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VEGETATION
MANAGEMENT
NEWS

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Take action NOW



We all have a responsibility to do something about invasive weeds. Whether you have identified an economic opportunity from managing invasive weeds, are in a position to recommend management actions, or make decisions about problems on the land you manage, we all need to address one of the biggest ecological and economic problems we face in Canada.

In this issue of Access we have recapped the ABC's of the invasive weed issue and introduced some challenging management situations. We have also outlined how weeds are spread and the tools available for control.

There has been increasing interest and involvement in invasive weed management issues over the past few years. Invasive Plant Councils in a number of provinces are doing outstanding work in establishing a framework for the short and long term.

We need to continue to develop strategy and policy, complete research and analysis and communicate and educate, but we as an industry also need to start taking action by targeting the issues and doing something about the problem. We may not always use the best tools, and we may not be successful at times, but we must try to get the show on the road.

For sure, we can promote and canvas for support. Educate yourself, your staff and customers. Get involved and take action. We cannot sit around and hope someone else will take charge. Lead the action yourself.

Thanks,

Mark Woloshyn
Marketing Manager
Dow AgroSciences



Identify the threat, understand the threat, take action

The ABC's of Invasive Weeds

The many impacts of invasive plants are extensive and well known. Invasive plants can pose direct agricultural, environmental and social costs from lost production values, higher management costs and reduced environmental and amenity values.

WHAT ARE ALIEN AND INVASIVE SPECIES?

Canada is being invaded by aliens, but not the type we see in science fiction movies. These organisms are found nearly everywhere in Canada. They can belong to any of the categories of organisms in the world, including plants, mammals, birds, reptiles, amphibians, invertebrates, and micro-organisms.

You are already well acquainted with some alien or non-native species. For example, lawns and gardens are made up mostly of alien species, including Kentucky bluegrass, periwinkle, lily of the valley, and even the unwanted dandelion. The domestic cat is thought to have originated in Africa. And the pigeon and the European Starling, birds commonly seen in Canadian cities, both came from Europe. Even many of the foods you eat originated in other countries. Potatoes came originally from the South American Andes, corn from Mexico, and wheat from Africa and the Middle East.

There are also many examples of species from one part of Canada that have taken up residence in another. The familiar moose, for example, is native to most parts of the country, but is an introduced species on the island of Newfoundland, as are the red squirrel and the snowshoe hare. The bullfrog is native to some provinces, but is an alien species in British Columbia. And the House Finch, which originated in several western provinces, is now found in a number of provinces in the east.

Many of Canada's alien species are beneficial, but a great number are not. Sometimes the conditions are right for alien species to become invasive—they move into new habitats and take over, their populations sometimes expanding beyond control. The harm they cause to the environment, the economy, or human health can be costly and sometimes irreversible.



WHERE DO THEY COME FROM AND HOW DO THEY GET HERE?

Alien species come into Canada by any means of transport that moves them farther than they could move on their own. Sometimes they are brought in on purpose, but often they arrive unintentionally.

Seafaring European explorers and settlers were the first to introduce new species to Canada. They brought cattle, goats and other domestic animals, along with familiar crops like wheat, when they came by ship to explore and settle the New World. Without meaning to, they also introduced unwanted organisms – pests like the Norway rat and weed seeds in the animal feed and crop seed.



Today, alien species are still being imported intentionally into Canada from around the world for use in many areas, from agriculture and horticulture to the pet trade to medical and scientific research.

A variety of legislation regulates the importation of alien species into Canada and their movement once they are in the country. Unfortunately, even when programs are in place to monitor and contain imported species, the effects the species can have on the environment if they accidentally escape from their intended habitat is not always considered.

About half of the alien shellfish species in Canada, including the highly invasive zebra mussel, probably arrived in North America in ballast water, the water used to stabilize large ships during travel. Aquatic species are taken up along with ballast water at one port and released at the destination port.

Shipping-crate wood and packing materials may also contain unwanted species such as insects. As well,

unwanted aliens may travel with intentionally imported ones. For example, plants, seeds and bulbs that are imported for use in landscaping may harbor foreign insects and fungi or may be contaminated with the seeds of other plants.

WHAT IS THE PROBLEM?

