

Wonalancet Out Door Club Newsletter

April



2019

Caring for the Sandwich Range since 1892

Requiem for the Squirrels

For the past year or so I've been hearing a multitude of horror stories about rodent hordes laying siege to real and personal property of us beleaguered humans. Squirrels are prominent in these tales of woe. And, among the squirrels, the red squirrels are getting most of the bad press.

I can commiserate with those who have suffered damage or insult from the red squirrels, for I too have an ongoing battle, trying to keep them out of my attic and attached shed. That said, my deepest empathy lies with the squirrels. I admire their bold persistence. Their behavior is a source of entertainment and, in my opinion, they are so darn cute. But the main source of my empathy comes from when they were one of my study subjects at Hubbard Brook Experimental Forest in Woodstock and Ellsworth. I suppose this is going to need some explaining.

Let's start with some red squirrel basics; and to save me some work, we'll just refer to them as the Reds from now on. Reds are specialist tree squirrels. They do best in dense coniferous forests, particularly northern coniferous forests. On the east coast, red

spruce and balsam fir is where they would most like to be. That's one reason why they are smaller than other tree squirrels. A smaller body can more easily move through the thick foliage of spruce and fir. But diminutive stature is a small price to pay for a big advantage. In the best, dense spruce habitat, a Red has all the resources it needs in less than an acre of forest. This allows the Reds to have two characteristics that are unique among North American tree squirrels. First, it can afford to defend its entire home range from its neighbors. Second, it can stash all its food stores in one location and defend it from pilferage and thievery. This is the true nature of the Reds, territoriality and larder hoarding. It can be an incredibly efficient lifestyle and for the Reds it's Heaven on Earth.



In spite of these specialist proclivities, Reds have retained some adaptability, a trait common in rodents and allowing them to become the most ubiquitous mammalian order in the world. In a pinch, a Red will have to settle for a mixed conifer/deciduous habitat or even a predominantly hardwood forest. These are typically the types of habitat that the young dispersers have to accept. They bide their time in marginal habitat, waiting for a piece of prime real estate to open up. The problem with this is that they need a much larger home range to meet

their needs. Instead of about two thirds of an acre, they need to scour anywhere from 2 to 5 acres and, in real hard times, up to 10 acres. A home range that size can't be defended by an eight ounce critter. Single larder hoarding becomes an impossibility but Reds don't have the ability of other tree squirrels to practice scatter hoarding. Instead of burying single nuts over a wide range, Reds in marginal territories will resort to multiple caches that are subject to pilferage.

Ecologists refer to these second rate habitats as population sinks. Reproduction isn't sufficient to replace the loss from mortality and emigration. The population is entirely dependent on immigration of young dispersers or individuals who have lost a prime territory due to various reasons. Although this may appear to be a detriment to the overall Red population, it serves a purpose by having a group of "extra" Reds available to immediately fill any vacancies that occur in prime habitat, and thus maximize exploitation of the resource. And it can be argued that population sinks actually improve the fitness of the species. The individuals that survive in a population sink are of good genetic stock and will prosper in the best habitat.

Now let's talk about trees. Trees produce seeds and nuts. And if you ask any squirrel, they'll tell you that trees were put on the earth to feed them. But trees are of the opinion that squirrels are the Devil's work and represent the arboreal version of a plague of locusts. Trees may be brainless but they're not stupid. They recognize squirrels as being r-selected animals and they have developed a means of temporarily foiling the squirrels.

[We're treading in dangerous territory by introducing the r-selected vs K-selected concept here. We could open Pandora's Box and I would likely launch into an extended diatribe about the folly of trying to jam every known animal species into one of two pigeonholes. Suffice it to say that the lower case r in "r-selected" is the mathematical symbol for the intrinsic growth rate of a population. It is an exponential number and for r-selected species the exponent is quite high. This is a group of animals that live for and can react in the moment. The only restraint on population abundance is food abundance. You can think of Reds as free market capitalism purists, which to my mind is synonymous with "density independence". Google

that if you want a better explanation. And if that doesn't confuse you, take a look at top-down and bottom-up trophic controls and coevolution. Then try to tell me who is controlling and who is adapting. It's a war out there.]

Now that we've dipped our toes into theoretical techno-jargon and scalded ourselves, let's get back to the trees. The trees know that if they continuously produce a steady crop of seeds and nuts, the Reds will maintain a maximum population and gobble up the seeds and nuts before they can germinate. The solution is to starve the squirrels to near extirpation and then produce an enormous amount of nuts and seeds, more than the squirrels could possibly consume, at least not before some of it germinates. This is called pulsed mast production, mast being nutrient rich hard fruit: nuts and larger seeds, although you will occasionally hear the term "soft mast" (apples, berries, etc.).

