BREAKING DOWN BORDERS:
ISSUES AND ACTIONS FOR INVASIVE PLANT SPECIES IN WESTERN CANADA

FINAL REPORT

July 2008

Canada

INVASIVE SPECIES COUNCIL OF MANITOBA

Rural Development Institute, Brandon University

Brandon University established the Rural Development Institute in 1989 as an academic research centre and a leading source of information on issues affecting rural communities in Western Canada and elsewhere.

RDI functions as a not-for-profit research and development organization designed to promote, facilitate, coordinate, initiate and conduct multi-disciplinary academic and applied research on rural issues. The Institute provides an interface between academic research efforts and the community by acting as a conduit of rural research information and by facilitating community involvement in rural development. RDI projects are characterized by cooperative and collaborative efforts of multi-stakeholders.

The Institute has diverse research affiliations, and multiple community and government linkages related to its rural development mandate. RDI disseminates information to a variety of constituents and stakeholders and makes research information and results widely available to the public either in printed form or by means of public lectures, seminars, workshops and conferences.

For more information, please visit www.brandonu.ca/rdi.

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FINAL REPORT

Submitted to:
Participants at the Breaking Down Borders Forum

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The *Breaking Down Borders Forum* was organized and the report was prepared by the Rural Development Institute (RDI), Brandon University, Brandon, Manitoba. RDI staff contributing to the forum organization and final report included Sylvia Henry, Bev Lischka, Karen Rempel and Paige Rushton. Haley Catton, Coordinator of the Invasive Species Council of Manitoba assisted with planning and organization. Sheldon McLeod provided considerable expertise in facilitating the forum discussions.

RDI also wishes to thank the following individuals for their advice and contributions to the agenda and the organization of the forum.

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Finally, many thanks to all of the participants who participated so actively in the forum. The enthusiasm of all to work together on key issues was a clear outcome of the forum.

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Executive Summary

In the past, the management and control of invasive plant species tended to focus on rural areas and resource-based industries. Today, a wide variety of stakeholders recognize that invasive alien species have very large and wide-ranging economic, environmental and social impacts in all areas of the globe. In Western Canada a large number of local, regional and national agencies recognize that collaboration is one of the most important strategies to address the threat of invasive alien species in the region.

In February 2008, the *Breaking Down Borders Forum* was held in Winnipeg. This invitational forum brought together more than 50 key stakeholders from the Prairie Provinces and British Columbia. The primary aim of the forum was to *provide a networking opportunity for key stakeholders in Western Canada to share information, discuss issues and identify mutually beneficial actions.*

Participants at the forum came from government, universities, non-profit organizations, municipal agencies and professional organizations. The origin of the forum can be traced back to an informal gathering of stakeholders from Western Canada held during the 2006 North American Weed Management Association Annual Meeting held in Calgary. More details of this meeting can be found in the *Background* section of this report.

The background section also sets out the connection between policies and programs, research activities, and local or regional practice. These elements were used by a program committee to develop an agenda of presentations and discussions. The section, *Policies and Programs,* provides examples of current policies and programs across Western Canada and the Federal Government. The next section, *Research Activities*, summarizes some of the research efforts currently underway at universities, government and industry. Three examples of local or regional practice are described in the section titled *Practice.*

In the breakout discussions as well as the plenary session, the participants raised a number of major issues on research, policy and programs as well as practice. The participants identified several collaborative actions to help address some of these issues. The section, *Participants' Perspectives*, sums up these actions by themes and levels of interest. The participants also provided their support to move forward on actively collaborating on issues of mutual interest and benefit. The report concludes with the section, *Model for Collaborative Action,* which sets out an organizational structure and a set of priorities for collaboration for the next 18 months.

Finally, all the participants at the forum greatly appreciated the high quality of the information provided by the presenters at the forum. With the permission of the presenters these presentations can be found in their entirety in *Appendix A.*

Background

The origin of the *Breaking Down Borders Forum* was an informal gathering of stakeholders from Western Canada held during the 2006 North American Weed Management Association Annual Meeting held in Calgary.

The meeting was initially promoted by an inter-provincial working group of representatives from across the Prairies working together on leafy spurge. The aim of the Calgary meeting was to explore the merits and potential of networking and partnerships

At that meeting the participants concluding that in light of the Federal Governments initiatives on invasive species, there was great merit in cooperating on regional basis. Individuals involved in the meeting also commented that

a) there was increased concern about the spread of existing and new invasive species in the region;

b) that resources and polices varied widely; and that

c) there was great value on working together on mutually beneficial activities.

The Calgary meeting also helped demonstrate the role and activities of the North American Weed Management Association (NAWMA). This organization is an example of an effective, broad-based stakeholder organization aimed at improving weed management, public and political awareness and cooperation among federal, provincial/state, municipal or local agencies and land managers.

It should be noted that the *Breaking Down Borders Forum* did not specifically target invasive plants however, most of the major invasive species problems across Western Canada are invasive plant species.

Presentation by Kelly Cooley
Pincher Creek, AB.
See page 36 for the complete presentation.

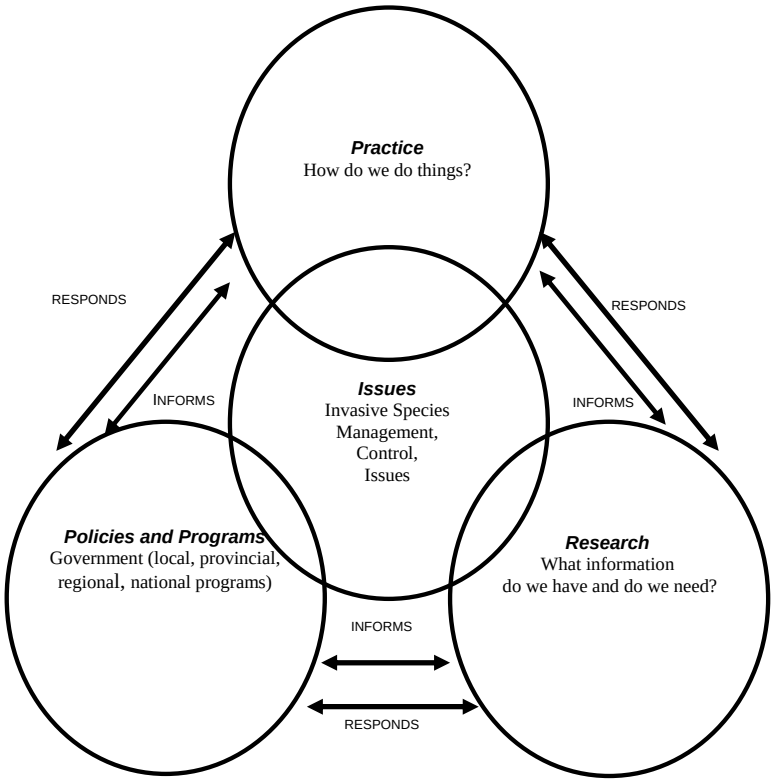
The Connection between Research, Policy and Programs, and Practice

Meaningful and constructive actions for invasive species awareness, prevention, management, and control are highly dependent on available resources and information. Effective collaboration between everyone involved in the areas of invasive alien species research, *policy (and programs), and practice* is essential to ensuring sustained and productive actions. However, there is an explicit understanding that these areas are highly inter-dependent.

At the *Breaking Down Borders Forum*, presentations were organized around these areas:

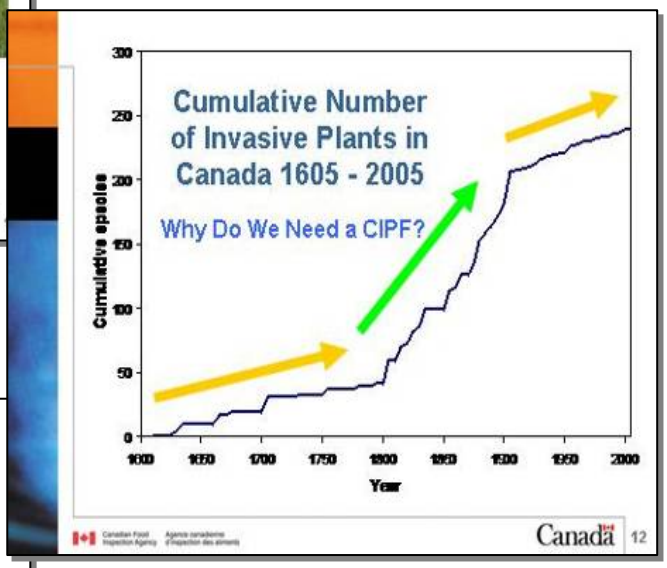
- Research, that is information and knowledge, responds to and informs our policies, programs and practice.
- Practice, our actions to control and manage invasive plant species, is informed by what we know from the research and the availability and applicability of programs and policies.
- Programs (and policies) are developed and implemented by government agencies such as the Canadian Food Inspection Agency or Environment Canada. These policies and programs promote future actions, react to issues or seek information about issues.

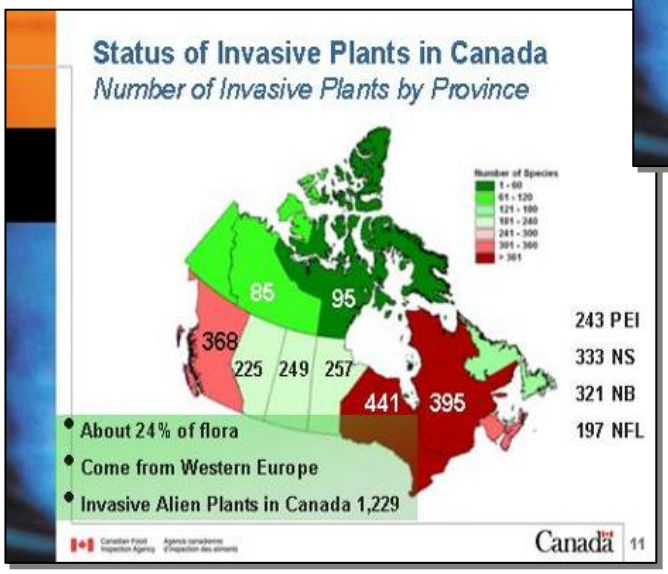
Figure 1: Connection between policy, research and practice



Model adapted from Rural Development Institute publications *Recommendations for enhancing the immigration experience in the rural West (2005)* and *Community Collaboration Project: Empowering communities and building capacity 2005-2008.*
Available at http://www.brandonu.ca/organizations/RDI/publications.asp

One example is the development and implementation of the Canadian Invasive Plants Framework (CIPF). This framework integrates and overlaps of research, policy and programs and practice to address the key overarching issues in invasive plants in Canada.





Presentation by Cory Lindgren
Canadian Food Inspection Agency, Ottawa, ON.
See page 49 for the complete presentation.

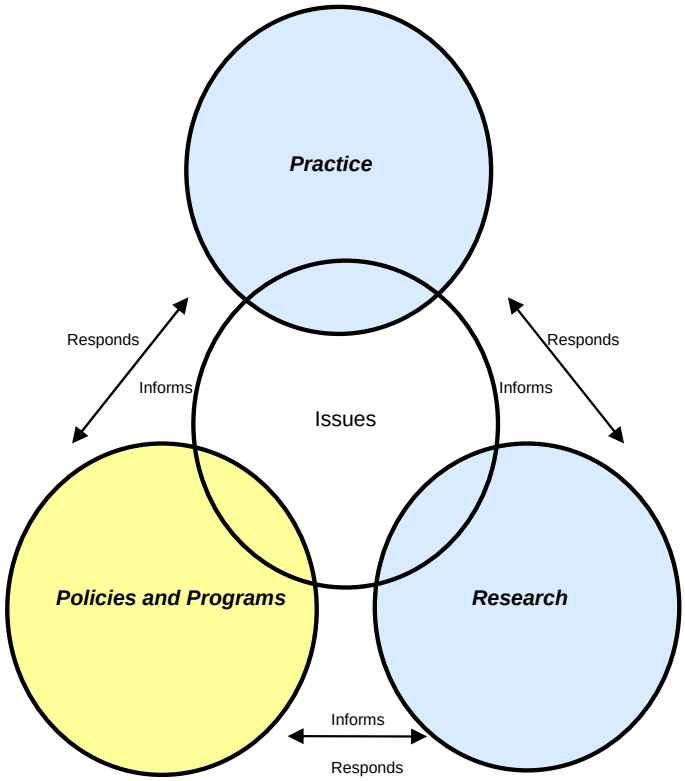
Policies and Programs

Policies include legislation, regulations, policy frameworks and guidelines. Governments, organizations and agencies use policies to guide, establish authority, encourage cooperation and promote activities.

The session on policies and programs was aimed at briefing participants on some of the current policies and programs across Western Canada. A representative from each of the province gave an overview of provincial policies and programs.

These presentations were followed by a description of the CFIA's Western Region Inspection Program

The session concluded with a presentation on the development of the Canadian Invasive Plant Framework.



British Columbia

Highlights

- The Province is working toward harmonization of IP policy, legislation and standards among BC ministries. An Inter-Ministry Invasive Plant Committee was established in 1993. The four Ministries include: Agriculture and Lands, Environment, Transportation, Forests and Range.
- The invasive Plants Council of BC was established in 2006. Current programs include development of an early detection and rapid response system, education and awareness activities, and the work of a number of sub-committees for research, legislation, communications, funding and technical needs.

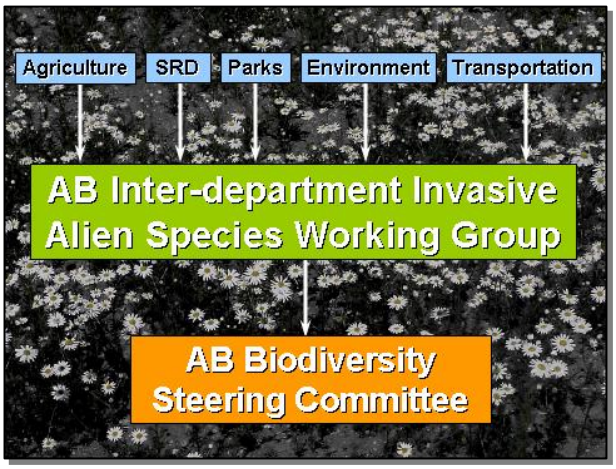
Presentation by Dave Ralph
BC Ministry of Agriculture and Lands.
See page 40 for the complete presentation.

- Current government activities include enhancement and maintenance to the database program and map display, invasive plant pilot programs. *Cross Borders Project* with US Counties, biological control initiatives, 14 Regional, district or municipal weed committees and 10 community or local committees.

- Opportunities include partnerships and collaborations, a new director appointed for the management of IAS and increased public awareness.
- Challenges are financial and human resources and the shortage of expertise for on-ground managers.

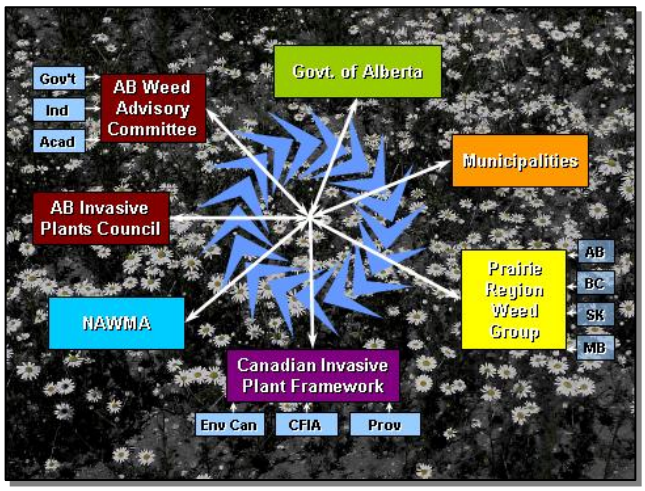
Alberta

Highlights



Presentation by Mike Undershultz
Alberta Sustainable Resource Development.
See page 42 for the complete presentation.

- The Alberta Weed Control Act under revision. Expected revisions include updates for primary noxious and noxious categories, clarification of roles and responsibilities, modernizing administration and improving document flow.
- The Alberta Inter-Department Invasive Alien Species Working Group of representatives from Agriculture, Sustainable Resource Development, Parks, Environment and Transportation has helped motivate the province to take a coordinated approach.
- Examples of current activities include the development of website and prioritization of research and the development of a Risk Assessment Tool and a Pest Surveillance System with an early detection component.
- The Risk Assessment tool is a quantitative, rapid assessment of the likelihood of impacts from potential and established IAS in environmental, social and economic terms.
- The Assessment Tool will help local managers make decisions about management priorities among invasive species; encourage transparency; identify data gaps and promote cooperation.

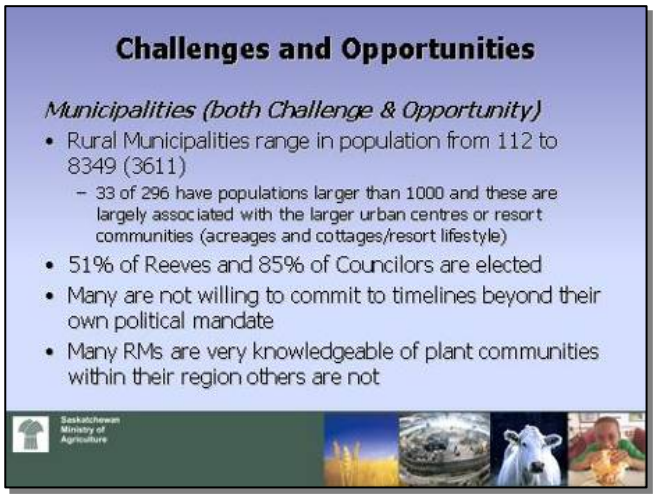


- The Alberta Invasive Plant Council (AIPC) was established in 2005. A major upcoming activity is the Beyond Borders International Conference being held in May 2008 at Banff. The conference is aimed at participants from Mexico, Canada and the US.
- The top five invasive plants are perennial sow thistle, Canada thistle, oxeye daisy, scentless chamomile, and tall buttercup.

Saskatchewan

Highlights

- The Province has started to move ahead with revisions to the Noxious Weed Act. It is anticipated that there will be multi-level weed list similar to Alberta and some US states. Higher fines and a graduated fine structure are also being considered.
- The Ministry is the lead on a joint project under the Agri-Environmental Group Plan of the Agriculture Policy Framework. The project involves a partnership with the Saskatchewan Association of Rural Municipalities and uses the services of two invasive alien plants stewardship advisors to help promote cooperative weed management areas. Several cooperative areas are underway or being proposed.



Presentation by Clark Brenzil
Saskatchewan Ministry of Agriculture.
See page 45 for the complete presentation.

- The Ministry of Agriculture is cooperating with the Saskatchewan Ministry of Environment on a distributed database of endangered and invasive species. Also, the Ministry of Highways has adopted a map and spray program.
- Changing rural and urban demographics and different levels of awareness across and between municipalities.

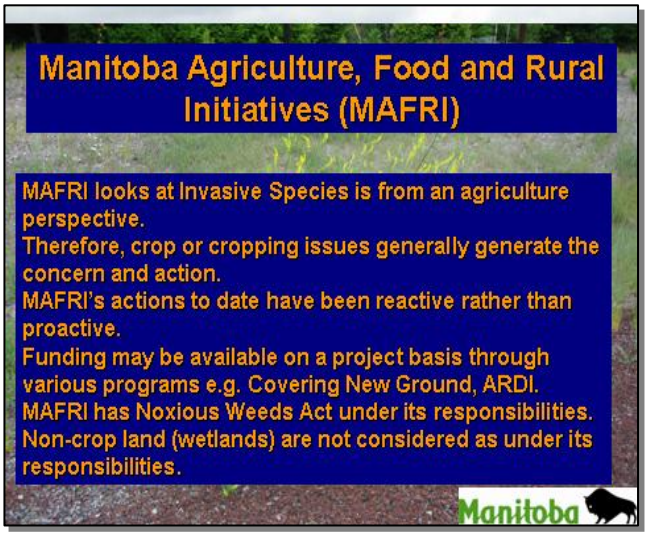
- Significant challenges include the expanded transportation sector as key IAP pathways.
- Industrial vegetative management (IVM) sector involves herbicide and pesticide manufacturers. Their focus has been primarily with critical pathways such as roadsides, and pipelines. There are a low proportion of low risk herbicide products in comparison to the products available for agricultural weeds.

- Also, Environmental Risk models for (buffers and rates) for herbicide registration are ag based and not well suited to ‘surgical strike’ or ‘ribbon type’ applications.
- The Native Plant Society of Saskatchewan is leading the process to establish an Invasive Plants Council for the province.

Manitoba

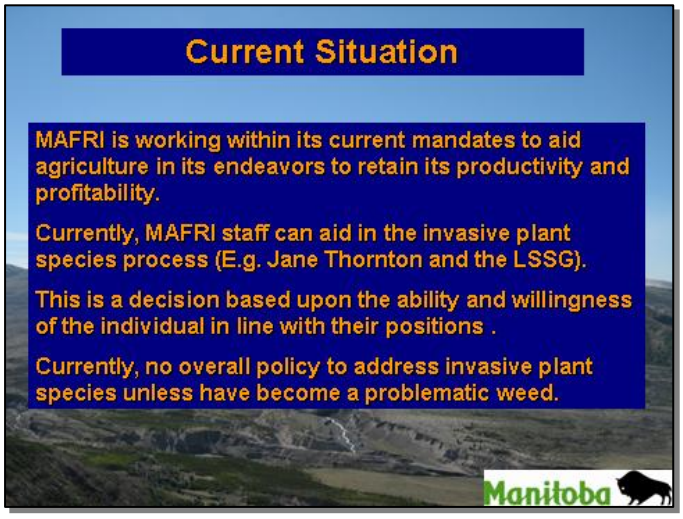
Highlights

- There are currently no plans for revisions to the act revisions although there are plans to revamp the noxious weeds list to remove weeds that are ubiquitous and add newer and/or potential problems.
- Manitoba Agriculture, Food and Rural Initiatives (MAFRI) is currently responsible for the Noxious Weed Act. However, non-crop weeds are not considered as part of MAFRI's responsibilities. MAFRI lost one of two weed specialist positions about 3 years ago. They have not been able to re-hire into that position.



Presentation by Doug Cattani
Manitoba Agriculture, Food and Rural Initiatives (MAFRI).
See page 47 for the complete presentaion.

- There is no overall policy or inter-departmental working group. Decisions to work together on invasives species are based upon the ability and willingness of the individual and in line with their positions.
- The major sources of new weeds appear to come with seed or nursery stock. The Seed Act and the Noxious Weed Act often contradict or have conflicting regulations.

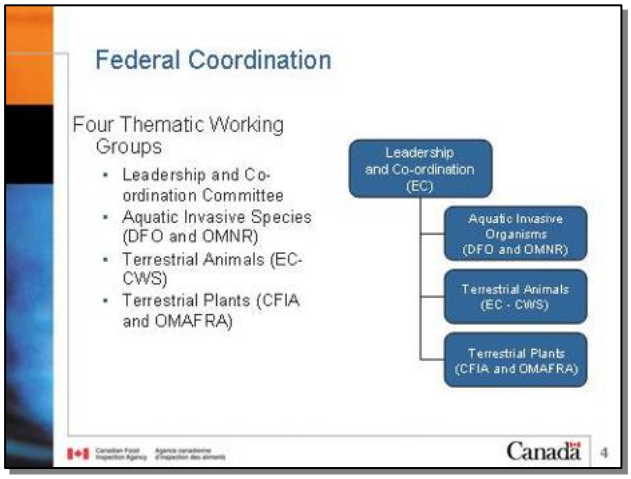


- The Invasive Species Council of Manitoba (ISCM) was established in 2007. Several activities are underway including mapping, education and awareness activities. Over 100 stakeholders have signed on in support of the ISCM. The Leafy spurge Stakeholders Group is also involved in education and awareness activities.

