SILVICULTURAL ADVISORY COMMITTEE
Field Trip: August 4 & 5, 2020

The 2020 field trip had been scheduled for the North Region, with proposed stops at Telos and Scraggly and a walk into the Big Reed Preserve. The travel/lodging impacts of COVID-19 mandated a late (mid-June) revision to sites that required relatively short commutes. The decision was made to visit sites in the general region of Bangor, thus hosted by the East Region. BPL-managed sites were visited at Bradford/Lagrange and Amherst, and the tour also looked at management and research at both the Demeritt Forest (University of Maine forest) and the Penobscot Experimental Forest (PEF). Because the recommendations for limiting spread of the pandemic, no more than two people could ride in the same vehicle and some were required to ride alone, resulting in a convoy of more than twenty vehicles.

The following people were present:

Committee members:	Si Balch	Patty Cormier (4th only)
	Mac Hunter	Laura Kenefic (new member, USDA Forest Service)
	Bob Seymour	
Bureau staff:		
Eastern Region	Justin Lyons	Tyler McIntosh
	Eric Nosel	John Pinette
	Doug Reed	
Northern Region	Jarrett Beaulier	Chet Condon
	Marc Deschene	Jacob Guimond
	Dave Pierce	Andrew Wilcox
Western Region	Jeff Bartley	Adam Blanchard
	Mandy Farrar (5th only)	
	Matt Foust	Frank Henry
	Tim Post	Ben Webb
Augusta BPL	Joe Anderson	Tom Charles
	Andy Cutko	Bill Patterson
	Liz Petruska	Stephen Richardson
DIFW	Sarah Spencer (IFW/BPL)	
	Jack Chappen	Eric Hoar (5th only)
	Dan Hill	
Other Attendees	Amanda Beal (DACF Commissioner, 5th only)	
	Justin Schlawin (MNAP)	
	George Ritz (BPL forester, retired – Bradford/Lagrange only)	
	Kris Hoffman (FSM, Amherst only)	
	Katie Schulz (Graduate student working with Laura Kenefic, 5th only)	
Uninvited guest	Tropical Storm Isaias (happily, only an overnight cameo)	

People gathered at the Black Bear Inn in Orono, our overnight lodging. After introductions, appropriate due both to change within Bureau field staff and the invitees from other BPL Augusta staff, we consolidated vehicles as much as feasible and headed to Bradford/Lagrange, where the first item was lunch.

Some key points from the trip:
--Regeneration of lowland cedar occurs almost entirely on mounds. Though BPL cedar harvests are well within net growth, operations on those sites should ensure that the mounds are left intact.
--The good working relationship at Amherst among the town's Forestry Committee, Forest Society of Maine and BPL illustrate the value of proactive education, in this case determining the timing for potential management activity on the Amherst Community Forest.
--Expanding gap silviculture can be an efficient way to perpetuate desirable forest conditions while providing good working conditions for logging operations.
--The backpack chainsaw followed quickly by direct herbicide application to cut stumps may be a valuable process for limiting dominance by beech regeneration.
--See BPL Assistant Director Bill Patterson's editorial note at the end of this document.
--Forester license board letter for continuing education credits is below that editorial note.

Sampling of discussion items (due to group size, not all discussions were noted)

Tuesday, August 4

Stop #1: Bradford/Lagrange – Hemlock/Hardwood mixtures.
The long long string of vehicles bounced through the puddles for a mile and a half to reach the first stop. Even Mac Hunter's Prius made the journey, through some artful driving. Before we headed into the woods, George provided some history on this tract, which had been assembled by a non-industrial private owner then purchased from that person's estate in the 1970s by IP. They made a large clearcut about 1980 in the northeast part of the lot and cut a mile of very wide right-of-way that heads north from the South Lagrange Road and was the route we had taken into the lot. He added information on the 2002-04 timber harvest, an improvement/selection treatment which produced more than 14,000 total cords, 74% hardwoods with less than 15% of that hardwood being sawlogs or veneer. Most was harvested using single-grip cut-to-length processors with fellerbunchers cutting the rest. At the harvest's start, a new-to-processors operator was learning on the job but with training and direction learned to work well. The lot then held nearly all the mature aspen on the two towns and the regional biologist requested that a significant portion be retained, which was done though 40% of hardwood logs came from the aspen. Much of the softwood being cut was hemlock and even back then marketing the species was difficult.

Laura asked what types of prescriptions had been made, George responding that much was group selection using the "beads on a chain" method, with trails 100 feet apart and "bead" size varying by what was desirable to cut or leave. Most of the spruce/fir harvested was fir, as most was mature and the balsam wooly adelgid had been (and still is) active here. George also noted two patches of overstory removal near the deeryard where the older trees weren't providing good cover and there was plenty of well-established desirable regeneration to release.

