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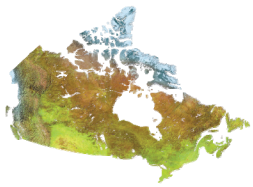
The Great Lakes Forestry Centre (GLFC)



GLFC researchers balance the debate over the use of forest herbicides

Overview

The use of herbicides in forestry is a topic that garners much attention. Issues surrounding this common forest management practice range from concerns over the potential impacts on the environment, to ensuring that the Canadian forest industry remains competitive through the use of highly effective tools to ensure effective forest regeneration. In recent years, public debate over the use of forest herbicides has intensified, often with minimal attention given to the wealth of science directly pertinent to the topic. Drs. Dean Thompson and Doug Pitt, research scientists at the Great Lakes Forestry Centre, hope to balance the debate by presenting some of this key scientific knowledge to interested readers.

The sustainable management of Canadian forests is dependent upon effective regeneration, and requires the control of competing vegetation that would otherwise win the fight with newly planted crop tree seedlings for light, moisture, nutrients and growing space. Although various vegetation control techniques have potential for use in very specific forest sites and conditions, none match modern herbicides, such as glyphosate, when evaluated against the key criteria of efficacy, cost-effectiveness, reliability and even environmental acceptability.

Herbicides are applied to only a small percentage of forested land annually (e.g., in Ontario, herbicides are applied annually to only about 0.28% of the entire productive forest land) and any specific regeneration site is typically treated only once or twice with a herbicide throughout a 60 to 80 year rotation; nevertheless, their use often elicits questions and concerns from many interested stakeholders and members of the public.

Dr. Dean Thompson, an environmental scientist at the Great Lakes Forestry Centre, has been studying the environmental fate and toxicology of forest herbicides for nearly 25 years. Recognizing that forest herbicide-related concerns are often based on mis-information, he and Dr. Doug Pitt, a professional forester and research colleague with the Canadian Wood Fibre Centre, recently developed an extensive Question and Answer (Q&A) document to help bridge the herbicide knowledge gap. Based on established scientific facts and findings from research, much of which has been conducted in key Canadian forest ecosystems, the Q&A addresses the most common issues and concerns surrounding the use of herbicides in the Canadian forest sector. The Q&A, which details in plain language the depth of scientific evidence supporting this common forest regeneration practice, has already been circulated widely and is being met with enthusiasm from forest management planning teams and their Local Citizens Committees (LCCs), the forest industry, First Nation communities and provincial forest regulators.

Dr. Thompson has also been travelling throughout Northern Ontario attending LCC meetings, using these and other opportunities to openly discuss scientific knowledge pertaining to forest herbicides and their safe and effective use in silviculture. In addition to receiving and reviewing copies of the new Q&A document, forest

management planning teams and their LCCs are hearing about new and ongoing herbicide research that is being conducted by GLFC scientists and their collaborators. Examples include the integration of advanced technologies such as geographic information systems, electronic-guidance, and on-site meteorological monitoring as a means of optimizing aerial herbicide applications. Another example of current research is the international collaborative development of a decision support system, called SprayAdvisor, which directly incorporates all of these technologies into planning, application and post-treatment monitoring phases of modern herbicide treatment programs. A substantial research effort has also recently been focused on assessing potential direct or indirect effects of herbicide use on the ecological integrity of forest wetlands and associated wildlife, such as various amphibian species.

If you are interested in learning more about GLFC forest herbicide research, or to receive a copy of the new Forest Herbicide Q&A, please contact Great Lakes Forestry Centre.

GLFC plays host to international boreal forest mapping meeting

Overview

The Circumboreal Vegetation Mapping (CBVM) project was initiated by the Arctic Council's Conservation of Fauna and Flora (CAFF) Working Group to produce a standardized Potential Natural Vegetation map of the Boreal biome. The purpose of this map is to provide a global overview of the current relations between climate, vegetation and terrain in the Boreal zone to support conservation of biodiversity and monitoring of global change.

The CBVM (Circumboreal Vegetation Mapping) mission is to develop a global map of the circumboreal forest biome with a common legend. The reason for concentrating efforts to map boreal vegetation from around the globe is to provide a common international framework for understanding the boreal region. By recognizing the boreal region as a single geo-ecosystem with a common set of cultural, political and economic issues, the CBVM project will be the first detailed vegetation map of the entire global biome. Such a map is needed for a wide variety of purposes related to resource development, land-use planning, studies of boreal biota and biodiversity, education, anticipated global changes and human interaction.

On December 1st and 2nd, 2009 a CBVM workshop was held at the Great Lakes Forestry Centre, Sault Ste Marie to plan the North American contribution to the CBVM. One would think that with the detailed forest inventories and advanced remote sensing technology that currently exists in North America, vegetation mapping should be a relatively straight forward task. However, the approach to vegetation mapping is quite different between North America and Eurasia. The Europeans and Russians have a long-established mapping tradition based on plant community classifications and their relation to climate and soil conditions. Their maps reflect the "stable" potential vegetation that would occupy specific climate and soil conditions in the absence of recent disturbance. In North America, most inventory and satellite land cover maps are based on a concept of dominant vegetation or species cover and, for the most part, reflect the existing vegetation, including recent disturbance, rather than the potential vegetation.