Federal Government Policies and Programs

The Federal Government is responding to increasing and immediate pressures for invasive alien species brought about by

- The increase volume and diversity of trade
- Access to international markets
- Speed of transport
- Travel
- International agreements
- National and global awareness.

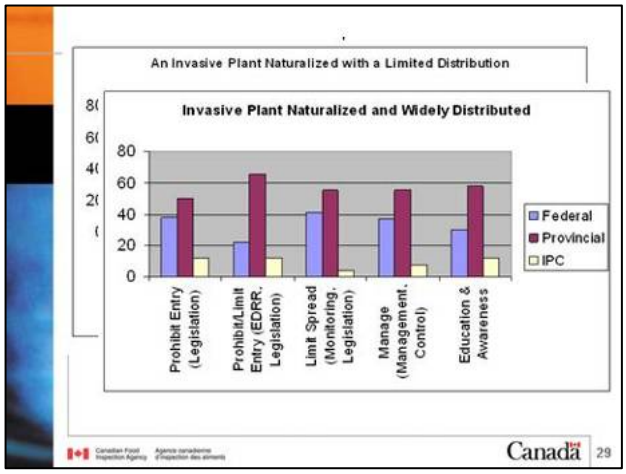


Presentation by Cory Lindgren
Canadian Food Inspection Agency, Ottawa, ON.
See page 49 for the complete presentation.

Environment Canada is taking a broad leadership role on coordinating the efforts of various federal and provincial government organizations for invasive alien species

In the case of invasive alien plants and plant pests, the Canadian Food Inspection Agency (CFIA) provides leadership. Established in 1997, the CFIA aims to protect Canada from potentially harmful plants and plant pests by focusing on prevention through science-based regulatory policies and programs. However, policy and program responses to invasive plants is a relatively new area for CFIA. Legislative authority is contained in the Plant Protection Act. Under this Act, the Plant Health Division of CFIA is responsible for

- The exclusion of plant pests
- Eradication or management
- Certification of plant and plant product exports
- Negotiation, development, maintenance and enforcement of international agreements.



Many of CFIA policies and programs are aimed at meeting Canada's obligations under international agreements such as:

- the International Plant Protection Convention (IPPC);
- Convention on Biological Diversity (CBD);

- World Trade Organisation (WTO):Agreement on the Application of Sanitory and Phytosanitory Measures
- North American Plant Protection Organisation (NAPPO)

CFIA is also involved with the development of collaborative emergency response plans, identification procedures, awareness of high risk pathways, risk analysis programs and the development of the Canadian Invasive Plant Framework.

Canadian Invasive Plant Framework (CIPF)

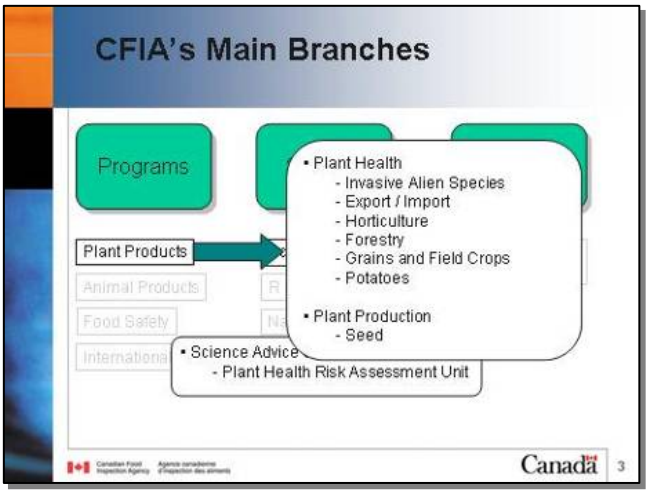
A Federal Steering Committee has been established in response to a Treasury Board Request for development of the Canadian Invasive Plant Framework (CIPF). The CIPF will be consistent with the 2004 Invasive Alien Species Strategy for Canada. The intent of the CIPF is to "provide proactive national direction and coordination in order to protect all areas of Canada from the impacts of invasive plants."

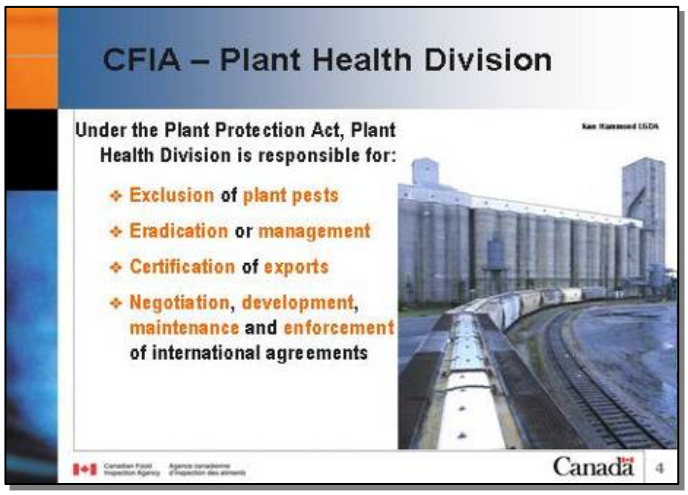
The CFIA's Plant Health Division has the task of developing the CIPF using a three phase, consultative process. The final CIPF is anticipated for late 2008.

Ultimately, the CIPF will help develop and coordinate programs nationwide to prevent spread and establishment. These efforts will involve the cooperation and joint effort of Federal and provincial agencies as well as non-governmental organizations such as Invasive Species Councils at a provincial or regional level.

CFIA Operations Branch in Western Canada

In the Western region of Canada, the Operations Branch of CFIA contributes to the overall Invasive Alien Species Program by increased inspection of imported goods such as imported seeds and grains; birdseed and wildflower mixes, horticultural products such as root cuttings and cut flowers. There is also increased survey delivery of plant pests such as exotic forest pests and pest-specific surveys such as the joint goat-grass survey in Manitoba.





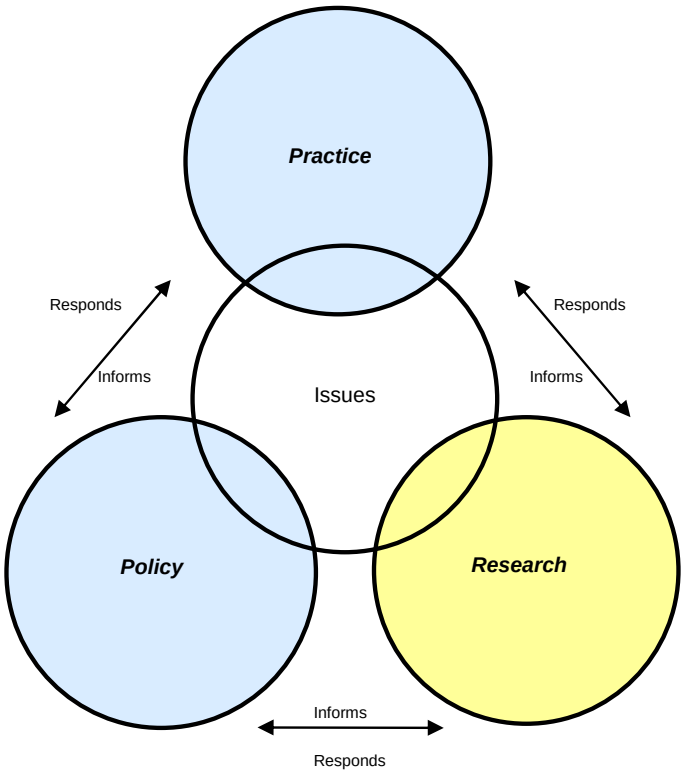
Presentation by Jamie Richardson
Canadian Food Inspection Agency, Vancouver, BC.
See page 55 for the complete presentation.

Research Activities

Research significantly contributes to all types of policies and programs as well to prevention and management practices on the ground. Conversely, policies and programs help support research and practices.

At the *Breaking Down Borders Forum*, three presenters gave participants an overview of the research issues and activities. These were

- university research in Western Canada;
- research efforts by Agriculture and Agri-Food Canada's research efforts;
- and industry-based research.



Invasive plant research in Western Canada: University perspective

Invasive species biology is a relatively new research area. In 1958 it was first recognized as an academic discipline however it was not until the 1980s that the first publications on the subject began to appear. Since the 1990's biological invasive have become a more popular area of research.

Canada's research efforts may be improved by the Invasive Alien Species Strategy and the Canadian Invasive Plant Framework.

However, current academic research on invasive plant species appears to be an increasingly controversial topic of debate and divergence of perspectives.

Presentation by Dr. David Clements
Trinity Western University, Langley, BC.
See page 58 for the complete presentation.

Two reasons contribute to this situation.

1. Invasive plant species research is a relatively young area of research that is usually approached 'sideways' from more established disciplines such as botany, population ecology, and weed science.
2. There is a limited amount and access to funding sources.

Examples of Current Research Efforts

While not exhaustive, the following list provides examples of meetings and individuals aimed at invasive plant research. (See pages 54-74 of the presentations for specific research activities.)

Topic	Organization / Institution	Individual
National/and regional meetings and symposiums	Canadian Weed Science Society Plant Canada Symposium Breaking Down Borders Weeds Across Borders BC IPC Research Forum	
Research activities	University of British Columbia	Kai Chan Brian Klinkenberg Judy Meyers Loren Rieseberg Mahesh Upadhyaya
	University of British Columbia Garry oak ecosystem research	Peter Arcese David Clements Roy Turkington Mark Vellend
	University College of the Fraser Valley	Sharon Gillies
	University of Victoria	Val Schaeffer
	Simon Fraser University	Duncan Knowles
	Trinity Western University	Paul Brown David Clements
	University of Alberta	Sean Cash Linda Hall Dr. Jane King Mark Lewis Anne Naeth
	University of Calgary	Ed Yeung
	University of Lethbridge	Rosemarie De Clerck-Floate
	University of Regina	Scott Wilson
	University of Saskatchewan	Fidji Gendron Steve Shirtliffe
	Brandon University	Karen Rempel
	University of Manitoba	Rob Gulden Norm Kenkel Stephane McLachlan Rafael Otfinowski
	University of Winnipeg	Karen Jones Richard Staniforth

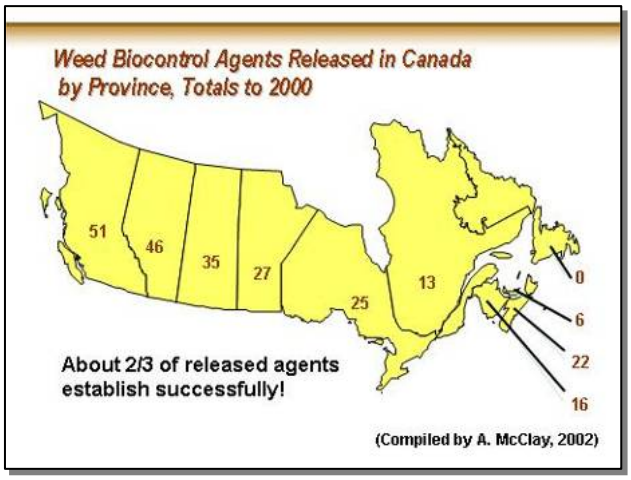
Canadian Aquatic Invasive Species Network (CAISN)

The CAISN provides a model for invasive plant species research. This network of 29 researchers comes from university and government institutions. CAISN's multi-million dollar research funding is provided by the Natural Sciences and Engineering Research Council. The CAISN will take a comprehensive approach to examine existing and potential aquatic invasive species.

Agriculture and Agri-Food Canada: Invasive plant research in Western Canada

Approximately 80% of agricultural weeds are considered as invasive aliens however only a few of these crop weeds are also problems in natural habitats. Consequently, invasive plant research within Agriculture and Agri-Food Canada (AAFC) is largely within the realm of chemical and mechanical methods for weed eradication, containment, or control and is aimed primarily at reducing crop yield losses. Currently in Western Canada, there are a total of 12 crop weed researchers in AAFC.

Canada wide, two researchers are dedicated for biological controls for weeds. Often, the only option available for invasive alien plant mitigation in natural habitats is biological control. Across Canada two scientists are dedicated for biological controls for all weeds including invasive species.



Key agencies involved in invasive plant species biocontrol in Canada are:

1. Exploration and screening: CABI (Europe); AAFC; US-Canada funding consortia
2. Regulatory: Canadian Food Inspection Agency
3. Rearing, releases, monitoring, ecological, implementation: AAFC with provinces and universities

Presentation by Dr. Rose De Clerck-Floate
Agriculture and Agri-Food Canada, Lethbridge, AB.
See page 65 for the complete presentation.

Current gaps or needs in biocontrol research include:

- Increased prediction of agent impact and ecological interactions
- Study and modeling of biocontrol systems
- Effects on efficacy and host range of invasive plant and agent genetic variation
- Development of novel release strategies in biocontrol
- Integration of biocontrol with other management strategies
- Insect mass production and rearing technologies to facilitate biocontrol availability and use.

Challenges to AAFC Research Activities

Opportunities

Dow AgroSciences: An industry perspective on research

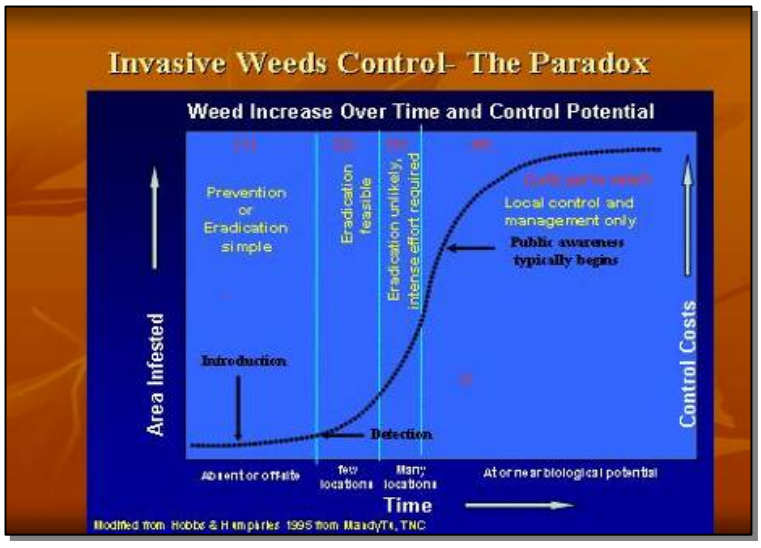
Industry has been involved in product research and development (R & D) for invasive plant species since the 1970s. R & D efforts are primarily focused on pesticide controls. These efforts generally fall into Industrial Vegetation Management (IVM) divisions, specialized business units such as restoration and protection, forestry and rangelands. Major industry stakeholders are Dow AgroSciences, BASF, DuPont (Monsanto).

Presentation by Don Hare
Dow AgroSciences.
See page 68 for the complete presentation.

Industrial/invasive vegetation management is an extremely sophisticated business involving multiple stakeholders and competing demands. In addition to the predictable challenges involved in product research and development, the control and management of invasive species have a unique set of challenges.

These include:

- Identifying a species at an early stage of invasion while meeting the requirements of a performance based regulatory system.

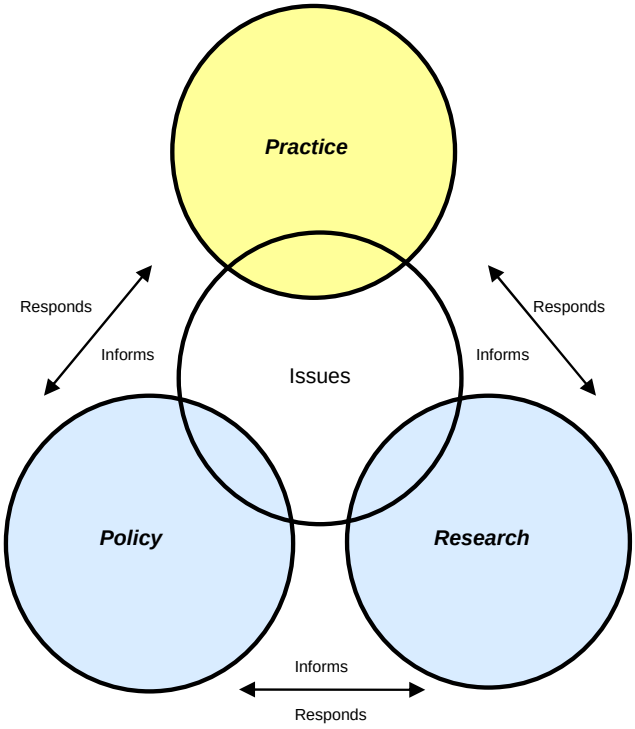


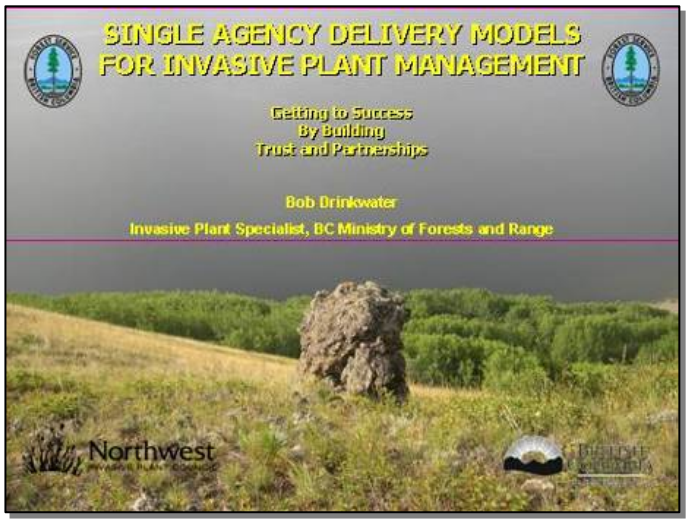
- Many invasive weed infestations are in areas that are considered as buffer zones or non-pesticides use areas such as riparian areas or watersheds.
- There are approximately 3000 plant species that have been identified as an invasive. However there is no comprehensive prioritization of species in terms of toxicity, environmental impact, interspecies, competitiveness, location and affects on biodiversity.

Currently, Dow AgroSciences (DAS) helps support a variety of organizations and agencies including the invasive species councils of British Columbia, Alberta and Manitoba, the Industrial Vegetative Management associations, the Canadian Weed Science Society and the North American Weed Management Association. DAS has also been working closely with federal and provincial agencies aligning and examining regulations and legislation regarding labeling to allow control of invasive weeds.

Practice

'Practice' refers to the grassroots or local level actions aimed at trying to control and manage invasive species. Three models or types of practice were described at the *Breaking Down Borders Forum.*





Presentation by Bob Drinkwater
BC Ministry of Forests & Range, Prince George, BC.
See page 79 for the complete presentation.

Single agency delivery model used by the North West Invasive Plants Council of British Columbia,

Single species model as illustrated by the Leafy Spurge Stakeholders Group of Manitoba

Presentation by Ryan Gibson and John Johnson
Leafy Spurge Stakeholders Group, Brandon, Manitoba.
See page 87 for the complete presentation.

Agri-Environmental Group Plan Program for the Development of Invasive Weed Management Plans.

Presentation by Nancy Gray
Saskatchewan Ministry of Agriculture, Regina, SK.
See page 90 for the complete presentation.

Model: Single agency delivery model North West Invasive Plants Council (NWIPC) British Columbia	
Description	NWIPC was formed in 1992 and now consists of a broad-based membership to include all of northwest and central BC. In 2005, rising concerns and the opportunity to access increased government funding, encouraged the NWIPC to become a formal organization with a constitution and bylaws aimed at making efficient and effective use of pooled resources.
Main activities	Activities are organized around: 1. support of volunteers and NWIPC awareness program 2. single reporting point at NWIPC linked to a IPMA single contractor 3. assist and coordinate organization contractors 4. assist organizations such as First Nations and bring all areas into the program.
Financial support	Multiple stakeholders, long-term funding.
Challenges	Integrating varying jurisdictions to cover all program areas.
Opportunities	Develop an and explain strategic approaches: Encourage stakeholders to focus on strategic approaches. Increase public understanding the necessity and function of the organizations. Work with communities to understand the issues and solutions.
Lessons learned	The single agency delivery model has helped expand partnerships while building a sense of 'ownership' of the NWIPC. People associate with the Council not government. Hotline works very well. The model uses strategic and tactical approaches including restoration approaches. Information is continually shared. Trust and partnerships are constantly improving processes and delivery. Single agency model has improved prevention of new infestations as well as containment and management of established infestations. The Council looks for solutions themselves.

Model: Single invasive plant species (leafy spurge) Leafy Spurge Stakeholders Group, Brandon, Manitoba	
Description	The LSSG was created in 1998. It is a broad coalition of agriculture and conservation organizations coordinated by the Rural Development Institute, Brandon University. Membership is open to any organization 30+ organizations are considered as LSSG members however active participation is much less. The Rural Development Institute and the Manitoba Weed Supervisors Association are the key proponents and activities.
Main activities	Education and increasing awareness of leafy spurge. Examining issues and impacts. Training and capacity building.
Financial support	No ongoing, multi-year funding. The LSSG operates by and through grant applications.
Challenges	Funding opportunities have influenced the direction and activities of the group. Levels and types of activities fluctuate on a yearly basis. Long-term planning difficult to set.
Opportunities	Single species focus allows a coordinated effort focused on leafy spurge.
Lessons learned	Inter-provincial efforts necessary to respond to changing priorities and capacity. A strong champion is essential. Need to attract the right people from organizations that have the capacity to contribute and collaborate. Garnering funding influences direction of the group. Leafy spurge not the sole responsibility of any group, gov't dept or agency.

Model: Agri-Environmental Group Plan - Invasive Alien Plants Project Saskatchewan Ministry of Agriculture and Saskatchewan Association of Rural Municipalities	
Description	Program is part of the Agri-Environmental Group Planning program, a part of the Agriculture Policy Framework (APF). Saskatchewan is leading the Group Planning process within the APF. The program is a partnership between Saskatchewan Ministry of Agriculture and the Saskatchewan Association of Rural Municipalities (SARM).
Main activities	Two stewardship advisors work with rural municipalities to carry out biocontrol monitoring, increased awareness of invasive plants, knowledge of integrated weed management, GPS monitoring and planning workshops.
Financial support	Short-term funding (3 years) provided through APF programs.
Challenges	Development of ten year weed management plans has been challenging. Need funding for weed inspectors. Revisions required for the Noxious Weed Act.
Opportunities	Work with First Nations communities is growing.
Lessons learned	Successful development and implementation of weed management areas. Group level activities rather than individual producers have considerable merit under the APF. Need for increased public awareness of invasive species. Cooperation of the rural municipalities has been a key element and great success. There is a need for licensed spray applicators. Biocontrol is essential.

Participants' Perspectives

By design, the *Breaking Down Borders Forum* brought together key individuals from each of the Western Provinces and Ontario to discuss common issues, establish networks and identify potential opportunities for collaboration. In the breakout discussions as well as the plenary session, the participants raised a number of major issues on research, policy and programs as well as practice. The participants' also identified several actions to help address some of these issues. The forum facilitator helped move the discussion along while several members of the forum planning team made detailed notes or audio-taped proceedings.