Invasive weeds have negative environmental, economic, recreational and public health impacts. Many are able to out-compete native plants for the resources needed to grow.

WHY ARE INVASIVE PLANTS SPREADING?

Most invasive plant species are hardy, reproduce easily and have no natural predators to control them. (See sidebar.)

WHAT ARE THE IMPACTS?

Invasive plants can pose direct agricultural, environmental and social costs from lost production values, higher management costs and reduced environmental and amenity values.

WHAT ARE THE ENVIRONMENTAL THREATS?

Invasive plants are often cited as the second greatest threat to biodiversity after land clearing and habitat destruction. Some possible effects of invasive plants on individual plants and animals, native plant communities, and ecological processes include:

- Displacement of native plant species and loss of biological diversity.
- Domination of disturbed habitats for prolonged periods of time, which impedes ecological restoration of native plant communities.
- Changes in habitat structure for mammals, reptiles, insects and even possibly soil organisms.
- Reductions in forage production for wildlife and domestic stock.
- Alterations of natural fire regimes.

WHAT ARE SOME POSSIBLE EFFECTS OF INVASIVE PLANTS?

The displacement of native plant species and loss of biological diversity is a severe loss. Domination of disturbed habitats for prolonged periods of time impedes ecological restoration of native plant communities.





Changes occur in habitat structure for mammals, reptiles, insects and even possibly soil organisms. Reductions in forage production for wildlife and domestic stock result. Alterations of natural fire regimes also pose a threat.

WHAT ARE THE ECONOMIC THREATS?

Most economic analysis of weed impacts have been conducted in agricultural systems where competition between weeds and crops, or weeds and range grasses can be measured and quantified. In natural ecosystems, however, costs and benefits are more difficult to quantify, especially for ecological values such as rare, threatened or endangered species, habitats at risk, and forage values for wildlife.

In the absence of comprehensive economic analysis, decisions regarding invasive plant control are usually based on assessment of the potential risk of not controlling these species compared to the benefits of immediate control. Whatever

systems are being considered economic losses are estimated to be in the millions.

WHAT CONTROL TOOLS ARE BEST?

Integrated Pest Management is the best approach. The best results will always be achieved using a combination of tools: herbicides, mechanical and cultural methods, along with available biological control methods.

Herbicides: Spot and broadcast treatments are possible depending on the target weeds and the location. New, less persistent and environmentally friendly products like Milestone* are being developed and specifically registered for control of invasive weeds.

Mechanical: Physically disturbing weeds by mowing, chopping and cutting either kills the plants or repeatedly weakens them, making them susceptible to disease, and depletes their energy reserves.

Cultural: Cultural control includes selective grazing, mulching, hand-pulling and burning.

Biological: This method uses the weed's natural enemies (insects and pathogens) to reduce weed populations. Biocontrol agents are in many cases very difficult to develop (they need to target very specific species) and results take time to materialize.

Biological controls are longer term solutions. Agents released at a weed site may take several years for their populations to build high enough to be effective. Also the goal of biocontrol is to establish a long-term balance between the agent and the target weed.





How Invasive Plants Move and Spread

- Birds are well known seed dispersers. Evidence is often found under utility lines, fence lines and other perching locations.
- Irresponsible use of off-road vehicles causing soil disturbance and providing suitable seed sites and well as soil and seed movement is significant.
- Gardening and wildflower mixes. Packaged wildflower seed mixes are notorious for containing invasive weed seeds. Escapes from the garden to adjacent or rural properties are an on going issue.
- Roads and railways are two significant transport corridors for weed movement. Weeds are transported on the vehicles, trains, RV's, etc. The disturbed environment along transport corridors also encourages establishment.
- Weeds are moved by animals by carrying seeds either on them or in them. Seeds cling to the fur or pass through the digestive tract.
- Recreation and outdoor enthusiasts such as hikers, campers and fishermen spread weed seeds on their clothing and camping equipment.
- Weed seed movement in streams and rivers is a major means of weed dispersal. Irrigation water being pumped from one catchment to another can also be a significant issue. Some seeds have special adaptations that aid in water travel.
- Industry and construction activities pose a high risk for invasive plant introductions and spread. Earth moving equipment often transports weed seeds and plant material from one site to the next.
- Farm equipment, infested feed and land-use practices all contribute to seed spread.
- Many seeds are well adapted to movement by wind. They float on the wind or are spread by parent plants tumbling across the landscape scattering seeds along the way.



