

Making the Cut

NB Power's field operations boosts the efficiency, accuracy and cost-effectiveness of its vegetation management program.

By **Peter Fox**, NB Power

NB Power, formerly known as New Brunswick Power Corp. and New Brunswick Electric Power Commission, is the electrical utility in the Canadian province of New Brunswick, wholly owned by the government of New Brunswick (a Crown corporation). Like any electric utility, NB Power gives high priority to mitigating threats from trees and brush to transmission and distribution assets as these threats are the single-greatest cause for outages and represent the largest recurring expense. Eight vegetation management supervisors (five in distribution and three in transmission) are responsible for covering about 28,000 sq miles (45,000 sq km) of territory that includes plenty of wilderness areas with rough terrain.

Historically, these supervisors would drive lines with paper electrical maps — not geographical maps — and mark down quantities of cut information on paper reports, summing them up and providing a package to hand out to contractors. All job details remained in project folders, so there was not a comprehensive understanding of systemwide maintenance internally. That changed on the distribution side of the business in 2007 when some in-house modifications made to the

Microsoft Windows-based field engineering software helped to create a graphical view of vegetation maintenance with all historic information available throughout the enterprise.

Getting the Picture

NB Power transitioned a few years earlier from traditional paper-based field engineering to using Powel Inc.'s StakeOut software for distribution line design. Field technicians routinely use the staking software to design new job sketches, add construction units, generate cost estimates and staking sheets, and edit job sketches and units to reflect as-built changes, all while using the built-in rule base to ensure design standards are met.

After synchronizing all of the data collected in the staking software with the Esri geographic information system (GIS) and SAP accounting system, NB Power could see an inventory of all physical assets and know their location.

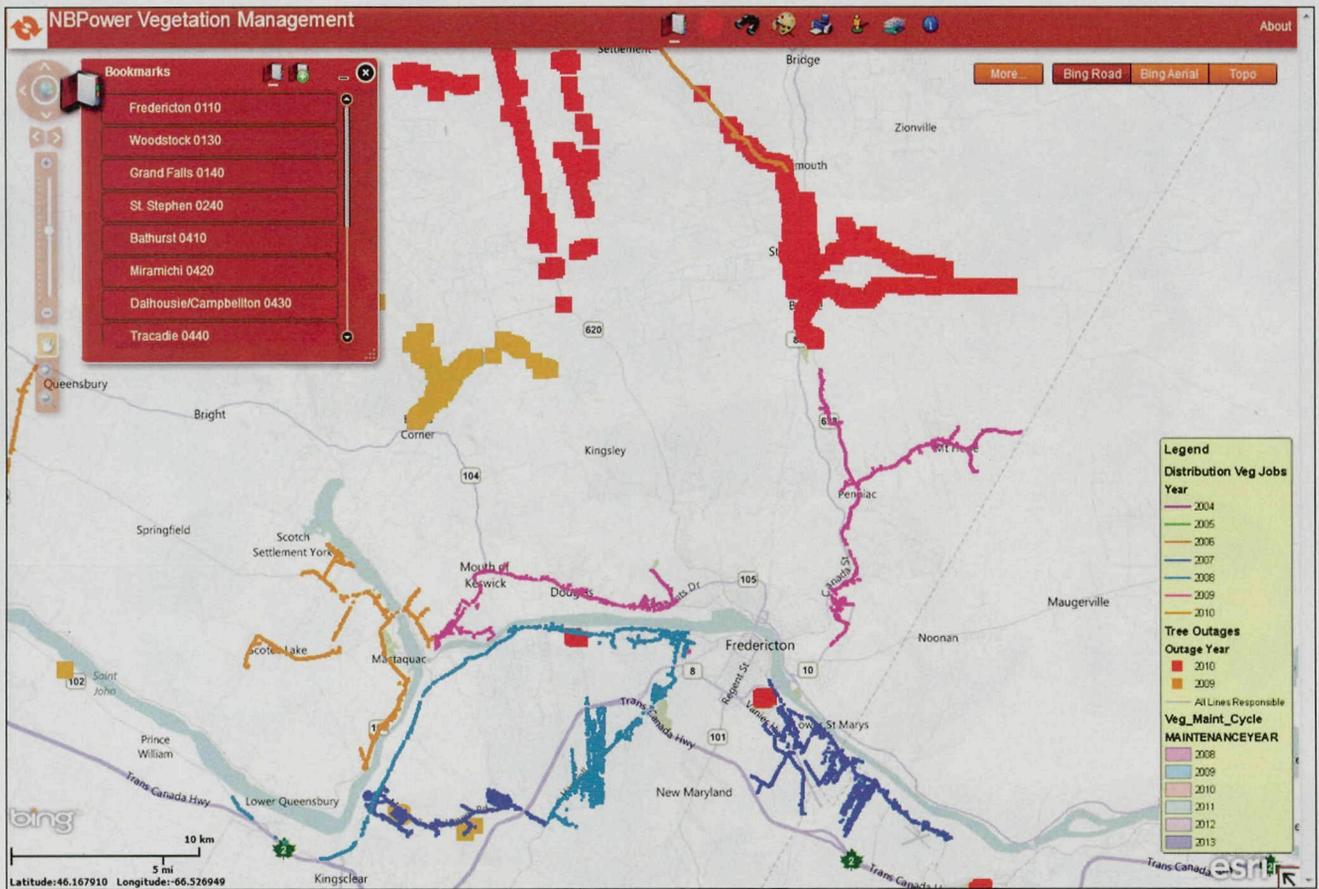
It was not long before vegetation personnel lobbied for a similar tool, because the data — maps, GPS, physical assets and property ownership — would remove a lot of the guesswork and help them be more productive in the field.