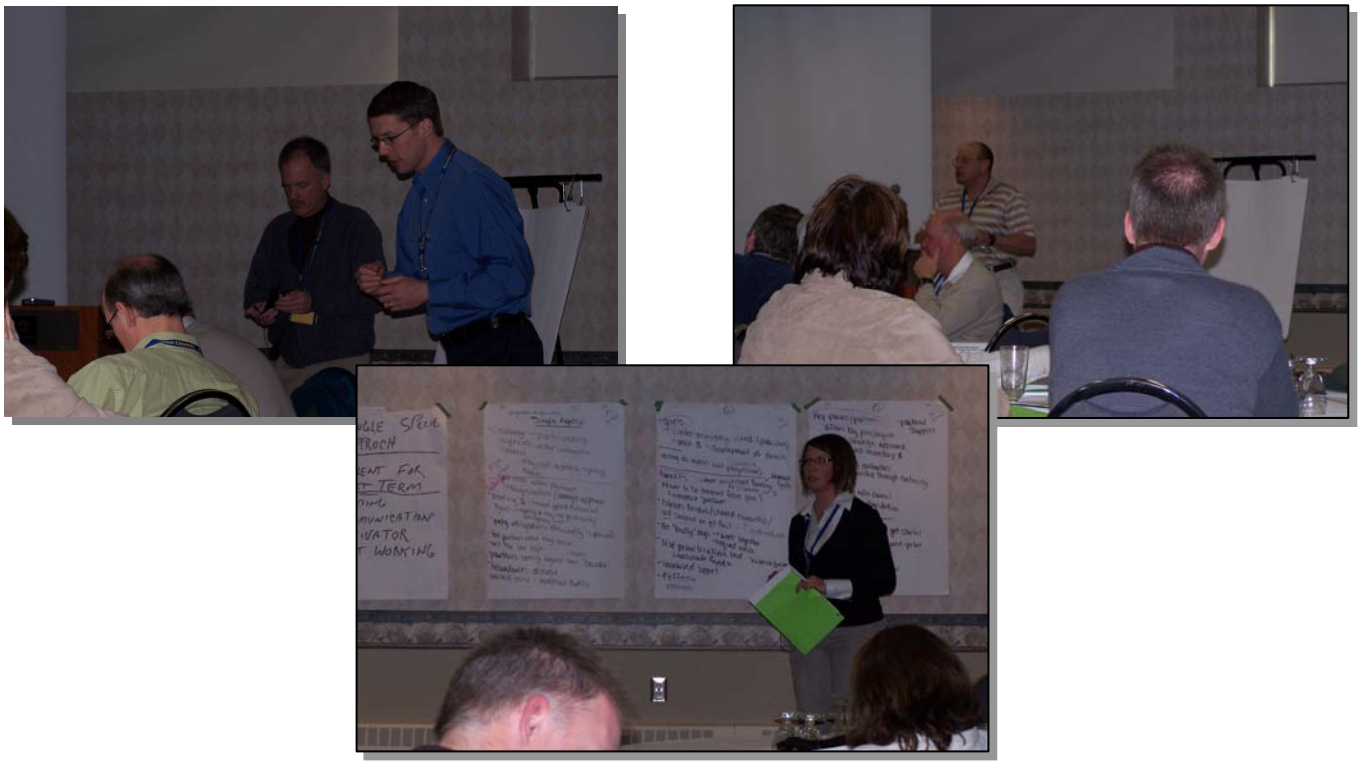
The table below summarizes the participants' perspectives and the level of interest that emerged based on the discussions. Over time and circumstances it is reasonable to expect changing issues as well as the level of interest - hopefully as a response to accomplishments!

Policies and programs

Major issues	Action	Level of interest ✓✓✓ High ✓✓ Moderate ✓ Low
Education and awareness	Encourage and / or join plant councils. Strong councils are necessary for collaboration.	✓✓✓
	Develop a National Invasive Plant Council. Encourage the involvement of members from other councils to participate across the country.	✓✓
Shared information	Develop a common list and use a standardized format for an online and reliable reference of invasive plants.	✓✓✓
	Link data sets across provinces and ensure easy access.	✓
Public and political support and commitment.	Encourage or enhance efforts to build philosophical and political commitment for efforts. For example, municipalities, local agencies, weed supervisors and awareness building organizations need stable and available funding support to assist with invasive species.	✓✓✓
Regulations	Identify and use science-based information to review and discuss regulations on buffer zones and riparian areas.	✓✓✓

Research

Major issues	Action	Level of interest ✓✓✓ High ✓✓ Moderate ✓ Low
Collaborative research	Develop and foster opportunities to bring together universities, awareness-based councils, policy-makers, and practitioners to share information, collaborate on opportunities, identify gaps in research, and build support for more research funding. An example is to increase connections and involvement of the Canadian Weed Science Society.	✓✓✓
Restoration ecology	Increase research on restoration ecology and invasive species control.	✓✓
Biocontrol	Increase research on biocontrol agents.	✓✓



Practice

Major issues	Action	Level of interest ✓✓✓ High ✓✓ Moderate ✓ Low
Human resources	Need support for weed inspectors / supervisors (MB and SK).	✓✓✓
	Develop prairie-wide certification for invasive plant management contractors.	✓
Education and Awareness	Develop common template for messages, fact sheets, weed identification.	✓✓✓
	Increase understanding of control of invasive species as 1st step in restoration ecology in natural areas.	✓
Biocontrol program	Organize a biocontrol distribution program.	✓✓
Management plans	Development of "How-to" guide to help groups develop weed management plans. Also, bring people together to share experiences.	✓✓✓

A Model for Collaborative Action

Throughout the planning stages and forum activities, the aim of the *Breaking Down Borders* was to:

> *provide a networking opportunity for key stakeholders in Western Canada to share information, discuss issues and identify mutually beneficial actions.*

Mutually beneficial actions or collaborative actions involve a variety of stakeholders including individuals, organizations or groups that have a vested interest in invasive species. Participants at the Breaking Down Borders Forum that there was

> *significant need and merit in actively collaborating on issues of mutual interest and benefit.*

Participants also identified the following attributes that should be taken into consideration for collaboration.

1. A strong chair (and secretariat function) is necessary for stability and to keep the common agenda and priorities moving along.
2. The Invasive Plants/ Species Councils play a critical role.
3. Loose affiliations in the form of working groups can be used to address the priorities.
4. Momentum should be built gradually but productively. Participation in collaborative efforts focuses on the Western region but is continually open to the involvement of other provinces.
5. Existing and emerging opportunities should be used to meet, talk about progress and continue to develop the network.

These attributes as well as the priorities identified by participants at the forum were used as the basis of considerations for the development of a model for Western Region collaboration. The model was refined based on the advice and input from the individuals listed on page 34. The model has also received approval to move forward and implement development.

Model for Western Region Collaborative Network on Invasive Species

The major features of the model are:

- A Steering Committee of key stakeholders co-chaired by a representative from the Prairie Farm Rehabilitation Administration and a representative from the Invasive Species Councils, selected by the Councils. The Invasive Species chair rotates on a two-year period.

- Working groups are established and carry out the priorities (see below).

- The Rural Development Institute (RDI), Brandon University has agreed to provide support for initial efforts to get the model operational as well as working groups established and underway. RDI will also begin immediately to work on finding funding support for the network.

Priorities

The following priorities for collaborative actions emerged from the forum as well as the follow-up meeting with forum organizers.

- The priorities delineated into short and medium-time frames address the participants' desire to 'walk before we run'.
- The long-term priority of building capacity respects and explicitly supports the role and importance awareness-building organizations such as the invasive plant councils, local practitioners such as weed inspectors or supervisors, local agencies such as municipalities or weed management areas, and the research community including universities, industry, and government.

Short-term actions (6 months – 10 months) are strategically aimed at sustaining current momentum for collaboration across Western Canada.

Priority #1 – Establish a working group to develop and disseminate a literature review on invasive species in riparian areas and buffer zones. Share the information broadly. Consider opportunities (Invasive Species Council of BC fall meeting, Canadian Weed Science Society meeting, input and participation in consultation meetings with PMRA).

Priority #2 – Establish a working group of Invasive Plant/Species Councils to network and cooperate on communications plan for sharing information, formats, common templates, fact sheets and common shared lists of invasive plant species.

Priority #3 - Develop and foster opportunities to bring together universities, awareness-based councils, policy-makers, and practitioners to share information, collaborate on opportunities, identify gaps in research, and build support for more research funding.

Medium-term actions (10 months – 24 months) are aimed at supporting invasive plant/species councils, building capacity at the local level and future networking.

Priority #4 – Begin planning for next forum to update information and set next set of priorities. This forum could address the experiences of local regions to develop weed management plans, gather input from contractors, ag fieldmen, weed inspectors and supervisors. The forum would also be an opportunity to review progress and if successful, set the next set of priorities for collaboration.

Long-term actions (on-going) are aimed at supporting invasive plant/species councils, building capacity at the local level, building and extending networks.

Priority #5 - Sustain and build momentum for collaboration through productive actions and supportive efforts. While participation and collaboration will focus initially on issues and priorities in the Western region, other provinces (e.g., other invasive plant councils, agencies or organizations) are welcome to become involved.

Work Plan (pending approval of Steering Committee)

The model is based on a two-year cycle.

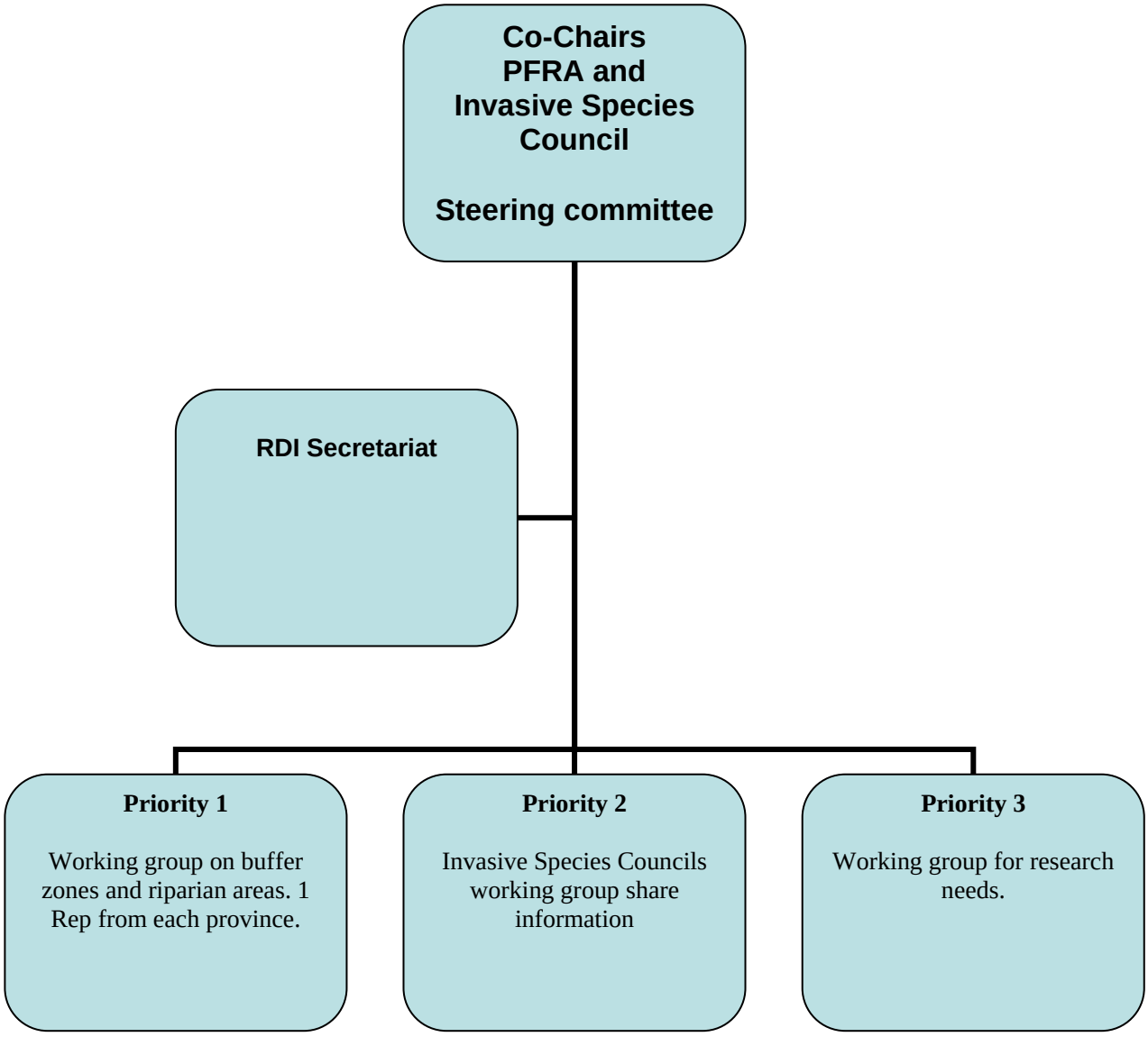
Year 1 – 2008-09

- Identify co-chairs, Steering committee and establish terms of reference or guidelines for participation.
- Establish, identify tasks and implement activities of working groups (see page 30).
- Pursue funding requests while not impinging on efforts of the Invasive Species Councils or other organizations to raise funds.

Year II – 2009-10

- Continue with priorities.
- Establish working group to plan 2nd Western Regional Forum on invasive alien species. Forum held at the end of the second year.
- At the forum old priorities reviewed and/or revised and new priorities set. New co-chair from Invasive Plant /Species Council. PFRA co-chair remains.
- RDI secretariat function concludes or is renewed.

Organizational Structure



The following individuals have provided input to this report and recommendations for the model.

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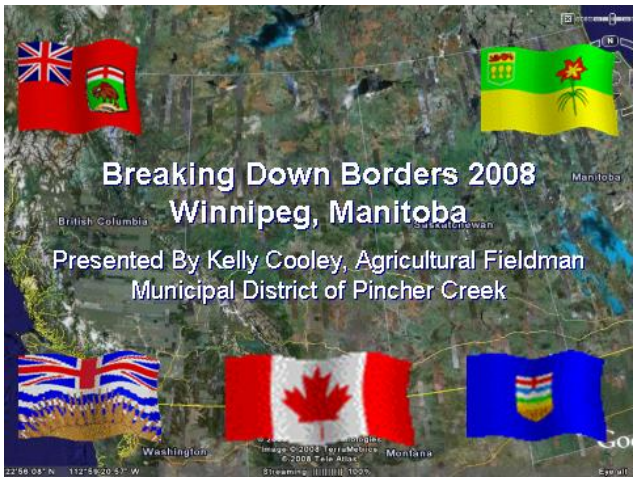
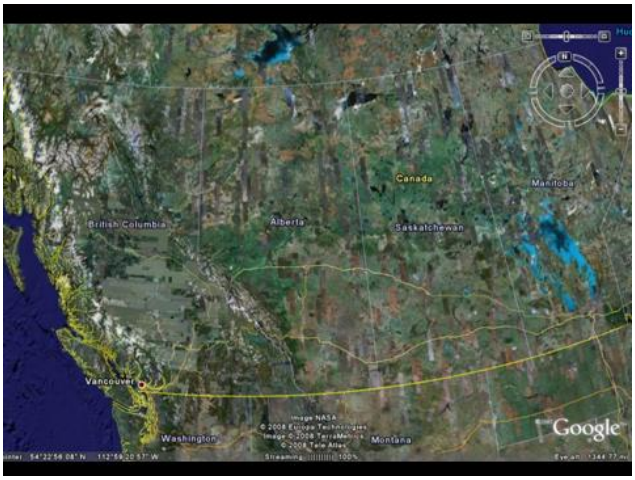
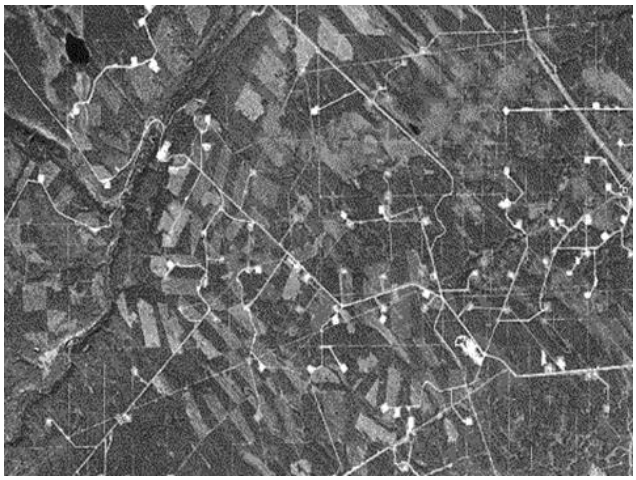
Appendix A: Forum Presentations

How did we get to this point

Kelly Cooley








Sickleweed (Falcaria vulgaris)

2006 Calgary NAWMA Conference

- Alberta Invasive Plants Council co-hosted
- Theme - Risk Assessment
- Inter-provincial working group of Greencover Canada Leafy Spurge project (2004-07) recognized the merits and potential of networking/partnerships and cooperation particularly in light of new Invasive Species Policy framework.

2006 Calgary NAWMA Conference

- Inter-provincial working group also recognized increased concern and spread of invasive plants across Western Canada
- Resources varied widely across prairie region.
- Did not want to reinvent the 'wheel' or duplicate other organizations.
- Looked at NAWMA, and thought there was merit in opening discussion to a broader audience of Canadian / Western Canadian organizations, agencies, and individuals.

About NAWMA
www.nawma.org

The mission of NAWMA is to provide:

- education
- regulatory direction
- professional improvement
- environmental awareness

to preserve and protect our natural resources from the degrading impacts of noxious and invasive plants

NAWMA's Goals

- Empower North American noxious weed managers by improving their professionalism & public image
- Assist in development of uniform international, national, provincial/state weed management legislation/regulation
- Foster cooperation/involvement in noxious weed management among federal, provincial/state, municipal district/county, & private land managers across North America

NAWMA's Goals

- Coordinate enforcement in noxious weed management among federal, provincial/state, municipal district/county, & private land managers
- Promote funding of weed management projects, research, & programs that are international, national, or regional in scope and/or effectiveness
- 2008 NAWMA Annual Conference will be held in Billings, Montana Sept 15-18
- BECOME A MEMBER OF NAWMA

www.nawma.org

NAWMA Member Benefits

- NAWMA Committees
  - NAWMA Mapping Standards – minimum recommended protocols for mapping weeds
  - NAWMA Weed Free Forage & Gravel Standards – recommended minimum protocols for inspection & transportation of forage and gravel
  - International Issues – NAWMA positions on national legislation in U.S.A. & Canada.
  - Personal Improvement/Education – CMIP program & other educational opportunities.

2008 Weeds Across Borders

CONGRESO MALEZAS SIN FRONTERAS

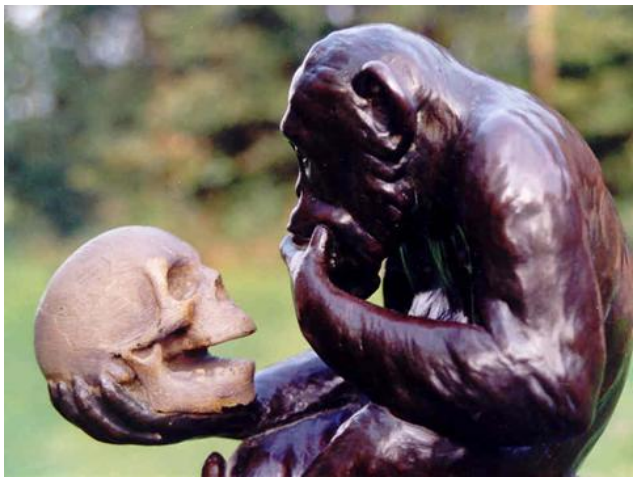
MAUVAISES HERBES SANS FRONTIÈRES

May 27 to 30, 2008 • Banff, Alberta

View from the North

- Unique opportunity to highlight weed issues across Canada, Mexico and the U.S.
- Encourages international participation in weed management.
- Speakers & scientists from across North America and beyond.

www.acca.coop/wab



Round Table Review of Situation and Activities

British Columbia – Dave Ralph

Ministry of Agriculture and Lands

Cross Borders Project

- 5rd year of partnership between:
- Boundary Weed Management Committee
- South Okanagan Invasive Plant Society
- Okanogan County Noxious Weed Control Board (US)
- Ferry County Noxious Weed Board (US)
- Education, awareness, treatment, management, mapping, inventory, cross jurisdictional strategy

Ministry of Agriculture and Lands

Biological Control Initiatives

- Over 50 biological insect species on over 20 invasive species
- Recent successes:
  - *Cruciger* – hound's-tongue
  - *Larinus obtusus/minutus* – knapweed
  - *Mecinus* - Dalmatian toadflax
  - *Galerucella* - purple loosestrife

Weed Committees

Ministry of Agriculture and Lands

Weed Committees

- 14 Regional District or Municipal
- 10 community or local committees
- Currently most of province covered off
- 3 -5 potential new committees in 2008
- Committee program functions range from education and awareness only, to complete management activities, enforcement and education

Ministry of Agriculture and Lands

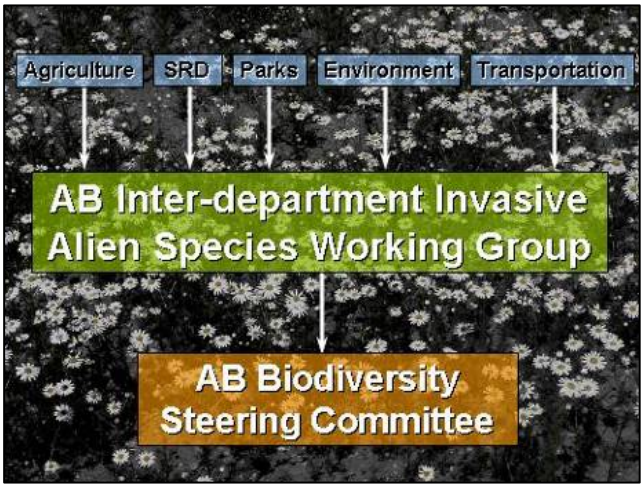
Other Initiatives

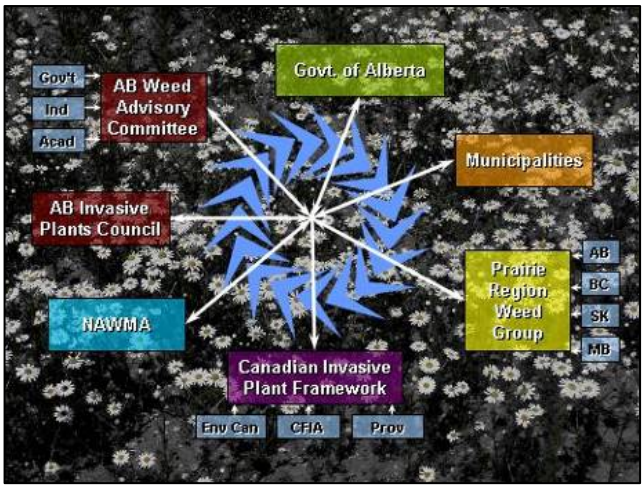
- Corrections Program utilizing low risk inmates for manual IP management
- Hoary alyssum Management Demonstration
- Aminopyralid - Timing and Rate Trials on non-labelled invasive species
- IASPP initiatives by various committees (strategies, publications, inventories, awareness materials, coordination)

