



Invasive Plant Early Detection and Rapid Response in British Columbia

An Initial Framework
As of December 13, 2006

Prepared for the
Invasive Plant Council of BC
By Amanda Moncrieff
On exchange to Ministry of Environment
From Department of Environment and Conservation, Western Australia

Invasive Plant Early Detection and Rapid Response in British Columbia – An Initial Framework for the Invasive Plant Council of British Columbia

TABLE OF CONTENTS

| | Page |
|---|------|
| 1. Summary | 3 |
| 2. Why have an EDRR Plan?..... | 4 |
| 3. Objectives of this EDRR Plan | 5 |
| 4. Policy Background | 6 |
| 5. The EDRR Model..... | 8 |
| 6. EDRR Principles | 9 |
| 7. Recommendations for Implementation of EDRR Framework | 9 |
| a. Early Detection – the ‘Invasive Plant Alert Network’ | 10 |
| b. Communication of invasive plant incursions | 11 |
| c. Risk Assessment | 14 |
| d. Rapid Response Management | 16 |
| e. Preventative Measures | 20 |
| Bibliography | 21 |
| Appendix 1: Abbreviations..... | 22 |
| Appendix 2: Glossary | 22 |
| Appendix 3: Early Detection Reporting Sheet | 24 |

Invasive Plant Early Detection and Rapid Response in British Columbia – An Initial Framework for the Invasive Plant Council of British Columbia

Summary

This document provides a potential model for the early detection and rapid response (EDRR) of new and emerging invasive plants in British Columbia (BC). It outlines the potential roles and responsibilities of various 'key players' in the development of an EDRR system and information on the crucial processes and steps required to successfully implement an EDRR system, including surveillance, incursion communications, invasive plant risk assessment, incursion management, monitoring, reporting and preventative action.

Some of the suggested positions or groups integral to this system utilize existing programs / organizational positions and some are potential new positions or groups. They include, for example, an alert network of invasive plant 'spotters', an Invasive Plant Risk Assessment Panel, Invasive Plant Incursion Management Teams, an EDRR Program Coordinator and regional EDRR Contacts.

Surveillance for new or emerging invasive plant incursions in BC can be progressed by creating or formalizing a provincial wide network of invasive plant 'spotters' who can carry out invasive plant surveillance and structured reporting (early detection) of information on potential new incursions.

When a new invasive plant incursion is discovered, the species will undergo a risk and threat assessment by an Invasive Plant Assessment Panel. If required, plant specimens from the incursion will be formally identified by the UBC Herbarium. The Invasive Plant Risk Assessment Panel will recommend to the Invasive Plant Council of BC and the Inter-Ministry Invasive Plant Committee the appropriate level of response (high, medium or low) and the appropriate response measures to be put into action. A Rapid Response Management Team is established in the event that a high or medium level of response is recommended.

This EDRR model is consistent with the objectives of the Invasive Plant Strategy for British Columbia and the *Invasive Alien Species Strategy for Canada*. It has been prepared as part of a number of policy documents that are being drafted by Amanda Moncrieff (from the Department of Environment and Conservation, Western Australia) for the Invasive Plant Council of British Columbia. It is intended that further development of this model will be required by key agencies and organizations in BC relevant to invasive plant management.

This report has referred strongly to existing models, including the *Weed Alert Rapid Response Plan Victoria 2004 / 2005*, the Tasmanian *Weed Alert Network and State Response Plan to New Weed Incursions*, the *National Weed Detection Project and Weed Spotter Network* as coordinated by the CRC for Australian Weed Management and the Queensland State Government, and several documents produced in the United States on early detection and rapid response systems. Please refer to the bibliography on page 21 for a full list of EDRR reference documents.

Note that this document does not address restoration requirements following rapid response measures, but acknowledges that this is an integral part of successful invasive plant management.

Why have an EDRR Plan?

This plan has been prepared to describe the process, steps and stakeholders relevant to implementing an EDRR system in British Columbia. This includes surveillance, collection, identification, risk assessment and response to new and emerging invasive plants and to ensure the timely implementation of effective management measures for the protection of the BC environment, industry and other social values.

It is widely recognized that the most effective strategies for the control of invasive plants are the prevention of new introductions in the first instance, and for species that have been introduced, intervention at the early stages of infestation. Prevention and early action are the most cost-effective means of dealing with new and potential invasive plant incursions. The value of eradication where possible and containment of new incursions is well documented and worthy of government investment. The importance of such preventative action in managing invasive plants is well recognized by Government agencies at an international level.

The *Weed Alert Rapid Response Plan Victoria 2004 / 2005* provides an example (p.8) of an Australian program focussing on the detection and removal of Mexican Feather Grass (*Nassella tenuissima*):

Mexican Feather Grass is closely related to Serrated Tussock which is one of the worst pasture grasses in Australia. Serrated Tussock is one of 20 “Weeds of National Significance” and costs Australian agriculture over \$50 million per year in lost production and control costs. Mexican Feather Grass has been assessed to have the potential to invade 70% of Victoria. Whilst the species is prohibited entry to Australia by the Australian Quarantine and Inspection Service (AQIS) it has still been posted to Australia from mail-order businesses overseas. Nurseries and gardeners have grown the highly invasive grass in Victoria and other States of Australia. The Department of Primary Industries, with the assistance of the Cooperative Research Centre for Australian Weed Management (Weeds CRC), has traced and destroyed plants as they are found. The Weeds CRC estimated in the year 2000 that this action may save Australia \$39 million over the next 60 years.

Acting to prevent the establishment of new species of invasive plants is a cost-effective use of government and community resources. Note that this report focuses on early detection and rapid response mechanisms at a post barrier level only, and does not address true preventative measures such as legislated weed risk assessment as part of a Federal or Provincial biosecurity or quarantine framework.

This report recognizes that an effective means to detect and identify invasive plants must be in place before early intervention measures can be implemented. Whilst there are numerous sources of relevant expertise and organizational structures already in existence in BC that can contribute significantly to an EDRR system, it appears there is an absence of established and agreed procedures to deal with new invasive plants rapidly, potentially resulting in significantly increased response times to new invasive plant incursions and therefore potentially compromising the outcomes of any eradication and containment programs that may be implemented.

