



OMPHALINA

ISSN 1925-1858



Newsletter of



Vol. IV, No 9
Oct. 14, 2013



FORAY NEWFOUNDLAND AND LABRADOR

is an amateur, volunteer-run, community, not-for-profit organization with a mission to organize enjoyable and informative amateur mushroom forays in Newfoundland and Labrador and disseminate the knowledge gained.

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... who eagerly invites contributions to **OMPHALINA**, dealing with any aspect even remotely related to mushrooms. No picture, no paper. Material should be original and should deal with the mycota of Newfoundland and Labrador. Authors are guaranteed instant fame—fortune to follow. Authors retain copyright to published material, and submission indicates permission to publish, subject to the usual editorial decisions. Issues are freely available to the public on the FNL website. Because content is protected by authors' copyright, editors of other publications wishing to use any material, should ask first.

COVER

Backpack and bucket found in a chanterelle woods. Eventually a couple appeared, burdened with buckets brimming. "We load these into our backpacks to prevent crushing. Some of our restaurants are fussy." Very garrulous, compared to most, who stay out of sight in the woods until you pass. There were no pickers in our patches for over a decade. Now, we regularly meet one or two groups, even in the remotest of spots, all picking to sell, some using larger containers and more sophisticated equipment to protect the product to market.

Read inside for more on the dark side of foraging: the commercial harvest. And tremble!

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Message from the Editor

Happy Thanksgiving! Celebrate commercial collecting in Newfoundland and Labrador. Until relatively recently, we were not aware that there was any. Apart from Faye Murrin's study several years ago, largely focussing on one operation that had ceased, this activity has remained mostly undocumented.

Indeed, the information is difficult to get. Most commercial harvesters do it very quietly. Nobody is willing to talk. Added to the protection of secret mushroom patches, is a deafening silence about prices or profits. Most are unwilling to be interviewed, even when anonymity is guaranteed, let alone write about it. Of two who did write, one did so under an alias. Despite the frustration, it has been enjoyable talking to these pickers, trying to extract some usable information. A lot of stories did not make it between these pages, and some promised work did not arrive.

The prices are so low that we do not have mushrooming "businesses" with a stable of pickers, and no local buyers or distributors. It only pays if done alone or with a small group of family or friends, the pickers also being the sellers, packers and distributors, either to local end users, or to larger international buyers. For many it is a very limited operation, one or two harvests, sold without a trace to a known buyer every year. Apart from a few, who do it on a larger scale—and even for them it is a purely personal effort from picking to selling—it seems to be part of our traditional underground economy.

There is a market for a lot of things we should not have suspected. Did you know that *Ganoderma applanatum* conks fetch \$6.00 apiece? Or that *Lactarius helvus* is a major commercial entity? Or that the nice, quiet, gray-haired lady next door finances her annual cultural junket to the Greek

islands with just two mushroom harvests each fall?

This has been a very poor year for most mushrooms everywhere on the Island, except the Avalon. There the ground was orange with chanterelles, enabling one picker to sell over 600 lbs by mid-season (interview or article declined, e-mail unanswered). There were no mushrooms of any kind to be found in Central Newfoundland, and only the first flush on the West Coast. Labrador seems to have done better. What leads to poor and good seasons? We offer a theory and ways it might be tested.

No doubt you remember April Muirhead's appeal for information via questionnaire about mushroom habitats. Thank you to those who participated. The results appear here, together with maps where the species considered might be found. We tested one region early in the chanterelle season, finding some, but not a huge lot. At least one of those sites is worth re-exploring in a better year and at a better time. The maps identify several sites worth exploring. It is too late for chanterelles and *Boletus edulis* this year. We had hoped you might check the maps for also for *Craterellus infundibuliformis* and *Hydnum* species, but the latter are not plentiful and the former almost nonexistent this year. Still, if you use these maps to guide your search this year, please write April back with a short note of your experience <[amuirhead AT grenfell DOT mun DOT ca](mailto:amuirhead@grenfellDOTmunDOTca)>. She hopes to keep refining the criteria to produce increasingly more accurate maps. For sure, do it next year!

Happy harvest!

andrus



Walt Endicott

MY DESCENT *into the* DARK SIDE *of* FORAGING

Morels, chanterelles, and that was about it! The safe easy ones that parents try to teach kids was the limit of my mushroom knowledge. Unconsciously, I was waiting for a book about our native mushrooms from some guy, who had spent years crawling around in mud, tuckamore, mosquitoes, ants, hornets, and black flies. Not some book by a guy from Michigan State about NE North American Mushrooms (actually all below the 49th parallel) but a book based on actual field work done right here. As an outfitter, I spent 6 days a week in the woods, whether I wanted to or not. However, with the economic collapse of 2007 I suddenly had a lot of extra time on my hands. Exactly then the book I didn't know I was waiting for came. I became hooked on photographing, identifying, and learning a few things about the ecology of our mushrooms. Even bought a few more books, including that Michigan guy's one. I was soaring around via Google Earth, scanning forest inventory and soil maps, and always yearning for new habitats to catalogue that next elusive species. Along the way I had found some rather nice "secret patches", and began to connect a few ecological dots that resulted in some "super patches". I knew I was in trouble when I discovered I had spent 26 days straight, daylight to after dark, one August, hunting mushrooms. Yes, I had the fever. Drat the day I bought that accursed book in Deer Lake Airport!

The freezer was full, neighbours and friends supplied, and still my super patches were burgeoning with booty, often with but 1/100th of the treasure picked. What do to? I started giving my sites away like free trips to the Dominican. Piles of rocks along a farming road told the farmer where to duck into the woods to collect a quick cooler load of lobster mushroom for the buyers of his ducks from St. John's. Red flagging tape marked an abandoned dairy farm field loaded in stumps with honey mushrooms (*Armillaria* sp.). Some European friends claimed a super patch of winter

chanterelles (*Craterellus tubaeformis*) with thanks. Another, a granite boulder marked a hidden north facing old growth hill loaded in sweet tooth (*Hydnum umbilicatum*). Still the super patches kept accumulating.

Finally, I broke down and called a serious wholesaler. Hmmmm. \$15 a kilo for fresh and \$150 a kilo for dried *Lactarius helvus*, eh? That last patch must have 100 pounds on it in under an acre, if you don't drown in the bog like a condemned horse while collecting them. 44 Kg x \$15... what the hell! After that first quick and easy \$660 I was hooked. OK, I had become



Illustrations:

Title banner: 30 minutes' worth of picking *Boletus edulis*.

Above: 44 Kg, ready to go!

Below: Lobster mushrooms and winter chanterelles getting set to meet their buyers.



one of them! Those nasty, global-shipping food traders. I had sold out. I had visions of living in a van down by the river with the other typical mushroom gatherers—hiding from Revenue Canada, a parole officer, and an ex-wife. No wonder this attracts the... er, um... travelling and free living type of people! Cash, no laws regarding shipping across provinces (federal or provincial), no permits, no regulations at all, at all! Even

the Canadian Food Inspection Agency told me to go away and not bother them with my worries about regulations and food items!

Wait a minute, the buyers want King Boletes (*Boletus edulis*) at \$40 a kilo? Well, have I got a patch to keep them happy! Missus, kindly book us some tickets to Norway for some salmon fishing! We just won the lottery!

I quickly got an education about shipping rates and packaging. Mondays, Fridays, and weekends were out of the question for air shipping. 22Kg was the optimal box weight for Air Canada. For Canada Post, the ideal weight was one box between 22Kg and 26Kg. Or two big apple boxes duct taped together. Spacers and cardboard layering sheets found in apple shipping boxes allowed stacking mushrooms in layers without bruising or smothering. The fine chap at Dominion loved new salmon flies and I tied too many every winter anyway. I was quickly up to my eyeballs in free but valuable apple boxes.

A friend, shanghaied into this madness, was busy duct taping a large, tall laundry basket to an aluminium backpacking frame, and talking with the Head Chef for the Sheraton chain of hotels in Atlantic Canada. Sadly, said friend was hooked, too. I had developed friends in Montreal, Toronto, Guelph, and Calgary, all eager for more of our fresh, wholesome mushrooms. But now what do I do? I can't go picking every day. Do I show others my secret patches? Do I train others and explain my techniques using maps, altitude, slope, aspect, stand age and structure, soil maps, and things? What about quality control and trust? Each basket had to be able to be tracked back the picker and a single mistake meant instant firing of friends!