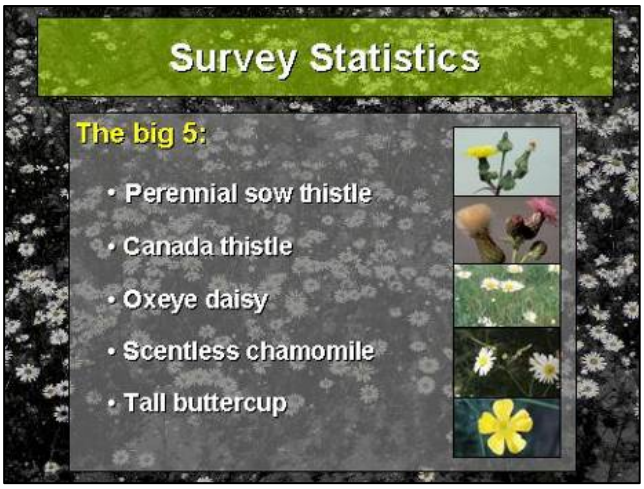
Ministry of Agriculture and Lands

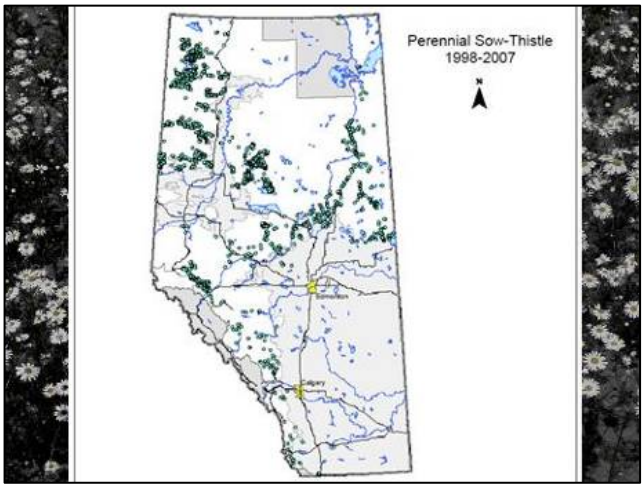
- Emerging Opportunities
  - partnerships and collaborations,
  - increase in public awareness of IP's
- Threats
  - IP species currently not found in BC
    - yellow starthistle, crupina, kudzu
- Challenges
  - money, resources
  - succession planning
  - shortage of expertise in on- ground contractors

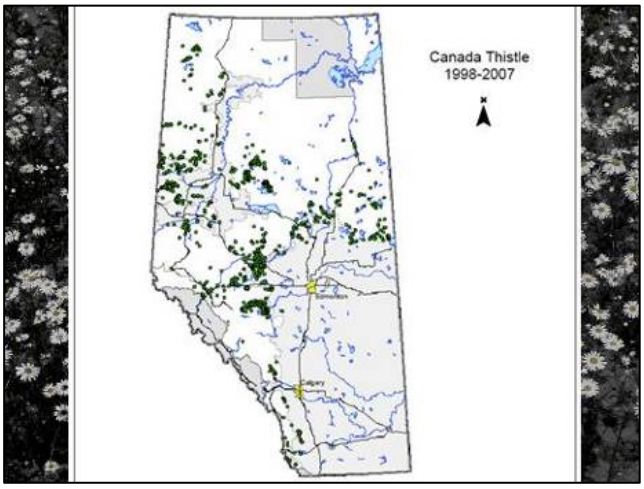
Alberta – Mike Undershultz

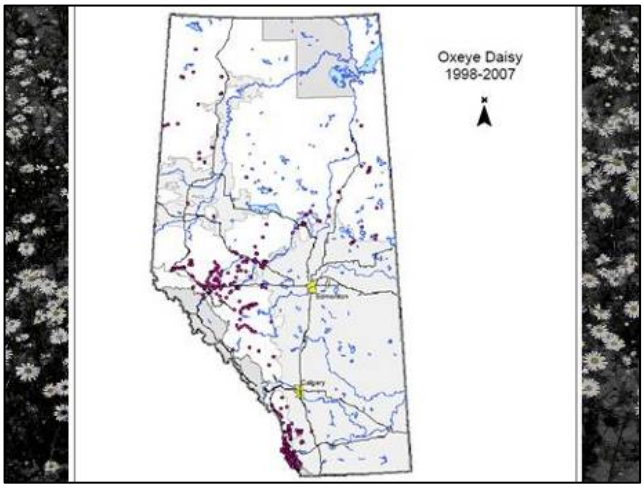


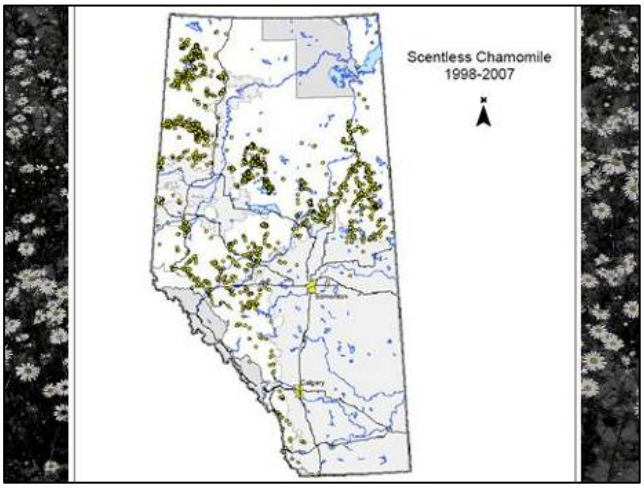


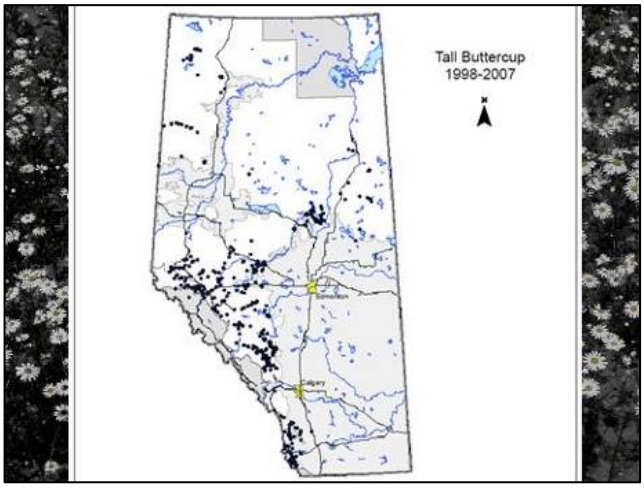


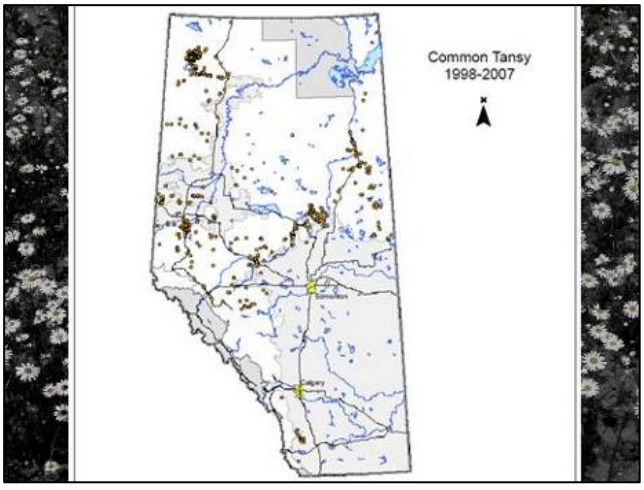


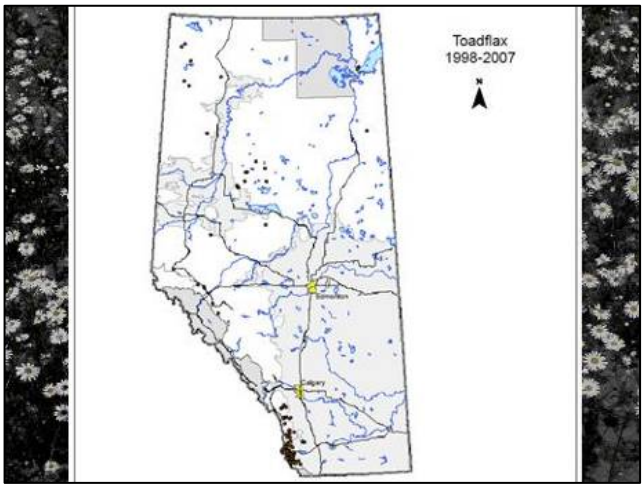


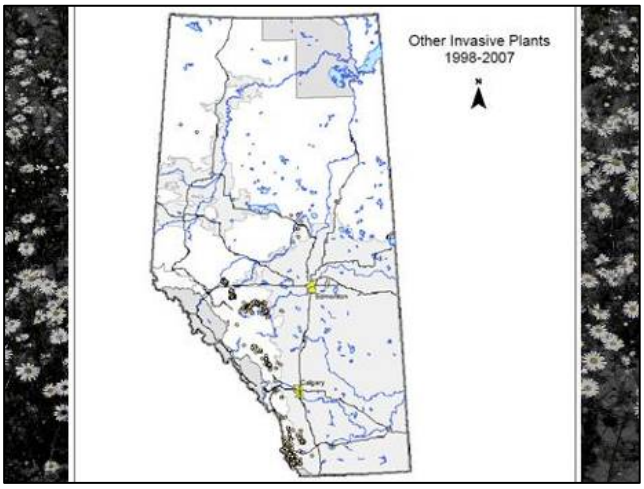

Oxeye Daisy
1998-2007

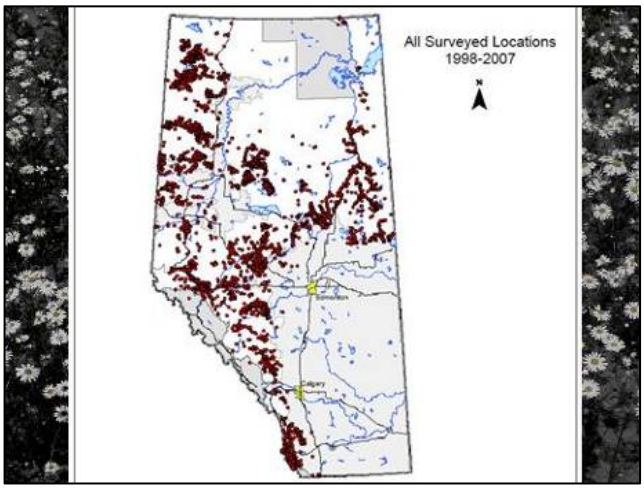

Scentless Chamomile
1998-2007


Tall Buttercup
1998-2007


Common Tansy
1998-2007


Toadflax
1998-2007


Other Invasive Plants
1998-2007



Weed Control Act Revisions

Expected updates:

- Primary noxious & noxious categories
- Clarification of roles/responsibilities
- Modernizing administration
- Improving document flow
- Definitions

Risk Assessment tool

A quantitative, rapid assessment of the likelihood of impacts from potential and established IAS in environmental, social and economic terms.

Probability: High
Severity: Serious

Risk Assessment tool

Outcomes:

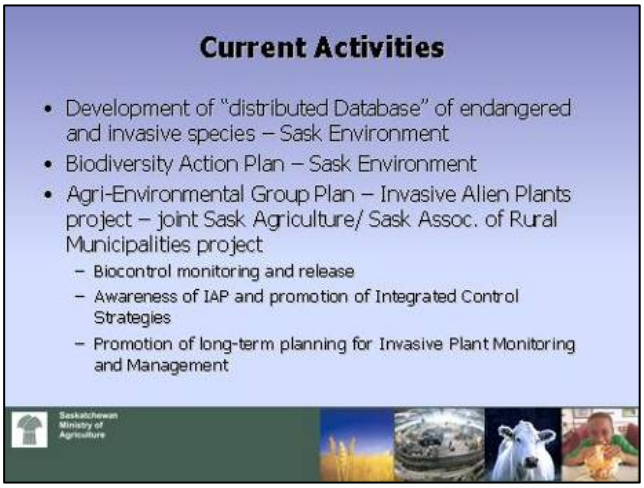
- Set management priorities among invasive species
- Transparent management decisions
- Identify data gaps
- Promote cooperation

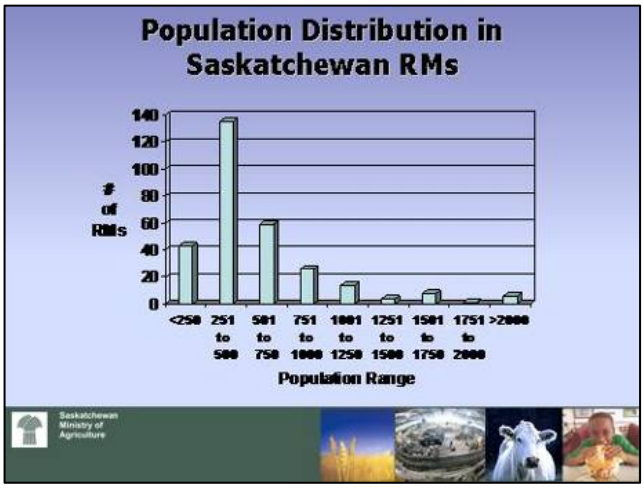
Pest Surveillance System

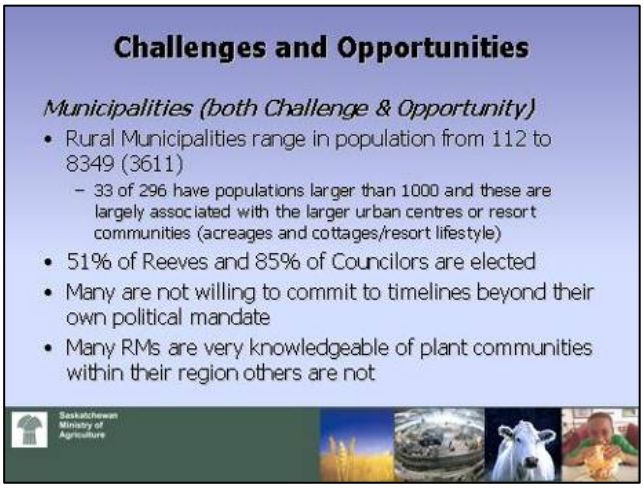
Provincial pest database:

- All Alberta pest species
- Early detection component

Saskatchewan – Clark Brenzil







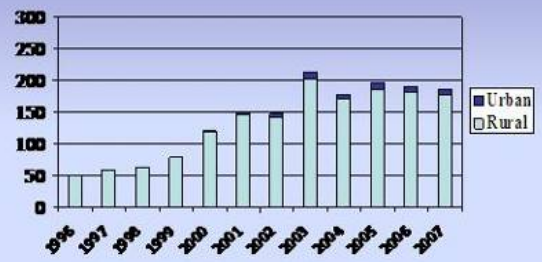
Challenges and Opportunities

Municipalities (both Challenge & Opportunity)

- Many municipalities are quite motivated and successful at containing IAP populations locally while others are largely unaware or complacent until over-run
- Approximately 170 of 296 RMs and 8 urban municipalities appoint weed inspectors (enforce Noxious Weeds Act)
  - Many RMs share a single weed inspector (as many as 10)
  - Many councilors appoint themselves as Weed Inspectors for their RM (Yorkton area in particular)

Saskatchewan Ministry of Agriculture

Municipalities appointing Weed Inspectors



Saskatchewan Ministry of Agriculture

Challenges and Opportunities

Transportation Industry (Challenge)

- Transportation corridors are key IAP movement route
- IAP management low priority (non-core) for transportation industry
- Weed control not usually budgeted separately but part of maintenance – competes with potholes
- Liabilities of action can be high – herbicide drift
- More engineering background than biology

Saskatchewan Ministry of Agriculture

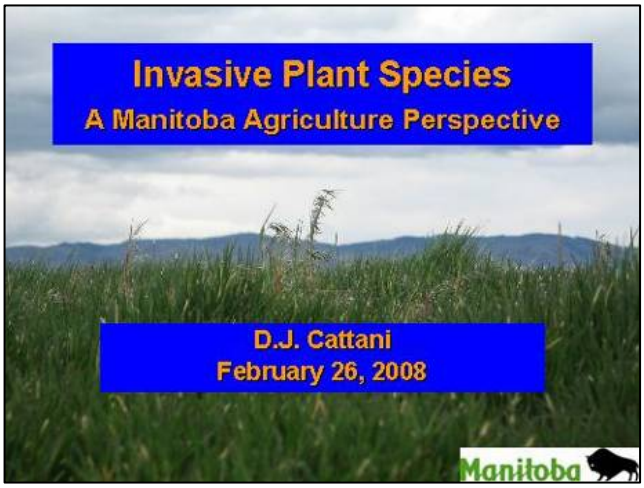
Challenges and Opportunities

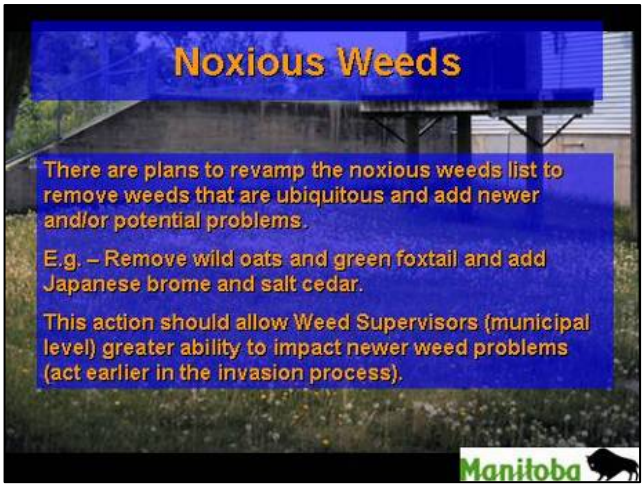
Industrial Vegetation Management Industry (Challenge)

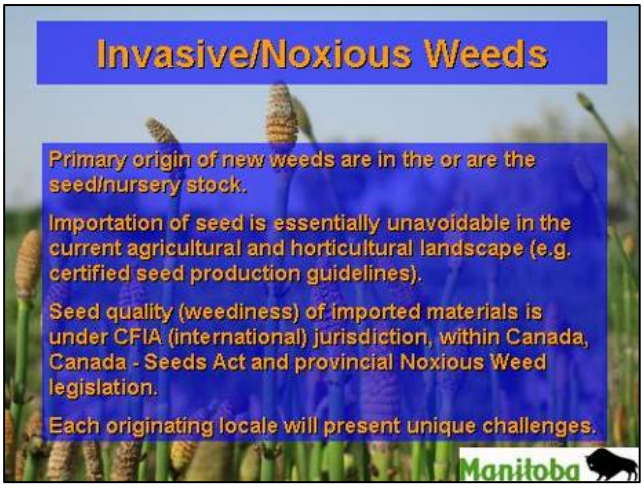
- Work largely in "Critical Pathways" for Invasive Plant spread – roadsides, pipelines, railroads, etc.
- Small acreage industry that is often a low priority for Crop Protection Companies – market potential
- Eligible for the federal Minor Use Pesticide Program?
  - If so who champions the work (= producer group)?
- Low proportion of "Low risk" products in total portfolio of herbicide options compared to Agriculture
- Environmental risk models (buffers & rates) for herbicide registration are Ag based and not well suited to "surgical strike" or "ribbon" type applications

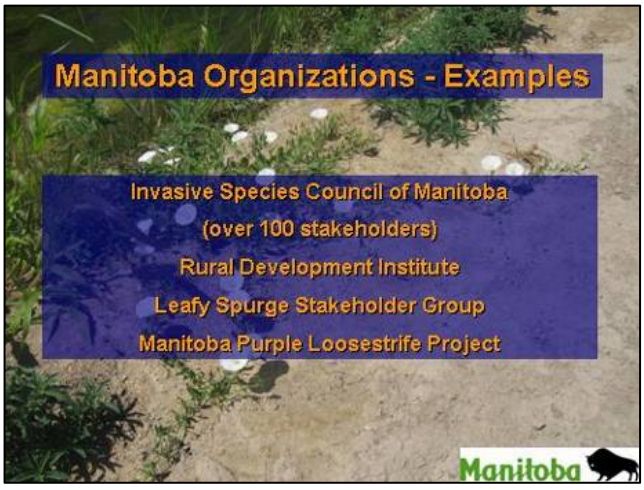
Saskatchewan Ministry of Agriculture

Manitoba – Doug Cattani





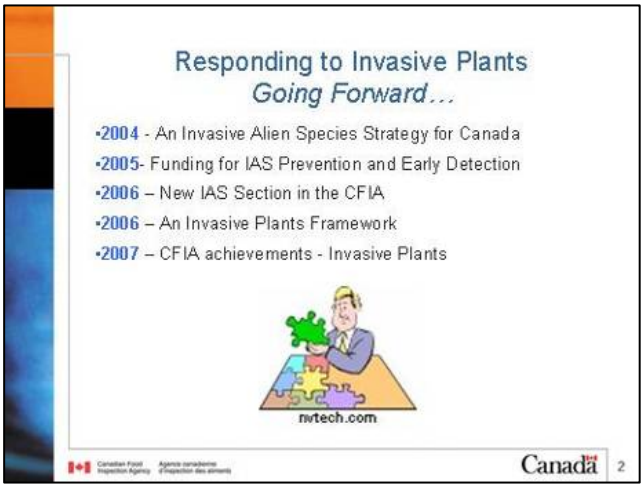


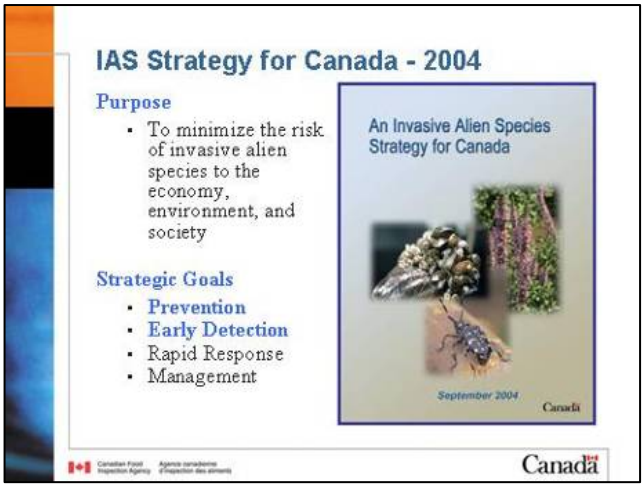


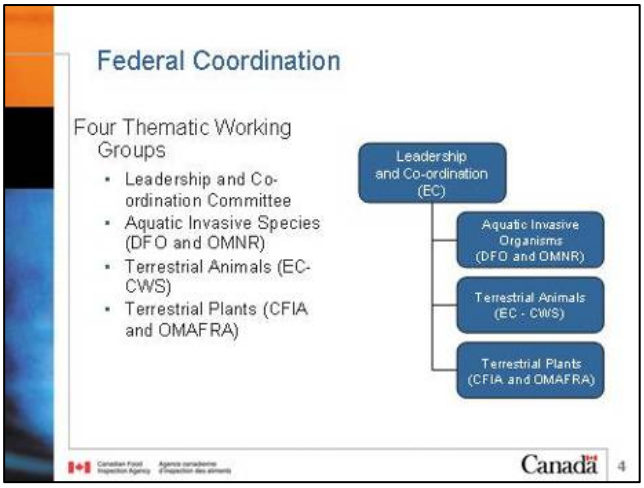

Current Situation
MAFRI is working within its current mandates to aid agriculture in its endeavors to retain its productivity and profitability.
Currently, MAFRI staff can aid in the invasive plant species process (E.g. Jane Thornton and the LSSG).
This is a decision based upon the ability and willingness of the individual in line with their positions .
Currently, no overall policy to address invasive plant species unless have become a problematic weed.
Manitoba

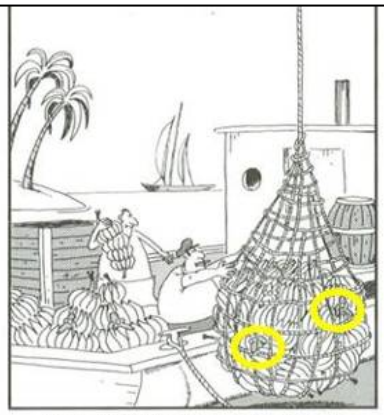

Future?

National Perspective – Cory Lindgren









How poodles first came to North America

A National IAS Strategy for Canada

Support for IAS Strategy Implementation....