Exactly how the trees accomplish this is still open to debate but, most likely, it's a combination of the two main schools of thought. The first is that the trees have on-off switches that are set at precise intervals. For example, there's some evidence that beech has a two-year cycle of effort used in nut production. Not only that, but it also shows synchronization with sugar maple and white ash. These three species work together to foil the squirrels. The second factor is weather, and in particular, at two separate times: when the flower buds are first formed, which is during the summer before the year of fruiting, and during the development of the nuts. Put this all together and you see how a random pattern biased against successive large production years could result. But when everything falls in place, look out! The granivorous rodents spring into action.

Anyone who follows Something Wild or Outside In on NHPR is surely aware of the Cliff Notes version of pulsed mast production. But they don't tell the whole story. It's a tale of the worst kind of feast and famine. I know because I witnessed and documented it when I was doing my study at Hubbard Brook. But let's discuss it in terms of the most recent incident.

The fall of 2017 proved to be a banner year for acorns and white pine cones. On top of that, there was a generous supply of beechnuts. A perfect storm, so to

speak. Areas normally serving as marginal red squirrel population sinks became, almost instantaneously, prime Red habitat. In fact, a Red could even eek out a comfortable living in places it normally wouldn't dream of occupying. The reds all fattened up over the winter and were in prime fitness by April of 2018, when all the mature females gave birth to as many as eight young. Most larders still had reserves from the fall mast and, augmented by early season food resources, a second litter was born around June or July, probably producing fewer young than the spring births but possibly close to the more typical litter size of 3 to 5. So in the course of three months the Red population multiplied by a factor of about 6.

On top of all this, the Reds seem to know in advance when a good mast is going to happen. It's been noted that Red litters average a little larger during the year of – and equaling prior to – a good mast crop. Some have speculated that it is caused by hormones released by the trees but I wonder if it has something to do with the fact that squirrels feed on hardwood buds, flowers and catkins in the spring. Additional food is already there before the mast and the squirrels take advantage of it.

But however they did it, by the summer of 2018 the Reds had increased their population by one or two orders of magnitude. It took no time at all to empty the larders and scrounge the last remaining cones and acorns. By August things were beginning to look grim. The population sink habitats were already overcrowded and the young would-be dispersers had no place to go. Even in the so-called prime habitats, overcrowding and lack of resources made territoriality fall apart. There were too many invaders and little left to defend. A slow starvation began. By the fall, when the mast crop was a bust, individual body weights dropped by 10 to 20%. Anemia set in; parasites such as mites, lice and botfly ran rampant.

And then there's cannibalism. Red Squirrels, just like any other rodent I'm aware of, are known to resort to cannibalism. Although the only documented cases for Reds that I can find involve infanticide, wounds I found on the reds, as well as the mice and voles – missing ears, tails and legs, all during the rodent apocalypse – indicate that there were some violent attacks occurring. And then every once in a while

there would be one male specimen that was in perfect health, even heavier than average for good times and super aggressive. What had this guy been up to, I wonder? The whole scenario sorta reminded me of Mad Max.

Winter takes its toll on all of us and a winter of starvation is a terrible way to go. The half dozen Reds I had in my population sink yard last year were down to two or three by December. The one that managed to chew through the patched hole to enter above my attic, I haven't heard any scratching or scurrying for over a month now. I admit that the red squirrels annoy me when they get in my house. But I miss them when they're all gone.

~ Chris Conrod

WODC Map: 4th Edition

The 4th edition of the WODC map is printed and available for purchase. Once again Mike Bromberg provided the excellent cartography and handled all of the technical aspects of the update. Although the change list included 66 items there were only a few significant changes to trails. The most significant were the relocation of McCrillis Path and the changes in Waterville Valley due to Hurricane Irene. A number of snowmobile trails between Rte 113A and Lake Chocorua were removed because of landowner requests. The official declination shifted from 15.5W to 14.9W since the 3rd edition. Adjusting the declination was the final change to the map.

The members of the map committee included: Mike Bromberg, Peter Smart, Doug McVicar, John Mersfelder, Mike Schneider, and Jack Waldron. The US Forest Service provided excellent cooperation in the person of Dylan Alden from the Saco District and John Marunowski from the Pemi District. Steve Smith, who is the Editor of the AMC White Mountain Guide as well as the owner of the Mountain Wanderer Map and Book Store in Lincoln, provided us with much useful information, particularly on the changes in Waterville Valley.