Adapting the staking software to vegetation management was relatively easy, only requiring the redesign of an extra set of compatible units, or construction units for vegetation. NB Power uses the term "engineering units," which for vegetation were defined for various cut methods, describing the type of cut for each job. Because field design engineering units are much more complex than vegetation, the vegetation interface was simplified to be more menu-driven as opposed to the unit-picking interface used for design.

Where there may be 1,500 units for engineering, there are only about 20 to 25 vegetation units reflecting jobs like machine cut and hand cut, and whether a job entails air (bucket) or ground cutting. NB Power personnel in the field work with ruggedized notebook PCs to



NB Power arborist enters field assessment data into the vegetation management system.



NB Power keeps a clearly mapped visual record to reflect tree-related outages to planned cutting and is able to adjust plans accordingly. The utility has a six-year plan, and the map-collected field data shows areas where the outages should escalate the cutting.

survey work to be done and enter all data into the software, and then they are able to maintain records and print out work orders for the cutting crews. The system provides a series of pop-up windows that prompt them for all the necessary units for a particular station. All construction units have a naming convention that combines alphanumeric codes with simple descriptions. For example, if a technician sees “CATAH-P8-H, trim aerial hand, single-phase, 8 foot heavy,” it means the job entails trimming an aerial line of single phase with an 8-ft (2.4-m) clearance that includes heavy cutting.

Once completed and saved, supervisors move on to the next station. Work orders based on the collected information can be generated, printed and handed to contractors. All of the base costs are included in the software, factoring in things like historical costs. Through experience, supervisors can estimate and factor in regional cost variances throughout the province. This lets NB Power better manage its maintenance budget, because the utility knows ahead of time what a job may cost and when it may be better to send its own personnel out to cut. This information is synchronized from the PC to the enterprise systems back at the office. Cost estimates are tracked through the SAP system, as are purchase orders, acquisitions and vendor payments.

Gold in the Data Mine

Every vegetation maintenance job in the province since 2007 has been mapped through the staking software, helping

NB Power build a graphical overview of the territory and be able to plan work more precisely. The tool has been so successful that vegetation work simply will not be done without it.

Instead of looking through paper files, supervisors can pull together the next day’s work schedule based on a yearly plan in 15 minutes using the tool. They can schedule one large maintenance job or design a yearly plan. Cutting packages that once took three, four or five days after a field assessment to produce now can be completed in about 15 to 20 minutes. The purchasing group can process contracts in roughly the same amount of time. The savings in time are huge, and the utility knows the records will be consistently accurate, because the system eliminates typos and calculation errors.

The greatest advantage is having access to all the cutting data. Knowing what is being cut and exactly where before a truck heads to the field is valuable information. Historical data allows NB Power to have a general idea of what a job will cost. In prior years, every line posed a new challenge, whether it had been cut before or not. Now a record is created as lines are cut to create specific cycles for periodic maintenance. Supervisors can quickly see where crews have cut, where they have not cut, where the outages are and where they are going to cut next year. With visual data, a new employee or contractor can be productive right away.