The lack of predetermined early detection and rapid response processes in British Columbia may be attributed to, and creating as a result, a number of issues:

- stakeholders with knowledge of new invasive plant infestations being unaware of who to forward information to, or stakeholders receiving such information being unclear on how to act on the information;
- uncertainty regarding the 'responsible parties' for management of any given invasive plant infestation;
- agreement on funding not being reached until an infestation becomes critical, by which time effective action is too late; and
- uncertainty about how to collectively prioritize invasive plant species, sites and control methodologies.

Establishment of a Protocol for notification of suspected new infestations of invasive plant species, including a network of invasive plant 'spotters' and formal reporting channels, combined with a process to assess the collected information, will assist in addressing these issues.

Objectives of this EDRR Plan

This document has been prepared to address the issues outlined above and to progress achievement of the outcomes referred to below under Policy Background. Objectives specific to this EDRR framework are:

1. Establishment of a supported surveillance program to enhance the knowledge-base of new and emerging invasive plants in British Columbia.
2. Establishment of a coordinated incursion reporting system to enhance the communication and information management of new and emerging invasive plants in British Columbia.
3. Increase community awareness and involvement against the threat of potential, new and emerging invasive plants.
4. Create capacity to assess the potential economic, environmental and social impact and level of risk posed by each new or emerging invasive plant in BC and to clarify the decision making process in determining the appropriate type of response to each new invasive plant incursion.
5. Development of a predetermined rapid response management process, across multiple stakeholder groups and land tenure types.
6. Develop a list of invasive plant species that are currently not found within British Columbia and for which preventative action and/or implementation of an EDRR plan in the event an incursion occurs within BC, would be a priority.

Note that this proposed model is essentially a communication and decision making framework, designed to complement, rather than replace (or be an additional layer to) existing programs and processes already in existence in BC. It is intended to enhance and expand upon these existing programs, with the goal of allowing for timely responses to new invasive plant incursions, via the prevention of duplicated EDRR related activities by different stakeholder groups, and the establishment of agreed communication pathways; information management and decision making processes; and clarification of stakeholder roles and responsibilities.

Policy Background

The *Invasive Alien Species Strategy for Canada* (2004) outlines a hierarchical approach to invasive species management that prioritizes:

- 1) prevention of new invasions;
- 2) early detection of new invaders;
- 3) rapid response to new invaders; and
- 4) management of established and spreading invaders.

The Strategy lists a number of high priority key actions under the Early Detection Goal:

- Undertake surveillance activities in geographic areas at high risk from invasives.
- Establish a coordinated public monitoring network to detect and report invasive alien species.
- Monitor the results and impacts of approved introductions and re-evaluate decisions to allow introduction if there are unexpected consequences.
- Establish nationally (and internationally) a core capacity of diagnostics and taxonomic expertise to accurately identify invasive alien species.

It also lists two key actions as Critical, under the Rapid Response Goal:

- Develop systems and networks for rapid decision-making, communication and implementation of emergency response plans?
- Develop contingency/emergency response plans.

The *Invasive Plant Strategy for British Columbia* (2005) states one of its 'Top Ten Challenges' for action on invasive plant management in British Columbia as:

Coordinate a system for the early detection and eradication of new invasive species that arrive in the province, and monitor these populations' impacts and any expansion.

The Strategy includes a Solution to:

Establish "Alert Programs" around high-risk areas for the presence of new invasive species.

The *Invasive Plants in British Columbia Protected Lands: a Strategic Plan* was prepared for the Ministry of Environment in 2006 and identifies one of three goals as:

- (1) To prevent the introduction, establishment and spread of invasive plants in protected lands.

'Early Detection and Rapid Response' is one of three objectives under this Goal, and consists of six Action Items:

1. Develop a mechanism through the Invasive Plant Council and /or Inter-Ministry Invasive Plant Committee to communicate regularly with other regions, ministries, agencies, provinces, and adjoining American states to identify new or rapidly dispersing invasive species that may become a threat in British Columbia.

2. Develop a mechanism through the Invasive Plant Council and the IMIPC for early intervention on new invasive plants introduced into the province, regions and protected lands.
3. Eradicate new invasive species before they establish permanent populations capable of dispersing to other locations.
4. Develop or improve existing early detection processes (invasive plant alert) that enables new infestations to be reported to all Ministry of Environment regions and partners so they can be eradicated or controlled in an expedient manner.
5. Conduct ongoing monitoring of susceptible sites within protected lands such as trails, day use areas, parking lots, maintenance compounds, etc.
6. Provide specialist information and advice on biodiversity and ecosystems at risk in developing early detection protocols.

The EDRR Model

A conceptual EDRR framework proposed in this document is summarised in Figure 1 on the following page.