Hmmm. Maybe it was time to contact the government and maybe the local Foray group. I think there is a market for this stuff and a good cottage industry; everyone enjoys a fast \$5,000. In BC, \$15,000,000 worth of this activity is reported to Revenue Canada. Our most respected review of this industry in North America suggests that many of our wild mushroom species have a global market worth in excess of \$1,000,000,000 each annually! One group in Québec collected over \$100,000 worth, and one of my buyers wants 2-3,000Kg of lobsters a year! While we do not have the diversity or abundance of commercial species like BC, Washington, Oregon or California—not even Québec—we do have a few shekels' worth here, the picking of which we'd love to report to Rev Can!



COMMERCIAL PICKING 101

Walt Endicott

Dangers

Parking. A ridiculous issue, but a two foot shoulder is not enough. Park and walk back. Do heavy pick-ups on straight-a ways quickly! Leave the keys with the car and show or tell everyone where they are stashed.

Flats. Your 2 ply city tires just won't cut it. Even with 6 ply off road tires you'll want some 6"x6" blocks, "fix a flat" (air and sealant in a can—it doesn't work worth a darn but will help cripple you out), electric pump that has been checked to make sure the cord will allow reaching all tires, etc, etc. Test run for a flat in your driveway. Finding the spare is on a crank down wire that is rusted or seized into place 20 km from cell service is never funny on a hot or rainy day and will result in your buying all the beer that weekend.

Hornets. You *will* discover their nests and you had better run fast and far while taking everything (packs, GPS, water, baskets, compass, etc) with you. The ones in the ground are the worst. No big deal unless you discover you are allergic or have to drive with 3 or more stings and feel faint and very ill. Epipens are about \$100 but worth having, if going in a group.

Orienteering. Be careful on cloudy days if on flat ground or dense wood. Keep an eye on the sun and the direction you are heading! Have a reliable GPS, make sure it works, the batteries are fresh, have spares, and know how to use it. Gadgets only work when they actually still work, and only if you don't lose them. Always carry a map and compass for back-up.

Eagle eyes and Bell satellite/cell sticks. These are great things to have with a laptop or iPad but a expensive at \$150 for start-up and \$40 a month. They can be de-activated during the non-picking season. They allow last minutes plan changes while still being able to access Google Earth, weather, etc. in areas with cell service.

Sun. Sun screen, chap stick, sun screening shirt and hat with brim or cap with visor (I know, a real nuisance in the woods!).

Dehydration. Always have water, as, or on, ice in the vehicle and in your pack. I half freeze mine then drink it as it melts.

Storage. Coolers with 2L plastic bottles full of frozen water keep mushrooms firm and chilled until they reach home. Park the vehicle in the shade if you can.

Drying

For many mushrooms, most buyers will pay a little extra for fresh and some will pay a lot more. It depends on the end use of the mushroom and how well it rehydrates.

Dried *Lactarius* in the candy cap group (the ones that smell of coconut, maple syrup, etc) are used as a dried shaved spice, so drying may even result in higher prices than fresh! Morels—but you probably won't have to worry about them in Newfoundland and Labrador. Boletes do well dried, but for some reason are preferred fresh. Corals are best dried.

Fresh Chanterelles are best sold fresh. They tend to get bitter when dried, but still sell well, so weekly profit margins and shipping frequencies/volumes will dictate what to do. Cats (*Catathelasma ventricosa*) and lobsters are invariably wanted fresh and prices plummet for dried. Honey mushrooms are best sold fresh locally, as demand is weak and prices low because they are abundant on the mainland. When selling locally, you can reduce the price by \$2 a kilo for shipping. Selling in the USA and EU requires some permits and paying a ridiculous anti-dumping tariff (like \$0.01 a pound) but can be done at significant profit margins. It is cheaper to ship to London England or New York, where prices are often premium, than to Alberta!

Methods Use food grade everything when handling mushrooms and keep it all clean. Buckets need lids



to keep needles and dirt out during harvesting and should be non-lacquered/treated wicker or wood or food grade plastic. Do not lay them on plastic on the ground or floor as they may sweat. Ideally, lift them on large metal screened frames. Sun drying is always best—gills up for home consumption! Sun drying can increase the vitamin D content in mushrooms by as much as 100,000%. No joke, it has been tested. Despite its fragility, vitamin D may keep as long as a year once locked in a dried mushroom. Drying racks need to be screened with stainless steel or new unweathered food grade plastic-covered fibreglass screens (**NOT** galvanized!). Mushrooms absorb smells, so no diesel, rotting seaweed, lawn mowers, etc. nearby. A tarp, deck or tent fly protects from showers. Thin papery ones like winter chanterelles, corals, graylings, etc. dry fast (1 to 2 days). Medium density and larger mushrooms like big *Lactarius* may take a week. Big meaty king boletes and chaga may have to be sliced or chopped first. If it is wet and rainy outside for an extended time, use an electric dehumidifier (\$200) and air-tight room or box. Drying also hides larvae; grinding dried mushrooms eliminates this quality issue. Winter harvested chaga and artists conks (worth \$6 each) can be dried with a 1500W indoor space heater that has a fan.

Finding Them

While forest inventory maps, soil maps, topo maps with elevation, forest fire maps, etc. are all helpful and in some cases critical, nothing beats ground pounding. Every book says burnt sugar milkies (*Lactarius helvus*) only grows on wet *Sphagnum* bogs right? But, large quantities also grow on dry, well drained soils, in a variety of tree stand types and ages, in the cooking sun (photo, right). Locating these hidden patches is hit or miss, best done with a sharp nose after a dry spell. The only way to discover this is to hike some ground. Use light, contrast, angles, and/or tinted sunglasses. At 9 am we found only a few patches yet when walking back over the *exact same ground* at 2 pm, from a different angle, we saw a bonanza of patches from 50 yards away! Walk up hill and you see them white stalk first, walk downhill and you see little of their camouflaged caps. Walk east or west during mid day and the mushrooms and their shadows can stand out, but walk north or south and they vanish on the same slope at the same time! For others the reverse is true and the sun on their stalks with no shadows makes them virtually glow. Finding good densities is best



done if you follow topography, such as ridges, glacial kames, brooks, and other land features. Once you find a good patch, stand back and look at the bigger picture via Google Earth. Are there similar features nearby?

Timing

Young and firm, with limited or no larva or slug bites. Pretty straight forward. But what about season lengths? Having one good patch that produces 100 pounds fairly consistently during the first week of September is great; but what of August and late September? The keen picker is always looking for two things—new patches *and* timing. Temperature and humidity are the keys. The season for “narrow windowed” species can vary up to 6 weeks with altitude, misty pond and lake shores with prevailing winds, north or west facing dew drenched hills, rainy valleys, river mists, proximity to the ocean, etc. I have picked sweet toothed and winter chanterelles that were over-ripe in late July. While I enjoy a Viking approach and 100 pound takes of a single species all at once, others enjoy driving from patch to patch weekly, collecting small amounts at each location spanning 2 or 3 months. Some patches are like that, especially lobsters, Newfoundland chanterelles, *Lactarius*, and some boletes. It is wise to make sure your buyers understand your patches and methods to insure that they are happy with 5 pounds of this and 8 pounds of that when making up big shipping boxes. If you build a repertoire, they will sometimes

negotiate a flat price per kilogram and take what comes. If you pick by happenstance then each species should go into separate containers in your pack. Necessity, a drill, and hot glue are the mothers of invention when designing pack frames that have 10 or more lids with easy access (picture a honey comb on an aluminium pack frame). Taking it off every 50 feet is a pain, whereas single species raids can be done by simply dropping the mushroom over one’s shoulder into a tall flip lid laundry basket on a pack frame; though admittedly, I often take it off and stockpile with smaller stackable containers. Or use a regular super padded backpack that is more comfortable.

Prices?

These are highly variable depending on the market you are in and the current annual production regionally, continentally, and internationally. Also, how honest your buyers are, how well they like you (usually based on volumes and consistency), etc, etc. Here are some generalization. The bigger the buyer the smaller the prices they are willing to pay—they don’t need you. It is always best to find a local or regional restaurant. Small private orders can be economically mailed via Canada Post if the product is dried and vacuumed packed in a large bag. As long as it is no more than 2 cm thick the “letter” can then be sent for \$3.65 while weighing up to a 500g (one pound is 454g). Otherwise it may cost \$10-15 to send a single pound of dried mushrooms!