Making headway

Conservation Groups Tackle Invasive Weed Issues

The Canadian Wildlife Federation, one of Canada's largest nonprofit, non-governmental conservation organizations, plays a lead role in showing Canadians how to take action and make a difference.

Together, the Canadian Wildlife Service and the Canadian Wildlife Federation are bringing a wealth of knowledge and experience to the Canadian public. They are also contributing to the rejuvenation of an outstanding website, Hinterland's Who's Who at www.hww.ca.

A comprehensive article on invasive weeds is posted that answers questions such as: What are invasives? Why are we concerned? What can be done?

THE NATURE CONSERVANCY

The Nature Conservancy's Invasive Species Initiative aims to control the threat to biodiversity posed by invasive non-native plants and animals. The Initiative achieves this through a combination of prevention, eradication, restoration, research and outreach.

The Conservancy believes that the threat of invasive species can be effectively abated by using these techniques and approaches.

The Nature Conservancy has discovered that invasive species are one of the top sources of stress across all priority conservation areas. Conservation success will depend greatly on preventing new invasions and managing invaded systems effectively.

Building on years of experience in invasive species management, the Conservancy has created the Invasive Species Initiative to address this urgent and pervasive threat.

The Invasive Species Initiative works with a network of private and public partners worldwide to pursue the following tactics as part of a comprehensive strategy:



■ **Prevention:** This strategy offers the greatest benefit for the least cost. The Conservancy is supporting enhanced port inspections and voluntary efforts to eliminate intentional introductions of non-native, invasive species.

■ **Early Detection/Rapid Response:** This strategy mimics initiatives like one under way in Chicago, where hundreds of local residents have been trained and have volunteered their time to check trees for signs of invasive Asian long-horned beetles.

■ **Restoration:** This involves working with hundreds of local organizations at thousands of sites throughout the Americas, Asia and the Pacific to remove and prevent the spread of invasive species.

■ **Research:** This strategy involves working with leading academic institutions like the University of California and the University of Florida to develop new research to improve the management and control of invasives.

■ **Outreach:** Another important strategy involves working with government agencies and international organizations to develop policies for invasive species awareness, management and prevention.

STRATEGY BECOMES ACTION

A comprehensive strategy is woven through the Initiative's work, both within the Conservancy and with external partners. This strategy is put into action by:

■ **Assessing problems and setting priorities.** The Conservancy works with other TNC programs and partners to encourage comprehensive regional assessments of invasive species threats to biodiversity, of efforts underway to prevent and abate those threats, and of important gaps in those efforts.