The physical production of the map and envelope took longer than previous editions. This was due to a sharp increase in the price of Tyvek. For the 3rd Edition we

paid \$1.65 per map, the 4th Edition cost \$3.65 per map. Because of the sticker shock associated with the price increase we examined alternative materials. These included using a thinner sheet of Tyvek or substituting other impact resistant materials such as “Paper Tiger”, a laminated paper and plastic product. None of these materials provided the same feel and toughness as Tyvek so we chose to accept the higher cost. The map was printed by Williams and Heintz Map Corporation of Capitol Heights MD who also printed the 3rd Edition. They provided us with valuable information and guidance as we explored Tyvek alternatives. The Tyvek envelopes were printed by Minuteman Press of Conway. Due to the increased costs of production we have changed the retail price of the map. WODC members who purchase the map directly from the club will still pay \$6 per map. The suggested retail price will be increased from \$8 to \$10 per map.

The final issue that the map committee wrestled with is digital distribution. We did not find an App such as Gaia GPS where the WODC map could be provided as a digital download with all the GPS information intact and usable. The state of the art hasn't reached the point where there is a portable map format similar to the portable document format(pdf) that is available for digital documents. Nevertheless we will make the WODC map available as a pdf on our website that can be freely downloaded to a smart phone or other digital device. The current size of the WODC map in pdf format is 10Mb. We are working to decrease that size so that the information is usable but the download time can be significantly shortened. Watch our website(wodc.org) for information on pdf downloads.

Philosophically, we do not view our map as a profit center but rather as a service we provide to not only educate hikers on trails and peaks but also to provide information that enhances their safety. We donate maps to NH Fish and Game for each of the Conservation Officers. One Conservation Officer, who shall remain anonymous, told us that the WODC map is absolutely the best map to use in managing a Search and Rescue operation in the Sandwich Range.

Finally, Mike Bromberg taught himself cartography to make the 4 modern editions of the WODC map. The map that Mike produced is widely recognized as the best hiking map of the Sandwich Range. Mike has always donated his time and considerable skill to the making of these maps. WODC and the hiking community owe Mike a deep debt of gratitude for his efforts.

~Jack Waldron

Climate Change? Blame the Fungi!

or

How the fungi (with help from their friends, the trees) created coal, and caused climate change

Some folks have trouble understanding climate change. Here's a simple explanation.

Once upon a time, about 360 million years ago, the plant kingdom started producing trees. Up until then, plants were limited to softer, shorter products, like moss. The breakthrough that made trees possible was the invention of lignin; a tough, plastic-like material that contributed structural strength to the cellulose that was all plants had had to work with up until then. The invention of lignin gave rise to wood and especially to bark, and once wood and bark had been developed, plants could stand upright and trees could evolve.

When the plant kingdom invented lignin, it behaved like a kid who discovers candy; it went overboard. The first trees had bark that was up to 80 times thicker than modern bark, and about half of that was lignin. The problem arose when those trees reached the end of their lives; fungi are the major rotters of wood but at that time, no organism on earth had the ability to break down lignin, and especially not lignin in such quantities. So, as more and more trees died, they simply lay where they fell and turned to peat. This long period — lasting for about 90 million years — was the Carboniferous era. When the sea rose to cover the swamps, marine sediments covered the peat and, eventually, heat and pressure transformed these organic remains into coal.

During those 90 million years, plants sucked up enormous amounts of CO₂, which was not released since they couldn't rot. CO₂ levels in the atmosphere fell and O₂ levels rose to a point that generated spontaneous fires.¹ All that CO₂ was sequestered in the dead trees, which then became coal. A lot of coal; there are carboniferous beds just below ground level that are almost forty feet deep.

Why so much? Well, carboniferous forests were especially vast because sea level was lower then leaving large tracts of lowland swamp available for plant growth. And, since much of our nation and Europe were then hanging around the equator, courtesy of continental drift, we're the ones who ended up with a lot of buried coal.

Why did the Carboniferous era end? Well, there were two reasons. First, the trees calmed down in their production of lignin. They began to resemble modern trees, with thinner bark, more cellulose and less lignin. Second, fungi figured out how to break down lignin. Lignin is so tough (think of bakelite, that black plastic in your grandparents' telephones) that it can't really be digested. No one has developed a lignase enzyme. What the fungi did was to develop enzymes that generate hydrogen peroxide — a really powerful oxidizing agent — and the peroxide literally explodes the lignin apart. (How fungi are able to do this without blowing themselves apart is one of their many secrets.) This is still the only way we know of for lignin to rot.