Some good advice would be to offer some mushrooms for free so restaurant chefs can try your product. Showcase your offerings in the “local foods fall feast” when it comes to town and or a farmers market. I have given away 20 pounds of primo king boletes and paid the freight! It costs money to make money. Also be willing to take some lumps. I once negotiated a price of \$35 a kilo and sent 100 pounds, at my expense. They landed safe and sound and the buyer suddenly only wanted to pay \$30, for no reason, and “throw out” 4 kilos as “not meeting grade and unsaleable” (despite that I checked each one personally!). My \$1540 shipment was now worth \$1200. I was pissed and screamed “rip-off artist” all over the living room! But, I took my lumps, and smiled, as this was my first shipment to him. He is now one of my better buyers. Demanding, yes, occasionally a week late paying, yes, but honest, dependable, accurate, and trustworthy. For others, I had to wait to get on their list. \$10 for King boletes... no way! 6 months later while lining up the summer orders - \$15! Still I said - no way. Two years later \$40 for primo and \$30 for grade A. Deal! One 22Kg box a week? Excellent. Once the deals start with a given buyer you are usually “in” so to speak. Don’t ask why it happened all of a sudden and don’t give up on any of them. Maybe there was a falling out with a supplier or a source dried up. Who knows or cares? Just produce an accurate and honest picture of what you think you can do and keep them informed if it looks like a crop is failing (and they will!). If you stick around long enough you will hit the lottery. Your crops of “whatever” will be burgeoning while others are failing and prices may jump from \$20 to \$400 a kilo like they did in NY for kings awhile back. Yes, 500 kgs buys a house!

If you google around you will see crazy prices like \$50-\$150 a kilo for winter chanterelles and \$50-\$100 for lobster mushrooms on virtually every website. You will likely never see these prices as a picker unless you know a local restaurant that can’t pick

its own. These prices are paid in big cities with a traditional and strong market to established buyers often with brick and mortar storefronts and where the nearest mushroom is 80 km from the city limits if someone hasn’t picked it already—and trust me, they have! However, never, ever, sell them for less than \$5 a pound or \$11 to \$12 a kilo or make the buyer pay the freight if the price is that low. Some choice species command good prices and can be abundant in ideal habitats (100-200 pounds an acre spanning two weeks). Five dollars doesn’t sound like much until you fill two laundry tubs in 3 hours and cart away \$400 or \$133 an hour!

The Who’s Who

So, who does this sort of thing? Teachers are off all summer and extra cash once a week is always welcome. I know a lady that has some patches worth \$2,000 each, who travels in winter with her mushroom money! Another is a commercial fisherman, who is bored in August and knows he can make over \$1000 a week from his secret patches. He sneaks around town and the woods roads and hides what he’s doing with great effort. He never uses the local post office for shipping and vacuum packs his own. Another is retired and welcomes the added income. It is not all college students, that is for sure. My best ever pay, so far, was almost \$1000/hr. No joke. I can often make over \$100/hr after I get on site if I subtract the travel/shipping/handling time. These included, it is still most often over \$50/hr. This will *not* happen in year one. It is like salmon fishing, moose hunting, or berry picking. You’re not going to fill the pan of the truck the first time you ever try it. Once you can fill the pan, one might do well to remember how many days of work it took you to get there when demanding prices. Or letting others in on what you are up to on the way to your secret waterfalls swimming hole with trusted friends, walking past \$500 mushroom patches. Nothing spoils things faster than money, fear, worry, and suspicion.



CHAGA *by* CHOICE, *not by* CHANCE

Bill Bryden

One in 15,000 birches has chaga.

Not exactly encouraging, but nevertheless that quote appears in most reliable descriptions of *Inonotus obliquus*. To improve these dismal odds, take the chance out of your hunt. Choose what you harvest.

This strange looking fungus is found on our yellow (*Betula alleghaniensis*), white (*B. papyrifera*) and heart-leaved (*B. cordifolia*) birch, and looks more like burnt wood than a fungus. If it is that uncommon, why do I absolutely love hunting chaga? Well, foremost is the enjoyment I get from strolling through a birch forest in winter. That's right, I hunt it in winter—the how will be explained below.

Hunting chaga provides a highly appreciated and needed incentive to get out of the house in winter. Then, there are the reputed health benefits from drinking chaga. It has an ancient history of use and thanks to chemists we now have names for some of its biologically active compounds and some data suggesting potential health benefits. Also, I just like the taste of a cup of chaga tea. Like many things, if you know where to find it, it is nowhere near that uncommon. If your harvest is good, there is a market for it—pays for your gas.

The best time to stalk through birch forests is whenever the snow is hard and easy to walk on. That means during a freeze after a thaw or rain from November to January and again on the frosty mornings of March and April when the winter snows have settled to cement. Lighting is also important when trying to spot chaga from a distance. The best lighting is on cloudy days, most gloriously during the horizontal light of the mid AM and mid PM. These conditions make the “black hole” rough surface glow like a blacker than black light-sucking vortex in a sea of white. There is no rhyme or reason as to which side of a tree they spring from, north, south, east, or west, so I always look behind me, and travel in zig-zags, to cover all sides of the trees around me. Even then, I miss some that get found on a second or third trip into the same forest. Be sure to wear sunglasses



to prevent snow-blinding damage to your eyes and the resulting evening headaches. Having worn out both a pair of snowshoes and a snowmobile, I've decided tight fitting neoprene lightweight muck boots are the preferred chariots of joy for hunting winter mushrooms in our weekly to monthly winter rains. Looking for them on brown, snow free, leaf-litter backgrounds of the fall, or hiding behind green foliage in mosquito infested boot-sucking swamps of summer—well, that approach probably gave rise to the quote at the start of this article!

Hot spots include wet trickles, tiny alder ridden brooks one can jump across, rivers, alder muck or swampy flood plains, bogs and bog edges, and other such places that make it hard for birch to survive due to soaking wet soils. You'll often see a few dead



From the woods to the table: conk to chunk to ready-to-use powder.

trees standing guard along the edges of such places. Near the dead trees will be wounded and dying trees with chaga. A pure birch forest allows spotting them from 50 meters or more. Old stands in glacial till are by far the best, especially those with conks galore. Using the “bird’s eye view” feature of Bing Maps will provide amazingly detailed maps once you learn what young birch vs ancient birch vs alder vs aspen look like from space.

Once I find a spot with chaga I slow way down. Almost always there are others nearby. The real McCoy’s will stand out from greater and greater distances as black-holes in a snow-white background. I walk very little and look a lot. The slower I travel, the more I find. I use an axe, or a chisel and hammer, so as not to dig too deeply or damage the tree, to get the tough chaga off the living birch trees. I never harvest from dead birch and only the cork like fleshed, golden interior, ones go into the packsack—otherwise, yuck, you’ll smell them when they thaw on your table. I do not use climbing spikes or a ladder, and thus usually only have access to 20-25% of the chagas I see. The same tree may produce up to 3-4 harvests, every 3-5 years assuming it survives this potentially fatal parasitic fungus that long.

Take heed: while moon lit strolls in a birch forest can bring back memories of Robert Frost poems, there really are things that go “bump”, even during the stark daylight, in winter birch stands. Goshawks start laying eggs around the first week of April—and



will start defense of a nest in mid March. They nest in birch trees and put a fresh twig of spruce or fir in an active nest. A goshawk may have 2 or 3 nests in its area and will chose one to lay in. The female will put the first wing feather she loses at the start of the spring molt in the nest of her choice just before she lays. This feather can sometimes be seen sticking above the nest edge. Beware, as often they don't give much warning and then proceed to try and scalp you even if you are a fair distances from the nest! I have found 7 nesting habitats so far, and escaped stitches so far (*barely!*). I now wear a thick hood.

Once home, I first use an axe to chop the chaga into small cubes, then a metal, adjustable, dual drummed, fruit grinder (\$100 from E-bay used) on the chaga before zapping the resulting coarse grit in a commercial coffee grinder or blender. Finally, a 1500 watt fan-aided space heater dries it mold proof and a vacuum packer seals the deal for my tea supply. I add some powdered Labrador tea leaves (as narcotic as I can get), dry *Lactarius helvus* shavings, and canned milk and voilà, my chaga-cinos are complete.



Above: Goshawk nest in birch. Wear a hat or meet the beak.
Photo: Joe Brazil.

Below: 180 lbs, 2 men, 3 hrs. This will pay for the gas.