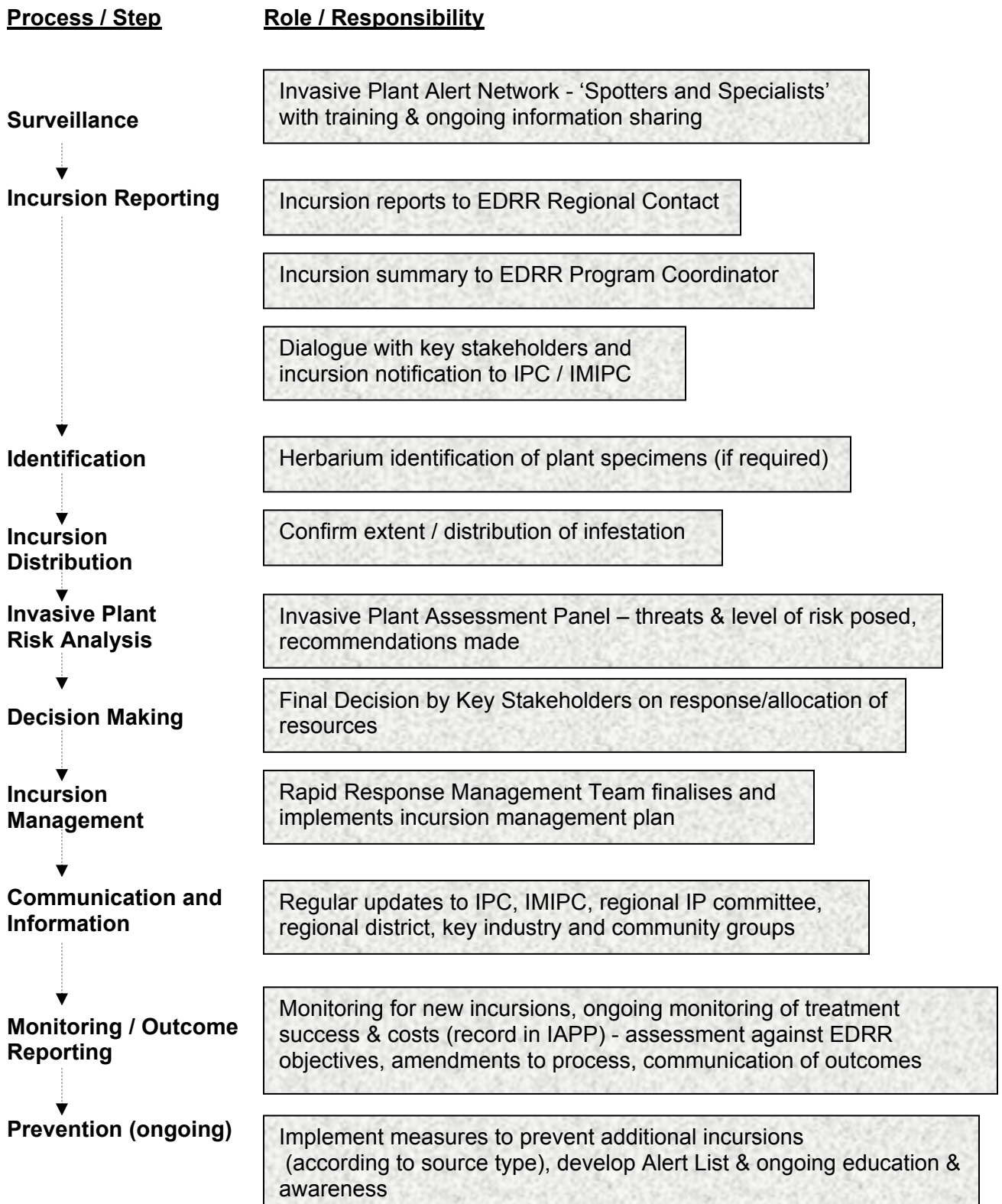


Figure 1. Framework of EDRR Model

EDRR Principles

This plan has been developed according to the understanding and acceptance of the following principles of early detection and rapid response (adapted from the *Victorian Pest Management, A Framework for Action, 2002*):

Principle 1: Prevention and early intervention provide the most cost-effective means of invasive plant management.

Principle 2: Early detection and rapid response provide opportunities to eradicate or minimise, specific invasive plants from the Province or a region within the Province.

Principle 3: Prior to applying resources to incursion responses, a risk analysis on the level of threat posed by new species with invasive potential to both economic and environmental values, needs to be assessed based on the likelihood of introduction/ spread into an area (risk) and the level of threat posed (impacts).

Principle 4: Eradication of invasive plants from an area where they are well established is not a reasonable expectation. However, EDRR processes can be applied to ensure established pests are prevented from spreading into other valued areas at risk.

Principle 5: Risks of introduction and spread must be communicated to the community so that attitudes and behaviour are modified, community vigilance increased and cooperative mechanisms developed to minimise these risks.

Recommendations for Implementation of an EDRR Framework

Recommendation 1: Develop and support an 'Invasive Plant Alert Network' to increase capacity to conduct surveillance for new and emerging invasive plant species or infestations, including the creation of a province wide network of 'Spotters and Specialists', EDRR Regional Contacts, a Provincial EDRR Program Coordinator, development of a training package, awareness material and a 'Key species to look for' list.

Recommendation 2: Develop and implement a protocol for reporting and communication of suspected new and emerging invasive plants across multiple stakeholders, including communication with neighbours, expert identification and a standardized Early Detection Reporting Sheet.

Recommendation 3: Creation of an Invasive Plant Assessment Panel to assess the potential economic, environmental and social impact and level of risk posed by each new or emerging invasive plant found in BC, and to make recommendations of the type of response warranted. This panel should be transparent and harmonize existing assessment processes at a Federal and Provincial level.

Recommendation 4: Creation of multi-stakeholder invasive plant Rapid Response Management Teams and a standard template for preparation of rapid response management plans, including the defining of roles, responsibilities, clarified permit and regulation requirements and funding requirements.

Recommendation 5: Develop a set of protocols for invasive plant incursion management, including specimen collection guidelines, communication processes, invasive plant hygiene, disposal methods and training requirements.

Recommendation 6: Investigation into development of 'potential' invasive plant species lists, development of containment lines and pre-barrier weed risk assessment processes and biosecurity regulation at a Provincial and cross border level, to foster a truly preventative approach to invasive plant management.

1. Early Detection – the 'Invasive Plant Alert Network'

Developing and supporting a network of surveillance across the Province will significantly enhance the ability to employ a timely response to new invasive plant incursions.

The effective detection of suspect plants across a large land area requires a network of people who can carry out invasive plant surveillance, reporting and where necessary, specimen collection for identification purposes.

It has been recognized by organizations such as the CRC for Australian Weed Management that a more substantial body of botanical expertise exists across Regional areas than is generally recognised. This includes retired professionals, interested members of the public with botanical or environmental skills, or people currently employed in the agricultural, ranching, forestry, nursery or horticultural sectors or other fields of vegetation management.

Case Study: Detection Networks in Australia

Queensland: the 'National Weed Detection Project' is a pilot project developed by the CRC for Australian Weed Management and supported by the State government, to identify expertise, and develop and train a volunteer network focused on detection of new weed incursions that is connected to and supported by the Queensland Herbarium.

Victoria: has established a 'Weed Alert Network' – a network of "Weed Spotters" who carry out weed surveillance and collection supported with training opportunities and an email discussion group. 125 people are registered on the Weed Spotter network.

Tasmania: a 'Weed Alert Network' with some 70 members including professional land managers, environmental groups, horticultural and gardening clubs, is coordinated by the Weed Alert Taskforce, which provides initial training and ongoing communication via weed alert bulletins and a newsletter.

Detection Networks in the United States

New England: the Invasive Plant Atlas of New England (IPANE) is a network of professionals and trained volunteer "Rapid Responders". It involves the establishment of teams of experts who assess new incursions and prepare an action plan. The process includes a web based 'Invasive Alerts' and Sighting Reports function.