It was in this context that experts from British Columbia, Ontario, Quebec, Alaska, Spain and Natural Resources Canada-Canadian Forest Service gathered to review existing science and discuss how the North American and Eurasian approaches could be bridged to establish a common international mapping standard. At

the conclusion of the workshop agreement was reached to use the "Bioclimatic Maps" developed by Dr. Daniel Sanchez-Mata and colleagues at Complutense University, Spain to define the Boreal climatic zone and subzones. A preliminary framework for the North American map legend that is comparable to a modified Eurasian proposal was developed based on existing vegetation classifications, and a committee was established to further refine the legend proposal for tabling at the next international meeting in Helsinki, March 2010. A number of small pilot mapping exercises will be established to "test drive" the legend. The final potential vegetation map will be presented as an overlay on the NRCan/CCRS MODIS satellite land cover map.

Overall the workshop was very successful in consolidating the North American approach and establishing a North American position for future international discussions. More detailed information on the results of workshops to-date and presentations made at the recent CBVM North American Workshop will soon be available at www.cbvm.org, or by contacting the Great Lakes Forestry Centre.

Researchers develop improved branch sampling method for detecting Emerald Ash Borer

Overview

Researchers at the Great Lakes Forestry Centre have recently developed a branch sampling method that is proving to be highly effective at early detection of low-density emerald ash borer infestations. This method has the potential to lower sampling costs and contribute to an improved management strategy for this non-native invasive insect pest.

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, a non-native invasive insect pest of Asian origin, is presently infesting large numbers of ash trees in Ontario and Québec and could easily spread to adjacent provinces. EAB infests trees for 2 or 3 years before outward signs of its presence. Such visual signs include woodpecker damage, epicormic shoots, and cracks with galleries under the bark. By the time these signs are visible control treatments may be ineffective in saving the trees, many of which are high-value urban specimens. Visual surveys are largely ineffective at detection during the initial stages of the outbreak. Similarly, indirect methods of EAB detection, such as trapping, are potentially ineffective in low density populations. However, locating EAB populations early, when densities are still low, is critical because it allows more time and more options for managing the outbreak.

Researchers at the Great Lakes Forestry Centre have recently developed a branch sampling method that is proving to be highly effective at early detection of low-density EAB infestations. The method is presently being refined to increase detectability while improving efficiency of sampling. Several communities in southern Ontario are presently testing the draft protocol. The goal is to aid urban forest managers in managing EAB infestations, providing an opportunity for applying measures to control an outbreak during the time when trees display no outward symptoms. Costs and benefits of this sampling method are being compared with other sampling options, such as trapping and visual surveys, to determine which is most effective and efficient. Details of the method, which may also be applicable to other wood boring insects, are expected to be published in the coming months.

Great Lakes Forestry Centre to host new Invasive Species Centre

Overview

The Great Lakes Forestry Centre is constructing an expanded facility to rear and study invasive alien forest insect species. The laboratories will be attached to the existing research centre in Sault Ste. Marie, and will serve as a national nexus for work on forest pests.

Invasive alien species are organisms that have been introduced outside their natural habitat, and which exhibit rapid growth, reproduction and dispersal. They are highly competitive to native species, destructive and difficult to control, particularly if the new ecosystem lacks the predators or pathogens of their own native range. They typically enter a country as hitchhikers in or on, for example, soil, plants or untreated wooden packing materials. It is estimated that the financial impacts resulting from past introductions of harmful invasive plant pests on the agriculture and forest industries in Canada is $7.5 billion annually, to say nothing of the ecological impacts.

GLFC scientists are studying three alien invasive insects affecting Ontario's forests: the emerald ash borer, the Asian longhorned beetle and the Sirex wood wasp. The knowledge generated from this research is critical in developing effective detection methods to identify areas where these insects may appear, and to provide information on control and mitigation measures to foresters and communities. On a broader level, this knowledge is used to deliver sound policy advice intended to reduce future risks to Canada's forest resources. Specifically,the research enables NRCan to support the regulatory requirements and activities of the Canadian Food Inspection Agency (CFIA) regarding forest pests.

Work is now underway to expand and enhance NRCan's forest insect-related invasive species research capacity with improvements and additions to GLFC. The existing GLFC insect quarantine and insect rearing facility will be upgraded by renovating a currently underutilized GLFC building next door to the main facility. The resultant new state-of-the-art (level two quarantine) research laboratories will also contain offices and a walkway to the main facility, along with access for disabled people and upgrades to the heating system to improve the building's energy efficiency.

Different types of insects require different control environments. Therefore, the harmful invasive species like the emerald ash borer will be moved into individual chambers in climate-controlled quarantine laboratories in the new ISC (Invasive Species Centre). A primary function of the quarantine facility is to keep the insects away from one another and to prevent their escape into the forest environment. The existing facilities are no longer adequate to handle the extensive demands by researchers for healthy insects to use in their studies, nor do they meet the current CFIA standards.

The Government of Canada is contributing $9 million to this project through Canada's Economic Action Plan. The Ontario government is contributing additional funds to complement NRCan's facilities, supporting added capacity in the management of invasive alien species. The Government of Canada's science and technology infrastructure will be boosted in the area of invasive species through the creation of these new facilities, which will not only enhance NRCan's current programs and scientific expertise but will also attract external funding and collaborators who might then undertake additional research. Furthermore, this upgraded facility is expected to become a national nexus for work on forest pests, and would position NRCan as a global leader in this area.

The ISC is scheduled for completion in the spring of 2011.

GLFC recent publications

If you would like to order any of the publications listed below, please contact Publications at the following e-mail address: glfc.publications@nrcan.gc.ca

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