AVAILABILITY OF CHAGA IN NL

In Minnesota chaga conks are the size of cabbages, larger than your head. In Newfoundland and Labrador something the size of your fist is a good find. Unless you live in or near a birch forest, harvesting means travel. And even if you live in a birch forest, after the first haul, you travel. The yield from an untouched forest of old birch is usually good. If you do a good job, return visits bring dramatically diminishing returns, so that a third combing of the woods usually will not pay off.

It takes at least five years to get back to the sort of yield seen the first time. For best return for your time, this means a new site every time you go to harvest. Yes, if you select your sites well, one man can collect about 50 pounds in a day, even more with good luck. Actually, only over 2-4 hours. However, when you figure in planning and travel, it takes a a good day. Once you get home, there is cleaning, sorting, chopping, drying, grinding, bagging. And then selling. And planning for the next site...

After you clean and dry it, that 50 pounds becomes 15-20. When I sell a pound of powder, it is clean of bark, wood and other undesirable matter. It is dry and will keep forever without going moldy. And that pound represents almost three brought in from the field. I could sell fresh at same price and make more, but I only sell dried powder in a sealed container, because then I know it is clean and pure and will keep for years without going bad.

The idea is to go for exercise, or a stroll in the woods, or as a challenge to see how well you can select sites. Then, if you find, harvest and sell, it's a bonus. If you go out only to make money, there must be better ways to get more. We lack the amount of product found in other areas, and it is the people with abundant supply, who will dictate the selling price. You need to compete, but the playing field is uneven, if you only do it for money. Enjoy the process, or do something else!

Amalgam of interviews by Andrus Voitk with three anonymous chaga hunters. Photo: Maria Voitk

There is a lot of firewood being cut in Newfoundland and Labrador. Where birch is plentiful, it is preferred, because it burns longer. Conclusion: there is a lot of birch cut in Newfoundland and Labrador. Some of this birch must be infected with chaga. It shouldn't take too much to teach a woodcutter to recognize it and it shouldn't take too much of the woodcutter's time to harvest it when cutting birch.

Match I

Armed with this sort of reasoning, I approached the man supplying me with firewood. I told him about chaga, told him there was a market for it and told him to harvest it when he next went out to cut birch. I said I'd be willing to look it over for him to make sure it was the right thing and help him find a buyer, all for no fee. With no additional effort, he could augment his income significantly. Gwan bye, was his friendly response. When I saw him next year, in response to my query he told me he had forgotten all about it. Also, he had no time.

This story repeated itself with four woodcutters. I did not approach a fifth.

Match II

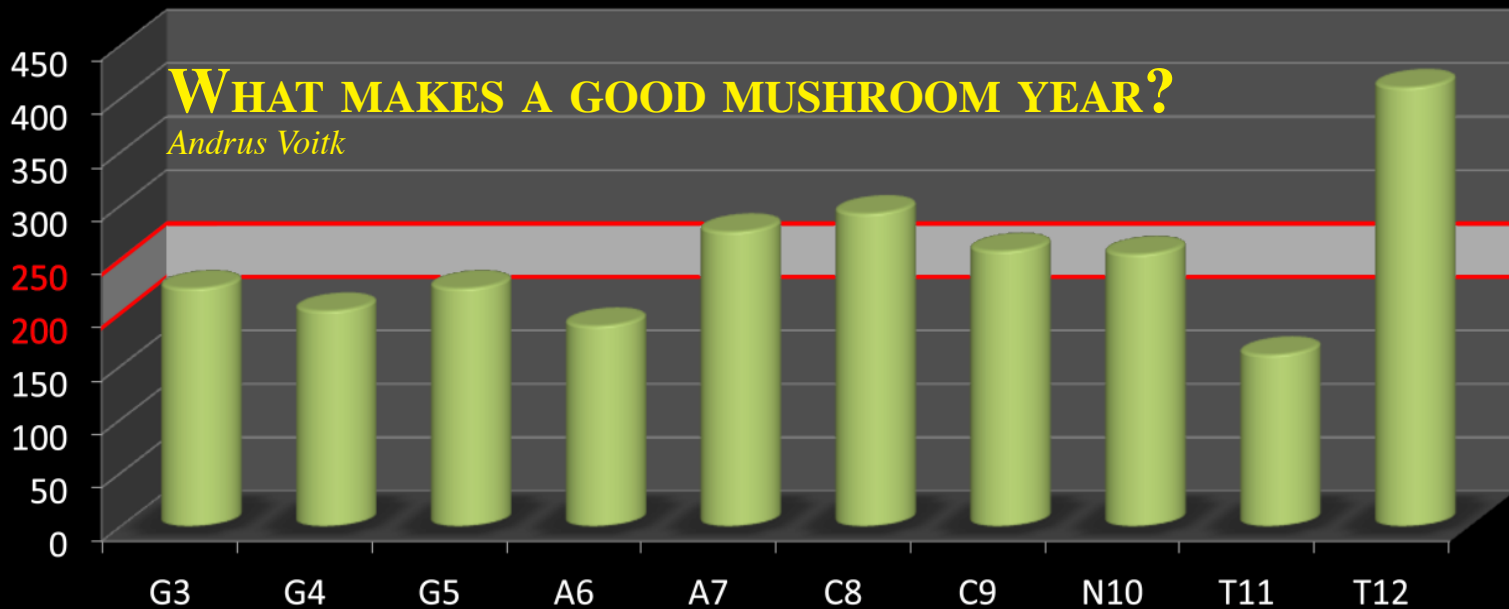
I had a stand promoting chaga at a forest fair, two booths away from some firewood cutters. We had a cuppa chaga tea. Because you boys cut down birch all the time, you must come across a fair number with chaga. Harvest it for me and I'll buy it from you. How much? Say, I give you five bucks a pound. Not worth me while. It'd slow me down too much. Gimme ten, and we can talk about it.

At the time, boys from Minnesota were selling it on eBay for five bucks a pound, ground or whole. A guy from Newfoundland and Labrador is offering it for 30 bucks a pound. How can I process, sell and compete if I agree to pay 10 bucks a pound before we even talk? But the boys would not be swayed.

Matches may be made in heaven, but all are not consummated here on earth.

First Match by Andrus Voitk, second from an interview with unidentified chaga hunter. Photo: Maria Voitk





This rain should bring them out in droves.

Involvement with 10 years of forays, culminating in a sandwich of two poor years framing an exceptionally good one, has allowed me to speculate on the factors leading to a bountiful mushroom season. Fall rain is NOT a factor: How so, when everybody knows that mushrooms appear as if out of nowhere after a rain? For an answer, let us see how mushrooms are formed.

The organism (the fungus, i.e. its mycelium, made up of strands or hyphae) lives in its substrate, usually underground. When conditions are right, some hyphae specialize to form little initial nubbins, called primordia, that become the eventual cap, stem and hymenium of a fruiting body. This nubbin varies from microscopic to a few millimetres in size. When conditions are right, it swells to become a visible mushroom, at times over the span of just a few hours. Most important among the "right conditions" required for this to happen is water. Some species take a few days to grow, while others reach up to 80% of their maximal size within their first appearance. Hence the very correct observation that mushrooms appear seemingly out of nowhere after an autumn rain.

However, please observe that the rain, which usually comes sooner or later, does not promote mushroom abundance. All it does, is to help the existing mushrooms (present as initial nubbins) burst forth at the same time, thus reaping the credit. Most of these

nubbins would likely glean sufficient moisture from the soil, fog, dew or the like to appear as mushrooms eventually in any case. Appearing together after a rain is easier and rain takes the credit.

The abundance of mushrooms is influenced by how many initial nubbins are formed, not by how suddenly they appear. This situation is analogous to that of any fruit crop. Some years, apple trees produce many apples, and some years a few. The same applies to fruiting fungi. Just as blossoms appear months away from fruit, the conditions that lead to the formation of many initial nubbins happen much earlier in the season than harvest time. Probably two important conditions determine fungal health and ability to fruit more than others. One is a need for plenty of water early in the spring, to allow the mycelium to grow and renew, refresh and repair itself from the previous season and the ravages of winter. A dry spring may result in a weakened mycelium, unable to produce many fruiting bodies.

The other factor depends on the amount of available nutrition during the year. A well-fed fungus may have better energy stores to produce copious fruiting bodies. For mycorrhizal fungi, this is essentially tied to healthy plants. Thus, expect many mushrooms in years when gardens are lush, plants grow well, flowers are spectacular and trees grow and produce copious fruit. In our climate, this usually happens if there is a hot, sunny summer, with adequate rain to prevent parching.