The group then separated roughly in half, people choosing whether to enter the forest on the right or left. One portion walked east into S and SH stands with George Ritz, who planned and supervised the 2002-04 harvest here. The other walked into SH/HS with Bob Seymour, who has taken his silviculture class on field trips (hosted by George) here several times. This author was with the westerly folks, but apparently the discussions were somewhat similar in both sub-groups. At the west side stop, Laura asked what this stand, now a hemlock-rich HS, had been prior to the BPL and earlier harvests and Bob thought that it had not been much different. He called the BPL work selection/improvement. We asked, "what next" and the consensus was to harvest in small groups to augment the existing regeneration and continue with an irregular shelterwood that would have an appearance much like a selection-managed uneven-aged stand. Laura notes that it would be tough to regenerate the yellow birch, which is mostly of good quality, without exposing some mineral soil. Doing another improvement harvest at this time might yield too low a volume to be practical. She added that research in both southern Quebec and the PEF had sought

without success to discover the "sweet spot" of harvest type and extent that would favor both yellow birch and red spruce. The latter species is rather uncommon on this part of the lot.

--Key Points to Consider:
1. Regenerating yellow birch in this spot will be difficult unless scarification is done, and perhaps a heavier removal than might otherwise be preferable.
2. Strategies to regenerate both yellow birch and red spruce, the two most valuable species on this part of the tract, have not been discovered though research continues.

Stop #2: Northern Hardwoods plus Hemlock

At stop #1 it began to shower, and with the progress of the tropical storm unknown, this author chose not to bring the notebook lest it become too soggy to use. Therefore, the comments here are incomplete. This was a stand with large and good quality sugar maple and especially white ash, with hemlock always visible and sometimes in fairly dense pockets. The 1970s harvest by a former landowner had taken most of the tract's grade sugar maple (Japan was having a bowling craze) but this particular area had been far enough from access roads to have been bypassed. The recent BPL harvest had taken low quality hardwoods of all species, with ash removals concentrating on trees that were mostly male, easily determined by a bumper seed crop. Some hemlock was also taken. Discussions on what to do next included the opinion that group selection might work to establish more yellow birch but beech regeneration would need to be controlled.

There were a few comments about the future of ash with EAB now in Maine, though nowhere in the state is much farther from the current infestations. (Note: Bob's article in a recent issue of *Maine Woodlands* recommended retention of some white ash when harvesting as that ash species appears to include sufficient resistant or tolerant individuals to be a valued residual.) No one recommended cutting all the ash in the next entry.

Most discussion concerned the control of beech. Most merchantable beech had been removed in the BPL harvest but seedlings and small saplings were heavy to the species, except in some trails and patches where yellow birch was tallest. Bob offered an enthusiastic recommendation for the backpack chainsaw from Sweden – at present there are no dealers in North America, so it is available only direct from Sweden. This tool holds a small (12" bar) saw at waist level, allowing ergonomic felling of trees from less than ½" to whatever the bar can handle. This felling is best followed as soon as possible (two-person crew is ideal) with herbicide application to the cut stumps and results in almost no beech resprouting. Purchase of the tool plus import fees run about $1,000. The rate of production for this system will vary according to the abundance of stems to be treated, but this one-two punch appears to be a logical approach. Marc noted that he had paid an extra $50 per acre to have regeneration crushed in patches (with retention) of up to seven acres in the North. He said that for five years or so the patches looked like a sea of raspberries but that sugar maple and yellow birch were coming up through the *rubus* and beech was present but far from dominant. (We observed this during the 2017 SAC field trip.) The measurements on the smaller patches at the Mahoosucs were noted, and we said that beech dominance had decreased markedly at harvest plus five years compared to three years earlier.

--Key Points to Consider:
1. EAB is coming, but this site is far from the insect's current presence in Maine and some white ash are apparently able to survive the infestations.
2. The backpack chainsaw followed by stump treatment is a viable approach to controlling beech regeneration.

We then traveled to the Demeritt Forest, the 1,800-acre University Forest tract contiguous to the campus, where our host was University Forest Manager Keith Kanoti. He gave a brief history of this portion of the University forest lands, that it had been under continuous management, often by students, since 1939.

Stop #3: White pine shelterwood, second entry

This fifteen-acre stand, now about 110 years old and 110-115 feet tall, had received the seed cut of a shelterwood fifteen years earlier. It was not a great seed year and little pine was established, so a couple years later with a big seed year coming the ground was scarified (by dragging a large hemlock log with limbs cut 18" from the bole) and a good catch of pine seedlings was the result. Shortly prior to this past winter's harvest the regeneration was cleaned with brush saws to favor the pine. The harvest took pines that averaged about 1,000 board feet each, with average dbh of 27" and many five-log trees. Si noted that some mills would not take pine that big and Keith said that wood from this sale went to Robbins, which still is set up to take logs to 48" on the butt. We asked about the percentage of select volume, Keith responding 37%. This was about 5% higher than the most recent shelterwood of large pines on the Bradley Unit, though the BPL pines had never been pruned. Si had asked whether this stand had been pruned, the answer being "probably". Keith noted that sales in which layout supported probable select percentage of 30% or more were bid out by grade, and where the selects were well under 30% it would be land-run.