Budget 2005 allocated new resources to four federal departments, including CFIA

- $85M over five years, beginning 2005/06
- CFIA, CFS, DFO, EC
- Partnerships
- Key actions identified in National IAS Strategy

The CFIA workplanning involves:

- Develop science-based **import policies**
- Develop collaborative **emergency response plans**
- Conduct **surveys**
- Provide accurate **identification**
- Promote **awareness** of high risk pathways
- Collaborate with **international** partners
- **Risk Analysis**: weed risk assessments and risk management decisions
- Develop a national invasive plants program/policy

Why Do We Need a CIPF?

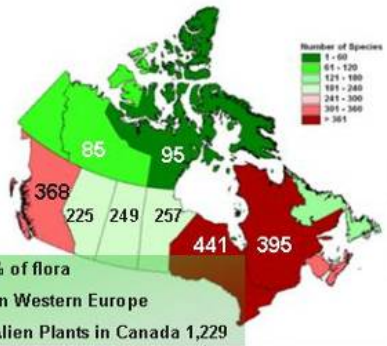
Invasive Plant Impacts

- About 24% of Canada's plant species are alien invasive plants
- Long term average 1.2 new invasive plant species arriving each year.
- 58% intentional introductions
- Invasive plants are one of the greatest threats to croplands, rangelands, aquatic areas, and natural areas in Canada.

- And the problem is increasing.....

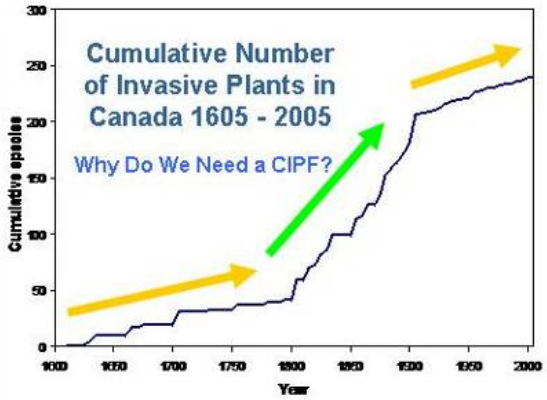
Status of Invasive Plants in Canada

Number of Invasive Plants by Province



243 PEI
333 NS
321 NB
197 NFL

- About 24% of flora
- Come from Western Europe
- Invasive Alien Plants in Canada 1,229



We need to Respond to Invasive Plants as Pests
This is a new area of business for the CFIA

Project Plan and Approach Towards
Engaging Canadians in Developing a

Canadian Invasive Plant Framework

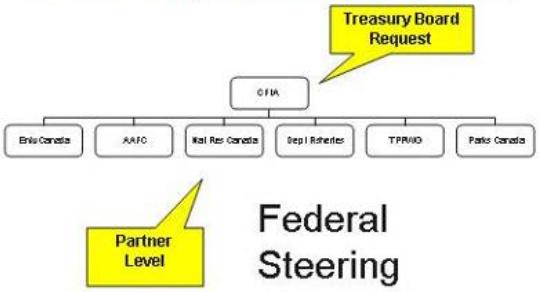
Canada 13

Leadership and Coordination

A CFIA federal leadership approach has been adopted to guide the overall development of the Framework.

Canada 14

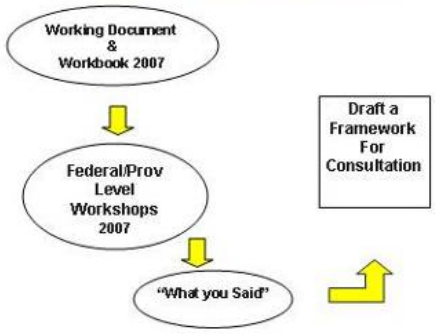
Leadership and Coordination



Canada 15

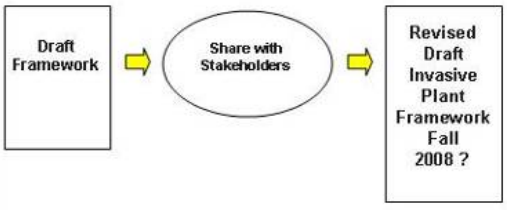
CIPF Phase I

Federal-Provincial Workshops



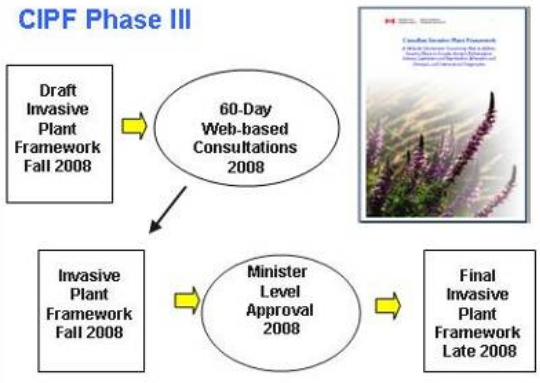
Canada 16

CIPF Phase II



Canada 17

CIPF Phase III

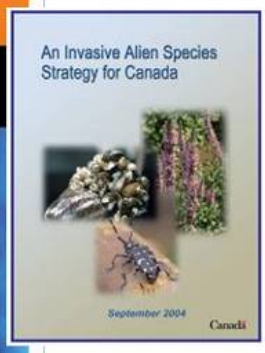


Canada 18

FTP CIPF Regional Workshops have been completed

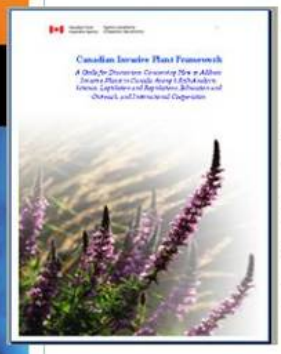
Toronto	March 21 2007
Vancouver	May 23 2007
Halifax	September 25 2007
Quebec	October 31 2007
Winnipeg	December 6 2007

Workshop report almost complete !!



Consistent Approach

A Canadian Invasive Plant Framework will be Consistent with the *2004 Invasive Alien Species Strategy for Canada*



The Vision

Provide proactive national direction and coordination in order to protect all areas of Canada from the impacts of invasive plants.

Scope

The CIPF will protect Canada's aquatic and terrestrial ecosystems, native biological diversity, domestic plants and animals, primary industries, and import and export markets from the risks of invasive plants.

The Objective

Outline the roles of governments, non-government organizations, industry, and Canadians in the prevention, early detection, response and management of invasive plants.

A CIPF will strive to establish consistent, coordinated policies and programs that will prevent, or minimize, the impacts of invasive plants on the Canadian economy, environment and society including human health.

Strategic Goals

Prevent harmful intentional and unintentional introductions;

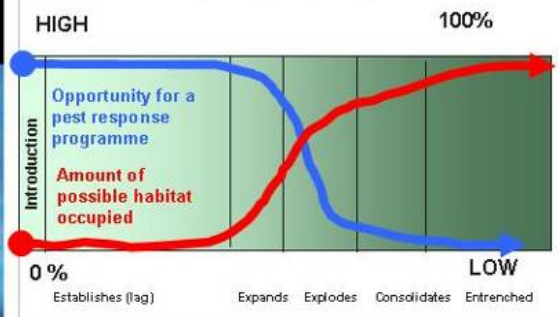
Detect and identify new invaders pre-border and upon entry;

Respond rapidly to new invaders upon detection; and

Manage established and spreading invaders through eradication, containment, and control.

Relationship Between Spread of a Pest and Feasibility of a Response Program

(Peter Williams 1997)



Canada 25

Identification of CIPF Priority Actions

Implementation Strategies

1. Risk Analysis
2. Science
3. Legislation and Regulations
4. Education and Outreach
5. International Cooperation

Canada 26

Examples

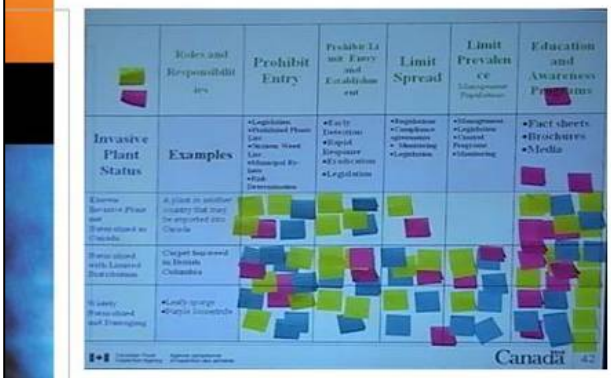
Implementation Strategy: Risk Analysis

Action 1. Develop a Pre-Screening (categorization) Tool
Accelerate the PRA process.
Lead CFIA, F/P/T, AAFC

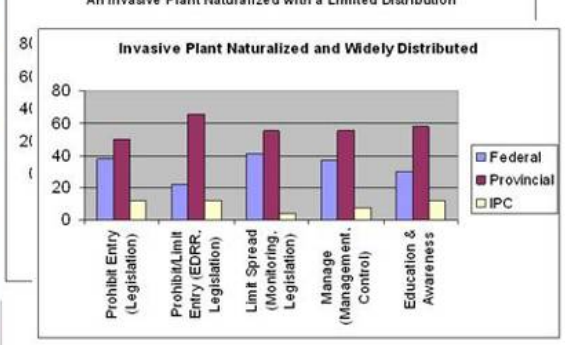
Action 2. Enhance Coordination and Communication of Risk Analysis with Provinces.
Lead CFIA and provinces

Action 3. Organize a Canadian Risk Analysis Workshop.
Lead CFIA, EC, DFO, CFS

Canada 27



Canada 28



Canada 29

Framework will lead to a New Invasive Plant Policy

- Imports of New plants
- Known Invasives

Challenges…

Most of the traits that are touted as great for biofuel crops – no known pests or diseases, rapid growth, high water-use efficiency – are red flags for invasion biologists and regulatory agencies.

- Aquatic Invasive Plants
- Bird Seed – Pathways
- Wild Flower Mixes
- Screening tools

Canada 30

Invasive Plants – CFIA example projects

- **Carpet burweed** (*Soliva sessilis*) in British Columbia
  - Contribution towards survey & development of response plan
- **Woolly cupgrass** (*Eriochloa villosa*) in Quebec
  - Surveys of infested sites & surrounding area
  - Tracebacks of potential sources
  - Regulated federal noxious weed (Seeds Act)
- **Jointed goatgrass** (*Aegilops cylindrica*) in Ontario
  - Discovered in Ontario Spring 2006
  - Investigation, traceback, review of management options
  - Additional surveys planned for 2007
  - Regulated federal noxious weed (Seeds Act)

Canada 31

Risk Analysis – Weed Risk Assessments

- Carpet Burweed
- Jointed Goat Grass
- Pattersons Curse
- Serrated Tussock
- Giant Reed Grass
- Miscanthus
- Saltcedar

Risk Management Documents

Rapid Assessment/Screening Tool

Canada 32

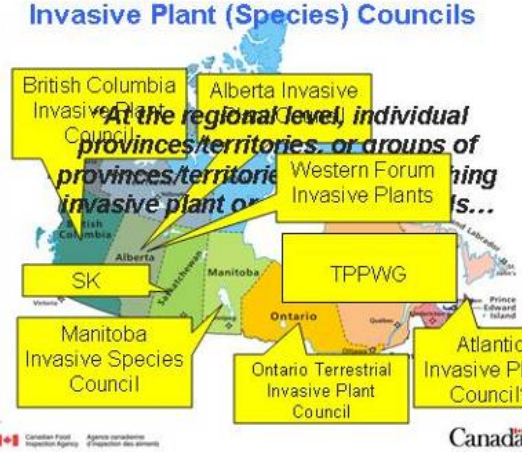
Carpet Burweed
(Soliva sessilis)

2007 Action Plan

CIPF - how best to partner with the provinces and coordinate programs nationwide to prevent spread and establishment

Canada 33

Invasive Plant (Species) Councils



At the regional level, individual provinces/territories, or groups of provinces/territories...

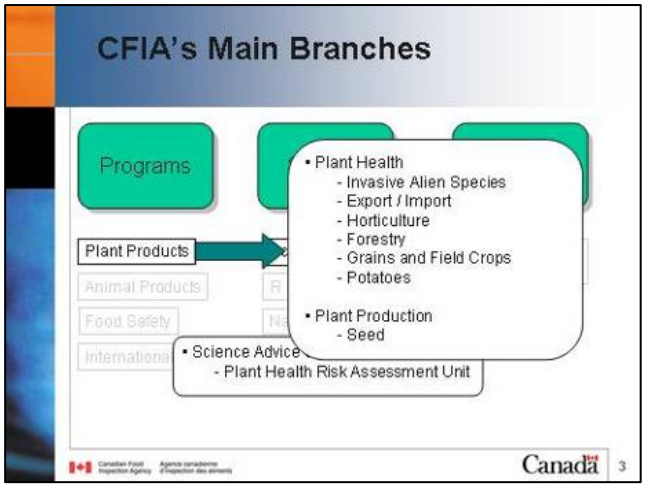
Canada 34

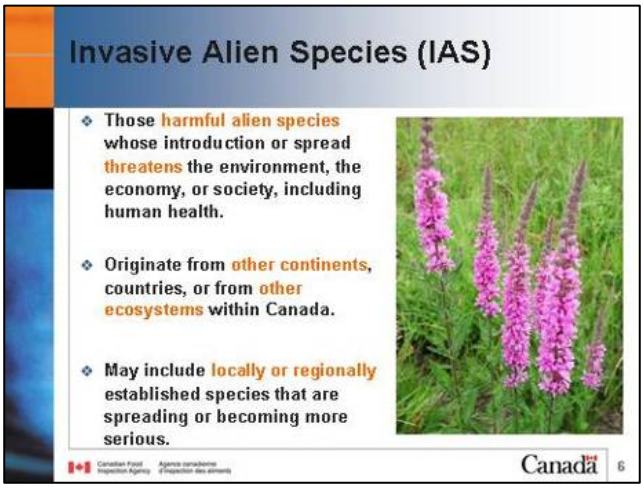
Are We Ready?

Networking
National Invasive Plant Accord?
TPPWG?
EDRR Framework

Canada 35

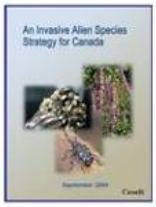
Regional Perspective – Jamie Richardson (CFIA)





A National IAS Strategy for Canada

Under Environment Canada leadership, CFIA joined with other federal and provincial government organizations to develop:



An Invasive Alien Species Strategy for Canada (2004)

Proposed Action Plan for Invasive Alien Terrestrial Plants & Plant Pests (2005)

A National IAS Strategy for Canada

- Protection of the environment, economy and society (social and human health treats)
- Key actions identified in National Strategy:
  - *Prevention* (e.g. risk analysis, research, education)
  - *Early Detection* (e.g. site-specific and general monitoring)
  - *Rapid Response*
  - *Management* (containment, control, eradication)
- Cooperation and collaboration
  - E.g. Other departments, IAS Partnership Program

A National IAS Strategy for Canada

- CFIA IAS divided: Invasive alien plants and plant pests
- Three primary objectives for the CFIA:
  - Strengthen existing plant health program
  - Develop & implement a new program for invasive alien plants
  - Collaboration
- Report to Parliament on IAS

A National IAS Strategy for Canada

CFIA's IAS Commitment:

- PRAs and risk based policies
- Pathway analysis
- Survey and identification tools
- Emergency response plans
- Network and collaboration

Science Branch Contribution to IAS Program

Pathways analysis & enhanced risk assessment capability

- New Botany Section in Plant Health Risk Assessment Unit (PHRA)
- Additional plant pathologist & entomologists
- High risk pathways identification
- PRAs for new plant species

Science Branch Contribution to IAS Program (cont'd …)

Survey design & implementation

- Regional survey biologist (Dave Holden)
- Expanded resources for surveys
- Survey of high risk sites

Laboratory capability & capacity

- Nematology (Charlottetown)
- Pathology and entomology (Ottawa)
- Seeds (Saskatoon)

Operations Contributions to IAS Program

Operations Branch

- Increased inspection of imported goods
  - Imported seeds & grains, birdseed & wildflower mixes
  - Horticultural products, e.g., root crops from high risk areas, cut flowers
- Increased survey delivery for plant pests
  - Exotic forest pest survey
  - Pest-specific surveys (e.g., *Jointed Goat Grass in MB*)
- Increased import data collection & analysis

Canada 13

Changing Pressures

Increasing and immediate pressures:

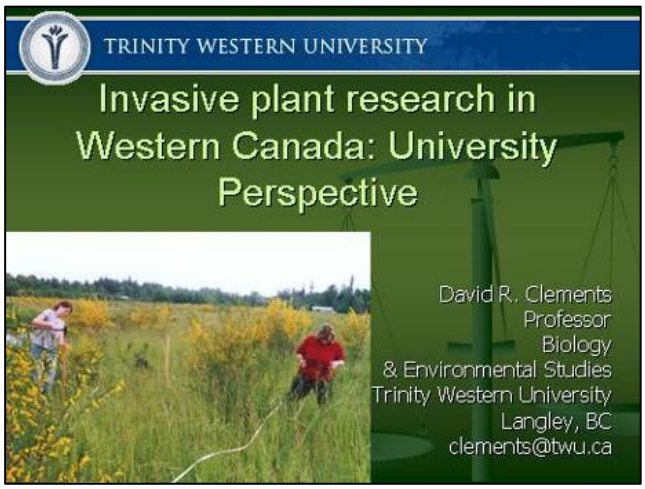
- **Increasing:**
  - volume & diversity of trade
  - access to international markets
  - speed of transport
  - tourism & other travel
  - national and global awareness
- **Changing environmental conditions**
  - can increase chances of establishment
  - 50 km north per decade

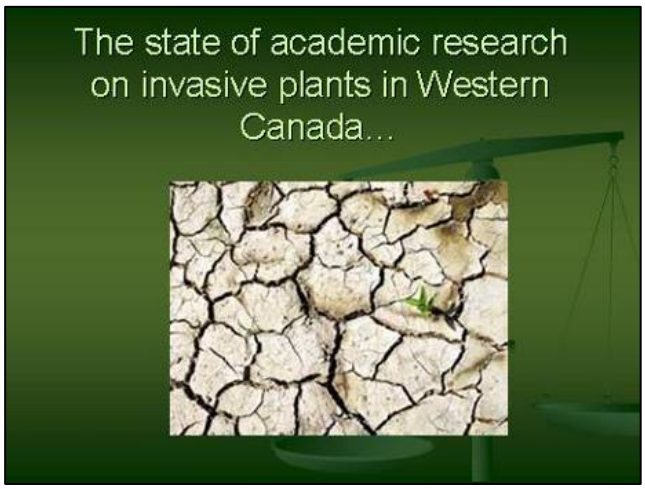
Canada 14

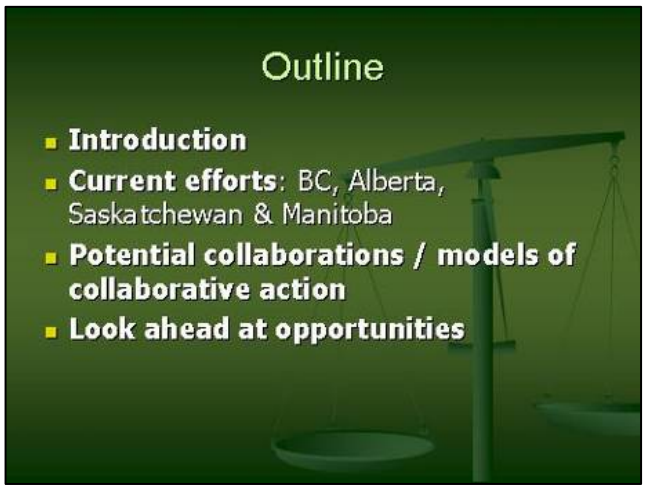
Canada

Issues and Needs in Research

David Clements







Introduction

- Invasive species biology a relatively new discipline begun by Charles Elton in 1958
- Richard Mack published his first article on biological invasions in 1981 on the ecological impact of *Bromus tectorum* in western North America

Mark A. Davis 2005, *Invasion Biology 1958-2004: The Pursuit of Science and Conservation*

Introduction

- "Biological invasions became a popular area of research and an increasingly controversial topic of debate during the 1990s resulting in a flood of publications, both scholarly and popular, that continues to this day." Davis 2005
- Executive order signed by U.S. President in 1999 helped spur on funding / research

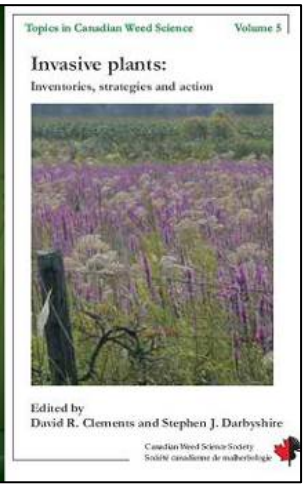
Introduction

- Because invasion biology is relatively new, academics must approach it sideways from more established disciplines
- e.g. population ecology, botany, forestry, conservation biology, weed science
- funding sources not readily accessible

Current Efforts

National/regional meetings:

- CWSS symposium (Nov. 2006 – Victoria)
- Plant Canada symposium (June 2007 – Saskatoon)
- Breaking Down Borders (Feb. 2008 – Winnipeg)
- Weeds Across Borders (May 27-30 2008 – Banff)
- BC IPC Research Forum (Oct. 29-30 2008 – Richmond)



Current efforts - BC

University of British Columbia

- Judy Meyers: biological control and ecology of invasive species such as knapweed, Scotchbroom and purple loosestrife

Myers, J.H., D. Simberloff, A.M. Kuris, J.R. Carey. 2000. Eradication Revisited - Dealing with exotics. Trends in Ecology and Evolution. 15: 316-321.

Current efforts - BC

University of British Columbia

- Mahesh Upadhyaya: ecophysiology of invasive plants
  - Furness, N.H., P.A. Jolliffe, and M.K. Upadhyaya. 2005. Experimental approaches to studying effects of UV-B radiation on plant competitive interactions. Phytochem. and Photobiol. 81:1026-1037.
  - Clements, D.R., M.K. Upadhyaya, and S.J. Bos. 1999. The biology of Canadian weeds. 110. *Tragopogon dubius* Scop., *Tragopogon pratensis* L., and *Tragopogon porrifolius* L. Can. J. Plant Sci. 79:153-163.

Current efforts - BC

University of British Columbia

- Loren Rieseberg: genetics of invasive plants e.g. spotted knapweed, starthistle, Canada thistle, ragweed, and common sunflower
- large-scale genome scan starthistle populations underway

Rieseberg, L.H., and J.H. Willis. Plant speciation. 2007. Science 317:910-914.

Current efforts - BC

University of British Columbia

- Kai Chan: societal impacts of invasive species, conservation and restoration

Current efforts - BC

UBC Garry oak ecosystem research

- Peter Arcese, Roy Turkington, Mark Vellend, David Clements and others studying restoration ecology and invasive species impacts in Garry oak ecosystems

Current efforts - BC

University of British Columbia

- Brian Klinkenberg: maintains E-Flora database for BC

E-Flora distribution map for *Impatiens glandulifera*

Current efforts - BC

University College of the Fraser Valley

- Sharon Gillies: impact of purple loosestrife control agent, *Galerucella calmariensis*

Current efforts - BC

Simon Fraser University

- Duncan Knowler: economics of invasive species
- Knowler, D. and Barbier, E. 2005. "Importing Exotic Plants and the Risk of Invasion: Are Market-Based Instruments Adequate?". Ecological Economics 52: 341-354.