It seems that persistent moderately high heat is better than swings of very hot, alternating with cold periods. Water need is actually minimal, and it seems that heat and sun are the more important factors. Plants that are healthy and strong, have more sugars left over to give to their mycorrhizal partners, making these strong in turn. Thus, the stage is set for a bounteous mushroom year. The same requirements of warm moist environments likely also apply to saprobes, fungi making a living breaking down organic tissues. Heat speeds up the chemical processes of rotting, making more nutrition available to the fungi. With loins thus girded, they have more strength to go forth and multiply, producing more abundant fruiting bodies.

In this picture, autumn rains are minor players that work with what they are given, merely influencing the timing of fruiting body emergence. The amount of initial nubbins for autumn rains to play with has been determined by the spring and summer.

This is a theory. There are good records of weather and we have enough data over 10 years that it can be tested. The title banner shows the number of species collected per year, 2003-2013. Although many factors contribute to what is collected at forays, abundance is probably the major one. Therefore, comparison of the weather patterns for the years with over 250 species to those with under 200 species might be a quick and dirty first test of this theory.



The Bishop's Sketchbook

Boletus edulis x 3





Where to find edible mushrooms *in* western Newfoundland

*April Muirhead
Darin Brooks*

Knowing where to find edible mushrooms in Newfoundland can be a challenge for inexperienced pickers. Understandably, experienced pickers keep the precise location of their sites tightly guarded to ensure a predictable harvest year after year. Beginner amateur pickers can find it difficult to stumble upon their own mushroom cache when there is limited ecological information available about the growing conditions required for particular mushrooms.

GIS (geographic information system) is a very helpful computer based tool that allows the analysis of geographic data to generate geographic information. Our objective was to see how reliably a GIS statistical model could predict the most likely locations of edible mushrooms in western Newfoundland (green area in title banner). First, we needed to know the sorts of habitats mushrooms prefer: rocky soil, sandy soil, dry, wet or in-between? Are particular tree species a requirement? Does the amount of canopy cover make a difference? What about the understory vegetation?

To get this information, we designed a questionnaire about edible mushroom locations. The survey was distributed to Newfoundland mushroom pickers (*OMPHALINA* vol. 4, No 2) to obtain knowledge about productive local site characteristics, forestry practices, and stand

composition for five mushrooms: *Boletus edulis*, *Cantharellus roseocanus*, *Craterellus tubaeformis*, *Hydnum repandum* and *Hydnum umbilicatum*. The surveys suggested that the following ecological parameters, in no particular order, might be particularly useful in predicting the presence of mushrooms: stand age, stand species composition, canopy closure, and soil moisture. This on-ground knowledge was supplemented with existing knowledge from mushroom books.

Predictive maps for each character were made, using digital data from the College of the North Atlantic Geospatial Research Facility, Department of Natural Resources, Forest Ecosystem Management Division, and Geobase. As an example of one of these parameters, the upper right map on the next page shows the distribution of 40-80 year old

balsam fir (*Abies balsamea*) in the study area. The squares on the bottom of the next page show similar data for stand species, stand age, canopy closure, and soil moisture within a small area of land.

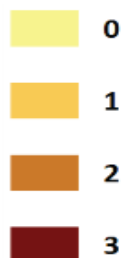
Next, each parameter was assessed on a scale of 0 to 3 regarding its likelihood of meeting a chosen mushroom's needs in that area. These values were represented by a shade of brown, as shown in the small colour patch, increasing darkness indicating increasing suitability. The lower squares show the resultant map for each parameter in the same area, using four shades of brown.

To create a single map that combined and measured all the ecological parameters together, the selected criteria were then combined to calculate a "suitability" or likelihood of mushroom presence for western Newfoundland.

For example, if site A, were optimal for stand age (3), soil moisture (3), stand species composition (3), and canopy closure (3), it would receive a suitability score of $(3)+(3)+(3)+(3) = 12$. If a site B were optimal for all criteria except the canopy closure was too open (1), then it would receive a suitability score of $(3)+(3)+(3)+(1) = 10$. In this example, site A would be "more suitable", or more likely to support mushroom presence than in site B.

The reassigned digital layers were combined using a GIS to create a series of maps showing suitability areas in the study area. For simplicity, the 12 values were reduced to eight shades of brown, producing the maps for individual species on the following pages. These maps can be used as starting points by beginners looking for productive areas, or by veteran pickers to explore for new sites.

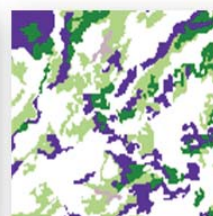
The results are only as good as the input data. Because the number of survey responses was limited, the information regarding important site criteria is likely incomplete, and may be skewed.



**Species
Composition**



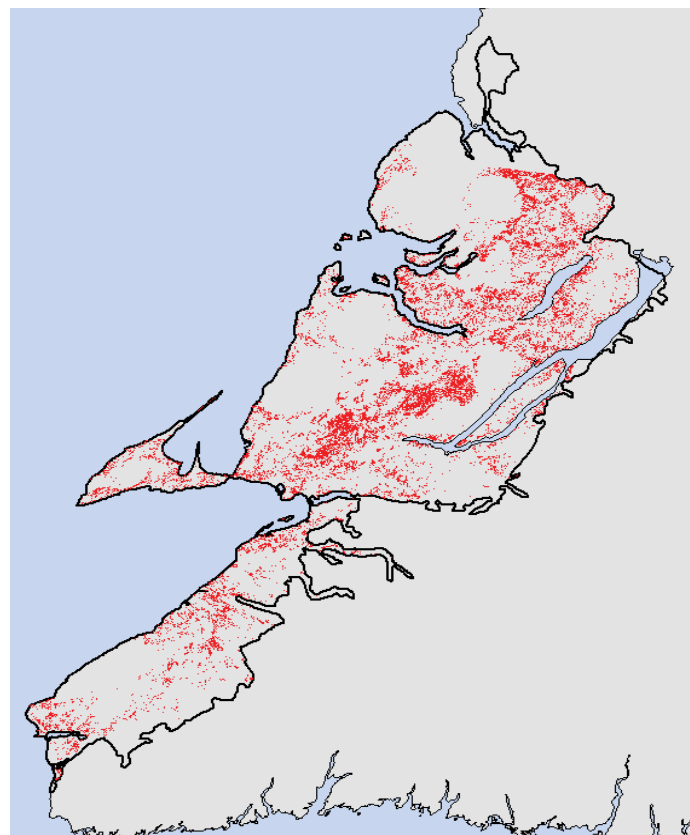
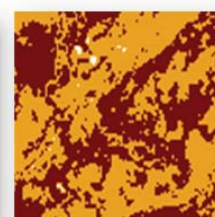
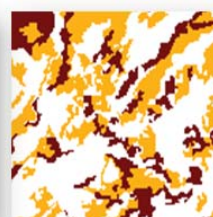
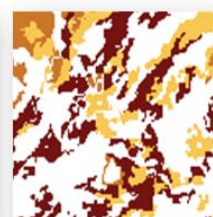
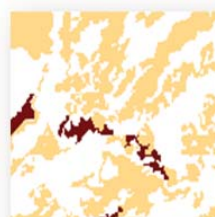
Stand Age