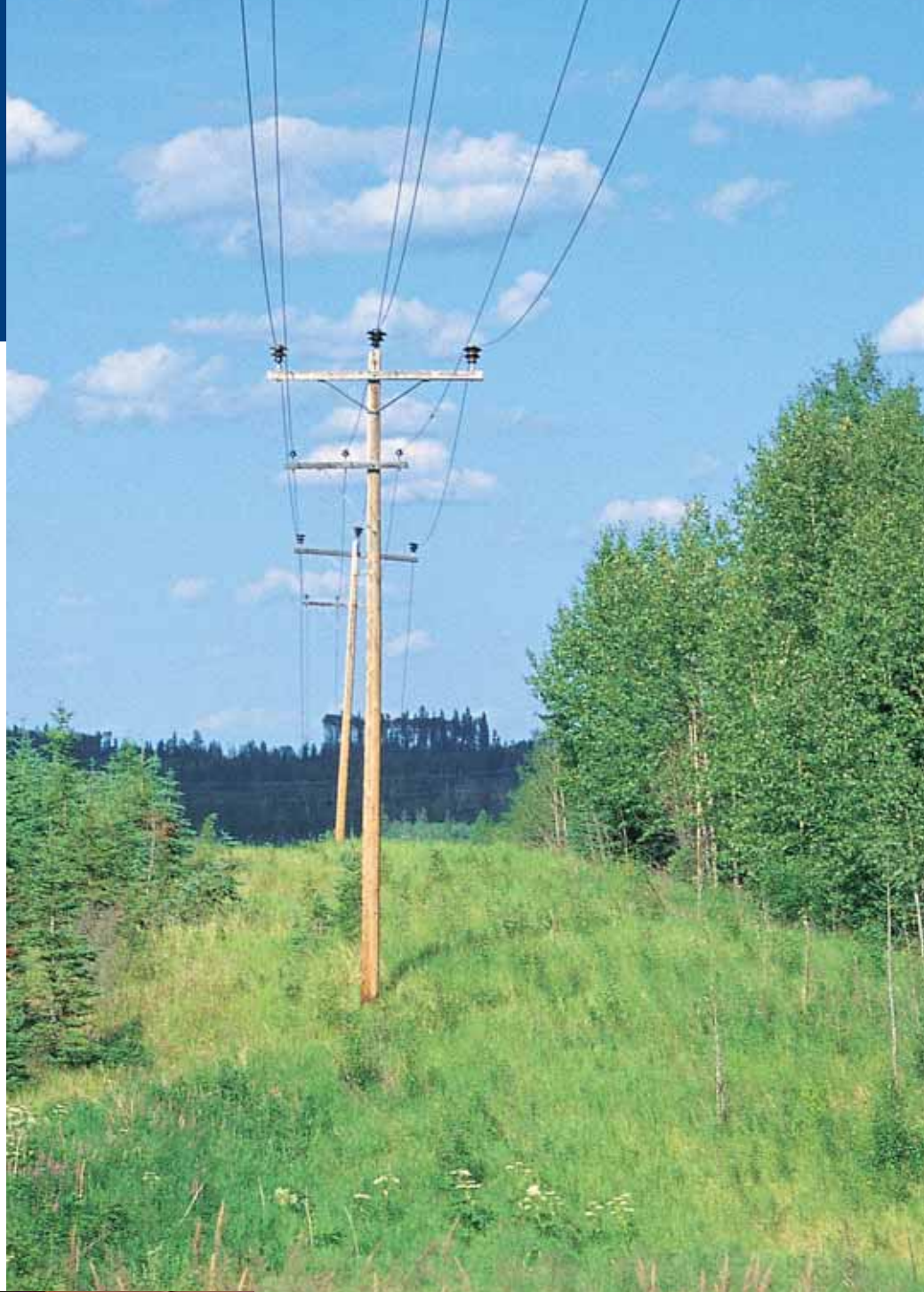
■ **Engaging in public policy.** To improve government programs and regulations that prevent, contain and manage invasions, the organization works with staff and external partners across the

globe to identify and coordinate activities promoting the highest priority policies.

■ **Creating strategies and tools.** The Conservancy develops information, tools and templates on invasive species biology, impacts, assessment, prevention and management to aid staff and partners in management, public education and policy decisions for conservation projects.

■ **Working with industry and professionals.** Partnerships include working with the nursery industry, landscape architects, botanical gardens and garden clubs to reduce the use and spread of invasive horticultural plants. The work also involves working with other Nature Conservancy programs and partners to identify other industries, such as oceanic shipping, where adoption of voluntary practices could prevent new invasions and stop the spread of existing ones.

■ **Training and Networking.** Conservation Learning Networks are set up to solve problems on invasive species assessment, prevention, management and monitoring.



Invasive Weed Councils Step Up Action



AB INVASIVE PLANTS COUNCIL

The Alberta Invasive Plants Council (AIPC) is comprised of representatives from governments, industry and grassroots organizations. Its intent is to provide credible information about Alberta's invasive plants and to foster cooperation among stakeholders.

The goals are to communicate, educate and make Albertans aware of the impact invasive plants have on the environment, the economy and society. Equally important goals are to promote and facilitate partnerships and act as a resource organization to provide expert advice and guidance to government, industry and the public on invasive plant issues.

Historically, weeds have been viewed as the problem of Alberta's large agricultural industry; the provincial Weed Control Act was established to protect agricultural lands. In time, of course, weeds spread from the farms into natural areas.

While weed control legislation supported the enforced management of provincially designated weeds by landowners and occupants, it became clear that legislation was not enough to stem the tide. Non-native, invasive plants were increasing, and industry and recreation were unwittingly carrying these invaders farther into the backcountry.

