

branch lines



Forestry
University of British Columbia

Volume 17 No. 3 December, 2006

Percy Barr's research forest legacy

In 1924, Percy Barr had a mission. That mission was to establish the first experimental station in the province on behalf of the fledgling BC Forest Branch (now BC Forest Service) and to locate it in the spruce-balsam forest type of the Central Interior. The purpose was to demonstrate sustained yield forestry, and the task was given to this colourful and talented 27 year old WW1 veteran and

recent UBC graduate, Percy Barr (BASc Forest Engineering, 1924; and participant in the "Great Trek"), who tackled the job with ambition. As he wrote in a 1926 report:

The object of forest research in the Northern Interior of the Province is to secure information which will enable us to manage the forest of that region so that



Percy Barr on a velopedede near Aleza Lake.



Horse logging at the Aleza Lake Experiment Station.

their productivity will be maintained or increased after logging, that valuable young growth may be established and brought to maturity at the least expense, and that waste in the forest through the agencies of fire, insects, decay, and improper utilization may be reduced to a minimum.

With recommendations made by local foresters, Barr chose the site: 2,590 hectares near the community of Aleza Lake, 60 km east of Prince George and bordering the Grand Trunk railway. No time was wasted in getting things done at the Aleza Lake Experiment Station; between 1925 and 1930, he and his staff conducted a preliminary inventory, established an annual cut (4530 to 5890 m³), built a camp, trails and a road, and initiated or participated in six research projects. He also conducted the first partial cuts at the experiment station and established, what are recognized now as, the oldest continuously measured growth and yield plots in British Columbia. Incidentally, he also attained his Master's and PhD degrees from Yale University during this time, using data from Aleza Lake experimental plots for his dissertations.

With the onset of the Great Depression, and consequently little funding to continue with development of the Aleza Lake Experiment Station, it is not surprising that someone as energetic as Percy Barr would seek new challenges. In 1932 he accepted a position as faculty member in the Division of Forestry at the University of California (U of C) at Berkeley where he would spend the rest of his career.

Barr applied his BC experience in research land bases by founding and managing the U of C Blodgett Forest Research Experiment Station for over 20 years. Barr was a strong advocate for forests devoted to research as he wrote in a 1946 Journal of Forestry publication on the Blodgett Forest:

The investigator who knows his forest well has a distinct advantage over even the experienced forester who undertakes research in a woodland to which he is a stranger.

At Blodgett, Barr immediately got to work building the forest inventory, surveying to produce topographic maps, and by 1940, had established 60 permanent sample plots to monitor second growth restocking, and vegetation and overstory competition and treatments. Barr then served in WW2 from 1941 to 1944, receiving numerous awards and honours. After his return, in 1945, UBC awarded him with a Doctor of Science (DSc) degree.

Percy Barr's ambition was well recognized by U of C, where he was assigned Chairman to several university committees, as well as Special Assistant to the President. Despite the physical challenges of Parkinson's disease in the 1950's, preventing further administrative service to the university, Barr's tireless work ethic continued to have an impact on forestry; in 1953 he delivered the first course on industrial forestry in the US. An inspiration to all around him, Percy was still putting in full days at the office when he passed away at home in 1960.

Well over 40 years after his passing, Barr's legacy endures today in Canada and the US through forestry alumni (graduates from Berkeley are still very familiar with Percy Barr), and through the Aleza Lake and Blodgett Research Forests.

For further information contact Mike Jull, Manager of the Aleza Lake Research Forest at 250-960-6674 or jullm@unbc.ca or Melanie Karjala, Project Coordinator at 250-960-6338

UBC's research forests: In for the long haul

The conservation movement of the 19th century started a line of reasoning with the question: How will we know if we are doing the right thing for future generations? That debate led to a dream of forests where new and experimental practices could be investigated and maintained for future study.

Instant gratification seldom comes to forestry researchers and practitioners. In order to study or make decisions about fields of knowledge as diverse as tree breeding, climate change, growth and yield, species at risk, silviculture, wildlife ecology or fire suppression, one will inevitably have to wait many years to determine the appropriateness and full impact of management actions and policies. Patience is a requirement, and so is the existence of a place where long term studies can be safeguarded and carried out.