**Crown
Density**

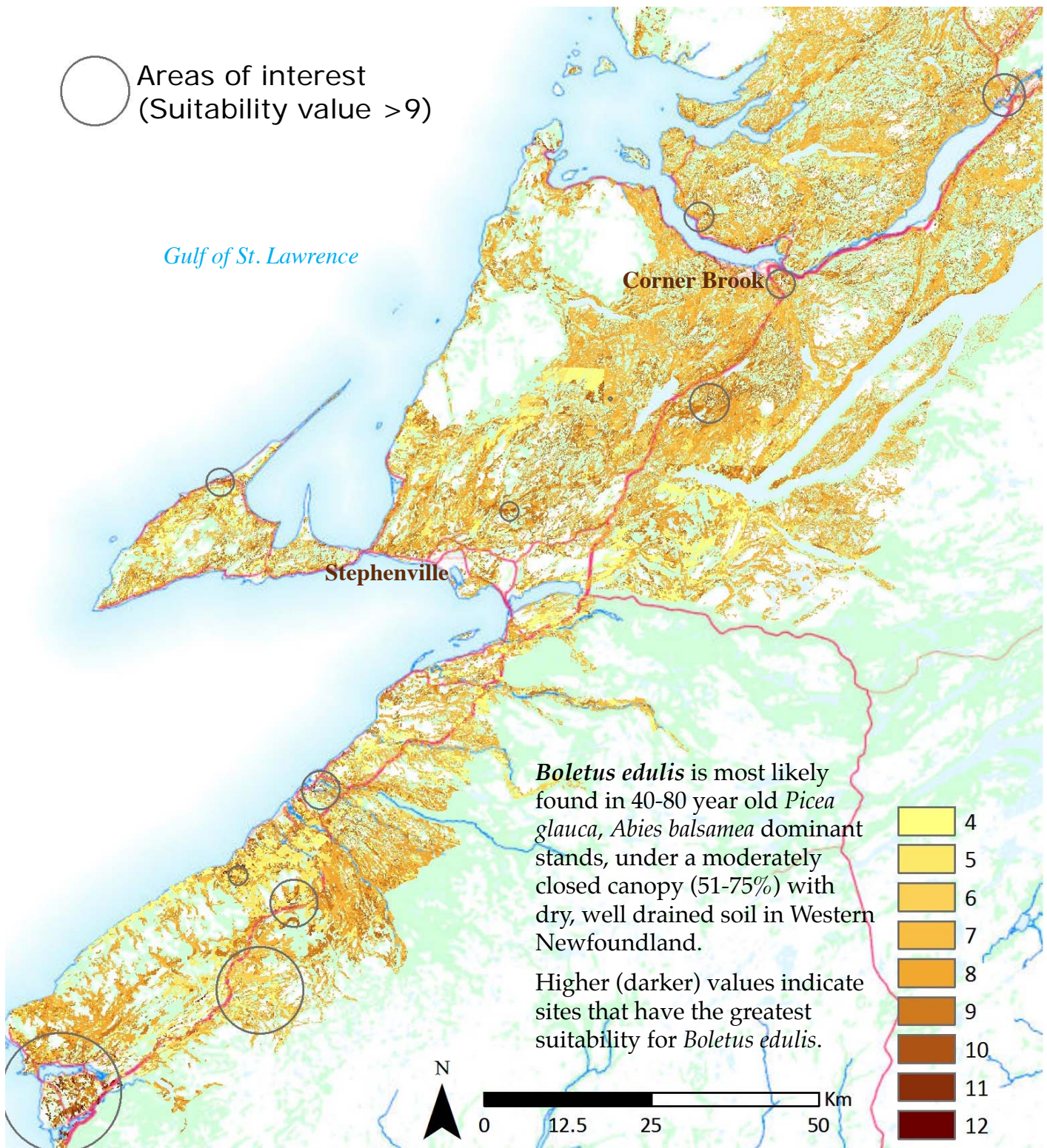


**Soil
Moisture**



A map book of the results was provided to all survey participants. We are very interested in obtaining feedback from users. If you use these maps as a guide, please drop a note of your experience to [amuirhead AT grenfell DOT mun DOT ca](mailto:amuirhead@grenfell DOT mun DOT ca). The article on p. 22 tested the chanterelle map in one area relatively early in the season. We hope to use additional information from feedback, possibly additional surveys, and fieldwork to refine the predictive model and help create a higher accuracy in mushroom presence mapping.

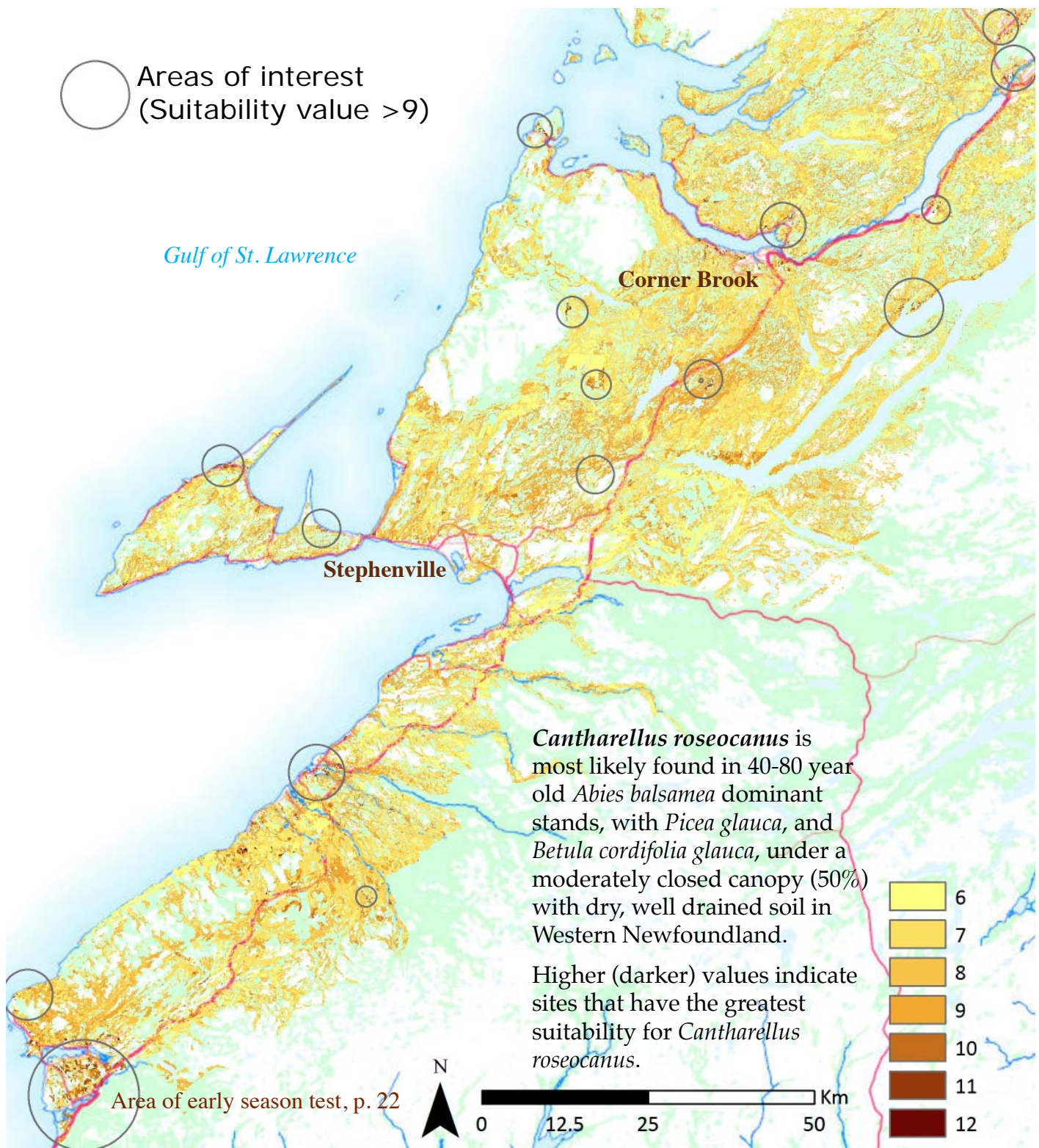
Boletus edulis



Created by April Muirhead and Darin Brooks
Date: Sept 2013
Projection: Transverse Mercator
Base Map Source: College of the North Atlantic
Geospatial Research Facility

For feedback or more information on methodology and results, email amuirhead@grenfell.mun.ca