--Key Points to Consider:

1. Selling high quality by grade rather than land-run makes great financial sense.
2. Scarification can spell the difference between success and failure in a pine shelterwood.

Stop #4: Low-density pine management (1)

This stand had received a final removal harvest about 1970. Prior to the 2009 thinning the stand held 1,244 pines per acre and 209 sq.ft. basal area (179 of white pine), a pine QMD of about 5.1". The harvest was done using a mini-processor, the Swedish V-Mek (sp), which was barely six feet wide and nicknamed "the termite". Removal totaled 82% of volume, leaving basal area at 27 sq.ft. on this slightly under five-acre stand and pine QMD raised to 7.1". The prescription was to leave crop trees separated by approximately one-half the average tree height. They were then pruned up to 20-24 feet – Bob said that low-density pine management makes no economical sense without pruning, as select-grade sticks are worth 2-4 times as much as other (non-pallet grade) pine logs. In the twelve growing seasons since the thinning, trees have added 4-5" diameter. (BPL's Outcome Based Forestry site near Tunk Lake has had average increment increase from 0.25" to 0.40" in the seven years since thinning, lower growth but still excellent on the less fertile site.)

Keith (or Bob) was asked about wind damage, the answer being relatively little, 30 of 470 pines, nearly all in 2012 and none in the October 2017 gale. The difference may be tree height, as taller trees suffered more here (200 MBF toppled) along with BPL pines at Bradley, Skowhegan and Topsham. Bob was asked about carbon sequestration, and he noted that any thin will reduce above-ground carbon storage at every stand age, but that low-density management would greatly boost the proportion of higher-grade logs and therefore more long-lived products. Laura asked if there was any effect on forest health. Bob said that the practice added vigor and health to the pines, that the caliceopsis canker was essentially absent and that – so far – the needlecast fungi have had little impact. Si added that having all large-diameter trees would make later harvests more efficient and therefore more valuable. Establishing regeneration was not an objective of this thinning but its timing hit a good seed year and there is plenty of pine 4-12 feet tall. Bob had discussed height-diameter ratio as a key to windfirmness, and we noted some eight-foot-tall pines on which the H-D was over 70:1. Andy wondered if precommercial thinning might help to keep H-D in better numbers, and Bob said it was a balance between lower H-D and higher weevil susceptibility.

Stop #4a: Low-density pine management (2)
This was a low-density area thinned in 2017 with material left on site, unlike the area across the road, and Bob estimated that the site index on this hillside was perhaps ten feet lower, often due to soils shallow to ledge. The residual here was 156 trees per acre and 49 sq.ft. BA for QMD of 7.6". Si asked if this was a shelterwood harvest and Keith replied it was purely a thinning, with no concern for regeneration at this time – there were a fair amount of pine seedlings on site, along with red maple sprouts and other seedling species. He continued by noting that this accelerated increment strategy would be helpful in filling the gap in the forest diameter distribution, which is lacking in trees 12-16" dbh and has too many larger trees at this time – good for current value but not so good for some decades down the road. Keith said that when Roger Taylor was the Forest Manager 30-50 years ago, he prescribed mostly improvement harvests, which were sorely needed but which contributed to the size class imbalance. Andy looked at the adjacent unthinned stand, a mix of hemlock, red maple and pine, and asked about the benefits, economically and environmentally, of managing such stands toward pure pine on sites which would naturally move toward the current mixture. Bob thought that stands with a clear minority of pine could become more valuable for both facets if those pines were managed to become large naturally-pruned stems full of select grade. He suggested culturing perhaps twenty such pines per acre.

--Key Points to Consider (for both 4 and 4a):
1. Low-density pine management only makes economic sense if the residual is pruned, so that the rapid growth response is producing clear wood.
2. The heavy thinning for low-density pine management can result in a surprisingly windfirm stand.
3. Low-density pine management often works as the seed cut of a shelterwood harvest even when regeneration is not the objective.

Stop #5: Expanding gap harvests (1)
This research project on the U. Maine forest would be followed by a somewhat older example of this strategy the next day on the Penobscot Experimental Forest (PEF). The strategy here was to cover the area in five entries at fifteen-year intervals, regenerating the entire stand over a 60-year period after which a rest period would follow before the next regeneration harvests. This was revised due to the age and condition of the aspen, a significant cohort, to a thirty-year process. The initial gaps, including the one we saw, were made about 2005, the next harvest for this coming cold season and the final in 2030, followed by culture of regeneration (already begun as seen by some crispy-leaved red maples) and a longer than originally planned rest. Each gap had 15-20 sq.ft. BA retained; this gap's retainer included several large pines. Keith noted that selection/improvement harvests in mixedwood stands like these failed to establish much pine, and since stands with quality this modest are scarce on the University Forest, this would be a good place to try the "sow's ear to silk purse" process. The vigorous small sapling pine in front of us was a good start.