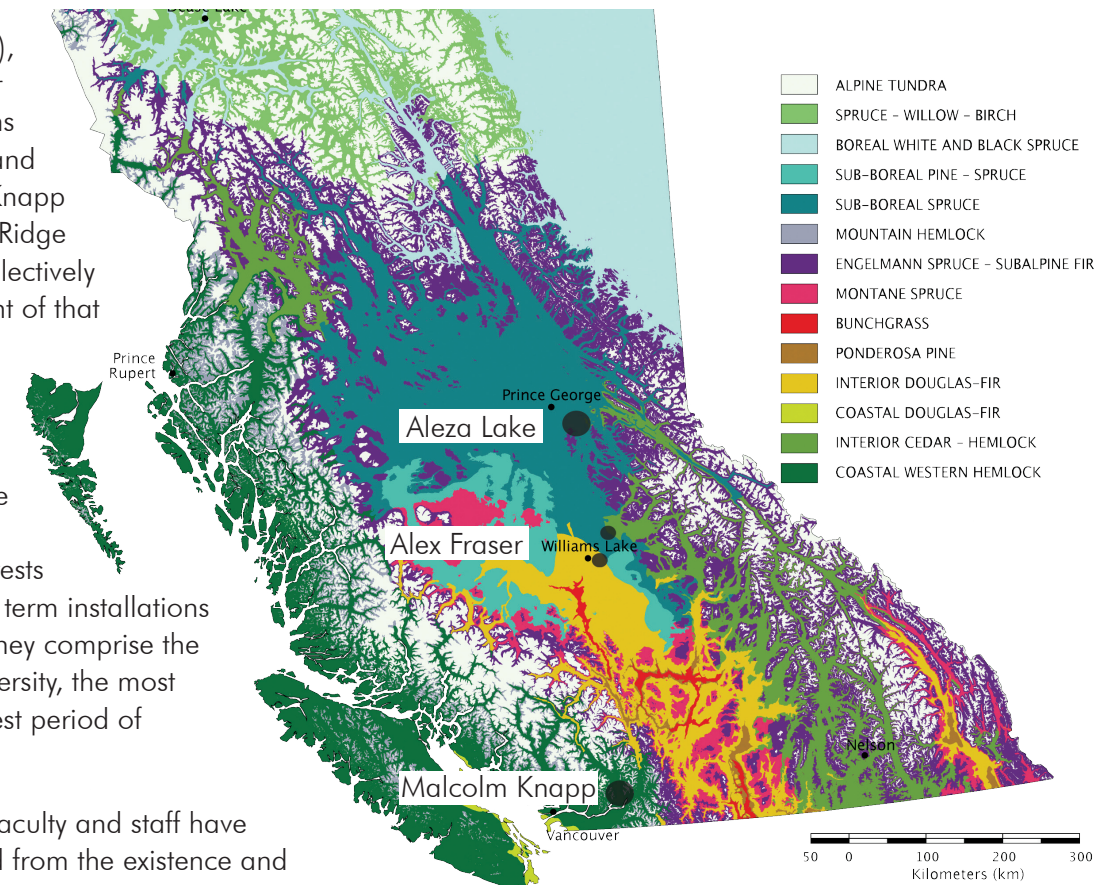
That was the vision of Percy Barr (see previous two pages), Malcolm Knapp and the many others who have contributed to the establishment of long term research installations in BC. The UBC Research Forests, comprised of the 9000 hectare Aleza Lake Research Forest near Prince George (managed in partnership with the University of Northern British Columbia since 2000), the 9800 hectare Alex Fraser Research Forest near Williams Lake (established in 1987), and the 5400 hectare Malcolm Knapp Research Forest near Maple Ridge (established in 1943) are collectively today the largest embodiment of that vision. From sea level to subalpine, from grassland to wetland, from maritime to dry-belt, they cover an extensive range of the diverse ecosystems that make up the province. While the UBC Forests are not the only sites of long term installations in the province, collectively they comprise the largest area, the greatest diversity, the most prolific legacy, and the longest period of dedication to scientific study.