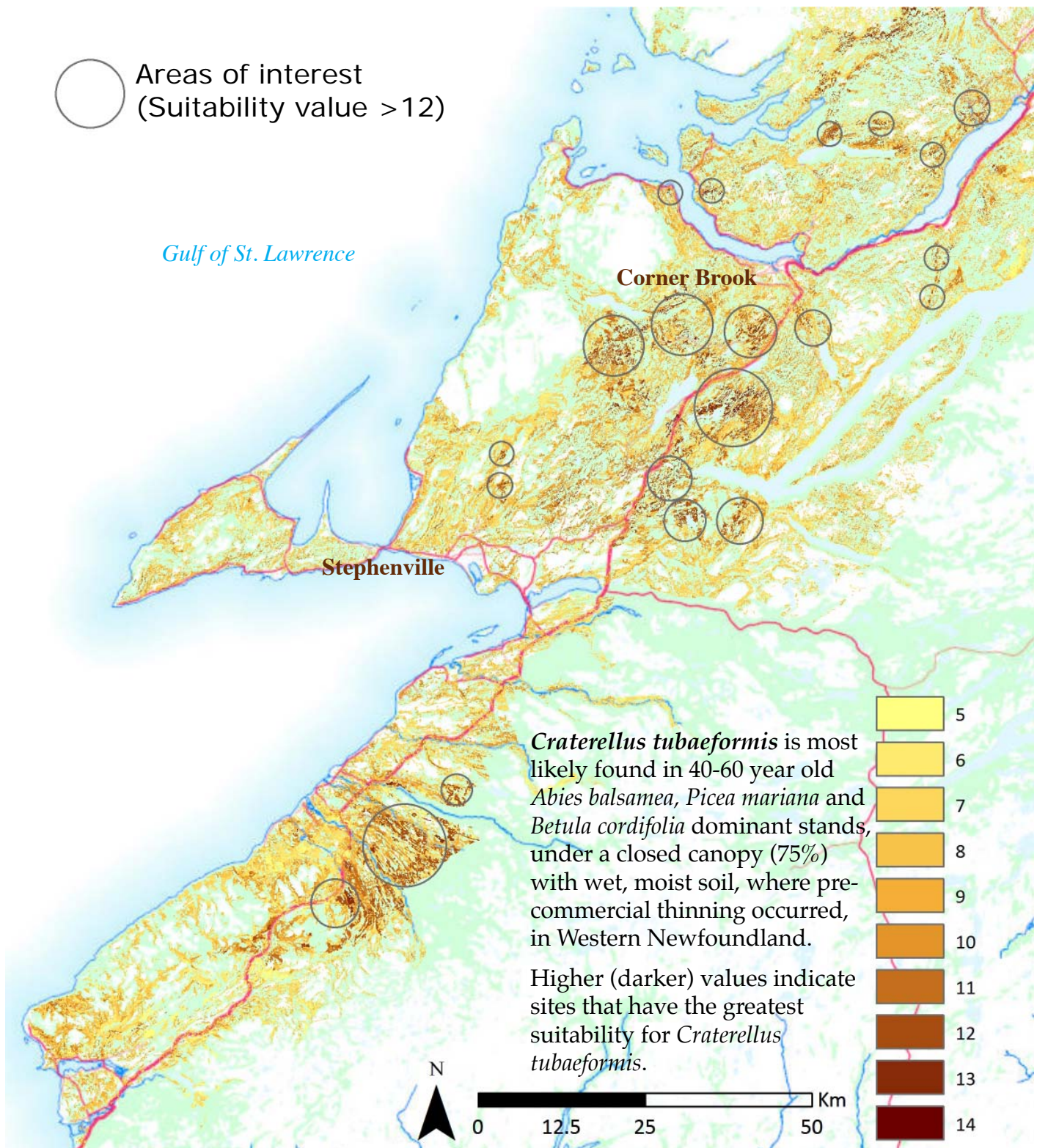
Cantharellus roseocanus



Created by April Muirhead and Darin Brooks
 Date: Sept 2013
 Projection: Transverse Mercator
 Base Map Source: College of the North Atlantic
 Geospatial Research Facility

For feedback or more information on methodology and results, email amuirhead@grenfell.mun.ca

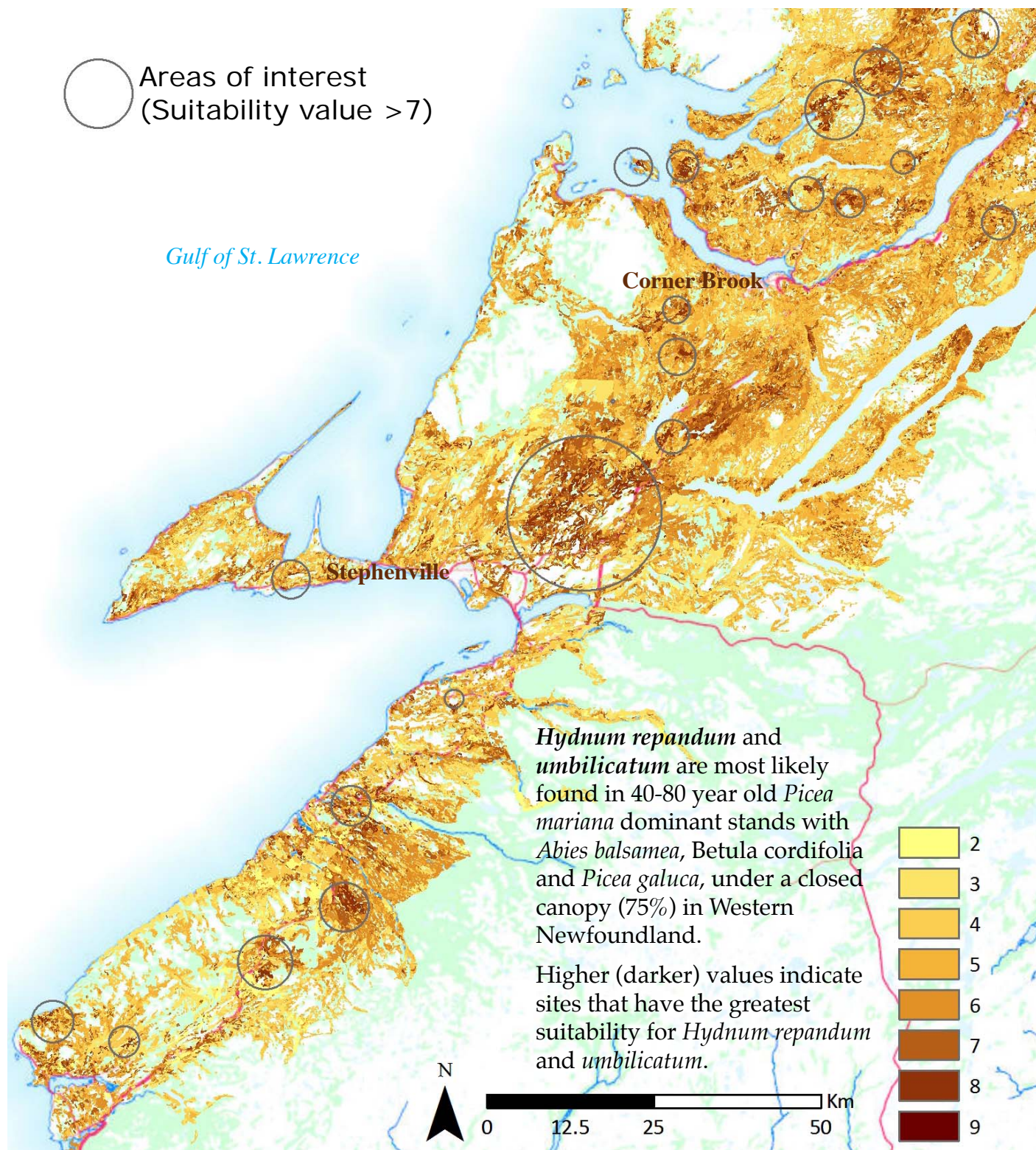
Craterellus tubaeformis



Created by April Muirhead and Darin Brooks
Date: Sept 2013
Projection: Transverse Mercator
Base Map Source: College of the North Atlantic
Geospatial Research Facility