Wisconsin: the Department of Natural Resources has an Invasive Plants Reporting and Prevention Project, including "Weed Watchers" – with Weed Watcher training, target plants webpage and Collecting & Reporting Guidelines.

It is recommended that an Invasive Plant Alert Network (IPAN) be developed, including a network of invasive plant 'spotters and specialists' to be established and supported, to assist in the detection and reporting of potential new invasive plants in British Columbia. 'Spotters' are members of the community, generally with some invasive plant or land management knowledge, who register as volunteers to contribute to IPAN, and specialists are the people

currently working across government, industry and non-government organizations and who can provide technical advice and support to the network.

Once a new invasive plant infestation is suspected, it is likely that multiple organizations would need to be notified. It is therefore important that an efficient information network is established between relevant groups and organizations.

The IPAN will require the support of the Provincial Government, the Invasive Plant Council of BC and key community and industry groups to operate successfully. A Program Coordinator for EDRR is recommended, operating out of an appropriate organization, and providing a central contact point and coordination between and across what is essentially a multiple stakeholder communication and decision making process.

A network of regional EDRR contacts is also required, potentially a nominated contact person from each Regional Invasive Plant Committee. This almost Provincial wide network provides a valuable existing knowledge and communication network. This role would complement activities already being conducted by many (although not all) regional invasive plant committees, however consultation would have to occur to ensure that this role is feasible. In some regions it may be more appropriate to have a Provincial Government contact as the regional EDRR contact.

The network of invasive plant spotters should receive training in invasive plant identification, incursion reporting and voucher (samples of suspected new invasive plants) methodology. The designated EDRR Regional Contact would liaise with members of the network in their region to ensure they are receiving the appropriate level of information and updates on 'invasive plant alerts' (discussed in Section 2) and are correctly following the agreed EDRR procedures.

Voucher Specimen Collection

Collection guidelines may be required to ensure that where collection of suspected invasive plant specimens and submission of a voucher to the Herbarium is required (i.e. whenever there is a degree of uncertainty regarding the species), it is completed without damage to surrounding native vegetation and within a reasonable timeframe. The guidelines would include information on collection methodology (including measures to prevent further spread of the invasive plants and damage to surrounding values), pressing, mounting and labelling of specimens, submission and survey advice on where to look.

Any volunteer network works best when it is provided with appropriate training, is supported by a central coordination point and is kept informed of progress and events across the network. Examples of information sharing from other EDRR networks include:

- initial training workshops (at major regional centres)
- email discussion group
- invasive plant identification and collection toolkit
- collecting and reporting guidelines
- on-line Weed Alert Bulletins
- target plants webpage
- Weed Alert Network newsletters

2. Communication of Invasive Plant Incursions

Invasive plant spotters, on detecting a suspected new (either to BC or regionally) incursion, would complete an Early Detection Reporting Sheet (see Appendix 3 for a suggested template)

and forward this to their EDRR Regional Contact, who would be responsible for initial verification of the report and ensuring it contains adequate and accurate information. Note that this process will require assimilation with existing invasive plant reporting processes (both Government and non-government) across BC.

The EDRR Regional Contact would forward this report to the EDRR Program Coordinator, who is responsible for ensuring accurate identification of the incursion (in liaison with the Herbarium), coordinating the gathering of information on the current size of the infestation and distribution of the species, and then if required, communicating information to all key stakeholders, including the IPC, Inter-Ministry Invasive Plant Committee (IMIPC), relevant Regional District, regional invasive plant committee and land managers.

The EDRR Program Coordinator then provides all available information to the Invasive Plant Assessment Panel, for assessment of risk posed by the species or incursion and the recommended actions, as discussed in Section 3.

Once a new incursion has been confirmed, the EDRR Program Coordinator will provide information, in the form of an invasive plant 'alert', to the Invasive Plant Alert Network via email and an established IPAN web page (potentially on the IPC website and a lead government agency website). The network will be asked to be vigilant for this new invasive plant. The community could also be alerted through the media as part of a broader communication strategy, to create increased awareness and level of reporting of that species.

Note that only a small proportion of all invasive plant sightings that are reported necessitate further action, once an initial assessment has occurred. For example, in Queensland, Australia 162 Spotters submitted approximately 160 plant specimens to the Queensland Herbarium in 2005/06 and eight of those were notified to the State and Local Pest Management Agency for further action.

Information on potential, new and emerging invasive plants should be developed by the Invasive Plants Assessment Panel and forwarded to all members of the network. This would include the identification and agreement on priority species, and the on-line distribution of invasive plant 'alerts', preferably by the IPC and IMIPC.

In addition to formal risk assessments, the Invasive Plant Assessment Panel and the EDRR Program Coordinator should maintain a sound level of awareness of potential new threats, via published literature, email list-servers, sources on the internet and global databases for potential invasive plants that may pose a threat to British Columbia.

The recommended communication pathways for reporting of suspected new invasive plant incursions as outlined in this section, is summarised in the diagram on the following page.