In 2003 the Eastern Slopes Invasive Plants Council with provincial government support, hosted the *Invasive Plants: Understanding the Threat* conference in Calgary. Over 200 participants listened to invasive plant managers from Canada and the US. This was just the start. Similar conferences followed and the Eastern Slopes Invasive Plants Council evolved into a province wide council called the AIPC.

BC INVASIVE PLANT COUNCIL

The Invasive Plant Strategy for British Columbia is the product of a diverse group of contributors from all orders of government – federal, provincial, local and First Nations, land- and water-based user groups, resource-based businesses and industries, utilities and non-government organizations.

Led by the Fraser Basin Council, development of the strategy stemmed from the exponential increase in the damage and threats caused by invasive plants, exacerbated by inconsistent management around the province. The strategy is presented as a process-oriented document that complements and supports ongoing activities in invasive plant management.

The strategy's goal is to build cooperation and coordination to protect British Columbia's environment and minimize negative social and economic impact

caused by the introduction, establishment and spread of invasive alien plants.

Implementing the strategy is expected to build commitment and buy-in throughout British Columbia from the many agencies, organizations and individuals concerned by or associated with invasive plant management. Integrated pest management principles will be promoted under the strategy when implementing invasive plant management programs.

The Council will coordinate invasive plant management province wide. It has been established as a legal, non-profit society with members and bylaws. Its inclusive membership will work to improve compliance with legislated responsibilities, establish research priorities, coordinate public awareness and outreach programs and conduct other related functions and activities. However, the Council will not be associated with the funding or delivery of operational activities.

Members of the Council will appoint a representative board of directors with comprehensive geographic and multi-stakeholder coverage.

The strategy identifies five key preliminary actions to be undertaken by the new Council:

- Help ensure sufficient funding both for its province-wide coordination role and for operational invasive plant management.
- Recommend changes to strengthen provincial and federal legislation.
- Work towards improved compliance with current and new legislation.
- Communicate and coordinate among its diverse membership.
- Increase public awareness and outreach.



Weed Watch

ORANGE HAWKWEED

The ancient Greeks believed the sap of hawkweeds is what gave hawks their keen eyesight. As with many other species of eye-pleasing invasive weeds, hawkweeds arrived from Europe as ornamentals.

Flowers are orange-red and crowded into a round-topped cluster. This is the only hawkweed, native or introduced, to have orange flowers. Mature flowers turn into dandelion-like globes of tufted seed.

While infestations usually originate from seed, their very rapid expansion is the result of the stolons producing new plants. Untreated infestations form dense mats of rosettes that exclude nearly all other vegetation.

Hand-pulling or digging before seed production can have an impact on infestations, but it is important to remove as much root as possible. Mowing is not an option for controlling hawkweed – pieces of stolon take root and produce new plants.

There are no biological control agents currently available. A number of herbicides have proven effective on Orange Hawkweed. Chemical control requires several years of effort and generally will not succeed on its own.

While wildlife and livestock may consume non-native hawkweeds, intensive grazing only results in nearly all of the desirable vegetation being replaced. Some invasive plant managers have had success with fertilizing to support competing vegetation, primarily in rangeland infestations.



OXEYE DAISY

Oxeye Daisy is flowered very similarly to Scentsless Chamomile. Often perceived to be a “pretty” wildflower, this non-native is an aggressive invader.

This perennial spreads primarily by seed, but also by shallow, creeping roots (rhizomes). It grows in a wide variety of habitats, and flourishes in nutrient poor soils. Individual plants can produce over 500 seeds that are viable in the soil for two to three years or more.

Oxeye Daisy is avoided by cattle and therefore capable of dominating pastures and rangeland. Dense infestations reduce forage for both wildlife and livestock.

Repeated mowing prevents seed production, but also can stimulate re-sprouting of stems. Hand-pulling or digging before seed production is effective, but it is important to remove as much of the fibrous roots and rhizomes as possible. Ground disturbance while digging should be kept to a minimum.



Several herbicides are effective at controlling Oxeye Daisy when applied to actively growing plants up to the flowering stage.

The availability of closely related plants through the nursery and seed trade contradicts the perception of Oxeye as an invasive plant. Shasta daisy is a cultivar of Oxeye sold through nurseries

and as seed in wildflower mixes. This fact makes public awareness critical to control. The two plants can cross breed, resulting in an invasive hybrid that is extremely difficult to distinguish from either parent.