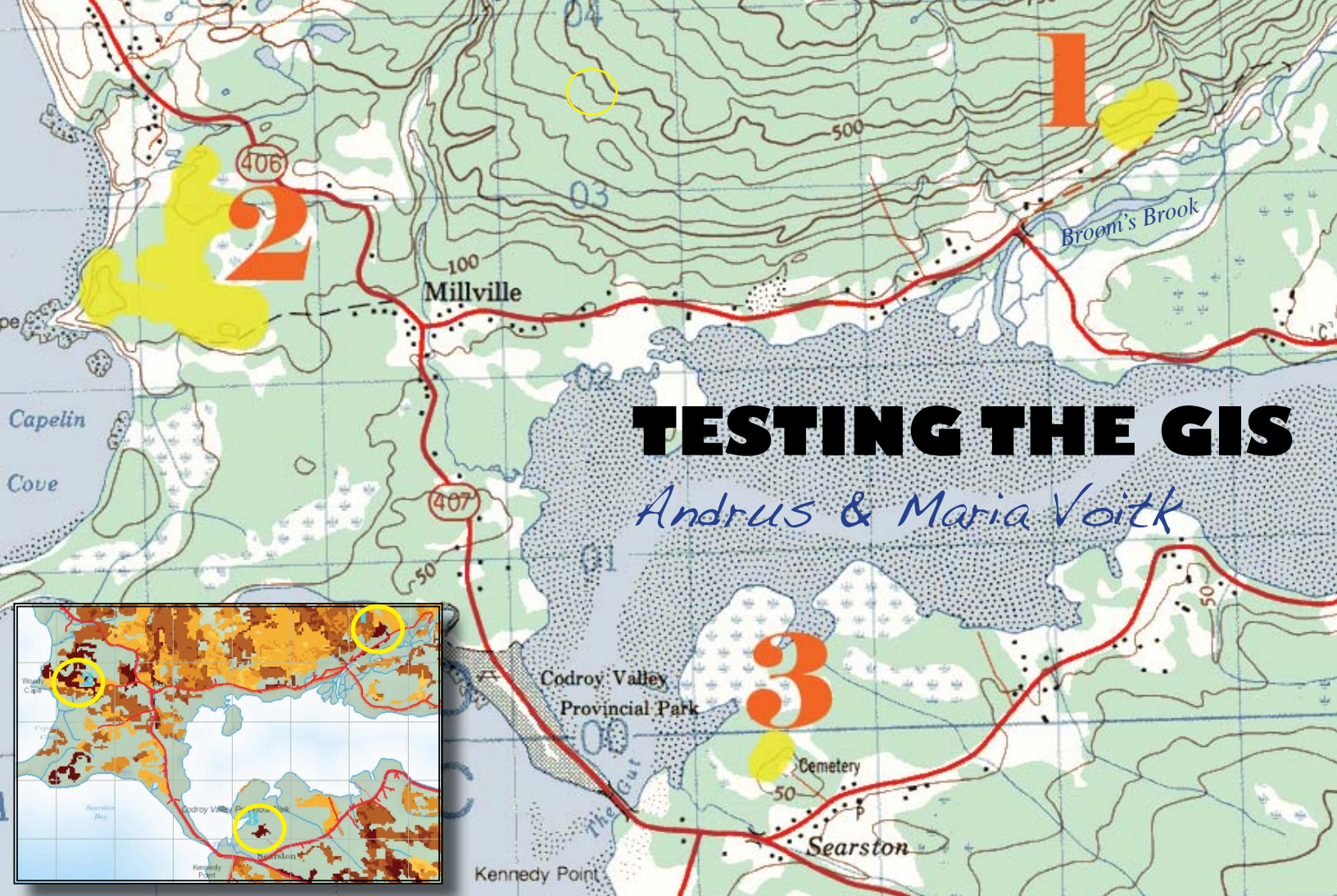
For feedback or more information on methodology and results, email amuirhead@grenfell.mun.ca

Hydnum repandum & umbilicatum



Created by April Muirhead and Darin Brooks
Date: Sept 2013
Projection: Transverse Mercator
Base Map Source: College of the North Atlantic
Geospatial Research Facility

For feedback or more information on methodology and results, email amuirhead@grenfell.mun.ca



TESTING THE GIS

Andrus & Maria Voitk

On page 3 of this issue, Walter Endicott tells us that with the aid of maps and attention to ecologic details, he graduated from nice patches to super patches. April Muirhead tried to go Endicott one better by adding the combined experience of several pickers, collected via questionnaire to produce likelihood maps. How reliable are maps produced in this way? We tested three potential chanterelle sites using April's maps.

A quick look at April's map of western Newfoundland suggested that conditions favoured by chanterelles were concentrated around the mouth of the Great Codroy River (the darkest areas in the title banner insert). We transposed these areas to a topo map of the region (1, 2 & 3 on the title banner) and surveyed them Saturday, July 27, 2013.

Site 1 Uphill and to the north of a woods road running SW to NE, parallel to Broom's Brook, about 1.1 Km from Hwy 406. Beyond roadside alders and birch, the forest was primarily made up of white spruce (*Picea glauca*) with a few balsam fir (*Abies balsamea*). There were no chanterelles in the dense forest, but at the edge of meadowed clearings, small groups were found under old spruce (Figure 1).

Site 2 North of a gravel road leaving Hwy 406 to the

east in Millville, about 150-200 m beyond its junction with Hwy 407. The woods to the north are primarily old growth white spruce. Chanterelles were found under spruce bordering the meadow, as well as near clearings in the woods.

Site 3 Go south on Hwy 407, and turn east onto the first secondary road after crossing the Searston bridge and a small bridge following it. About 300 m along, take the small 200 m grass lane on the left (opposite the Silver Sands Restaurant) to St Ann's Cemetery. Spruce woods with about 20% fir surround the cemetery. Chanterelles were found on the SE side of the cemetery (Figure 3).

The good news is that the maps work! In each of the places where a high likelihood of finding chanterelles was identified, they were indeed located, and without

much difficulty, although they were often low branches had to be lifted up to see the mushrooms. Admittedly, the quantities were not large, a bit disappointing after surveying a large “promising” area. In a province with some spectacular chanterelle patches, regions with the greatest number of conditions for chanterelles to thrive might be expected to contain more abundant mushrooms.

At least four reasons may explain this gap between expectation and reality. First, we were a bit early in the season—all mushrooms were very young. Possibly a survey two or three weeks later might produce larger quantities. Secondly, our survey was very superficial. In his second article, Endicott states clearly that despite all his maps and other aids, “nothing beats ground pounding”. Indeed, were we to live in the area and spend some time in these woods, we may in time identify areas of copious yield. In particular, site 2 just “feels” like it should produce! We only examined one small border of this extensive woods. Thirdly, unknown to us at the time, 2013 was a poor chanterelle year on the Island outside of the Avalon. Definitely, these areas are worth a second look in future seasons.

Finally, April may not have had enough data, and more might make the information more robust. We have walked through a lot of woods for a long time and can avow that although chanterelles are not rare in the province, they are capricious. To find chanterelles in three places chosen at random is highly unlikely. Therefore, the maps work, at least in a fashion. But only as well as the available information allows. With more respondents (more experience), these maps can be much better predictors. Should April find time to repeat the project and appeal for more information, then please, please, take the time to fill out the form. To be ready, note now the soil, trees, their age, aspect, sunlight, etc., of your chanterelle patches. With your help she might produce maps to make pounding the ground outdated.

Meanwhile, please use April’s maps to narrow down your search for your favourite edible. Please write her of your experience. If she gets a few accounts, perhaps we can publish some kind of composite report of how these maps work for our readers in 2014. And, more importantly, produce even better maps in the future.



Photos, top to bottom:

Chanterelles from sites 1, 2 and 3. Mushrooms were young, with no mature or big ones yet, suggesting that the survey was early in the season for the region. In mossy places, much slug damage was already evident.



THE MAIL BAG

OR WHY THE PASSENGER PIGEONS ASSIGNED TO SERVE THE
LAVISH CORPORATE AND EDITORIAL OFFICES OF OMPHALINA GET HERNIAS

The chill in the air should tell you that the gift-giving season is soon approaching. 365 small flasks of very expensive Cognac would be fine for the Editor, should you be driving Humber Village way. That won't leave you much for other gifts. Consider a 2014 calendar from the California Lichen Society <<http://californialichens.org/>>. Not too expensive, and you could negotiate a bulk rate if you order over two. Why this? Well, the April picture is of *Arctoparmelia incurva*, the Tree of Life image by John McCarthy that graced the cover of OMPHALINA in May of this year.

Slightly paraphrased and markedly improved from a letter from an unnamed correspondent in that state.

The *Daedaleopsis* article (OMPHALINA, vol 4, nr 8, p 12 [*Daedalus* (without a second e) was the architect, and *Daedaleus* the mushroom named after him. Thus, *daedaleoid* means like the architect and *daedaleiod* means like the mushroom. The terms are often interchanged, the former more common in North America, and the latter in Europe.]) answered a puzzle I had for a long time: why I “grew up” saying “daedaleoid”, while the more expert crowd I hung out with (Ginns, Bursdall, Gilbertson) would say “daedaloid”. I learned from George Barron, of course, from the other side of the pond from said experts. RGT.

The Editorial staff expresses its sincere thanks to all five readers, who wrote in with pictures of various bucket-carrying machines with all terrain tread, and one with posed pictures of professional models performing helicopter rappelling, all to permit surveying the crown of trees on crown land, without cutting them down.

OMPHALINA wishes to assure its readers that the government is studying proposals to purchase such equipment for us in the near future. Apparently money is no problem because of the huge savings after firing 98% of the Department of Environment & Conservation staff earlier this year, who did not fit with the core mandate of the Department. Machine selection process has narrowed down to the two-step kicking process: over the course of 2014, Cabinet will kick the tires of said equipment, to follow up with kicking the bucket in 2015.

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The second decade

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