Many of our UBC students, faculty and staff have contributed to, and benefited from the existence and

dedication of these forests. Forest research can be arduous and yet careers have been launched, degrees earned, products developed and books written from the results of such field studies. In many cases, new generations have taken over from the originators of these projects with fresh approaches and new hypotheses to be tested. As new questions have emerged, original approaches have been replicated, adapted and refined.

Since 1924 when Percy Barr helped to establish the first experimental station at Aleza Lake, these three forests have proudly been accumulating long term research projects dedicated to learning about forests and nature. This issue of Branch Lines highlights and explores that legacy, and examines how these three forests are poised to assist in answering the next big questions that are emerging from the continuing debate over how our forests are managed. We trust that the value to science and society represented by the investment in these facilities has only begun to be realized.

I welcome your feedback. You can reach me at jack.saddler@ubc.ca or 604-822-3542.



Ambrosia beetle research at the Malcolm Knapp Research Forest



Pheromone traps for ambrosia beetles.

It was my good fortune to carry out a large part of my initial PhD research at the Malcolm Knapp Research Forest (MKRF). I was a graduate student with John Borden at Simon Fraser University, 1974-76. It was an exciting time as we were discovering the special chemicals that the ambrosia beetles use to let one another know that they had found a suitable host tree that they would be prepared to share in return for some complementary genetic material – the world of sex and aggregation pheromones. Many ambrosia beetle galleries have been marked with a pin and the distributions of galleries along a log, around a log and on the matching stump have been recorded in detail in order to assess the effect of pheromone baits on population distribution. Once we had identified the pheromones it was important to assess the correct strength of lure in order to optimize the catch – yes, it is possible to have too much of a good thing. Ambrosia beetle traps have been set up regularly at MKRF over the past decades. My early research in the Forest brought me into contact with Jack Walters and Harry Smith, two leading lights in the world of BC forestry. After postdoctoral research with John Borden I was fortunate to be able to join these gentlemen at UBC after the retirement of Ken Graham who was also an ambrosia beetle enthusiast.

My PhD research, and that of my early graduate students, centered on the genus *Gnathotrichus*, two species of which abound at MKRF. Work on *G. sulcatus* was extended by Jose Zanuncio (PhD 1982) while Yongbiao Liu (M.Sc. 1987) defined some of the first population data on *G. retusus*. Terry Shore (PhD 1983) further evaluated brood production parameters for *Trypodendron lineatum*. These early studies provided the bases for surveys and mass-trapping of ambrosia beetles in commercial forestry locations such as sawmills and dry land sorting areas. In conjunction with the extensive knowledge of the most numerous ambrosia beetle *Trypodendron lineatum*, collected by John Borden and colleagues, we have been able to set up an ambrosia beetle pest management operation around the new custom cut sawmill and adjacent log building enterprise at the Malcolm Knapp Research Forest.

Many generations of forest entomology graduate students, and their professors, have appreciated the opportunity to carry out research at the Malcolm Knapp Research Forest. The benefits of the research forest include security of the study sites, help with setting out experiments and also the sharing of the working forest knowledge of the staff.

For further information contact Dr. John McLean, Forest Sciences Department, at 604-822-3360 or email john.mclean@ubc.ca.

Finding a measure of certainty through forest management planning

Forestry in British Columbia is continuously being buffeted. Forces within our control (rules and regulations), and outside of our control (climate change, bark beetles, fires) affect us every year. The litany seems unending, and the pace of change is unnering.

When the sailors of wooden ships had to cross open oceans, they did so by knowing where their destination lay, setting a course, checking on their progress, and making incremental changes to their course as external forces necessitated. They certainly weathered storms, but they generally arrived at their destination.

Forest management is much like sailing in the open ocean: there are fair winds, storms, and currents. We can check our progress, but if we don't know our course, we might not arrive at our destination.

We are presently completing the Alex Fraser Research Forest Management and Working Plan #3, and more than ever we are convinced of the value of the management planning process. Previous management plans helped us to identify our risk of loss to mountain pine beetles, causing us to direct our harvest to lodgepole pine as early as 1993. As a result, we enjoyed a higher average selling price and lower average logging cost for our pine. This single advantage more than compensated us for the cost of all our planning. In addition, the management plans have helped

us to adapt incrementally to the direction resulting from the Cariboo-Chilcotin Land Use Plan, and more recently have directly supported the development of our Forest Stewardship Plan under the Forest and Range Practices Act.