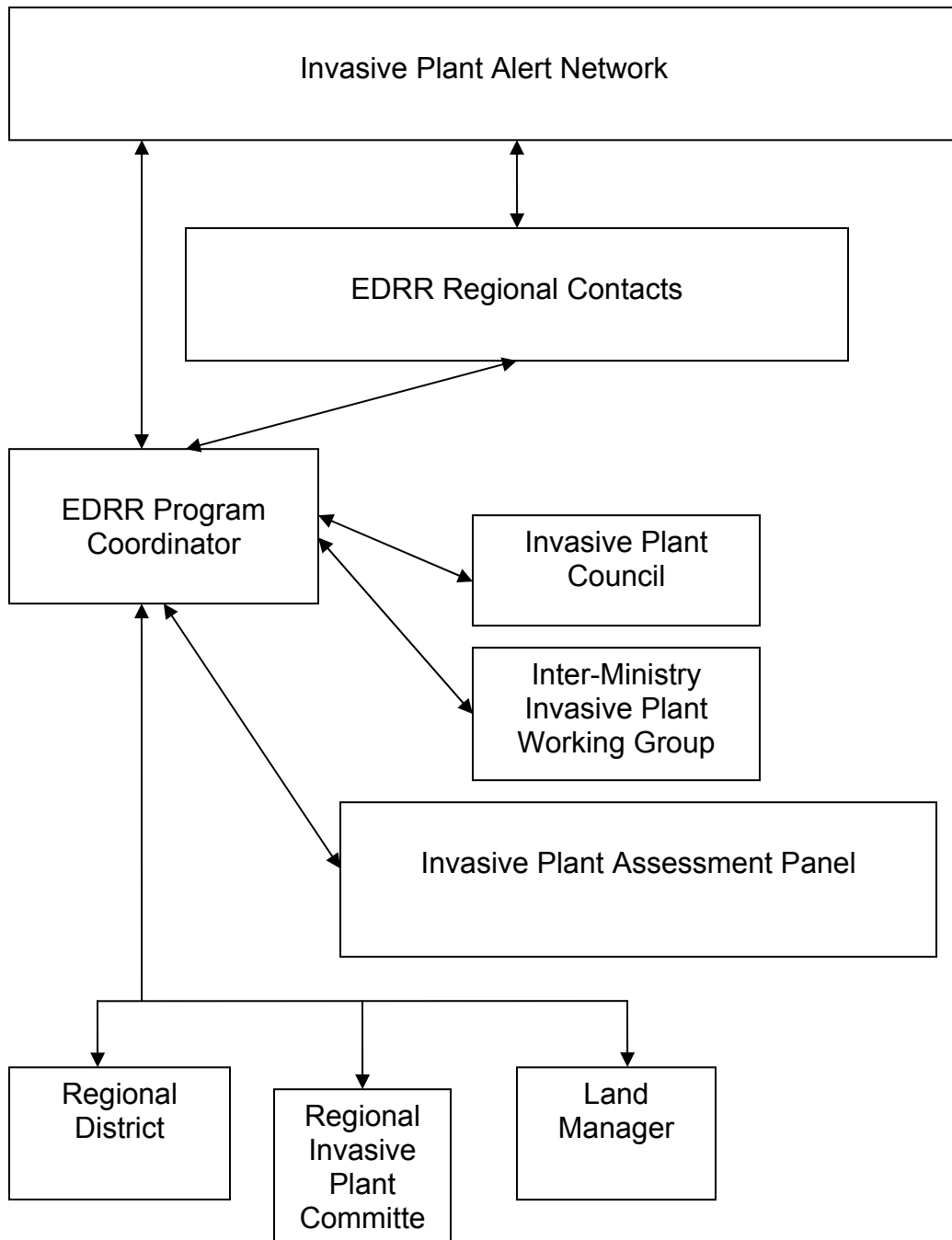


Figure 2. Communication Path for an Incursion Report

3. Risk Assessment

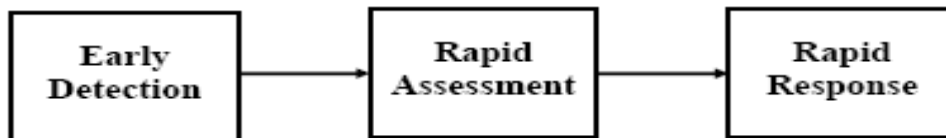
3(a) Assessment of Risk and Recommendation on Action

An essential step in any EDRR process is the timely assessment of the threat posed and level of risk of a given invasive plant incursion. This step is important for three main reasons:

- 1) a predetermined process allows for rapid decision making;
- 2) decision-making utilizes sound scientific principles; and
- 3) scarce invasive plant resources are allocated to incursions of the highest priority and with the greatest chance of success.

Weed Risk Assessment is a process applied to the plant importation regulation process; however, common principles apply to post barrier management and many examples exist internationally of risk assessment procedures being part of an EDRR system. For example in Tasmania, Australia 'Alerts' are only issued once a scientific risk assessment procedure has been followed.

In the United States, the *General Guidelines for the Establishment & Evaluation of Invasive Species Early Detection & Rapid Response Systems* (June 2003) by the National Invasive Species Council, highlights that certain invasive species can spread rapidly, creating a critical need to coordinate EDRR efforts. Detecting and responding to invasions requires a "complex series of interlacing, coordinated, and sustained actions" - grouped into three main categories (p. 3):



Rapid Assessment in this instance involves:

- preliminary risk assessments of high priority species prior to detection; and
- rapid risk assessments of newly detected species to allow prompt and informed decision-making (decisions to contain, treat, monitor only, or ignore a population), while populations are still localized.

Following this work, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds developed 'A National Early Detection and Rapid Response System for Invasive Plants in the United States' (September 2003), advocating a Rapid Assessment process to determine the potential threat to different habitats and appropriate State and Federal regulatory status. This process investigates what should be done and how to do it, encompassing a science based ecological assessment of:

- invasiveness;
- potential extent of habitat to be invaded; and
- potential long-term impacts, including on the economy.

It is recommended that an Invasive Plant Assessment Panel (IPAP) be formed for British Columbia, responsible for completing analysis of new invasive plant incursions. This assessment would include investigation of the:

- environmental, social and economic impacts (threat posed); and
- likelihood of spread / further introductions (level of risk) of the incursion.

The IPAP would be responsible for recommending a high, medium or low level of response as appropriate for each incursion and the key actions that are required, which would form the basis of an incursion Rapid Response Management Plan. The IPAP can also recommend instances where eradication of a given species is desirable/feasible for a specific Region within BC, rather than at a Province wide scale.

The IPC or the IMIPC would be responsible for the effective operation of the IPAP. Its membership would comprise of (3-4) individuals with a high level of expertise in invasive plant impacts, assessing potential distribution and management options, and would be likely to hold positions in Provincial Government or academic institutions. It is essential for the IPAP membership to consist of the appropriate specialists representing a range of perspectives and existing risk assessment processes. The IPAP would undertake a risk assessment on receipt of notification of a potential or new species from the EDRR Program Coordinator, and would provide recommendation on the type of response required, within a predetermined timeframe (1-2 weeks). It may be necessary for IPAP to seek external advice, regarding taxonomic information or experience with a given species elsewhere. The final response would go to the EDRR Program Coordinator, for discussion with the IPC, IMIPC and the relevant land manager.