Keith had noted that the stand bordered a vernal pool and Dave P asked about buffer width. Not having the exact dimension in hand, Keith said "enough". Bob was careful to differentiate these gaps from "patches", which here he described as cuts of roughly equal size and spacing, placed on the landscape with little if any regard for varying stand conditions and usually with no retention. He saw his gaps as a "group shelterwood" harvest and said that irregular-shaped gaps worked better than the strict "femelschlag" method which expanded the initial circular gaps by increasing gap radius. The current shapes would better retain useful travel corridors for wildlife and would allow later harvesting to avoid driving over the regeneration. He remarked that some operator education was necessary to avoid having gap-2 trees dumped onto regeneration from the previous opening; that would negate one of the systems' advantages. Bob added that he was retaining 2-3 stems per tenth-acre.

Key Points to Consider: These are mostly the same as for stop #3 on day two and may be found there.

Evening "Program"
Unlike most of these get-togethers, there was no organized evening discussion, though there were chats over dinner on relevant topics by several groups. The table at which this author sat also had BPL staff involved with easement acquisition and monitoring, and we did some advance strategy for the Teams meeting set for two days later. The feared tropical storm sprinkled rain after 8 PM but it was 9:15 before it became sufficiently irritating to drive us indoors. By 6 the next morning the rain was long gone and it was partly cloudy.

Wednesday, August23

The long convoy traveled to the Penobscot Experimental Forest where we visited research areas on lowland cedar and beech bark disease before exploring expanding gap #2, a somewhat older installation than #1. Before those stops, we again did introductions as some additional people had joined. (While that was taking place, we counted 22 vehicles, mostly pickups, more than twice the number that usually accompany these trips.) Bill gave an update concerning actions required by MFS after a BPL siltation incident last summer, and noted formation of a "BMP team", the regional managers, Bill, Stephen and Andy. Stephen explained the upcoming BMP training, a virtual session in September and then region-by–region work sessions with - one hopes - some on the ground sessions. After that, Liz introduced Joe and explained the bureau's easement program, which is responsible for monitoring adherence to landowners' management plans on over 60 easements totaling slightly less than 400,000 acres. She said that plans for the Tumbledown tract are well under way and added that Augusta would work more closely with the regions when considering acquisitions. Then Laura offered a brief history of the PEF: Nine of Maine's large landowners worked together to purchase about 3,800 acres, which they then leased to the USDA Forest Service as a "silviculture" research forest. Projects were soon initiated for most forest types found on the tract, which includes the general forest species and types found in eastern and northern Maine. There are currently more than 1,000 acres in various research efforts, and conventional management on much of the rest helps in supporting the research. In the 1990s the PEF was donated to the University of Maine, resulting in researchers from the University adding their projects to those being conducted and proposed by the Forest Service.

Stop #1: Cedar regeneration on lowland sites
Laura's introduction to this project noted the increased management and harvesting of cedar during the last ten-fifteen years, and with most available research on the species being in upland sites she saw the need for work in the wetter conditions. The definition being used for "lowland cedar stand" is a wetland site where cedar makes up at least 60% of the stand. In the subject stands for her research, cedar is closer to 90%. She noted the high ecological functions of such sites beyond commodity production: many endangered and threatened plant species occur mostly in such stands and they are very important facets in most deer wintering area. Someone noted that the stand we viewed held little browse and we cited studies that found up to a third of deer diet in the yards is litterfall, with cedar the major contributor. Returning to commodities, Laura said that the largest northern white cedar shingle mill in North America is the Maibec facility in St.-Pamphile, about three miles from the Quebec-Maine border.

One major research objective was to discover methods to secure cedar regeneration in lowland sites. It is often difficult or impossible where deer populations are high, but often lacking or outgrown by fir even were deer are less abundant. Cedar is shade tolerant and is one of the slowest growing tree species in Maine, often needing 100 years to attain pole size, though when given room and sun its growth is twice as rapid. It can show a strong response to release even at age 200. (From a later discussion but appropriate here: Laura noted the effects of cedar leaf miner, which occasionally causes reduced growth and some mortality. She said she would cross-reference changes in cedar increment with outbreaks of the miner, also with spruce budworm epidemics, to determine whether and how those factors were related to faster

or slower cedar growth.) Laura had pictures that showed most cedar regeneration being through layering rather than from seed, with even tiny seedlings able to expand into groups through layering. Larger cedar often have hollow centers though the "rind" can produce high quality shingles. Laura said that when living, cedar wood is subject to decay, but upon death the wood undergoes a chemical change that makes it very resistant to decay, adding to its usefulness as a durable external construction material.