Forest management planning is an obligation of forest land management. It is our opinion that it must be resolved to the landbase at an appropriate scale, and implemented on the ground. Planning tools in Geographic Information Systems have given us a tremendous advantage, but unfortunately we have shifted to planning by query, forgetting that the results of the queries are only as reliable as the map data supporting the analysis.

Plans must be at a sufficient resolution to give direction at the stand level, answering the question that a person developing a cutblock must ask; "What is the objective



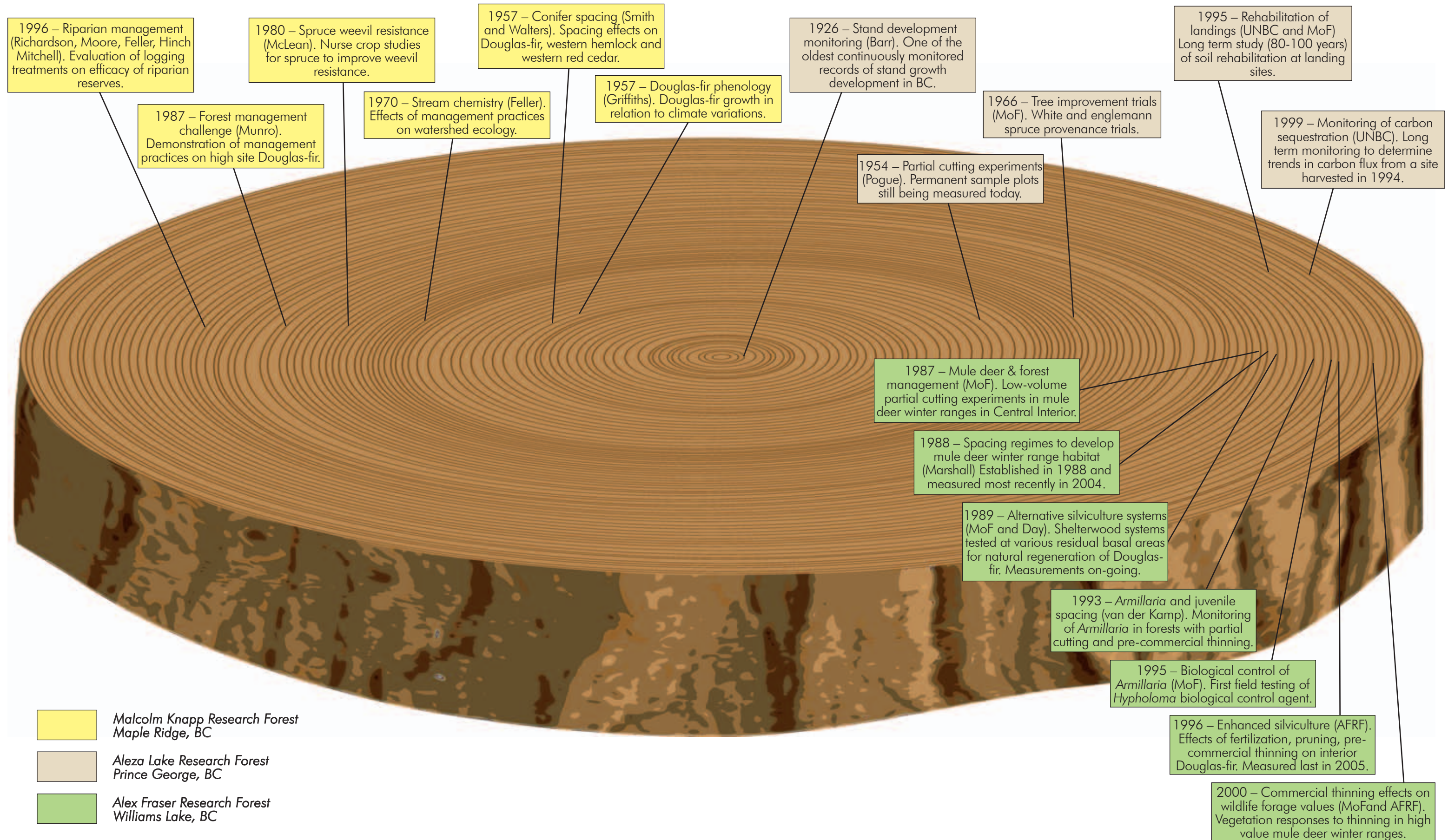
Block 101 (lower right), 102 (middle left) and 103 (upper foreground) are contiguous cutblocks at the Alex Fraser Research Forest, harvested from 1999-2000 to manage stand condition (50% lodgepole pine with increasing incidence of pine bark beetle) and site conditions (high wind exposure) with consideration of mule deer winter range objectives (retention of Douglas-fir canopy).