The IPAP's assessment would address the following factors (adapted from *Weed Alert Rapid Response Plan Victoria 2004 / 2005*):

- modeling the potential distribution using climatic data and other known data;
- assessment of the invasive ability of the species;
- likelihood of spread and/or further introductions from human activity;
- assessment of the potential economic, environmental and social impact (utilizing a cost benefit analysis);
- comparison to existing invasive plants in Canada or United States;
- recommended control methodology;
- clarification of objectives: is achievement of eradication possible or is containment a more realistic outcome?
- any special management requirements to limit further spread, including immediate preventative actions and requirements during removal operations;
- the cost of proposed measures and the likelihood of success;
- estimated costs/impacts for the eradication, containment and 'do nothing' options;
- legal implications – authority required for proposed actions (relevant legislation and land owner permission), impact of on-ground operations (compensation implications), pesticide use and potential off-label herbicide requirements (Integrated Pest Management Regulation); and
- assessment of gaps in knowledge base i.e. treatment methods, ecology, method of distribution etc.

Rating Rapid Response Types

Low level incursion response: dealt with at local/regional level by reallocation of existing resources.

Medium level incursion response: may require the establishment of a multi stakeholder Invasive Plant Rapid Response Team and the provision of special funding.

High level incursion response: requires the establishment of an Invasive Plant Rapid Response Team and the provision of special funding. May require the implementation of quarantine measures and declaration under the Weed Control Act.

3(b) Decision Making

It is important to note that the risk assessment process is a science-based process, which investigates the type of threat and the level of risk posed by a specific invasive plant species or incursion. Whilst this process does consider environmental, social and economic impacts to determine the recommended actions, it does not consider the financial capacity to implement the recommendations. The final decision on whether to act on the recommendations made by IPAP will inevitably allow for financial capacity and is made by the land holder and appropriate government organizations responsible for management of the incursion.

Cost benefit analysis involves assessment of the potential impact of invasive plant species on economic, environmental and social values. It includes consideration of the value of the invasive plant's use or commercial value, as well as its impacts. The costs of a variety of management actions can be compared to the cost of doing nothing, and intervention versus non-intervention. Many examples of cost benefit analyses applied to invasive plant management exist (such as the Victorian Weiss/Morfe model) and development of a cost benefit model specific to British Columbia may be warranted.

Following the steps outlined in this EDRR framework, the IPC and the IMIPC will confirm the recommendation of the IPAP or seek further information on the incursion. A low type of response could generally be managed directly by the relevant land manager, in communication with the EDRR Program Coordinator. Management of medium and high type responses would be via a multi-stakeholder invasive plant Rapid Response Management Team. The IPAP should submit a full report with recommendations to the EDRR Program Coordinator (for forwarding to IPC and IMIPC) on the potential impact and the appropriate type of response within two weeks, to allow for final decision making on how to proceed.

It may be appropriate in some instances to conduct preliminary risk assessments of high priority species prior to their detection within British Columbia. Depending on the outcome, the development of rapid response contingency plans for some invasive plant species may be required, for those species that are not yet in BC, but that are considered highly likely to enter British Columbia, and to pose a substantial threat to environment, industry or other social values.

4. Rapid Response Management

4(a) Rapid Response Management Teams

Invasive plant incursion responses in Victoria, Australia follow a wildfire response model (Incident Control System (ICS)), using an Incident Management Team (IMT) approach to management.

Incident Management Teams (adapted from *Weed Alert Rapid Response Plan Victoria 2004 / 2005*)

Control: overall management of the incursion incident; coordination of progress reports and the final report; coordinate debriefs.

Planning: gathering, analysing and processing information related to the incursion; predicting invasive plant behaviour; planning how to contain/eradicate the incursion; provide information on the ecology and taxonomy of the species and the management options and treatment methods; in liaison with the Invasive Plant Assessment Panel.

Operations: direction of resources used to manage an incursion; including minimising spread of propagules, disposal of plant material and follow-up rehabilitation of the site; substantial incursions may require establishment of an operations team to develop and implement part of the incursion management plan including survey, mapping, GIS, training, local community liaison, treatment and quarantine procedures.

Logistics: providing and maintaining facilities, services and materials used by those controlling the incursion; additional expertise may be sought on policy, legislation, communication and finance.

While not recommending direct transfer of this framework to an EDRR system for British Columbia, aspects of an IMT approach to invasive plant incursion management are relevant to the proposed EDRR system. The development of predetermined Rapid Response Management Teams (RRMT) is recommended, to assist in the delivery of a rapid response that is timely, and that consists of the appropriate expertise.

A RRMT would be required for medium and high type responses and consists of a group of incursion management personnel comprising an incursion lead and the personnel that are responsible for the functioning of the operations, planning, logistics and communications aspects of managing the incursion. The IMIPC, IPC and the relevant land manager would normally convene this team, on the recommendation of the IPAP.

One of the primary responsibilities of the RRMT is to prepare a rapid response management plan for each incursion, outlining how actions recommended by the IPAP will be delivered upon. The intensity of the RRMT process would vary from a number of teleconference calls to agree on actions and check progress of the incursion management, to daily communication to plan and implement high priority incursion responses.

Roles and responsibilities

The following information details the key roles and responsibilities recommended for implementation of a rapid response management system. Those roles marked with an asterisk are temporary positions that will vary for each incursion, all other positions are constant. Note that these positions are examples only, and are not prescriptive.

- **Invasive Plant Alert Network:** a network of volunteers and designated Provincial Government staff who can watch for, report, collect, identify and deliver specimens of potential, new and emerging invasive plants to their EDRR Regional Contact.
- **EDRR Regional Contacts:** based out of each of the sixteen Regional Invasive Plant Committees found across the Province, to assist in the identification and filtering of IPAN

Early Detection Reporting Sheets and invasive plant specimens, and if required, in the on-ground implementation of a rapid response management Plan.

- **EDRR Program Coordinator:** responsible for the overall coordination of the IPAN, IPAP and any RRMT that is formed; for communication with all key stakeholders involved in invasive plant management, and for policy and planning of preventative measures regarding new and potential invasive plant incursions. This position does not require a permanent full time capacity, however it is essential that the person is able to 100% work time to EDRR tasks on an as needed basis.
- **Invasive Plant Assessment Panel:** responsible for risk and impact assessment of potential, new and emerging invasive plants.
- **Rapid Response Management Team:** Provincial wide team convened in response to specific invasive plant incursions and made up of a number of positions who will be able to coordinate the province's response and make resource allocation decisions for the prevention or management of new or potential incursions.
- **Incursion Lead:** responsible for overall outcomes of an incursion response process.
- **Planning Coordinator:** responsible for the collation of incursion and resources information and predictions of development.
- **Operations Coordinator:** responsible for management and supervision of on-ground resources as part of an incursion response.
- **Logistics Coordinator:** responsible for the provision of facilities, services, materials and funding required for an incursion response.
- **Communications Coordinator:** responsible for coordinating communications between stakeholders, the broader community and media liaison.