The stand in which we stood held about 250 sq.ft. basal area prior to the recent harvest and was mainly mature cedar above fir regeneration with sparse and small cedar seedlings. The stand had last been treated in the 1950s, possibly for utility poles. Like most lowland cedar stands there was abundant woody material on the ground, in all stages of decay including some so covered with moss that only some digging could distinguish stump/log from rock (if any rocks were present.) Laura said that the mounds were crucial for cedar regeneration, displaying a study of seedling presence in pits, flats and mounds that showed essentially all the survivors being on mounds. A look around at the mature cedar fully supported the importance of the mounds. She said that the prescription here was an irregular shelterwood with thinning to increase growth and small (40-80 feet wide) gaps created above established cedar regeneration, with the intention of maintaining continuous cedar cover. Keith added that the harvest in 2018 was done by Prentiss and Carlisle on nearly perfect conditions, deep and moist snow which turned into pavement after a machine pass and one overnight, so there was essentially no ground disturbance. (This deep packy snow along with colder nights often enables lowland cedar harvesting into early spring in northern Maine.) Si asked if the harvest brought a rise in the water table, Laura affirming that there had been some and noting that the changes are being measured though she did not have the data in hand.

Stop #1a: Here we stopped on a skid trail between a gap and the uncut or lightly thinned stand. Laura noted that the trail itself was not presently good cedar substrate but would become a good seed/layer site in the longer term. She said the pre-harvest stand had 87% crown closure and the post-harvest 67%, including the area in gaps. The stand has had no windthrow since that harvest. This gap had less cedar regeneration than most, such that fir would probably dominate the regeneration, at least for several decades. Mac wondered about PCT, while admitting that it probably was not economically feasible, and Laura said that probably no PCT would be done here. However, she added that when PCT was done elsewhere on the PEF, cedar would usually be favored or at least "invisible" – neither favored nor cut, unless blocking a pine or a better cedar.

Si asked Laura if she had encountered lowland sites with plenty of cedar regeneration, the reply being affirmative, though always in places with very few deer. Si followed that by asking if lowland cedar had regenerated to fir and red maple, might it revert to cedar as the longer-lived species outlasted the others. Laura said that might be possible but that increasing deer populations in some areas had upset the natural process. Andy asked the North Region folks about their cedar prescriptions and regeneration success. (During 2010-19, the North has provided 92% of BPL cedar sawlogs/shingle stock.) Marc said it usually was a 30% removal with trails at 100-foot spacing and some reaching in. He said fir regeneration was an issue but thought it would die long before the cedar reached maturity. Ben said that most lowland cedar in the West is within deer wintering areas and that regional biologists usually want it to remain uncut.

We walked into a second, smaller gap and noted where cedar was regenerating. Some cedar seedlings had been planted here and Laura said that first-year mortality of those plantings was five times higher in pits/flats than on mounds. She recommended a "protect the mounds" philosophy in lowland cedar and retention of large downed woody material, a strategy that would make whole tree harvesting a less desirable method in these stands. Mac asked what percentage of the cedar harvest came from uplands compared to lowlands. Laura had no data (it's probably almost impossible to accurately determine) but guessed that the majority came from uplands, as the harvest timing is less limited there and lowland cedar can better be banked for the future. She added that harvests in lowland cedar seemed to be increasing, and that such harvests should be done when cedar roots can be protected from damage, which allows

decay to enter the residuals. We asked if the "cedar seepage forests", which are usually on gentle slopes, were considered lowland sites, the answer affirmative. Andy said that most lowland harvests, for any species, occurred in the North, and brought up cedar's vulnerability to climate change, along with that of red spruce. Both are at the high end of Maine tree species for potential vulnerability. Laura's final comment here was that cedar would definitely be a "climate change loser" and that we should be cautious about eliminating it prematurely. Keith stated that the critical point for climate change was regeneration, that mature trees would probably withstand a few degrees of warming but that seedlings of the cold-climate species would be out-competed by those native to warmer climes. Bob saw this as a conservation issue and one that affects certified forests, as management-caused losses of key species would violate FSC criteria. Laura added that cedar stands with abundant woody material on the ground will retain old growth character.

Key points to Consider (for both 1 and 1a):

1. Lowland cedar provides important ecological functions as well as commercial value.
2. The species regenerates through layering more often that by seed.
3. Cedar is nearly impossible to regenerate in the presence of large deer populations.
4. Retaining large woody material on the ground and preserving the mounds in lowland cedar stands is crucial for obtaining cedar regeneration.

Stop #2: Beech bark syndrome, tolerance and resistance.