Analyzing several years of maintenance data could take months, and it would be hard to know if all the data was on hand. With the information stored electronically, all detailed

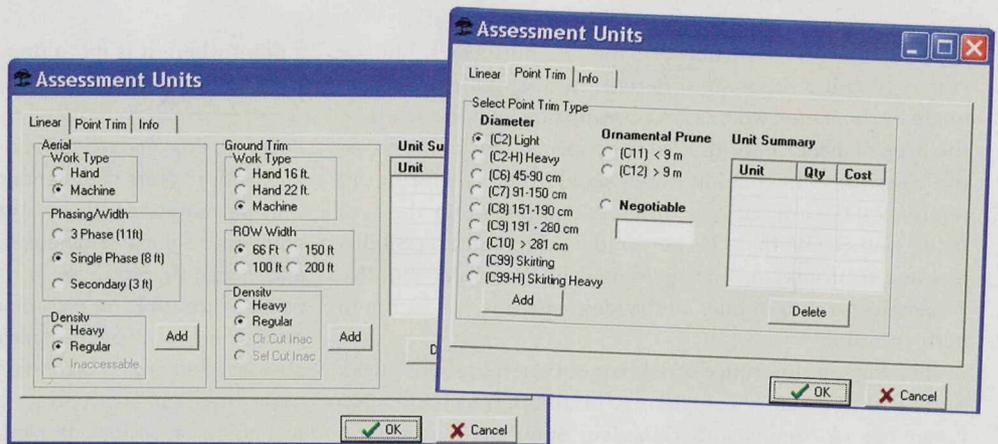
historical data can be retrieved quickly and easily.

Good for the Goose

Reliability issues from vegetation pose a challenge for the distribution business, but the stakes are far higher on the transmission side. With tough North American Electric Reliability Corp. (NERC) compliance mandates and the possibility of heavy fines for outages caused by vegetation, right-of-way maintenance is a priority for utilities in North America. The success of NB Power's software tool for distribution system maintenance led the utility to develop and implement an identical tool for transmission in 2009. Early results for that side of the business are positive.

Rick Doucett, manager of transmission vegetation and environmental support for NB Power, reports a big gain in productivity since transitioning from paper records.

"What you notice right off the bat is the speed in how we do our work because the tool saves a lot of office work," said Doucett. "In the past, after detailing a job in the field, supervisors would spend weeks putting together a work plan on spread-



The menu-driven interface used for vegetation management.

sheets before deploying crews. Now the job can be detailed in the field and staking sheets can be produced immediately."

Doucett also noted the time savings from navigation as the software-generated map shows where a truck is in relation to the lines.

"It's far easier to know where the lines and structures are out in the field," Doucett explained. "This saves a lot of time compared to using paper maps because the up-to-date location of each access road is on the stakeout map and is available on the computer in the truck, which save the crews from guessing which road to take to each location."

There is no major difference in how the software func-

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tions or how it is used between the two businesses, but the rules governing them are different. In distribution, cuts are made by the meter, whereas in transmission, cuts are made by the area or hectare. Both deal with special cuts and decorative trees (this information is now saved in the GIS for future reference). Contractors use different equipment for the area being worked. Work cycles are similar, although accessibility to some transmission lines is limited in the winter months. Transmission also applies herbicides, which is not common in distribution.

The biggest difference is that transmission has more work to do with regulatory compliance. In addition to NERC, NB Power has to comply with Canadian Standards Association standards. Canadian utilities do not actually pay fines to an authority; instead, utilities must demonstrate all of the actions taken and expenditures made to mitigate vegetation hazards. NB Power needs to show that money spent on mitigation equals the fine assessed by the authority, or they will have to pay the fine or the difference.

NB Power's software tool for vegetation management has provided a great deal of value. In the future, the utility wants to gain more detailed geographical information beyond aerial photography and know the types and species of vegetation by location. The business is in the process of building out the graphical detail of the entire system. Operations are far less reactive now than in the past, but the utility wants to get to

a point where it is more proactive, trying to identify and cut trees before an outage. TDW

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Companies mentioned:

Canadian Standards Association www.csa.ca

Esri www.esri.com

Microsoft www.microsoft.com

NB Power www.nbpower.com

North American Electric Reliability Corp. www.nerc.com

Powel Inc. www.powelinc.com

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