The following information lists the key roles and responsibilities of those (existing) parties likely to be involved in a rapid response process.

- **Invasive Plant Council of British Columbia:** a key multi-stakeholder group providing policy information and coordination of invasive plant initiatives, with open membership and a Board of Directors representing a wide range of interests including government, First Nations, non-government, industry, user groups, and utilities.
- **Inter-Ministry Invasive Plants Working Group:** the IMIPWG provides a forum for government agencies to discuss and make decisions on the coordination of invasive plant issues including responses to priority incursions.
- **Integrated Vegetation Management Association:** The IVMA has worked closely with government on key operational issues, including the Pest Management Regulation.
- **Government of British Columbia:** a number of Provincial Government agencies will be involved in the EDRR system, including Ministry of Agriculture and Lands, Ministry of Forest and Range, Ministry of Environment and Ministry of Transportation.
- **Canadian Food Inspection Agency:** Federal agency responsible for plant health risk assessment, regulation of plant pests, generic emergency response planning and importation and quarantine policy.
- **Agriculture and Agri-Food Canada:** Federal agency with responsibilities including the biological control research program for the management of invasive plants.
- **Indian and Northern Affairs Canada:** Federal agency responsible for the provision of services for First Nations and northern peoples of Canada.
- **Environment Canada:** Federal agency with lead responsibility for the Invasive Alien Species Strategy of Canada.
- **University of British Columbia Herbarium (or other Herbarium):** a predetermined Herbarium, responsible for formal identification of plant specimens forwarded by the EDRR Program Coordinator.
- **Invasive Plant Regional Committees:** liaise with the EDRR Program Coordinator and EDRR Regional Contact to provide on-ground coordinated action for the inspection, tracing,

retrieval, eradication, containment, management and disposal of potential and new invasive plants.

- **Local Government:** Regional Districts across the Province (and similar organizations in neighbouring Provinces and States) will be key stakeholders in any rapid response implemented.

4. (b) Communication and Information

The development of a communication strategy will assist in ensuring the effective flow of information during an incursion, and in helping to maintain agency and community awareness in relation to the threat of potential and new invasive plant species. An essential role for the strategy is to provide feedback on the operation of the plan to the community including industry organisations, First Nations, Regional Districts, Provincial Government agencies and other key stakeholders.

Sharing of information on rapid response initiatives with neighbouring Provincial, Federal and international agencies will ensure cooperation between organizations in the implementation of cross border management and preventative measures.

A communication strategy should be designed to address the following issues (adapted from *Weed Alert Rapid Response Plan Victoria 2004 / 2005*:

- promote awareness about possible threats from potential, new and emerging invasive plants to economic, environmental and social values;
- emphasise the need for community awareness and involvement in relation to potential, new and emerging invasive plants;
- establish a framework for effective communication during surveillance, eradication and containment campaigns;
- encourage and support IPAN and rapid response participants by establishing an effective communication network, providing feedback to invasive plant spotters on identification, and keeping participants up-to-date on the assessment and action components of the early detection and rapid response plan;
- publicise successes to both motivate and ensure continuing participation of volunteers, and to increase likelihood of on-going funding;
- ensure that all participants are informed on the progress and development of the surveillance and response plan;
- specify the EDRR Program Coordinator as a general contact point for members of the public, the EDRR Regional Contacts are the first contact point for the IPAN Spotters; and
- investigate the development of a separate EDRR information package and school kit that includes case histories of invasive plant invasions, and information on invasive plant biology and threats.

4. (c) Monitoring and Outcome Reporting

It is important to implement some form of review following the implementation of any rapid response processes, to ensure that outcomes are being met and the effectiveness of decision making, information sources and communication processes that have been introduced. This information should be forwarded to all individuals and organizations involved in the EDRR process, followed by a forum for discussion and feedback.

Final reports for each incursion rapid response should be prepared, including any recommended changes to be implemented and an analysis of resources required compared to

achievement of outcomes. Progress reports may be more appropriate, given the long timeframe required to eradicate certain species or infestations.

The EDRR Program Coordinator is responsible for providing an annual summary of the early detection system, including number of registered participants in IPAN (by region), any training and communication conducted for IPAN, number of notifications received via IPAN (by region), results of risk assessments conducted by IPAP and number of rapid responses initiated as a result of the alert network.

It is also important that any rapid responses initiated include a sound, ongoing monitoring program, to ensure that objectives are being met, and to allow for any necessary changes to be made to the management approach.

Successful EDRR requires a two-fold approach to monitoring – a preventative action to monitor for new incursions (linked to an ‘Alert’ list of species and with a focus on susceptible sites) and the monitoring described above to determine the effectiveness of implemented rapid response treatments.

4. (d) Protocols for Invasive Plant Incursion Management

The key objective of an early detection and rapid response plan is to create a state of preparedness, in order to significantly reduce the response time to new invasive plant incursions and therefore improve the level of success of management efforts. This document outlines recommendations for positions and processes to be established and maintained prior to incursions occurring.

In the event that a formal EDRR system is introduced in British Columbia, an additional level of information will need to be agreed and documented to allow the implementation of the EDRR measures outlined here. The development of Protocols is recommended on specimen collection guidelines, communication processes, invasive plant hygiene, disposal methods and training requirements.

5. Preventative Measures

Applying a preventative approach is crucial to any sound invasive plant management program, and is at the core of early detection and rapid response processes, i.e. addressing priority invasive plant species and infestations whilst it remains possible to do so successfully. How to decide when to apply resources to a preventative approach in the context of EDRR is discussed in Section 3 on Assessment of Risk and Recommendation on Action.

A thorough risk assessment process would include the identification of species that are potential invasive plant threats to BC, but that are not yet present within the Province, and identify routes and methods that are most likely locations for the establishment of new invasive plants, in order to guide early detection efforts. This information should be widely shared amongst the IPAN and other stakeholders.

It is recommended that a ‘potential’ invasive plant species list is developed, and pre-barrier weed risk assessment processes and biosecurity regulation at a Provincial level is further investigated, to foster a truly preventative approach to invasive plant management.