This stop featured the varying degrees of beech condition when exposed to the organisms that cause beech bark disease (BBD). Laura cited Dave Houston, long time researcher on beech, as stating that full resistance – mature trees showing no signs of BBD in the presence of inoculum – are very rare. There also are partially resistant beech which maintain low levels of scale insect and cankers. What this stop displayed was beech tolerance, trees that may exhibit large amounts of scale and bark damage, but which are able to wall off the cankers before they can penetrate the cambium, thus able to produce normal wood. On these trees the periderm, the outside layer of the cambium, blocks the inward expansion of cankers.

Tolerant beech have lesions on the bark but usually none of the bumps and pits that indicate canker damage entering the wood. (Some trees have both lesions and cankers.) These tolerant beech are not common but there appear to be a significantly greater number than beech which are resistant. Learning to recognize tolerant beech, which have "blocky" or "flaky" lesions, can help managers to retain those beech best able to maintain good growth and full crowns, and to produce heavy beechnut crops in addition to clear lumber. There were a few questions, sources not noted, that mainly addressed identification of tolerant beech and the relationships between intensity of BBD and beech growth. Laura's handout here had solid data on the latter, supporting the logical conclusion that beech with less cankering show faster growth.

Key point to Consider:

"Tolerant" beech can offer additional opportunities to retain vigorous stems of this important mast producer.

Stop #3: Expanding gap harvests (2)

Bob began this stop by recalling the "New Forestry" proposed in the 1990s by Jerry Franklin, a call for "natural forestry" as opposed to the more common clearcut/plant practice in the Pacific Northwest. Bob said this was a valuable addition to the PNW forestry toolbox, but because it was at its base an even-aged system, it was not well suited to the Acadian Forest, in which natural stand replacement generally takes place through small-gap disturbances over many years. His estimate, based mainly on witness trees from surveys from early in the 19th century, was that annual replacement occurred at about 1% per year, in gaps ranging from tiny to about one acre and that full stand replacement incidents (wildfire, major windthrow) came at intervals of up to two thousand years.

Bob saw examples resembling this type of replacement when he and others toured forests in Germany and Switzerland earlier in this century. In Germany he saw "Femelschlag" (continuous cutting) that consisted of expanding circular gaps and in Switzerland the gaps were irregular with additions on a side rather than all around. Each was designed as a method of continuous cover, but Bob thought the Swiss version would better target the gaps most needy of attention and would more easily retain wildlife travel corridors. He and Mac thought that the PEF, now more closely connected with U. Maine, would be the right place to install some expanding gap trials.

The first gap we encountered in the "Eastern Maine mixedwood" stand was part of a 1% per year system, with group selection harvests covering 10% of the research block at ten-year intervals, similar to a classic selection. In another block within the stand, groups totaling 20% of block area were being done at ten-year intervals, requiring a fifty-year rest following full stand coverage before resuming harvests. Each method included some retention trees within gaps – Bob did not say whether the Europeans did the same – that amounted to about 15 sq.ft. basal area, equivalent to 10% of the original stocking. The original reason for doing this was to retain legacy features and functions for the future stand, though these trees also were a useful seed source. Bob referred to the practice as "irregular shelterwood with retention."

This 1%/year trial has had three entries, with numbers two and three not tending in the matrix nor dropping trees into the adjacent gaps, a point of education as noted yesterday. Bob says this method is more efficient than a single-tree selection as the operator – cut-to-length was used here - can work several hours in the same place rather than chasing through the woods tree by tree. Laura asked how Bob differentiated these "patches" from the type he had criticized yesterday. He admitted that a group was indeed a patch but his idea of a "bad" patchcut was one located without regard for stand variability and in which regeneration was not considered. Mac called that kind of patch cutting "cookie cutter forestry". Bob then noted three reasons to retain trees within gaps, seed source, legacy and on some especially valuable trees, continued increment. Si, who has visited European forests on several occasions, noted that across the Pond foresters had little regard for basal area or total stand volume. Management was done tree by tree on the most valuable specimens – high value crop tree management versus a pulpwood economy.

We then walked into another patch that had been made about 2005. Marc asked about short-lived species within a 90-100 year system and Bob said the fir and aspen would be targeted in early gaps. He added that on his own woodlot he had the operator lag into the matrix for valuable paper birch. Laura asked Mac if he would call this "ecological forestry ("Yes") and she thought it was a great system. Some years ago, a graduate student (Mitch Hartley) had studied bird use and found little difference between the gap areas and the matrix. One variation noted was that in/near gaps there was more mast, thus more red squirrels and more nest predation. A study of amphibian usage in harvest gaps versus natural gaps found some species affected but the overall community much the same in both places. A twenty-years-after bird study is ongoing.