Invasive ornamentals can be very difficult to contain and should be avoided. Consumer education is needed. Consumers should carefully read the contents of so-called wildflower seed mixes and avoid those containing invasive ornamentals.

Jasper National Park

THE DRIVE TO RESTORE ECOLOGICAL INTEGRITY

Jasper National Park in Alberta is Canada's largest Rocky Mountain Park and one of North America's largest natural areas, spanning 10,878 sq. km. (4,200 sq. mi.) of awe-inspiring, scenic splendor.

The invasion of non-native plants poses a threat to the park's ecosystem, says Jennifer McPhee, coordinator of non-native plants control and reclamation at Jasper National Park.

"Maintaining and restoring ecological integrity through the protection of natural resources in keeping with Parks Canada's management plan is a top priority," McPhee says. "Non-native plants threaten the diversity of plant life and the well-being of park ecosystems."



One of the challenges is to reduce the spread of non-native plants via the many vectors that operate in the park. "Jasper has a national travel corridor passing through it. Non-native species are spread along roadside ditches and rail lines. We also see spread in gravel pits and on land where highway construction projects have disturbed the soil. We also have a town in the park which draws tourists, who may be carrying non-native weed seeds."

Non-native plants, once introduced and left uncontrolled, accumulate over time.

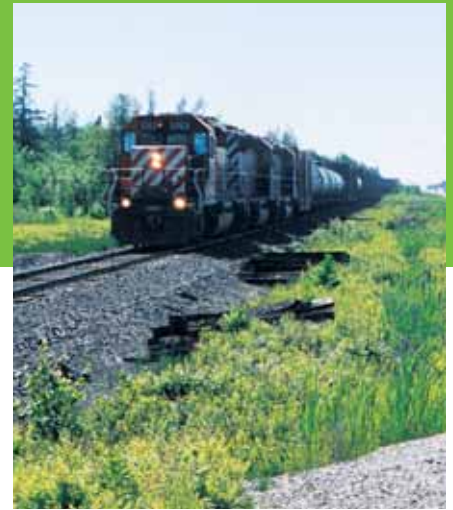
"The management plan is to limit the introduction of non-native plants, and to treat the most invasive species first," says McPhee. "Initiatives such as targeted education and information programs and a weed-free hay policy help prevent the introduction and spread of non-native plants."

Jasper National Park already has its fair share of weeds, the most invasive including spotted knapweed, Dalmatian toadflax, tall buttercup and yellow clematis. "We have seen clematis kill a spruce tree by climbing up and blocking the sun," she says.

The park manages invasive weeds with the help of an Integrated Pest

Management program and the assistance and cooperation of land leaseholders such as CN Rail, who keep their ballast and right of way clear of weeds through the use of herbicide applications. Other companies like ATCO and Terasen also play an important role in reducing the spread of weeds.

Before herbicides were initially used in the park, a detailed consultation was undertaken with cooperators such as Alberta Agriculture and Agriculture and Agri-Food Canada to determine the best control method and the effects of



herbicide use. The University of Alberta set up research plots to test various methods.

"Herbicides definitely have a place in weed control as part of a larger IPM strategy. We just want to make sure that we choose products with the lowest environmental toxicity paired with the best application method and timing on a site-by-site basis," says McPhee.

Broadleaf selective herbicides are spot-sprayed to target the most ecologically threatening invasives. The park's summer student program employs nine summer students. Three or four students are certified to spot spray the plants in targeted areas that are most likely to disrupt the park's ecosystem. Other members of the team pick weeds and use mechanical means of removal to complement and augment herbicide treatments.

The park uses Tordon* and Transline* along with picking and mowing to control knapweed, toadflax, clematis, thistle, and other restricted species. Along rail lines Milestone* has recently been used. McPhee says the park will be interested in assessing the control results of this product, given it's good environmental profile.

McPhee says: "We rely heavily on the cooperation and expertise of the leaseholders, land managers, residents and other partners to help Jasper National Park manage non-native plants. Dealing with this issue requires cooperation and collaboration. The whole initiative is a drive to maintain and restore ecological integrity."





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