season and at every stage of life, and it seems to me that one way to describe Aron's life, and perhaps the lives of us all, is in terms of our trails.

Aron started out as a trail snob, turning his nose up at (for example) Old Mast Road as too easy. But when we discovered winter hiking, Old Mast Road suddenly turned desirable, and each time we hiked it we learned one more thing about how to do it safely and comfortably. (It should be mentioned here that we were slow learners and amazingly lacking in good

sense; a great example of this being how painful it was to stay hydrated, drinking water filled with ice crystals. It was only after hiking with friends who offered us hot tea from a thermos that we experienced a "duh" moment.) Aron suffered from Reynaud's disease, which impairs circulation in the extremities, and his hands would become really painful in cold weather, despite his accumulating a collection of gloves and mittens better suited to arctic exploration. It was a big step forward for us both when those little chemical hand warmers became available and I no longer felt obliged to offer up my armpits as warming stations. Aron loved gear, and as we accumulated the appropriate stuff, our winter hiking expanded and even being out in a storm became exciting and beautiful. Certainly, one of his favorite quotes was, "there's no such thing as bad weather, only insufficient gear".



Aron had been a fast hiker, who was more interested in completing the hike than in contemplating any particular piece of it. He was known both for his speed and his lack of engagement with anything along the trail, although he loved lookouts where the scenery was macro. But aging changed that. As he slowed down, in his late seventies and early eighties, he started to pay attention to what was happening on the trail, although perhaps I was rubbing his nose into what was interesting me. Certainly, he developed an interest in fungi, and started to notice mushrooms and all the phenomena of rot. Having started out resenting my slowing us down by mushroom hunting, he evolved into someone who was happy to spend some non-hiking time picking dinner or just appreciating

the weird and gorgeous shapes and colors of fungal growth. Along with this appreciation in more micro scenery, he stopped feeling that a hike was a failure if he didn't reach the peak. Or the junction. Or whatever goal the map offered. Instead he was happy just to experience as much of the trail as his energy allowed. And, as his energy and balance diminished, and hiking trails became too difficult, he managed to keep walking on groomed trails, developing a new appreciation for snowmobilers who kept so many paths through the woods open in winter. Finally, even that was too much. His last walk in the woods, was on a groomed path where he pushed further than planned in order to get to a river. On the way back, he simply ran out of steam. He needed to rest but there was no way for him to sit down and still get up later. Luckily, it was near a boy scout troop on a winter expedition, and two of the scout leaders carried him out to the car. We both realized that this marked the end of the trail.

Aron supported many worthy organizations, but he reserved his most consistent and strongest support for three: The Council for a Livable World (devoted to nuclear arms control, where Aron was a long-time member of the National Board); Peace Action, and WODC. Aron loved WODC; loved its trails, and loved its t-shirts, of which he owned probably the world's largest collection, using them as outerwear in summer and underwear in winter. He lived in those t-shirts and (quite literally) died in one. Not a spectacular hiker; just a steady hiker who deeply loved WODC's trails in all the seasons of the year and of his life. How many of us are there, and how do we measure the joy that our trails have provided over the years to Aron and to so many like him?

~Susan Goldhor

Timber Sale in Wonalancet??

In January the Forest Service held a public meeting to discuss possible plans for a timber sale on the southern slopes of the Sandwich Range. This meeting was intended to be an informational meeting where the Forest Service sought input from the public on their past experiences with logging operations in the

White Mountain National Forest. The only specific data that the Forest Service provided was the two areas where a timber sale might be held. This is the url for a map of the current proposal: <https://tinyurl.com/TimberSaleMap> The two designated areas are the Guinea Pond area in Sandwich and the Wonalancet area extending roughly from the Old Mast Road easterly to just beyond the Liberty Trail. WODC suggested that it would be a good idea to hold another informational meeting in the summer when seasonal residents would be able to attend. The Forest Service agreed that they would try to do this.

The meeting was held in the basement of the Wentworth Library in Sandwich and was jam packed. One reason for the crowd was an unfounded rumor that the Forest Service wanted to increase snowmobile trail mileage in Sandwich. There was no truth to this rumor but it certainly brought out a crowd. There was no formal presentation but rather 5 – 7 Forest service employees were scattered around the room each with a specific map displaying such characteristics as wildlife habitat, previous timber operations, watershed features, recreational activities, etc. The public was able to talk with the Forest Service personnel about the various maps and how a timber sale could impact an area. There were a lot of very civil conversations over the course of the evening.

After the informational meeting this summer the next step will be the publication of a specific timber sale proposal. This will probably occur in 2021 and be subject to a public comment process. The Timber Sale proposal is still more questions than answers.

Wilderness Monitoring

There will be opportunities to be involved in monitoring Wilderness areas this season. There are two different types of opportunities. In Destination/Trail Use monitoring you spend 4 hours(11AM – 3PM) at a specific location on a specific date. For Solitude monitoring you travel in a specific area for 4 hours noting how many other hikers you see. If you are interested contact Jack for more details (jackw@myfairpoint.net or 323-8913)

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