for this particular stand at this particular time?" Broad-scale land use planning processes do not answer these questions completely; they only give a list of possible answers.

Winds of change will continue to blow, and sometimes the deck seems to be awash. We can only stay on course if we know where we want to go, and how we plan to get there. It is time for us in BC to chart a course for every ship.

For further information contact Ken Day, Manager of the Alex Fraser Research Forest at 250-392-2207 or ken.day@ubc.ca

Long term projects at the UBC Research Forests – 80 years and still growing



- Malcolm Knapp Research Forest
Maple Ridge, BC
- Aleza Lake Research Forest
Prince George, BC
- Alex Fraser Research Forest
Williams Lake, BC

A tribute to the Loon Lake cabins – historic structures about to come down

When the UBC Research Forest at Haney was dedicated in 1943, the construction of student quarters became a priority for the Forest's first Director, Professor Malcolm Knapp. These badly needed accommodations had to be built both quickly and efficiently.



Cabin construction without electricity, 1948.

A road was constructed from the forest gate to the Loon Lake site in 1946. Shortly afterwards, horse logging operations were begun to clear the camp area. The forests around the Loon Lake site were thinned and a small sawmill was set up at the camp to cut logs for the new buildings. Thinned logs were "flat sided" on the mill so that they could be stacked as building logs. Flooring and door stock were also cut on the mill.

The cabins were strengthened using steel rods driven down through the walls. The corners of the cabins were



Horse logging for cabin building, 1948.

"miter cut", and the cracks between logs sealed with caulking. As these buildings shrank and settled they had to be resealed each year. This technology has now been surpassed by improved lateral joinery and corner notching techniques, sliding door and window frames, and the use of insulation and/or foam gaskets between logs.

In 1948, UBC Forestry held the first Field School at this new facility. Since cabins were still under construction, temporary tents were set up on the floor platforms of the unfinished buildings. Students that year had to help nail floorboards and spread gravel between the cabins.

The Haney Gazette published a record of the event on August 25, 1950:

"With the addition of the 9,800 acre Haney Research



Visitors touring the partially built staff house, 1949.

Forest, together with the \$120,000 student quarters provided on the property by the B.C. Logger's Association, UBC's new Faculty of Forestry compares with the best on this continent."

Since that time over 4,000 UBC Forestry students have attended both the Forestry and Conservation Field Schools and stayed at Loon Lake. But the intent of Knapp's original vision of "student quarters at Loon Lake" has been far exceeded. Thousands of school and community groups have used the facilities since opening to the public in the 1960's. Since 2003, the Canadian Cancer Society's Camp Goodtimes has used the cabins each summer to house children

battling with cancer. In spite of having no foundations, no plumbing, and being built with now obsolete technology, these original buildings have served their purpose – and much more, for almost 60 years.

Three cabins were demolished in 2005 to make way for the new Walter C. Koerner Forestry Centre. The remaining four cabins will be replaced with new buildings in 2007.

For further information contact Paul Lawson, Manager of the Malcolm Knapp Research Forest at 604-463-8148 or paul.lawson@ubc.ca



Forestry field camp, 1949.

Pogue's partial cutting experiment keeps going...

The decade of the 1940's transformed logging in the BC Interior woods. Labour shortages and the need for faster and more efficient means of production during and after World War II spurred the replacement of traditional horse logging with machinery. Unfortunately, early logging machinery was often imperfectly adapted from farming, road-building, or even military applications, causing damage to leave trees and poor condition of the resulting partial-cut forests.