Si asked Mac about birds requiring early successional habitat, noting the at the "bead on a string" didn't satisfy that need. Si wondered if ES habitat was a specific consideration on the PEF. Mac noted that nearby landowners have created more than enough ES stands and Keith added that the University Forest had no acreage quota for ES stands. He concurred with the advantages of the expanding gap system.

We then entered a larger gap (Stop 3a?) in which PCT had been conducted to favor individuals of most species present, the objective of the TSI being to retain most/all species present before the harvest. Bob stated that all this was not a fixed methodology but that it had to have some fluidity to better match forest variability. Someone (Bob?) mentioned the goal of a "LIT" forest: Long-Lived Intermediate and Tolerant species.

--Key Points to Consider:
1. Expanding gap silviculture is intended to closely match natural processes in the Acadian Forest.
2. This system offers efficiency in the harvest and protection of regeneration in gaps created earlier.
3. Long-lived intermediate and tolerant species (LIT) is an appropriate goal for management of the Acadian Forest.

Stop #4: Amherst Community Forest
The group arrived here a bit before noon, and before lunch we provided a handout summarizing Woodstock runs with the yield curves built by Ernest Bowling of J.W. Sewall, using the Acadian Growth Model, a region-specific variant of Forest Vegetation Simulator, developed by the USDA Forest Service. Si asked why we had done the modeling and we stated two reasons, to inform our legislative committee of jurisdiction that our management was sustainable, and to ensure that our silviculture was not taking the forest off a cliff. The model results offer confidence that BPL management will continue to move the forest toward our long-term objectives.

The lunch location, in the riparian buffers of two significant brooks, provided a view of what the Amherst forest might have looked like before significant heavy harvesting had begun. At this tract we were joined by Kris Hoffman, of the Forest Society of Maine. Due to time constraints the group visited only one of the planned stops, though within that walk we paused for discussion at three places, which are labeled as stops 1-3.

Stop #1: Young hardwoods
Before discussing silviculture here, Mac and Kris provided some history for the acquisition and the unique town-state relationship. Mac has the longer history, being as his and Aram's property lies between the two lobes of the Amherst tract and he has recreated on this land since the 1970s. In the 1990s he lobbied the then-current landowner (Champion) to set aside the +/-2,000 acres that hold several pristine ponds. Shortly after the turn of the century the new owner, IP, was planning to sell this land and those interested in conserving it were raising the asked $2.3 million over a three-year period. However, before they could finish another buyer offered $.6 million and made the purchase. The state then negotiated a deal in which they would acquire the land after the new owner had logged it (heavily – an inventory in 2006 showed 7.6 cords per acre outside of the ponds area), and with the proviso that the ponds area be left intact. This agreement came to fruition with a closing in 2009.

Kris then picked up the process, with some items like a concept plan being made even before the tract changed hands. The small (population 232) town was concerned about the loss of tax revenue, and as part of an agreement with the Forest Society of Maine (FSM) that organization agreed to reimburse the town for tax revenue lost up until the point where the 3,000 acres inventoried in 2006 achieved stocking greater than 11.5 cords per acre. Amherst has entered the "town lease" program with the state, an arrangement in which the town receives 50% of revenue generated from the tract instead of the usual 25%, in exchange for their conducting the day-to-day management, to be done according to BPL policy and procedures. Though the bureau has worked with the town lease arrangement with several towns in the past, though none in the most recent 25 years, the intense participation by the folks in Amherst made this one unique. An inventory in 2018, paid for by the town, revealed that volume had increased to 12.9 cords per acre, ending FSM's tax obligation. Mac asked (at a later time but it fits here) what the FSM tax payments had been, Kris replying that the land was under tree-growth which was low but rising, and that the bill had been about $13,000 for the most recent payment. One attendee asked whether that 12.9 figure was for the whole unit and Kris said that it was only the land outside the ponds, which are now allocated as Special Protection. We added that the 2006 inventory included a separate report that showed slightly more than 20 cords per acre in that SP area.

She then described the planning process for the property. The town had formed a committee for this purpose prior to the closing, which at first held weekly meetings and as decisions were made and issues resolved, slowed to monthly and now quarterly meetings. Kris said that FSM and the committee had worked well together on tract plans and policies and on things like future timber harvesting. That 11.5 cords per acre threshold also applied to the time at which the town might contemplate a timber management and harvest prescription, and FSM had made it clear that "possibility" did not mean "probability" as the prescription would need to meet BPL silvicultural standards. Kris noted that the town committee understood this and offered no pushback.

After this information was shared, we discussed the stand type in which we stood. This half-mile trek passed through at least a half-dozen distinct variations, here being a young hardwood stand of pole-size aspen atop smaller red maple and paper birch with occasional red oak, spruce and fir. The site appeared to be fairly good – the tract is heavy to coarse soils and rocky terrain – and the trees appeared to be growing well. Doug posed the "what and when" question, opinions varying between aspen harvest, improvement cut or releasing oak and softwood. As to when, the group agreed that wait-a-while was appropriate, with no time period suggested.