360 million years passed (give or take a bit). Continents drifted. Species arose and went extinct either singly by natural selection or massively through great disasters. *Homo sapiens*² evolved and, after about 150,000 years, came up with the industrial

¹ These high O₂ levels are the reason why insects became so large. (Dragon flies with wingspans of a yard or so seem to be the poster children for this phenomenon.) Insects don't have lungs; they take in oxygen through minute holes called spiracles in their cuticles. The entry of O₂ is passive, driven by the partial pressure of O₂ in the atmosphere. The higher levels of O₂ in the Carboniferous era meant that it could penetrate further and allow larger bodies.

² Why are we the only species named "sapiens" meaning intelligent? Because we're the only species that got to name ourselves.

revolution. It's no surprise that it started first in England and then here, just where the two nations had been joined together on the equator so many millions of years ago. Mills were built; engines invented; ores smelted; all powered by coal. More and more coal was dug up and burned; more and more was needed. Fortunes were made by those lucky enough to own land underlain by coal. And, as the coal burned, all the CO₂ that had been sequestered in it was released. We reversed 90 million years of the Carboniferous in less than two centuries. CO₂ formed an increasing blanket over the earth, preventing heat from dissipating and changing patterns of air flow and precipitation. CO₂ warmed the ocean, changing currents and expanding water volume, which was already expanded by the ice that the blanket of CO₂ had melted and continues to melt. (How much ice? Well, in the last decade Antarctica has been losing about 250 billion tons of ice per year. That's two and a half trillion tons of ice added to the ocean's water in the last ten years. Just from Antarctica.)

And that, my friends, is how the fungi caused climate change. It's good to have a culprit.

~ Susan Goldhor

Dave Bowles: Gone But Not Forgotten

Confession: I loved Dave. That probably makes me one of thousands, because Dave knew everyone and was active — really active — in more organizations than any other person I've ever known. Since Dave was not the type to brag (that's putting it mildly), probably no one outside of his family knew everything that he did. I certainly didn't until I went to his funeral and saw the double line of multi-uniformed honor guards stretching from the middle of the road up the church steps. I knew one side: the side that impacted WODC. Of course, even that was a lot because Dave was a past President of the club who maintained trails, built trails (more on that later), built bridges (66 according to his last count) and performed rescues. In fact, Dave and a few friends started and equipped the Tamworth Rescue Squad and carried out uncounted rescues, by foot and by snowmobile. They did this initially out of their own pockets because it needed to be done and no one else was doing it. (For the full story on Dave and rescue, please go to: <http://>

wodc.org/newsletter/index.htm and download the Spring 2011 issue.) If Dave thought that something was needed, he just did it. He took care of the Chapel. He was a mainstay of the Tamworth Fire Dept. His trail maintenance extended to snowmobiling and dogsledding as well as hiking and — as a civil engineer who'd worked construction on the Cannon Mountain Tramway as well as numerous highways and bridges — he did it all well.

Dave's can-do attitude sometimes rubbed WODC the wrong way. Take his trail building. As a hunter, a hiker, a snowmobiler, a skier and a rescuer, Dave knew all the trails in ways that most folks don't and — in the course of one or more of these activities — he'd sometimes decide that a new bit of trail was needed.



Being Dave, he'd then simply build it. This occasionally annoyed those who saw our trails as set in stone (being the granite state, many of our trails are set in stone but I was speaking metaphorically), and more or less sacred. Of course, at least one of Dave's bandit bits is now the trail that we all use and the original trail has been forgotten. And the others you've probably never noticed, being useful only for rescue.

We all knew that if we said, "I need help", Dave would find time. As Newsletter editor, I took shameless advantage of Dave more than once, using

him not only as a source of information but also as a model for logging gear in WODC's Men's Fashion Issue (see Fall 2015). Happily for me and my whims, Dave had a great sense of humor. When I see Dave in my mind's eye, there's a twinkle in his.

I miss him. As do we all.

- Susan Goldhor

Spring Trails Report

We'll employ the combined efforts of Volunteer Trail Days, Trail Adopters, and hiring members of Jed's crew to perform Annual Maintenance on our 55 miles of trails. There is a small project on the lower section of Blueberry Ledge Cutoff which we might tackle on a volunteer trails day. There are no plans for a major trail reconstruction project this summer.

As usual we'll host 4 Volunteer Trailwork days:

- May 18 (WODC Spring Trails Day),
- June 1 (National Trails Day),
- July 20 (New Hampshire Trails Day),
- September 28 (National Public Lands Day).

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.