Current efforts - BC

Trinity Western University

- David Clements and Paul Brown: biology and ecology of invasive species in the BC interior, Garry oak ecosystems, riparian habitats and beyond…

Current efforts - BC

University of Victoria

- Restoration Institute hosting symposium on Alien Invasive Species Management, May 22-23, 2008
- http://www.urbanecology.ca/restorationinstitute2008.php

Val Schaeffer, Faculty Coordinator of the Restoration of Natural Systems Program

Current efforts - Alberta

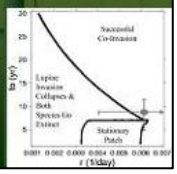
University of Alberta

- Anne Naeth: restoration/reclamation and non-native plant species e.g. smooth brome or crested wheatgrass
  - Henderson, D.C. and M.A. Naeth. 2005. Multi-scale impacts of crested wheatgrass invasion in mixed-grass prairie. Bio. Invasions 7:639-650.
  - Dormaar, J.F., M.A. Naeth, W.D. Willms and D.S. Chanasyk. 1995. Effect of native prairie, crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.) and russian wildrye (*Elymus junceus* Fisch.) on soil chemical properties. J. Range Manage. 48(3):258-263.

Current efforts - Alberta

University of Alberta

- Mark Lewis: spatial dynamics of invasive species
  - Finnoff, D., Potapov, A., Lewis, M.A. "Eradication and the optimal management of a spreading invader." (submitted to Journal of Environmental Economics and Management).
  - Jerde, C., Lewis, M.A.: Waiting for invasions: A framework for the arrival of non-indigenous species. The American Naturalist: 170: 1-9 (2007).
  - Fagan, W., Lewis, M.A., Neubert, M., Aumann, C., Apple, J., Bishop, J.: When can herbivores slow or reverse the spread of an invading plant?: A test case from Mount Saint Helens. Am. Nat. 166, 669--685 (2005).



Current efforts - Alberta

University of Alberta

- Sean Cash: economics of invasive species
  - Holly A. Ameden, **Sean B. Cash**, and David Zilberman. **2007.** "Border Enforcement and Firm Response in the Management of Invasive Species," *Journal of Agricultural and Applied Economics* 39: 35-46.
  - Holly A. Ameden, **Sean B. Cash**, D. Angele Vickers, and David Zilberman. **2007.** "Economics, Policy, and Border Enforcement of Invasive Species," *Canadian Perspectives on US Policy: Essays from a US Policy Research Workshop*, edited by Constance Smith. Edmonton: Institute for United States Policy Studies (19 pp).

Current efforts - Alberta

University of Alberta

- Linda Hall: weed science and ecology
  - Leeson, J., A. G. Thomas, L. M. Hall, C. A. Brenzil, T. Andrews, K. R. Brown, and R. C. Van Acker.. **2005** Prairie weed surveys of cereals, oilseed and pulse crops from the 1970s to the 2000s. Saskatoon, Saskatchewan: Agriculture and Agri-Food Canada, Weed Survey Series. 395 p.

Current efforts - Alberta

University of Alberta

- Dr. Jane King: weed management in forages
- Clements D.R., Cole D.E., Darbyshire S., King J.R. and McClay, A.S. 2004. Biology of Canadian Weeds 128. *Leucanthemum vulgare* Lam. CJPS 84: 343-363.
- Cole, D.E., King, J.R., Debbie A. Oyarzun, D.E., Dietzler, T.H. and McClay, A.S. Experiences with invasive plant management and ecology in Alberta. CJPS (*in press*)

Current efforts - Alberta

University of Calgary

- Ed Yeung: plant physiology
- Qaderi, M.M., D.M. Reid, and E.C. Yeung. 2007. Growth and physiological responses of an invasive alien species, *Silene noctiflora*. Ecoscience, accepted August 22, 2007.

Current efforts - Alberta

University of Lethbridge

- Rosemarie De Clerck-Floate (adjunct professor): biological control of invasive species

Current efforts - Saskatchewan

First Nations University of Canada

- Fidji Gendron: native plants & restoration ecology

A Native Prairie Area located next to the First Nations University of Canada, Regina campus

Current efforts – Saskatchewan

University of Regina

- Scott Wilson: plant community ecology in prairie ecosystems (e.g. impact of *Agropyron cristatum*)
- Hansen, M. J. and S. D. Wilson. 2006. Is the management of an invasive grass *Agropyron cristatum* contingent on environmental variation? Journal of Applied Ecology 43: 269-280.
- Wilson, S. D. and M. Pärtel. 2003. Extirpation or coexistence? Management of a persistent introduced grass in a prairie restoration. Restoration Ecology 11: 410-416.
- Heidinga, L. and S. D. Wilson. 2002. The impact of an invading alien grass (*Agropyron cristatum*) on species turnover in native prairie. Diversity and Distributions 8: 249-258.

Current efforts – Saskatchewan

University of Saskatchewan

- Steve Shirtliffe: weed biology and ecology in cropping systems
- Willenborg, C.J. , W.E. May, R.H. Gulden, G.P. Lafond, and S.J. Shirtliffe. 2005. Influence of wild oat (*Avena fatua* L.) relative time of emergence and density on tame oat yield loss, wild oat seed production, and wild oat contamination. Weed Science 53: 342-352.

Current efforts - Manitoba

Brandon University

- Prairie Region Invasive Noxious Weed Survey and Mapping System 2006-2008 funded by the Invasive Alien Species Partnership Program (Environment Canada)
- Karen Rempel, Rural Development Institute (RDI)

Current efforts - Manitoba

Brandon University

- involved in Leafy Spurge Stakeholders Group

LSSG

Current efforts - Manitoba

University of Manitoba

- **Predicting the invasiveness of exotic plants in natural areas in Manitoba** (Plant Canada meeting 2008)
- Rafael Otfinowski and Norm Kenkel
- Raf did his Ph.D. on smooth brome (*Bromus innermis*)

Current efforts - Manitoba

University of Manitoba

- Rob Gulden: weed biology and ecology

Current efforts - Manitoba

University of Manitoba

- Stephane McLachlan: restoration in prairie and riparian systems

McLachlan, S.M. and A. Knispel. 2005. "Assessment of long-term tallgrass prairie restoration in Manitoba, Canada". Biological Conservation 115:11-17.

Moffatt, S.F., and S.M. McLachlan. 2003. "Effects of land use disturbance on seed banks of riparian forests in southern Manitoba". EcoScience 10:361-369.

Current efforts - Manitoba

University of Winnipeg

- Richard Staniforth & Karen Jones: plant community ecology

ARTICLE IN PRESS

The biology of invasive alien plants in Canada. 9. *Impatiens glandulifera* Royle

David R. Clements[1], Kathleen R. Campbell[1], Karen Jones[2], and Richard Staniforth[2]

[1]Department of Biology, Trinity Western University, 7600 Glover Rd., Langley, British Columbia, Canada V2Y 1Y1; and [2]Biology Department, University of Winnipeg, 515 Portage Avenue, Winnipeg, Manitoba, Canada R3B 2E9.

Received 9 November 2006; accepted 21 November 2007.

Drawings of *Impatiens glandulifera*

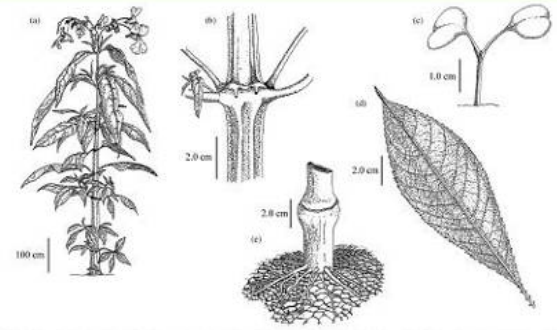


Fig. 1. Vegetative characteristics of *Impatiens glandulifera*. (a) habit of plant, (b) stem/branch node showing finger-like glandular stipules, (c) seedling at cotyledon stage, (d) foliage leaf, (e) base of stem showing swollen first node and adventitious roots on the soil surface. Illustrated by R. Staniforth.

Potential collaborations / models of collaborative action

Canadian Journal of Plant Science series:

- Biology of Canadian Weeds (135 accounts published)
- Biology of Alien Invasive Species of Canada (9 accounts published)

2008 WEEDS ACROSS BORDERS
CONGRESO MALEZAS SIN FRONTERAS
MAUVAISES HERBES SANS FRONTIÈRES
View from the North
May 27 to 30, 2008 • Banff, Alberta

Themes

- Applied research on prevention, control, and management of invasive plants
- Ecological restoration success after weed control
- Best management practices so far
- North American Invasive DATABASE Status
- Examples of cross border partnerships
- Fire and Invasive Species
- Public involvement and invasive species
- Agriculture, livestock and horticulture and invasive species
- WHAT NEXT?

BC IPC Research Forum

Basic themes:

- Management approaches
- Research needs
- Funding challenges
- How can more research be encouraged?

Future opportunities: Research networks?

- One model: The Canadian Aquatic Invasive Species Network based at the Great Lakes Institute for Environmental Research, Windsor, ON
- "The CAISN network is made up of specialists who are conducting Canada's first comprehensive study to examine and identify existing invasions with the goal to predict and prevent new aquatic invasive species from harming Canada's valued aquatic ecosystems."

CAISN

Future opportunities: Research networks?

- CAISN includes 29 researchers from a variety of university and governmental institutions across Canada
- "Dr. MacIsaac [University of Windsor] was named director of a **multi-million-dollar research initiative, the Canadian Aquatic Invasive Species Network**, announced Friday [June 2, 2006] by the Natural Sciences and Engineering Research Council of Canada (NSERC) and the University of Windsor."

Rosemarie DeClerck-Floate

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Agriculture and Agri-Food Canada: Invasive Plants Research

Rose De Clerck-Floate

Current Efforts within AAFC

- 80% of agricultural weeds are invasive aliens (IAS Strategy for CA, 2004)
- But few crop weeds are also problems in natural habitats
- Research emphasis has been on chemical and mechanical methods for weed eradication, containment or control to reduce crop yield losses (Thomas & Leeson 2007)

Current Efforts within AAFC

Crop weed researchers in Western Canada

British Columbia = 0
Alberta = 3 (2 Lacombe + 1 Lethbridge)
Saskatchewan = 8 (4 bioherb gp + 4 weed mgt, S'toon)
Manitoba = 1 (Brandon)

Total: 12

AAFC Classical Weed Biological Control Programme

- Use of host-specific foreign arthropods for invasive alien plant control on rangelands & natural areas
- 2 scientists for all of Canada (Lethbridge)

Classical Weed Biological Control

- Self-sustaining and dispersing
- Overall positive environmental impact
- Cost-effective (eg. Benefit:Cost of 23:1 in Austalia over 100 years)
- Long-term control
- Does not eradicate!

• Often the only option available for *Invasive Alien Plant* mitigation in natural habitats!

Weed Biocontrol Agents Released in Canada by Province, Totals to 2000

About 2/3 of released agents establish successfully!

(Compiled by A. McClay, 2002)

Stages of Weed Biocontrol

1. Overseas exploration (CABI, consortia-funded)
2. Biology/risk-assessment studies ►PETITION (Regulatory oversight by CFIA)
3. Mass propagation
4. Initial field releases
5. Establishment and impact assessment
6. Release strategy development (redistribution)
7. Ecological interactions/ long-term assessment

Current weed biocontrol projects

- Yellow* and Dalmatian toadflax
- Leafy spurge
- Hawkweeds*
- Tansy ragwort*
- Common tansy*
- Knotweeds*
- Russian knapweed*
- Houndstongue
- Oxeye daisy*
- Garlic mustard*
- Dog strangling vine*
- Knapweeds

(*Exploratory stage)

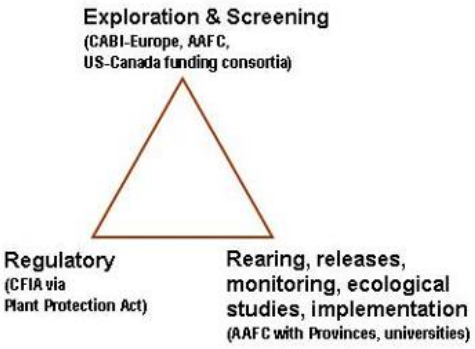
Research Gaps

- Increased prediction of agent impact & ecological interactions ahead of release (to manage efficacy and minimize risk)
- Study and modelling of biocontrol systems (i.e., agent, weed and associated organism populations; role of climate change)
- Invasive plant and agent genetic variation; effects on efficacy and host range

Research Gaps

- Develop novel release strategies in biocontrol for more reliable weed management
- Integration of weed biocontrol with other management strategies
- Insect mass-production/rearing technologies to facilitate biocontrol availability and use

Enablers of Weed Biocontrol in Canada



Houndstongue Consortium 1988-present

- AAFC (1988-2007)
- BC Ministry of Forests & Range (1988-2006)
- Montana Noxious Weed Trust (1994-2003)
- USDA-ARS (1994-2000)
- Montana State University (1994-2007)
- Wyoming Weed & Pest Districts (1998-2007)
- University of Idaho (2001-2007)
- USDA-APHIS (2003-2007)

Total budget average $90,000/year

Challenges

- **Preparedness for new alien plant invasions (i.e., need to plan for new biocontrol releases at least 10 yrs in advance)**
- **Legislative/risk aversion issues (safety & efficacy of agents)**
- **Availability of efficacious agents**
- **Availability of experts to develop & implement biocontrol**

Opportunities

- **International linkages based on our long-standing reputation in weed biocontrol**
- **Collaborations with universities (e.g., UBC, U of AB, U of Lethbridge, U of T)**
- **Existence of model systems for continued research and advancement of biocontrol in Canada (e.g., knapweed, spurge, houndstongue, toadflax)**

Insect and plant research facilities at AAFC, Lethbridge Research Centre to foster partnerships.

Insect Microbial Containment Facility

Don Hare

Invasive Weeds- Industry Perspective

Breaking Down Borders
Issues and actions for invasive plant species in Western Canada

Don Hare
Dow AgroSciences Canada
25 February 2008

Industry Research and Product Development on Invasive Species

- Identify Current efforts
- Determine major research issues or gaps
- Identify potential collaborations or models of collaborative action,
- Look ahead at opportunities

Current Efforts- Global Overview

- Global Agriculture Pesticide Total Market - $27-$31 Billion (USD) Annually
- Global Herbicide market for invasive species management – IVM / R&P - $800 M (USD)
- NA Invasive Species Market - $190 M
- Canada Invasive species herbicide market - Approx. $30-35M / annually
  - Total Canadian Pesticide Market ($1.2 B, Invasive species non-Crop - 3%)
- Halopyridine molecules are biggest products – Broadleaf / Woody species
  - Picloram (Largest) – Aminopyralid, Triclopyr, Clopyralid
- Only 9-10 selective actives that are really effective – 24D, dicamba, metsulfuron
- Glyphosate (Grass) Tebuthiuron

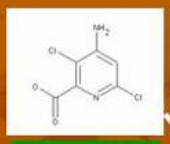
Dow AgroSciences – largest global player – 80% Market share globally

- DAS has invested about $230 M into invasive weed management world wide since 1999.
- DAS Canada
- Registered one new active – specifically for IVM/R&P/Invasive weeds
- Registered 2 new products – 2 more in progress -7 total
- Updated and "modernized" 3 products – new formulations, better inerts, updated tox
- Defending 2 active ingredients through re-registration – rates, buffer zones
- 1 dedicated scientist, 1 registration manager 1 technical specialist, 7 sales people - 10

DAS Pyridine Chemistry

Global Registrations
Cost of New Active - $184 M*
Registration time – 9.1 years*
139, 400 molecules screened/each new active

Only 2 actives into development globally



Fluroxypyr

Aminopyralid

Clopyralid

Triclopyr

Picloram

*2003- Phillips McDougall Report (Croplife America and European Crop Protection Association)

Current Efforts- IVM

- Invasive weed research and control has been ongoing since 1970's.
- Industrial Vegetation Management Divisions
  - Non-crop habitants – parks, protected areas, natural areas, watersheds
  - Utilities – corridors and industrial sites – Electrical, Oil gas
  - ROW – transmission lines, pipelines, cut lines
  - Roadside / Railways
- Specialized business units – R&P, Forestry
  - Grasslands Rangelands
- Industry – DAS, BASF, DuPont, (Monsanto)

Current Status – NA DAS Research

- US introduced Invasive Species Legislation - 1999
- Canada - 2004
- US & Canada DAS - a concerted invasive weed effort since 1999
- >800 trials, 330 species technical information
- Canada – 260 trials (8 scientist years)
  - Efficacy – 2- 4 YAT, Grass tolerance, Yield Response
  - Plant species Competition, Habitat response (Grass / legume / Forbs)
- Registered New Active (2005) – Aminopyralid – Specifically for IVM/R&P markets
- reduced risk herbicide with very small environmental footprint, very specific plant activity
- Currently – 8 weeds label – submit 72 invasive and noxious weeds
- 2005-6 - 17 tours, 1784 people

Canadian DAS Trials – R&P / IVM

Canada – wide geographic research area represented

Efficacy – long term- 2-4 years

Grass Tolerance – habitat restoration of degraded lands

Yield response / Plant competition studies

R&P and IVM = Projects and Active Trials - 2006

Location	DAS Small Plot Carry over	DAS Small Plot New -2006	Outside & operational / RA Carry over	Outside & operational / RA New -2006	Total All	Total Small Plot	Total Operational
BC	9		1	4	14	10	4
AB	38	34	20	7	99	58	41
SK	7	1		1	9	7	2
MB	8	10	20	18	56	28	28
ONT	4			4	8	4	4
QUE				2	2		2
Total	66	45	41	36	188	107	81

Highly Invasive Plants Controlled by Milestone*

Weed species		Application timing
Common name	**Scientific name**	
chamomile, scentless	*Matricaria indoria*	Prebud
cinquefoil, sulfur	*Potentilla recta*	Prebud
daisy, oxeye	*Chrysanthemum leucanthemum*	Prebud
hawkweed, orange	*Hieracium aurantiacum*	Bolting
hawkweed, yellow	*Hieracium pratense*	Bolting
knapweed, diffuse	*Centaurea diffusa*	Bolting
knapweed, Russian	*Acroptilon repens*	Bud, early bloom or fall
knapweed, spotted	*Centaurea maculosa*	Bolting
kudzu	*Pueraria lobata*	Flowering
starthistle, yellow	*Centaurea solstitialis*	Rosette
thistle, Canada	*Cirsium arvense*	Prebud or fall
thistle, musk, plumeless	*Carduus nutans, acanthoides*	Rosette, bolting or fall
tropical soda apple	*Solanum viarum*	Foliar

* 52-120 g ae/ha

Absinth – 2 YAT - Milestone

Current Status – Challenges and Gaps - Industry

- Focus – Target species – Criteria?
- Biodiversity and habitat response
- Regulations / Registration System /Legislation
- Freedom to Operate
- New Technologies

Why – Which is the target?

- Biodiversity decrease?
- Habitat degradation?
- Endangered species losses?
- Environmental damage?
- Economic value loss – Ranching / Agriculture?
- Human health?

Invasive Weeds – Specific Analysis

- What Species and Where?
- In Agriculture – traditional crop land
  - 80% of all IPM resources are targeted against 8-12 weeds (AVEFA-1/3)
- For invasive species – Non traditional areas
  - 300,000 species, 10% become established, 10% become invasive - 3000 species*
    - *2004 Invasive Weed Global Think Tank Geneva, Switzerland

Invasive Plants in North America

• 3310 exotic species in 48 states (Kartesz), 60 of major importance on range and wildland (CAST 2000).

• No comprehensive studies to assess magnitude of impacts on range and wildland sites.

Assessing Economic, Environmental, and Societal Losses from Invasive Plants on Rangeland and Wildlands

C. Duncan, J. Jachetta, V. Carrithers, J. DiTomaso, R. Lym, K. McDaniel, M. Renz, and P. Rice

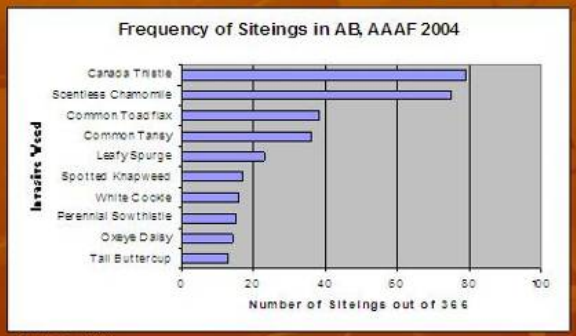
Invasive Plants Impact All Regions of BC

6 of over 40 major invasive plants in BC.

Note: Many of these invasive plant species overlap in distribution. Other species impact other areas of the province.

22

Top 10 Invasive Weeds- Alberta – 2004 Problamatic Invasives Frequency



14 December 2004

Invasive broadleaf plants on rangeland and wildland

- Musk thistle (*Carduus nutans*)
- Russian knapweed (*Acroptilon repens*)
- Diffuse knapweed (*Centaurea diffusa*)
- Spotted knapweed (*C. stoebe spp. micranthos*)
- Yellow starthistle (*C. solstitialis*)
- Canada thistle (*Cirsium arvense*
- Leafy spurge (*Euphorbia esula*)
- Hawkweed (*Hieracium sp)*
- Perennial pepperweed (*Lepidium latifolium*)
- Sericea lespedeza (*Lespedeza cuneata*)
- Dalmatian toadflax (*Linaria dalmatica*)
- Tropical soda apple (*Solanum viarum*)

Milestone use in Grass Restoration Projects

Dow AgroSciences

Washington Department of Fish and Wildlife

MINNESOTA DNR

PTS: US Das Research

National Park Service

Name	Location	Researcher	Site Type	Treatments	Methods
McLaughlin Reserve	Northern CA 2004	DiTomaso	Yellow starthistle grassland	Milestone 5and 7 fl oz spring applied	Pre and Post: 3 quadrats per 3 reps for a total of 24 frames per treatment. Point-intercept transects for cover- 3
Theodore Roosvlt NP	Western ND 2004	Lym/Samuel	Canada thistle/arid grassland	Milestone 7 fl o z fall	Pre and Post: 30 plots - 3 frames/plot - 90 frames per treatment
Two Rivers - MN Dept of Natural Resources(DNR)	SWMN 2008	Beisler	Canada thistle prairie restoration	Milestone 5 fl o z Transline 12 fl oz applied spring and fall	Post only: 20 frames per treatment for counts by species and presence per plot
Hedquist - DNR	SWMN 2008	Beisler	Canada thistle prairie restoration	same	same
Glacier Ridge Nature Conservancy	Northern MN Fall 2008	Lym	Canada thistle prairie restoration	Milestone 7 fl o z fall	Pre and Post: 90 frames per treatment %cover by species
Grant Cr. Elk Refuge National Wildlife Federation	Western MT	Rice	Spotted Knapweed grassland	Milestone 5 fl o z, Transline 2/3 pt, Tordon 1 pts Fall only	Pre and Post: 4 reps - 4 transects with 9 frames - 144 frames per treatment (720 per location). Canopy cover and frequency of occurrence
Larry Cr Bitterroot National Forest	Western MT	Rice	Spotted knapweed open canopy forest	same	same
Petties Canyon Lolo National Forest	Western MT	Rice	Spotted knapweed open canopy forest	same	same
Big Creek Lolo NF	Western MT	Rice	Canada thistle wet riparian meadow	Milestone 7 fl o z, Telar 1.5 oz, and Landmark 1.5 oz fall	same
Morgan-Carp Rock Creek Lolo NF	Western MT	Rice	Canada thistle well drained riparian	same	same
Boulder Open Space	Colorado 2006	Beisler	Diffuse knapweed upland rangeland	Milestone 5 fl o z, Transline 2/3 pt, Tordon 1 pts and others summer	Post only. %visual injury to each species in 2006. 1 YAT: density of each species per plot.
Boulder Open Space	Colorado 2007	Beisler	Diffuse knapweed upland rangeland	Milestone 5 fl o z, Transline 2/3 pt, Tordon 1 pts and others summer	Second location: Pre data - density of each species per plot.