In 1945, Mickey Pogue (UBC For Eng., 1940), based at the Aleza Lake Forest Experiment Station, undertook a study of spruce regeneration and growth following logging in the Interior spruce-balsam forests east of Prince George. In his landmark 1946 technical report to the BC government, Pogue described the mechanized diameter-limit cutting practices that 'cut the best and left the rest'. He noted heavy logging damage to leave trees and marginal to poor natural regeneration conditions in these partial cuts. And he suggested solutions for improving the quality and productivity of the young stands left after logging.

Pogue advocated better control of partial cutting methods to focus harvesting on mature, unhealthy, and defective trees; limit logging damage to young and healthy pole- and sapling sized trees; promote new regeneration; and speed the re-growth of quality timber stands.

Mickey Pogue put his ideas to the test. At Aleza Lake, he prepared the first of a series of new single tree selection timber sales. Pogue limited volume removal to 50 to 60% – a major departure from the greater than 90% volume removals of the diameter-limit approaches.

In the winter of 1946-47, Timber Sale # 35728, a 130 acre (52 ha) area, was harvested. Known as the "Pogue Sale", it was the first of six experimental selection cuts at Aleza to be harvested according to his basic specifications. Although Mickey Pogue left Aleza Lake in 1951 to lead the new BCFS Forest Inventory and Surveys Division, his successors, Larry DeGrace, Tim Decie, and Harry Coates, carried on his silvicultural principles. Selection timber sales totaling over 1000 acres (400 ha), were harvested between 1952 and 1961, each with its own set of inventory plots to monitor growth and yield.

It was far from clear whether the silvicultural techniques pioneered by Pogue would work out. Early reviews of the results of Pogue's selection methods were unflattering, if not downright discouraging. Field assessments of the Pogue Sale in the mid-1950's starkly concluded that: "the objectives were not obtained", "windfall has been heavy" and the treatment was too irregular in application. "The result, eight years after logging", one assessor wrote, "is a patchy understocked stand supporting a dense cover of brush...". And indeed, 1954 to 1959 data from inventory plots in the Pogue Sale verified a 10 to 15% basal area decline in this stand, as losses due to mortality exceeded growth of the remaining trees.

Other local foresters, however, argued for a more patient approach – that a longer time period was required to adequately assess the silvicultural outcomes in these partial cuts.

Unfortunately, in the early 1960s, external events severely interrupted the monitoring and management of these trials. The Aleza Lake Experiment Station was closed in 1963 due to changing research priorities. Pulp mills were established in the Central Interior, sawmilling technology changed to handle smaller logs, and government and industry shifted to more intensive timber utilization standards. All these near-simultaneous changes seemed to render such partial cutting, and the abandoned Aleza selection trials, to the trash bin of history.

But, the trees, oblivious to changing forest policy and silvicultural fashions, kept on growing...

In the early 1990's, the Aleza partial cutting trials regained the attention of foresters interested in potential alternatives to the "clearcut-and-plant" paradigms of the previous three decades. Surprisingly for some, the original partial cuts were not 'silvicultural slums', but instead, were now clearly well-stocked, vigorous spruce-subalpine fir stands. 1990 and 1995 re-assessments of the inventory plots confirmed that four decades of post-harvest stand growth had fully replaced the logged timber volumes, at an average annual net growth of five to six cubic metres per hectare per year.

In 2001, the Aleza Lake Research Forest (ALRF) entered a new era as UBC and the University of Northern BC

...and going

(UNBC) took on shared management of the area. Between 2003 and 2005, the old partial cut timber sales were assessed, and the "Pogue Sale" was included in the Research Forest's development plan for an upcoming partial cut harvest entry.

The Pogue Sale had released well and grown into a high-quality, fully stocked stand. Timber cruises in 2004 confirmed average standing merchantable volumes of 400 m³/ha – higher volumes than the original stand and typical mature natural stands in the area. Mature merchantable trees in this stand range between 80-120 years of age, indicating that most of these trees were released by the original harvest 60 years ago. Live basal area of 45-50 m²/ha indicated fully stocked conditions throughout. Species composition by volume is now 50-60% spruce, 30-40% subalpine fir, and about 5% paper birch.