For more information on any of our trail projects contact Jack 323-8913, jackw@myfairpoint.net

~ Trails Chair: Jack Waldron

WODC 2019 Annual Meeting
Sunday August 18 at 6:30 PM in the Chapel
Potluck in the Chapel Grove at 5PM

WODC members know the mountains can be dangerous. Even careful mountaineers can get lost or injured, and when that happens it is often a challenge to find them, and, once they are found, to carry them out to the waiting ambulance. That potentially life-saving service is frequently performed by volunteers trained in back-country search and rescue.

Sochard, has (ahem) . . . come to the rescue! In just a few weeks, the new group has drafted bylaws, submitted its legal paperwork to the state, launched a webpage (lrsar.org), enrolled its first members, appointed interim officers, and secured a startup grant.

Many of these volunteers belong to storied organizations based north of our area:



Responding to a search and rescue call is not only a vital public service, it can also be an adventure.

Androscoggin Valley Search and Rescue (AVSAR, Gorham), Pemigewasset Valley Search and Rescue (Pemi SAR, Franconia) and the Mountain Rescue Service (MRS, North Conway). New Hampshire Fish and Game, the pros who take charge of search and rescue operations under NH law – and who rely heavily on help from local volunteer organizations – feel a need for more volunteers based closer to the Sandwich Range, the Squam Range, the Ossipees and Mount Major.

Volunteer search and rescue organizations are noted for their esprit de corps. They are dedicated to the principle that the safety of the rescuer is paramount. Members need not have rescue or medical experience; training will be provided. Physical fitness, outdoor experience and equipment are requirements for “3 season” members. Men and women who are equipped and experienced in winter mountaineering can qualify as “4 season” members. If you are interested, please email Al Sochard (asochard@yahoo.com). Training sessions begin this April.

And so, the brand-new Lakes Region Search and Rescue under the leadership of SAR veteran Al

- Doug McVicar

Qty	Description	Price	Total	WODC ORDER FORM (Shameless Commerce and Stocking Stuffer Division)	
	WODC Patch	\$3		Order at website(wodc.org) or Mail Completed Order Form to: WODC Member Services HCR 64 Box 248 Wonalancet, NH 03897 Name: _____ Street: _____ City, State, Zip: _____ Phone: _____ Email: _____	
	4 th Edition Map Member	\$6			
	4 th Edition Map Non Member	\$10			
	WODC Historical Collection(CD)	\$25			
	“Serene Green” Cotton T-Shirt (Old Logo) Specify M, L, or XL	\$19			
	Synthetic Navy Blue T-Shirt (New Logo design at wodc.org) Specify M, L, or XL _____	\$19			
	Memberships Pathfinder _____ Steward _____ Trail Blazer _____ Five Year _____	\$15 \$25 \$50 \$250			

Timber Harvest in our Backyard????

Every year WODC meets with the Forest Service in late winter to review the previous year and discuss our plans and goals for the upcoming year. Its a valuable occasion to share concerns, experiences, and thoughts on how each organization is coping with kaleidoscope of challenges that we all face. WODC has one standard question that we ask every year: Are there any plans for a timber sale in Wonalancet? That answer has always been no, but this year the answer is maybe.

The Forest Service is exploring a timber harvest on the southern side of the Sandwich Range, an area ranging from Waterville Valley, through Sandwich, Tamworth, and Albany. Currently a Forest Service Biologist and Timber Specialist are evaluating the condition of the forest in this area. This investigation is expected to last through 2019 and possibly into 2020. Once completed, a decision will be made on whether a timber harvest will be proposed on the southern side of the Sandwich Range. Such a

proposal will lead to a scoping process where the Forest Service will document their plan and solicit public comment. The scoping process is expected to occur in 2020.

If this process determines that a Timber Sale is warranted, then the sale will begin in 2022. The sale will be a Stewardship Sale where some of the proceeds of the harvest will be reinvested in various projects in the area such as trailwork, wildlife habitat issues, and infrastructure improvements. Exactly where any timber harvests occur within this area will be determined during the Scoping Process.

Stay tuned for further information. The WODC will remain in close communication with the Forest Service as this process proceeds over the next few years.

- Jack Waldron



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Bonus Pictures of the Carboniferous Era



Coal beds, which can be up to 11 to 12 meters thick, characterize the late Carboniferous. The forests of seedless vascular plants that existed in the tropical swamp forests of Europe and North America provided the organic material that became coal. Dead plants did not completely decay and were turned to peat in these swamp forests. When the sea covered the swamps, marine sediments covered the peat. Eventually, heat and pressure transformed these organic remains into coal

<http://www.ucmp.berkeley.edu/carboniferous/carboniferous.php>

Carboniferous