Grasslands & forbs- Community Response Studies

Western Noxious Weed – mostly knapweed and yellow starthistle

Mixed Grass Prairie

Tall Grass Prairie

NDSU

3 S knap, 2 CT

California Community Response Study – Yellow starthistle (Joe DiTomaso)

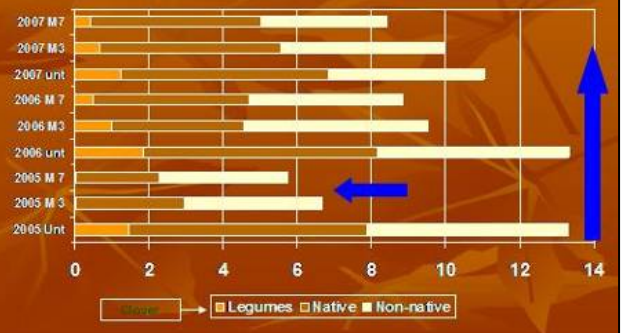
2004

2006

Short Grass

Canada thistle control in riparian areas throughout the US

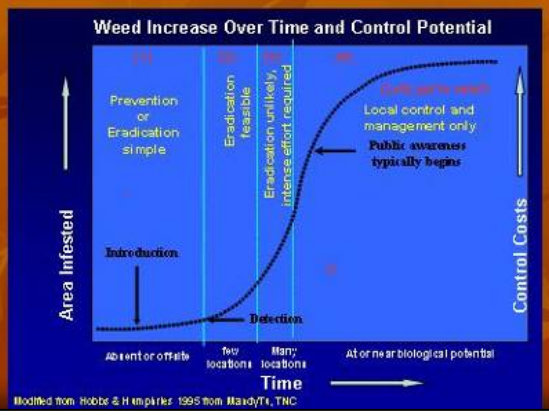
Species Richness – California Biodiversity rebounds with time



DAS – Canadian Invasive Weed Strategies and Implementation

- 2003-7 Dow AgroSciences has been working with invasive weed specialists introducing / trying /adding species to the new selective herbicide 'Milestone' available for IVM, R&P and Invasive Weed Managers
- Paradox – performance based regulatory system
- Challenge!!: - 10 trials / weed species for label reg'n.
- Some of these weed species are very difficult to detect until they become major infestations.

Invasive Weeds Control- The Paradox



Regulations / Legislation

- 2005-7 – Dow AgroSciences has been working closely with federal and provincial agencies aligning /examining regulations and legislation regarding labeling to allow control of invasive weeds.
- Many of the invasive weed infestation situations are actually areas that are considered buffer zones or non-pesticide use areas (riparian, watershed corridors,etc)

Common Tansy

Common Tansy

Tansy spread along riparian corridor

(Athabasca River way 1800 miles 180 miles tansy)

Tansy Riparian Zone Picture

Tansy spreading outwards from riparian area

Into sensitive habitats

Progress!!

- PMRA is looking closely at invasive weeds legislation.
- considering scientific data from other ecosystem, countries, different styles of trials
- PMRA is working closely on buffer zones
- Provinces?? need to work on secondary restriction zones (5m-25m exclusion zones)

Projects and Collaborations

Invasive Weeds Segment

1. **Activities – DAS market development– councils, meetings, tours**
   1. AB AIPC, BC –IPC
   2. SK/ MB- Invasive weed initiative
   3. NAWMA
   4. U of Brandon / KRemple /Leafy Spurge
   5. U of Alberta – Grass Legume Weed Interactions - NSERC
   6. Provincial IVMA associations
   7. CWSS, SRM, US Scientific Conferences
2. **Aminopyralid – Invasive Weed Label Use Category PMRA**
3. **PMRA - Buffer zones - pesticide free zones, riparian areas**

Projects Review – 38 irons in the fire

Invasive Weed/Brush Segment R&P / IVM

Aminopyralid – Invasive weed research - Projects on the go

1. Additional Invasive weeds targets
2. AB – Blackfoot Provincial Park/Protected Area - Tansy
3. AB- Blackfoot PP/Protected area Rose Trials
4. Leafy Spurge initiative – Manitoba/SK
5. BC Invasive research Trialing BC Interior – Dave Ralph
6. BC Vancouver Island Update
7. BC – First Nations trials- Spallumcheen Reserve
8. Ontario – Giant Hogweed trials
9. MB forage council – Red Bartia, Clipping studies
10. Ducks Unlimited – Project scoping
11. Brown Brush Monitor
12. Wet blade trials

Current Efforts

- BC – 14 trials Knapweed, Sulfur cinqfoil, hawkweed, ox-eye daisy, Marsh T.
- Dave Ralph – conducted 10 trials – specific weed characterization, timing
- First Nations Band – 7 agencies involved
- BCIPC – working on regulations

- Alberta
- Conducted DAS majority of work
- Canada T, Chamomile, Tansy, Buttercup, Invasive brush species
- 115 trials
- Private land, Public land – Grazing reserves, Roadsides, industrial areas, parks
- Special area sensitive ecological reserve
- Collaborations SRD Alberta Ag, Fieldman, U of A, AIPC
- Conservation Groups
- Alternative technologies – wet blade, site specific delivery technologies

Current Efforts

- SK –
- Absinth, CT, Dandelion, Tansy S Chamomile,
- Western Beef Development Center, SK Ag, U of S
- Sask Crown Lands, PFRA

- Manitoba
- Absinth, CT Red Bartsia, Tansy, Buttercup, Canada Thistle
- Private land, Public land – Grazing reserves, Roadsides, industrial areas, parks
- Collaborations U of M, U of Brandon Leafy spurge Consortium PFRA MB crown Lands NPIC. Manitoba forage council

- Ontario
- U Guelph, Ont Govt- G. Hogsweed knapweed

Invasive Weeds - Opportunities

- For invasive species
  - 3000 species – need to determine invasiveness (Nature Conservancy).
  - 3% are really serious – 30-60-100 species??
  - Need to Prioritize species to control
    - Toxicity, Environmental destructive power, interspecies competitiveness, location, alleopathic, ability to modify environment
    - (Salt cedar, Downy Brome, Leafy Spurge, Knapweeds

Invasive Plant "Alert"

Over 20 million acres in north-western US are infested with the toxic Yellow Starthistle – and it's moving north in BC.

"...invasive plants (can cause) a level of destruction to the environment and the economy matched only by damage caused by floods, earthquakes, wildfire, hurricanes and mudslides."

– US Secretary of the Interior

Thank You

Dow AgroSciences

Extra Slides

- Extra slides of background support information and reference material
- re invasive weeds.

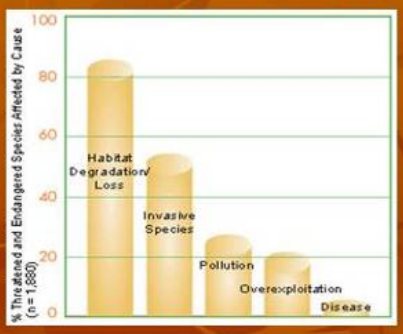
Current Efforts – Industry Evolution

- Invasive weed research and control – evolution over 50 years:
- 1960's – first chemistries discovered – anything with activity was used -24D
- 1970's – Herbicide infancy – new chemicals registered
- 1980's – largest use period of herbicides / new modes action/ control methods
- 1990's – budgets reduced- introduction of environmental restrictions, permits, gov't funding reductions - highly targeted chemistries developed
- 2000's (early) – alternatives and restrictions - leave it natural, ABH control, pesticide bans, moratoriums.
- 2000's (Mid) – if left alone – will not evolve into desired state – severe habitant destruction, invasion of undesirable species
- Quebec ice-storms, water contamination, Vancouver water restriction
- pine beetle, BSE, club root, ragweed (Forestry/Food/Agriculture/Health)
- invasive species legislation introduced 2004
- 2008 – starting to get a much more balanced approach between mandates and responsibility, consequences, and utilizing all technologies available to help manage nature and environment.

Current Efforts

- IVM – Today
  - IVM is an extremely sophisticated business
  - Highly specialized firms focused on specific business
  - Personell is highly trained, licenced and responsible
  - Specialized equipment and application technology – spray trucks - $350k, helicopters $500K
- Very highly regulated , direct lines of operating between industry stakeholders and regulators

The Status of Biodiversity in the United States



Source: *Precious Heritage: The Status of Biodiversity in the United States*
© The Nature Conservancy and NatureServe

Environmental Impacts

- Loss of biodiversity
  Native grasses, wildflowers and endangered species destroyed
- Loss of wildlife habitat
  7 rare plants eliminated by Knapweed in 3 years in Glacier National Park
  Reduce elk winter forage by 50-90%
- Loss of water quality and fish habitat
  Runoff increased 56% and stream sedimentation 192% due to Spotted Knapweed (Vancouver – 2007?)

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Environmental Impacts

Example: Impenetrable habitat and severe wildfire hazard due to Gorse spines

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Ranching

- 50% loss of forage on some BC grazing lands – lost value exceeds $30 million/year.
- *Knapweed* caused $42 million damage in Manitoba.
- *Leafy Spurge* caused $129 million damage in four northern US States.
- Economic losses in BC have not been calculated but they are in the millions of dollars annually.

Agriculture

Invasive Plants…

- Host insects and crop diseases
- Reduce farm income (avg. yield reduction 10-15%)
- Reduce crop quality and market opportunities
- Annual crop impact - $50 million +
- Increase wildlife/cattle conflicts

Human Health and Safety

- Toxic Nightshade berries
- Poison Ivy blisters
- Corridor site lines
- Hay fever and allergies-ragweed ($200 M annually/ Quebec)
- Giant Hogweed skin burns
- Threaten fresh water supply

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Invasiveness Assessment

NatureServe

1101 Wilson Blvd., 15th Floor
Arlington, VA 22209

Completed U. S. National Assessments of Non-Native Plants

Assessments as of January 10, 2005 (further assessments in progress)*

Over the next several years, NatureServe will evaluate all of the estimated 3,500 non-native vascular plants established outside cultivation in the United States for their impact on biodiversity using a new methodology – the "Invasive Species Assessment Protocol" (Morse, et. al., NatureServe, 2004*). The result will be a prioritized U.S. national list of non-native plants based on their impact to biodiversity. As of January 10, 2005, NatureServe has assessed 382 non-native plants and are presented here in alphabetical order. The information provided includes answers to all questions plus citations and references. Updated information will be posted on a regular basis.

*See http://www.natureserve.org/getData/plantData.jsp for download.

Leafy Spurge (*Euphorbia sp.*)

NatureServe

Invasive Species Assessment Protocol:
Completed U.S. National Assessments

(Euphorbia esula)

ELEMENT NATIONAL ID: 204733
SCIENTIFIC NAME: *Euphorbia esula*
COMMON NAME:
I-RANK REVIEW DATE: 2004-04-21
EVALUATOR: Pellow, M.

I-RANK: High/Medium

I-RANK REASONS SUMMARY:
Considered to be a pest because of the speed that it invaded (and continues to invade) as well as the extreme difficulty to control and manage the infestation.

SUBRANK I - ECOLOGICAL IMPACT:	Medium
SUBRANK II - CURRENT DISTRIBUTION/ABUNDANCE:	High
SUBRANK III - TREND IN DISTRIBUTION/ABUNDANCE:	High/Low
SUBRANK IV - MANAGEMENT DIFFICULTY:	High

NON-NATIVE THROUGHOUT NATION
NATIVE RANGE: Europe and Asia (Thomhorst and Swearingen 1999).

Milestone* Herbicide

- Aminopyralid - New active ingredient discovered in 1998
- Pyridine chemistry family
  - triclopyr, clopyralid…
- Developed specifically for IVM and R&P for invasive weed control
- Registered in 2005 (Canada and U.S.)
- Milestone* and Restore*
- > 800 trials in NA - 330 species

Reduced Risk Herbicide

- Registered by PMRA (& EPA) as a "Reduced Risk Pesticide":
  - *"Demonstrates **Reduced Risk to man and the environment** through comparative risk assessment with the market standards"*
- Based, in part, on:
  - Improved control of invasive plants
  - Lower use rates
  - Favorable results of toxicological, ecotoxicological and environmental fate studies.
  - …when compared to the market standards

Environmental Fate

- Soil
  - Aerobic microbial degradation
  - Soil half-life of 34.5 days
  - Remains in top 6-12 inches of the soil
- Water
  - Photolysis is primary route of degradation
  - Rapid breakdown, half life = 0.6 days, gone in 24 hours
  - Groundwater contamination potential is low
- Air
  - Low vapor pressure - extremely low potential for volatilization.

Is it safe?

- Environmental Toxicology:
  - Practically non-toxic to birds, fish, honeybees, earthworms, and aquatic invertebrates.
- Acute Mammalian Toxicity:
  - Low acute mammalian toxicity
- Chronic Mammalian Toxicity:
  - Not carcinogenic or mutagenic
  - Does not cause birth defects (not teratogenic)
  - Causes no neurological problems
  - Does not cause any endocrine or adverse reproductive effects

Key Plants Controlled by Milestone* (70-120 g ae/ha

Common name	Scientific name
absinth wormwood	*Artemisia absinthium*
amaranth, spiny	*Amaranthus spinosus*
broomweed, annual	*Gutierrezia sarothrae*
buttercup, tall	*Ranunculus sp.*
camphorweed	*Heterotheca latifolia*
croton, woolly	*Croton capitatus*
cudweed	*Gnaphalium spp.*
dock, curly	*Rumex crispus*
horsenettle, Carolina	*Solanum carolinense*
horseweed/marestail/Canada fleabane	*Conyza canadensis*
ironweeds	*Veronia sp.*
lettuce, prickly	*Lactuca serriola*
ragweeds	*Ambrosia sp.*
sneezeweed, bitter	*Helenium amarum*
sowthistle	*Sonchus sp.*

Effect on invasives… 29

Absinth wormwood *
Black medic
Bull thistle
Burdock
Buttercup (tall, hairy)
Canada thistle *
Chicory
Common tansy *
Curly dock
Fuller's teasel
Hawkweed (Orange, Yellow)
Henbit
Hoary cress
Knapweeds (diffuse, Russian, spotted*)
Kudzu
Lady's thumb
Musk thistle
Mayweed (scentless, stinking)
Oxeye daisy
Scentless chamomile*
Sulfur cinquefoil
Tansy ragwort
Tropical soda apple
Yellow starthistle
Wild carrot

Susceptible Weeds - 71

- Absinth wormwood Inv
- Annual broomweed
- Annual marshelder
- Annual sow thistle
- Black medic Inv
- Bitter sneezeweed
- Bluebur
- Blue lettuce
- Bull thistle Inv
- Burdock Inv
- Buttercup (tall, hairy) Inv
- Canada thistle Inv
- Carolina horsenettle
- Chicory Inv
- Cocklebur
- Common fiddleneck
- Common plantain
- Common sunflower
- Common tansy Inv
- Common yarrow
- Curly dock Inv
- Cutleaf evening primrose
- Dandelion
- Fireweed
- Flax-leaf fleabane
- Flixweed
- Fuller's teasel Inv
- Goat's beard
- Goldenrod
- Gumweed
- Hawkweed (Orange, Yellow) Inv
- Henbit Inv
- Hoary cress Inv
- Horseweed
- Ironweed (tall, western)
- Knapweeds (diffuse, Russian, spotted) Inv
- Kudzu Inv
- Lady's thumb Inv
- Lambsquarters
- Musk thistle Inv
- Mayweed (scentless, stinking) Inv
- Oxeye daisy Inv
- Pennsylvania smartweed
- Peppergrass
- Perennial sowthistle Inv,
- Plumeless thistle Inv
- Prickly lettuce
- Purple cudweed
- Ragweed (common, western)
- Scentless chamomile Inv
- Spiny amaranth
- Stinging nettle
- Sulfur cinquefoil Inv
- Sweet clover
- Tansy ragwort Inv
- Tropic croton
- Tropical soda apple Inv
- Yellow starthistle Inv
- Wild carrot Inv

Habitat Restoration – Who is the Customer?

Natural Resource Focus within:

- Federal Agencies
- State Agencies

National Park Service

MINNESOTA DNR

IDAHO FISH AND GAME

- County Land such as open space – Boulder, CO
- Weed supervisors within "environmentally sensitive" areas
- Private landowners – CRP managed for wildlife

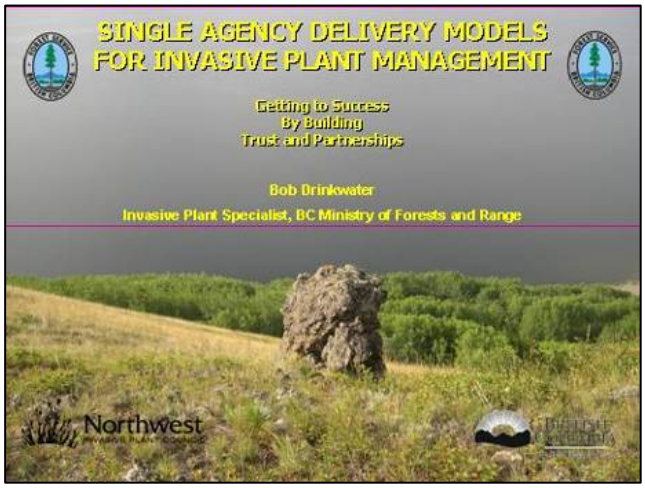
Federal Buffer Zones

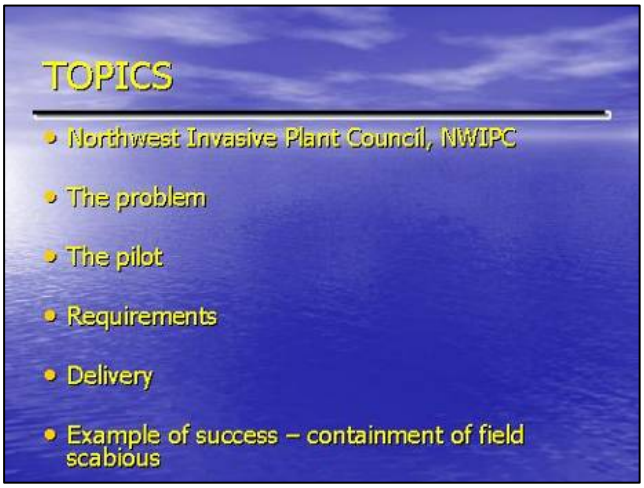
Target site	Application type	Non-target Terrestrial	Non-target Aquatic
Rights-of-way	Ground	None	Downwind only
Industrial & other non-cropland uses	Grou	d only	Downwind only
Rangeland & Pasture			Downwind only

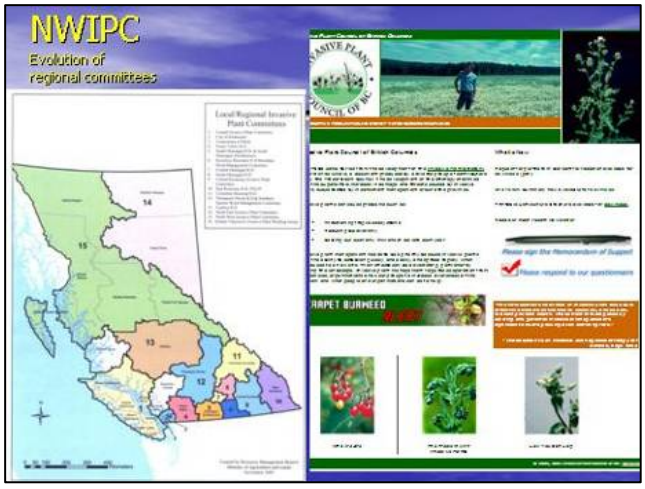
Dow AgroSciences Working with PMRA to develop strategies to address Invasive Weeds in Buffer Zones.

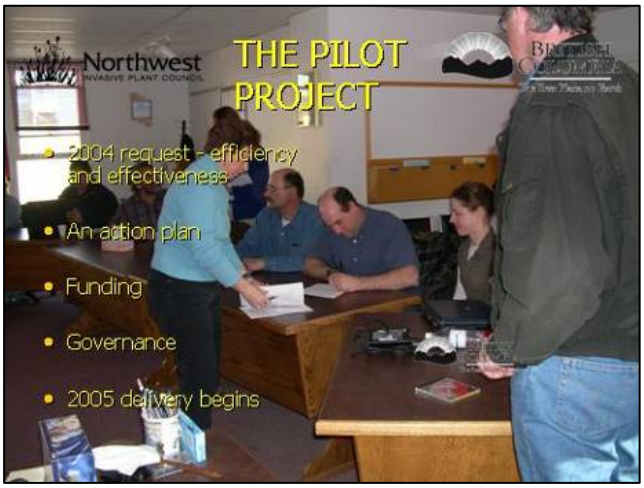
Models of Current Practice

Bob Drinkwater – British Columbia, Single Agency Delivery Model









REQUIREMENTS
PREVENTION, CONTAINMENT, RESTORATION

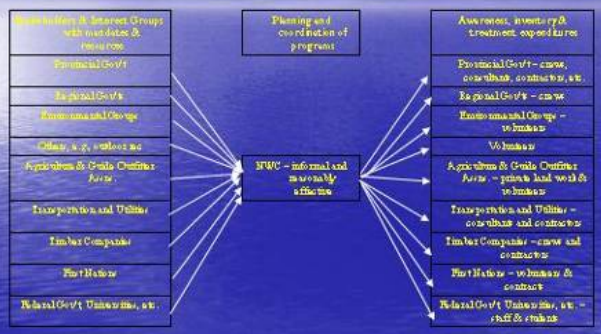
A complete program is needed

1. Public awareness
2. Early Detection & Assessment
3. Rapid Response
4. Evaluation and adjustment
5. Trust, partnership, participation, ownership

REQUIREMENTS
structure and governance

- Refine and explain strategies
- Integrate programs
- Work with communities
- Solicit, support and sustain commitment
- Build trust and partnerships
- Sharing and ownership
- Assessment and adjustment

DELIVERY – pre pilot



DELIVERY – pilot

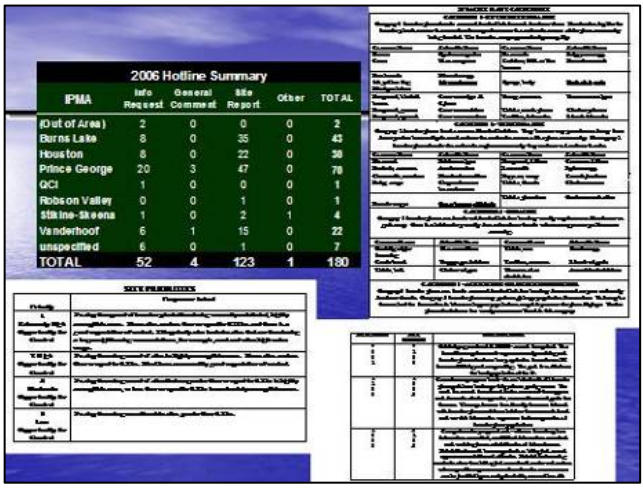
DELIVERY

1. Increase and integrate public awareness with all the other aspects of the program.

Northwest INVASIVE PLANT COUNCIL

DELIVERY

1. Public awareness
2. Strengthen the detection, reporting & assessment system



2006 Hotline Summary

IPMA	Info Request	General Comment	Site Report	Other	TOTAL
(Out of Area)	2	0	0	0	2
Burns Lake	8	0	35	0	43
Houston	8	0	22	0	30
Prince George	20	3	47	0	70
QCI	1	0	0	0	1
Robson Valley	0	0	1	0	1
Stikine-Skeena	1	0	2	1	4
Vanderhoof	6	1	15	0	22
unspecified	6	0	1	0	7
TOTAL	52	4	123	1	180

Northwest INVASIVE PLANT COUNCIL

DELIVERY

1. Public awareness
2. Early Detection & Assessment
3. Put an effective and efficient Response system to work

Operational Funds

Contributor		Budget
Ministry of Forests and Range	$	200,000
Ministry of Transportation	$	200,000
Regional District of Bulkley Nechako	$	53,000
BC Transmission Corp.	$	10,000
Pacific Northern Gas	$	500
Pre-season Total	*$*	*463,500*
Ministry of Environment - Omineca	$	35,000
Ministry of Environment - Skeena	$	11,000
Town of Smithers	$	3,462
District of Houston	$	570
Candian National Railway	$	3,070
TOTAL	$	516,602

IPMA CONTRACTS

IPMA	Budget	Spent
QCI	$ 45,000	$ 36,379
Stikine-Skeena	$ 45,000	$ 29,856
Houston	$ 45,000	$ 36,107
Burns Lake	$ 67,000	$ 48,686
Vanderhoof	$ 66,000	$ 65,441
Prince George	$ 119,000	$ 118,984
Robson Valley	$ 75,000	$ 75,000
TOTAL	$ 462,000	$ 410,453

- Organise activities by IPMAs and provide a single contractor for each IPMA to respond to reports, meet mandates and assist with integration of programs.