Stop #2: Fir and hardwoods among the rocks

We headed into steeper and rockier ground, arriving at an HS area in which the softwood component was nearly all small-pole fir, with a few pine mixed in and similar hardwood species as at the first stop, albeit much less abundant. .Bob had been clear at stop 1 that we didn't need to do anything for a while. At this stop he was equally clear that we ought to cut the fir soon if there was enough similar ground to support a harvest. With balsam wooly adelgid rampant in the general area, he predicted that all the fir would be dead ten years from now, making an entry imperative. Others wondered whether only the fir should be cut or other trees (the larger aspen, for example) should be added for economics. Bill asked about markets for softwood pulp as the fir wasn't large enough for anything else. Tyler said the aspen market got filled by May and spruce-fir pulpwood was open for just a short time last winter. He added that the hardwood pulp market was slow and steady, that he was recommending that contractors have some at the ready to jump on spot openings, and that one could take spruce-fir logs to a 4" top to Enfield. Several folks asked what this area would look like after such a harvest. The probability was a hardwood/HS stand with mainly fir and sprout origin red maple, not an improvement on what was currently on the site. However, the group agreed that given the adelgid the choices were limited.

Stop #3: Mixedwood with beech and bigtooth aspen

Farther up the hill we stopped at a place where the rocks covered only 25% of the surface rather than about 75% at stop 2. The stand had a BTA overstory mixed with some beech (badly cankered), red maple, spruce and birches. Except for the beech quality was good, and there was easily sufficient aspen to make a harvest viable. Bob recommended cutting most of it, sometime, and though the taller trees were not crying for harvest it would be nice to release the mid-story red spruce. He then added that the BTA was the best growing stock at this site, was probably putting on really good growth, and could wait. Tyler suggested selling firewood blocks in the beech-rich hardwoods along the road, Kris adding that it has been suggested by the town. Doug thought a firewood contractor could cover more area and reach well beyond where individual firewood permittees were likely to work.

Bill and Bob said BPL should use the currently available LiDAR data to distinguish tree heights and therefore discover remotely those places where near-term harvests might be profitable for both the logger and the land's future forest. Andy, working from Bob's comment about "best growing stock", said that if this stand was on the steep part of the growth curve we should wait. In fact, other than fir/adelgid, that was unsurprisingly the general conclusion at all these stops.

From there we rock-skipped down the hill and back to the road, where Andy asked the group to stand on the high-side embankment for a masks-on photo then joined the group after asking Katie to take another one so none could avoid being in pictures. Andy thanked all the presenters, individually, and staff. Si thanked BPL for having the courage and flexibility to conduct a tour at all.

--Key Points to Consider (stops 1-3):
1. Even the best harvest opportunities on a tract should have cutting delayed if trees are healthy, well-formed and growing well.
2. Insects and/or disease can move even immature stands to the front of the harvest queue.

Next Year: Assuming COVID-19 allows it, the traditional rotation would treat this year as invisible, and the 2021 excursion may well be what had been planned for this year, Telos area and Scraggly, with a walk into Big Reed between.

"Editor's note from Bill Patterson: All participants offered Tom Charles (the author) a hearty round of applause when Director Cutko noted that Tom plans to retire before the next field tour. In recognition of the tremendous amount of respect for Tom and the institutional and general silviculture knowledge he brings, Tom was identified as a prime candidate for the Advisory Committee and/or staff emeritus status in the future."

A first-person response to the above: It has been a real privilege to be a part of these field trips; they are one of the high points of my year. In addition to offering my thanks to all the committee members and the BPL field staff that make these tours both efficient and valuable, I would like to thank Rob Gardiner, who as BPL Director was the main driver of the original Integrated Resource Policy, in which the formation of the SAC was put forward. He also made the decision to hire me as chief of silviculture in 1985 (with some urging from [future] committee member Bob Seymour) and suggested names for the initial committee membership. I was tasked with contacting those people, and each one accepted the invitation. After 35 field trips from 1986 through 2020 (two in 1987 and none in 2001 due to BPL's initial certification audits), it is obvious that the input from committee members and discussions in the woods have had a major positive impact on BPL's forest management.

August 19, 2020

Tom Charles

VIA E-MAIL

Dear Tom:

The Maine Board of Licensure of Foresters has approved the following workshops/training:

Bureau of Parks and Lands
Eastern Region

Silvicultural Advisory Committee Field Tour 2020

Presented by BPL Silvicultural Advisory Committee
August 4th and 5th, 2020

Contact hours approved:

August 4	4 ½ hours	Category 1
August 5	5 ½ hours	Category 1

Please contact me with any questions.

Sincerely,

Deborah A Fales

Deborah A Fales
Board of Licensure of Foresters