A new partial-cut stand entry has been prescribed for the Pogue Sale for the winter 2006-07 logging season, exactly six decades after the first stand entry. The site plan was prepared by Mike Jull, ALRF Manager (UBC BSF 1983 & MSc, 1989), and Matt LeRoy, ALRF Operations Forester (UBC BSF 2000).

Lessons learned from Pogue's original experiment have been merged with newer silvicultural approaches and technologies and incorporated into the management of this stand. For example:

- To reduce windthrow risk, proposed maximum timber removals in partial cut areas have been reduced to between 20 to 35% of the basal area, from the 50 to 60% cuts used previously.
- Ecosystems, sensitive areas, wildlife tree patches, harvest units and proposed harvest access trails within the stand have all been mapped with the aid of GPS technology.
- A goal of progressive improvement of stand quality and value will be pursued by careful partial cutting and harvest of the now-mature subalpine fir, poorer-quality spruce stems, and extraction of select spruce house logs.
- Minimizing logging damage will be a central priority. And;

- A detailed regeneration plan has been incorporated into current and future stand entries. Small to medium sized irregular clear-felled openings will be harvested to incorporate both planted and natural seedlings, and allow vigorous conifer regeneration in even-aged patches.

As demonstrated by Mickey Pogue and the Aleza Lake Research Forest, forestry innovation often must be measured and proven over decades, not years. The fusion of innovative long-term research, new technologies, and adaptive forest management at the Research Forests brings the research and learning process full circle, in a way that provides uniquely accessible teaching opportunities.

For further information contact Mike Jull, Manager of the Aleza Lake Research Forest at 250-960-6674 or jullm@unbc.ca



Worlds of experience for international students at UBC's research forests

What would it be like to live in a cabin in the woods while learning the ins and outs of forest management while in a foreign country? Ask any of the more than 90 students from countries outside of Canada who have volunteered at one or both of the Alex Fraser and Malcolm Knapp Research Forests. The International Internship Program was initiated in the late 1980s to provide forestry and natural resources management students with an understanding of the forest industry in British Columbia. Since then, students from Australia, Austria, Belgium, Denmark, England, Finland, France, Germany, Holland, Italy, Korea, Scotland, Sweden, Switzerland and Wales have interned at these interior and coastal forests.



BC's extensive forested ecosystems and its strong reputation for integrated resource management appear to be common draws. Increasingly, students

indicate their interests lie with sustainable management of ecosystems, combining both forest practices and conservation as reflected by societal influences. The UBC Research Forests provide exposure to modern forestry where research results are integrated into operations and interns get to be involved first-hand. They are provided with a wide spectrum of opportunities to develop field skills and apply what they have learned at school to real situations. Most are keen to practise speaking English as well.

Interns work closely with Research Forest staff, assisting with field duties and keeping regular field/office hours. From planning and operations, to silviculture and research we try to ensure as much involvement as practicable during their stay. In the peak period from May through August, an intern can help supervise tree planting contracts, lay out cut block boundaries and roads using GPS and GIS, identify and act upon forest health problems, survey wildlife, timber cruise, collect and archive research measurements, and mark trees for single-tree selection (amongst other things!). They are invited to join tours with visiting practitioners and researchers, as well as attend Fall or Spring Field Schools if the timing is right. Special projects are also encouraged; this summer, two French students designed a terrific database for monitoring vegetation and fungi at the Alex Fraser Forest.

With consistently positive feedback from student volunteers the program is maintaining its momentum. We look forward to hosting more international students, making new friends, and learning from each other about forest management around the world.

For further information contact Cathy Koot, Research Coordinator at the Alex Fraser Research Forest, at 250-392-2207 or cathy.koot@ubc.ca

Newsletter Production

Branch Lines is published by the Faculty of Forestry at the University of British Columbia three times each year.
ISSN 1181-9936.
www.forestry.ubc.ca
Editor: Susan B. Watts, Ph.D., R.P.F.
susan.watts@ubc.ca
In-house graphic design and layout: Jamie Myers
jamie.myers@ubc.ca

Questions concerning the newsletter or requests for mailing list updates, deletions or additions should be directed to Dr. Susan Watts, Newsletter Editor at:
Faculty of Forestry, Dean's Office
University of British Columbia
Forest Sciences Centre
2005 – 2424 Main Mall
Vancouver, B.C. V6T 1Z4