Northwest INVASIVE PLANT COUNCIL

DELIVERY

1. Public awareness
2. Early Detection & Assessment
3. Rapid Response
4. Evaluate and adjust the program so that it is continuously improving

Continuous Improvement

23 recommendations were implemented in 2006.

- Examples:
  - Hotline
  - Raising awareness - raising expectations
  - Volunteers
  - Getting and keeping the best contractors

Area Surveyed or Treated by the NWIPC

	Site Visits	Area (ha)
2005	1329	484
2006	2835	549

SUCCESSES

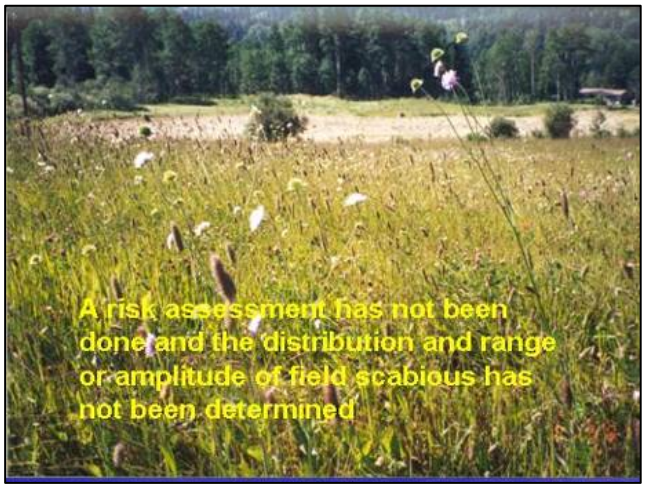
- Expanding partnerships with and ownership of NWIPC and strategic and tactical approaches
- Expanding geographic coverage
- Prevention of establishment and spread
- Restoration approaches that are strategic and supported

EXAMPLE OF A SUCCESS FROM THE PILOT

Field Scabious
(*Knautia arvensis*)

Regional Noxious
Bulkley Nechacho, Kootenay Boundary, Thompson Nicola

- Teasel Family
- Native of Europe, likely introduced as an ornamental
- taprooted perennial
- Grows to 1.3 metres
- Sparsely branched above
- Produces up to 2,000 seed per plant



Major Field Scabious infestations in BC

- Houston – Buck Flats
- Fort Fraser – Telegraph Road
- Vanderhoof – Stony Creek (55 sq. km)
- Cottonwood (west of Quesnel)
- Kamloops
  - Knutsford,
  - Knouff Lake
  - Savona
  - Bull Canyon (Douglas Lake)
- Salmo

Background

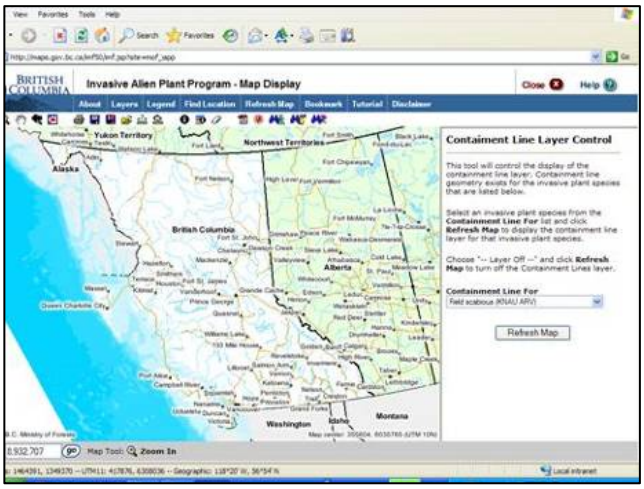
- NWC & the Buck Flats infestation
- The Ft Fraser infestation
- Stony Creek Infestation
- NWIPC and testing formalising containment

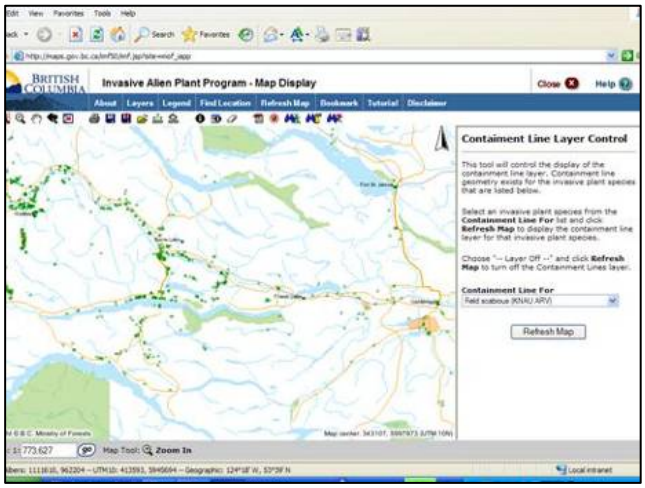
CONTAINMENT

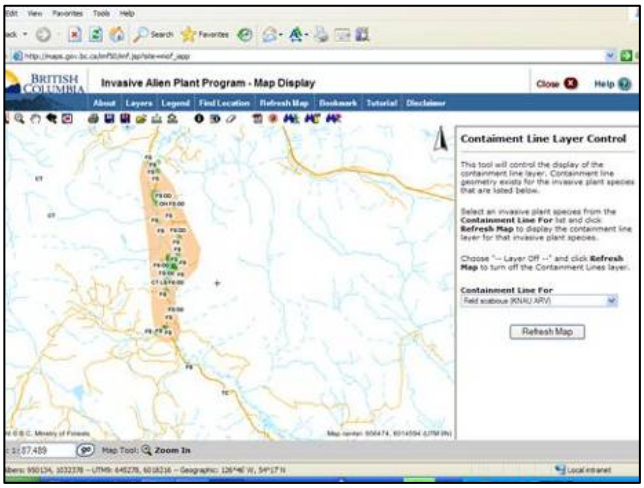
A containment line is a closed polygon which delineates between areas on one side of the line where control actions are required on all sites for a specific invasive plant and on the other side of the line where, for that invasive plant species, control is only undertaken on sites when it can be justified through mechanisms like a treatment matrices or specific projects such as rehabilitation.

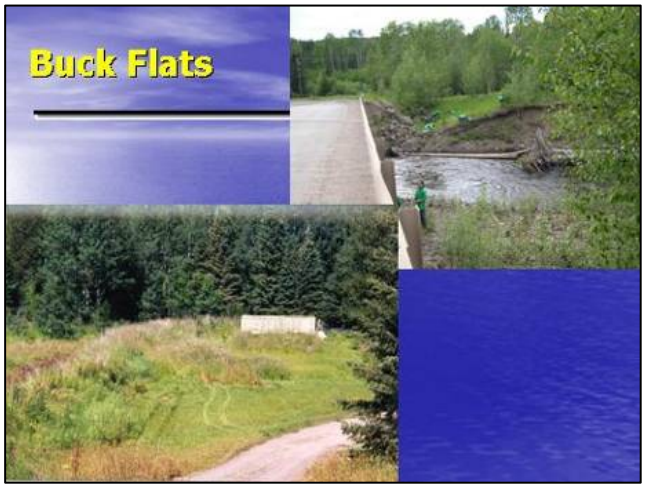
REQUIREMENTS FOR CONTAINMENT

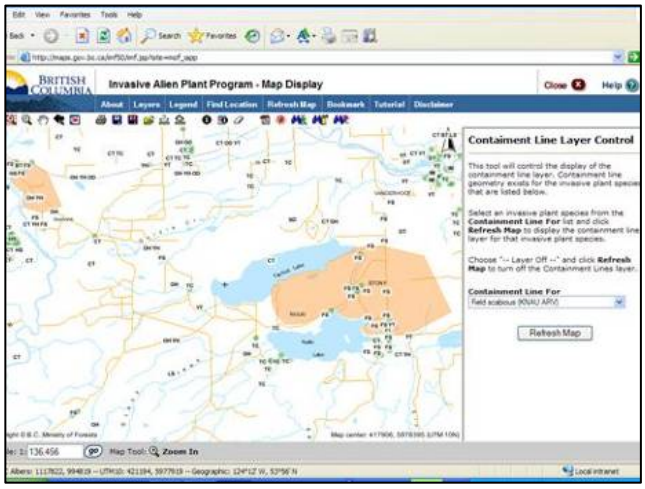
- Awareness of the problems and approach
  - Particularly for those within the containment polygon
  - consensus to proceed
- IAPP
- Investigation and determination of treatments and options
- Development and agreement of plans
- Coordinated inventory and treatments
  - Regionally, Provincially, Nationally & Continental
- Assement and adjustments

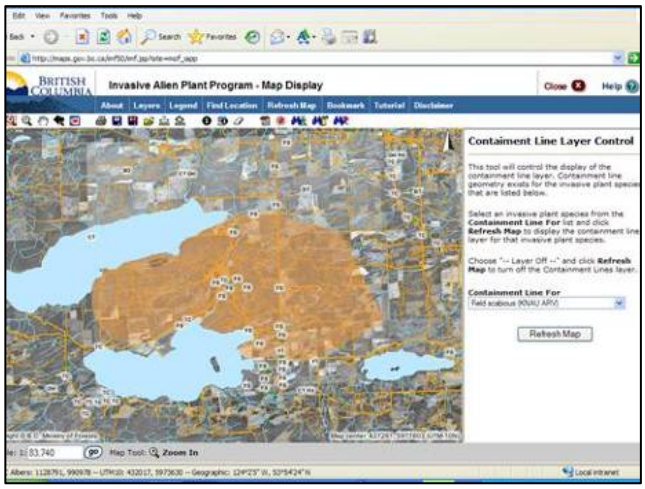







Buck Flats

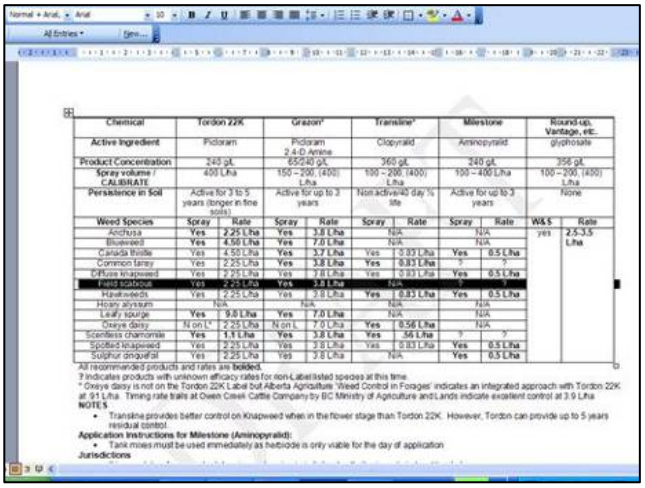

Invasive Alien Plant Program - Map Display
Containment Line Layer Control
Refresh Map


Invasive Alien Plant Program - Map Display
Containment Line Layer Control
Refresh Map


TREATMENT OPTIONS
Prevention
– Awareness, inventory, management
Crop management
Herbicides
Manual – pulling, digging & cutting
Targeted grazing
Biological control
Integration

CROP MANAGEMENT

- Proper grazing maintains crop competitiveness
- Fertilization and proper management of pastures increases health and resistance of pastures to invasion
- Scabious can be controlled with cultivation



Chemical	Tordon 22K		Grazon*		Transline*		Milestone		Round-up, Vantage, etc.	
Active Ingredient	Picloram		Picloram 2,4-D Amine		Clopyralid		Aminopyralid		glyphosate	
Product Concentration	240 g/L		65/240 g/L		360 g/L		240 g/L		356 g/L	
Spray volume / CALIBRATE	400 L/ha		150 – 200 (400) L/ha		100 – 200 (400) L/ha		100 – 400 L/ha		100 – 200 (400) L/ha	
Persistence in Soil	Active for 3 to 5 years (longer in fine soils)		Active for up to 3 years		Non active/40 day ½ life		Active for up to 3 years		None	
Weed Species	Spray	Rate	Spray	Rate	Spray	Rate	Spray	Rate	W&S	Rate
Anchusa	**Yes**	**2.25 L/ha**	**Yes**	**3.8 L/ha**		N/A		N/A	yes	**2.5-3.5 L/ha**
Blueweed	**Yes**	**4.50 L/ha**	**Yes**	**7.0 L/ha**		N/A		N/A		
Canada thistle	Yes	4.50 L/ha	**Yes**	**3.7 L/ha**	Yes	0.83 L/ha	**Yes**	**0.5 L/ha**		
Common tansy	Yes	2.25 L/ha	**Yes**	**3.8 L/ha**	**Yes**	**0.83 L/ha**	?	?		
Diffuse knapweed	Yes	2.25 L/ha	Yes	3.8 L/ha	Yes	0.83 L/ha	**Yes**	**0.5 L/ha**		
Field scabious	Yes	2.25 L/ha	**Yes**	**3.8 L/ha**		N/A	?	?		
Knapweeds	Yes	2.25 L/ha	Yes	3.8 L/ha	**Yes**	**0.83 L/ha**	**Yes**	**0.5 L/ha**		
Hoary alyssum		N/A		N/A		N/A		N/A		
Leafy spurge	**Yes**	**9.0 L/ha**	**Yes**	**7.0 L/ha**		N/A		N/A		
Oxeye daisy	N on L*	2.25 L/ha	N on L	7.0 L/ha	**Yes**	**0.56 L/ha**		N/A		
Scentless chamomile	**Yes**	**1.1 L/ha**	**Yes**	**3.8 L/ha**	**Yes**	**.56 L/ha**	?	?		
Spotted knapweed	Yes	2.25 L/ha	Yes	3.8 L/ha	Yes	0.83 L/ha	**Yes**	**0.5 L/ha**		
Sulphur cinquefoil	Yes	2.25 L/ha	Yes	3.8 L/ha		N/A	**Yes**	**0.5 L/ha**		

All recommended products and rates are **bolded**.
? Indicates products with unknown efficacy rates for non-Label listed species at this time.
* Oxeye daisy is not on the Tordon 22K Label but Alberta Agriculture 'Weed Control in Forages' indicates an integrated approach with Tordon 22K at 9 L/ha. Timing rate trails at Owen Creek Cattle Company by BC Ministry of Agriculture and Lands indicate excellent control at 3.9 L/ha

NOTES

- Transline provides better control on Knapweed when in the flower stage than Tordon 22K. However, Tordon can provide up to 5 years residual control.

Application Instructions for Milestone (Aminopyralid):

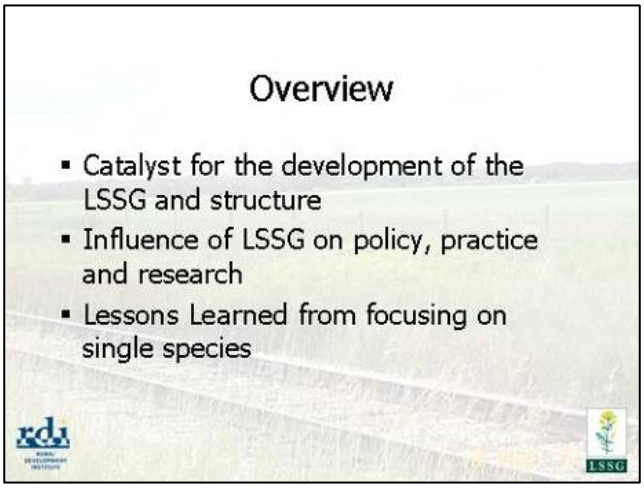
- Tank mixes must be used immediately as herbicide is only viable for the day of application

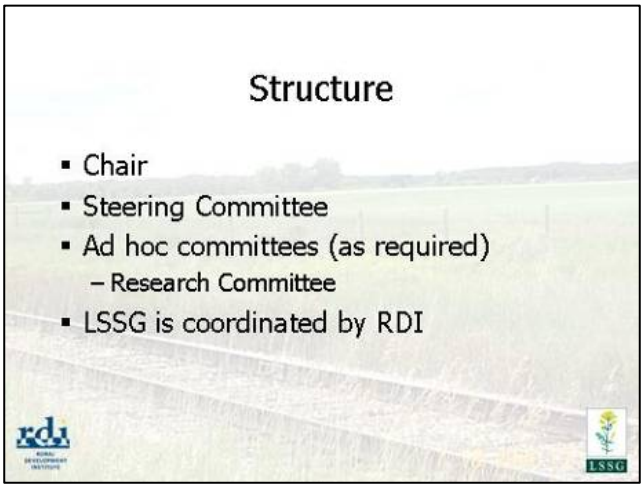
Jurisdictions

Assessment and Adjustment

- NWIPC Plan & Profile
  - containment boundary
- IPMA Plan
- Research
  - Targeted grazing
- Regulation change
  - Milestone
- Inventory and awareness
- Provincial level coordination & IPC
- Funding – adequate and consistent

Ryan Gibson and John Johnston - Leafy Spurge Stakeholders Group





Influence on Policy, Practice and Research

Influence on Practice

- Development of knowledge resources and tools
- Training and capacity building
- Communication tools
- Partnerships and relationships

Influence on Policy

- Participated in CFIA discussions on developing an Canadian Invasive Plant framework
- Asked to make presentations and comment on policy documents
- Invited to make presentations to MAFRI
- Developed relationships with Association of Manitoba Municipalities

Influence on Research

- Field research / demonstration plots
- Hosted leafy spurge forums
- Relationships with Ag Canada research stations in Brandon and Lethbridge

Economic Impact Study (1998)

Total Direct and Indirect Economic Impacts

	Grazing Land	Public Land	Rights of Way
Direct Annual Impacts	> $5 M	$0.8 M	$0.4 M
Secondary Annual Impacts	> $11 M	$1.7 M	N/A
Total Annual Impacts	**> $16 M**	**$2.5 M**	**$0.4 M**

Over $19 M per year

Moving Forward and Lessons Learned

- Single species focus has allowed:
  - Coordinated effort focused on leafy spurge
  - Build necessary relationships with key stakeholders
- Funding opportunities have influenced the direction of the group
- Leafy spurge is not the sole responsibility of a single provincial government department

- Need to attract the right people from organizations to participate in collaboration
- Need for inter-provincial efforts
- Changing priorities
- Capacity
- Need strong champion

www.brandonu.ca/rdi/leafyspurge.html

Nancy Gray – Saskatchewan, the Environment Farm Plan Experience

A New Program for Invasive Plant Management in Saskatchewan

Invasive Alien Plants Stewardship Advisor

Saskatchewan Agriculture and Food / SARM

Invasive Plants Management Program

- Application made through Agri-Environmental Group Planning pilot under Agriculture Policy Framework
  - Funding for activities that are better conducted on a group level rather than individual producer level
  - Still influences individual producers to participate
- Four objectives:
  - Monitor biological control sites for health and harvest potential

Invasive Plants Management Program

- Funding Program is an offshoot of the Environmental Farm Plan Process
- Saskatchewan is leading the Group Planning process within Agriculture Policy Framework
- Rationale?
  - Funding for Beneficial Management Practices for like invasive species control and bio-control that were likely to go unutilized
  - Allow producer or watershed groups to

Invasive Plants Management Program

- Partnered again with SARM
  - SARM providing in-kind administration
  - SAF providing office amenities
- Requested funding for two "Stewardship Advisors" hired Nancy Gray to cover the east and Harvey Anderson the west portions of Saskatchewan
- Also funding to subsidize purchase of GPS units by RMs for documenting weed population locations

Biocontrol Monitoring

- Update information for U-Pick scentless chamomile and leafy spurge biocontrol agent locations
- Release any new agents that become available and manage "mother-sites"
- Exchange inf ts in



Increase Awareness of Invasive Plants

- There is budget allocated for the printing of factsheets
- Articles in the Rural Councillor
- Presentations at WITC and other meetings
- Booths at SA District Meetings


Knowledge of Integrated Weed Management

- Integration of Physical, Chemical, Biological and Ecological controls
  - Physical – mowing, hand pulling, flaming, etc
  - Chemical – environmentally & economically efficient options
  - Biological – classical insects
  - Ecological – competition, grazing, fertilizing, etc.
- Keep current with new research in USA and Canada

Long-term Management Planning

- New element to project
- Encourage the development of formal management plans for noxious weeds and Invasive Alien Plants (IAPS)
  - Collection of data on "IAPS" populations
  - Setting of priority species
  - Listing possible management strategies
  - Listing planned management activities
  - Setting follow-up dates
  - Setting communication goals

GPS Funding

- Funding has been provided to assist RM's with purchase of GPS units
  - Up to 50% of cost of GPS unit
  - Maximum $125 rebate
  - Will require memorandum of understanding that rebate is contingent on RM contributing weed data to RDI internet mapping service
  - For RM's to receive the rebate they must formally agree to develop a 10-year IAPS Management Plan

Planning Workshops

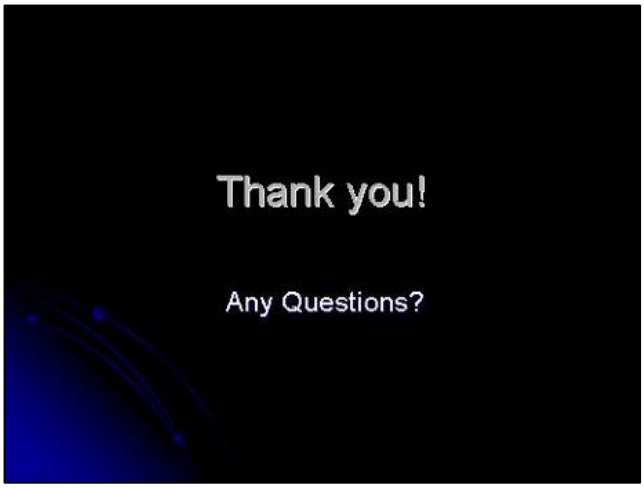
- One per SARM District
- For Participating RM Weed Inspectors and two producers with Invasive Species Management challenges
- Topics will likely include:
  - EFP presentation
  - Invasive Plant Identification and awareness
  - Management Activities
  - Planning methods

Successes

- Rural Municipalities
- 1st Nations
- Weed Management Areas
- Proposals
- Individuals
- Awareness
- Biologicals

Difficulties

- Ten Year plan development
- Funding for Weed Inspectors
- Licensed Spray Applicators
- Responsibility of Noxious Weed Act


Thank you!
Any Questions?

RDI ADVISORY COMMITTEE

The role of the RDI Advisory Committee is to provide general advice and direction to the Institute on matters of rural concern. On a semi-annual basis the Committee meets to share information about issues of mutual interest in rural Manitoba and foster linkages with the constituencies they represent.