Bibliography

- Cooperative Research Centre for Australian Weed Management, 'National weed detection - weed spotters', http://www.weeds.crc.org.au/projects/project_4_2_2.html
- Braithwaite, H. (2000) *Weed surveillance plan for the Department of Conservation*. Department of Conservation, New Zealand.
- Department of Natural Resources and Environment (2002) *Victorian Pest Management. A framework for action. Weed management strategy*. Department of Natural Resources and Environment, Victoria.
- Department of Natural Resources, Wisconsin Invasive Plant Reporting and Prevention Project, <http://dnr.wi.gov/invasives/futureplants/weedwatcher.htm>
- Department of Primary Industries and Water, Tasmania, *Weed Alert Network* <http://www.dpiw.tas.gov.au/inter.nsf/WebPages/TPRY-52J4KL?open> and *State Response Plan to New Weed Incursions* <http://www.dpiw.tas.gov.au/inter.nsf/WebPages/TPRY-4ZV5MR?open>
- Department of Sustainability and Environment and Department of Primary Industries (2005) *Weed Alert Rapid Response Plan Victoria 2004 / 2005*, Department of Primary Industries, Frankston, Victoria.
- Federal Interagency Committee for the Management of Noxious and Exotic Weeds (2003) *A National Early Detection and Rapid Response System for Invasive Plants in the United States: Conceptual Design* Washington DC.
- Government of Canada, (2004), *An Invasive Alien Species Strategy for Canada*
- Harris, S., Brown, J. and Timmins, S. (2001) 'Weed surveillance - how often to search?' *Science for Conservation* (175). Department of Conservation, New Zealand.
- Invasive Plant Atlas of New England (IPANE), <http://invasives.eeb.uconn.edu/ipane/earlydetection/early.htm>
- Invasive Plant Council of British Columbia (2005) *Invasive Plant Strategy for British Columbia*, A project initiated by Fraser Basin Council, Williams Lake, British Columbia
- National Invasive Species Council (2003) *General Guidelines for the Establishment & Evaluation of Invasive Species Early Detection & Rapid Response Systems*, Department of the Interior, Washington DC.
- University of British Columbia, Herbarium Website, <http://www.botany.ubc.ca/herbarium/>
- Wikeem, B. and Miller, V. A. (2006) *Invasive Plants in British Columbia Protected Lands: A Strategic Plan*, report for the Ministry of Environment, Victoria, British Columbia.

Appendix 1: Abbreviations

| | |
|-------|--|
| EDRR | Early Detection and Rapid Response |
| IPC | Invasive Plant Council of British Columbia |
| IMIPC | Inter-Ministry Invasive Plants Committee |
| IPAN | Invasive Plant Alert Network |
| IPAP | Invasive Plant Assessment Panel |
| RRMT | Rapid Response Management Team |
| CRC | Cooperative Research Centre |

Appendix 2: Glossary

alien species that are introduced, or non-native, to a specific area.

alien invasive plants plants that have the potential to pose undesirable or detrimental impacts on ecosystems, agricultural values, landscape amenity or human health.

contingency plan is a predetermined plan to be implemented in the event of, in this case, a new invasive plant incursion.

CRC Cooperative Research Centres, research organizations formed in Australia using collaborative funding arrangements

early detection in the context of invasive plants, processes to find new infestations in the early stages of establishment, whilst they remain relatively easy to eradicate or control

early intervention is the timely action to prevent a small problem becoming a large one.

eradication an invasive plant has been completely removed or killed over time and no longer occurs at that site, including its propagules.

incursion is an invasion or an introduction, especially one of sudden character, with detrimental consequences, to a specific area.

infestation presence of an invasive plant in quantities large enough to create negative impacts on surrounding values

invasive plant colonizing plants, adapted to disturbed soils, that can establish quickly due to an aggressive structure and/or reproduction method, and are adaptable to a broad ecological niche.

naturalised means that a plant has been able to self propagate for at least one generation.

new and emerging invasive plants are invasive plants that have recently been recorded for the first time (new) or have been present for some time and are known or are suspected to have the potential (emerging) for detrimental impact on environmental, social or economic factors.

noxious weeds are those that have been declared under legislation, for some form of management action. In BC, plants are legislation according to the *Weed Control Act* – most are invasive aliens, specifically related to agricultural competition or unsuited as livestock forage.

potential invasive plants to British Columbia are plants that have not yet established in the Province but their invasive behaviour elsewhere and/or a risk assessment indicates that the plant has invasive potential here.

protocol is a document detailing the expectations of etiquette for a particular process.

rapid response in the context of invasive plant management, implementing processes to ensure the timely and efficient management of a specific incursion

sleeper weeds are invasive plants that have naturalised in a region but have not yet increased their population size rapidly.

surveillance is the process of watching for, in this case, potential, new or emerging invasive plants.

weed risk assessment is the process of assessing or estimating the potential risk a weed or invasive plant poses to the environment, industry, human health or other social values.

weeds any plant not wanted where it is found.

Appendix 3: Early Detection Reporting Sheet

NOTE: This form requires revision to link it to the MoFR IAPP Inventory Form. It also requires linking to an 'Alert' Species List.

This sheet is to be used by members of the Invasive Plant Alert Network, for submission to the EDRR Regional Contact.

| | | | | | | | | |
|--|------------------------|---------------------|-----------------------|--------------------------------|---|----------------------------------|------------------|------------------|
| Invasive plant species (botanical name): | | | | Common name(s): | | | | |
| Person locating infestation: | | | | Name of property or park etc.: | | | | |
| Contact phone number: | | | | Region: | | | | |
| Email: | | | | Owner/Manager of land: | | | | |
| UTM Coordinates or GPS reading of centre of infestation: | | | | Date of sighting: | | | | |
| Map: [or Country Road Directory reference] | Easting: | | Northing: | | Date of specimen: | | | |
| | OR: | | | | | | | |
| | Latitude: | | Longitude: | | Location features/Address of property or park and infestation location: | | | |
| Has Identification been confirmed? | | By: | | Your specimen number: | | | | |
| Type of plant (circle as appropriate): | Tree | Shrub | Herb | Grass/sedge | Creeper | Vine | Floating aquatic | Emergent aquatic |
| Average height cm: | 1-10 | 11-20 | 21-50 | 51-200 | 200+ | | | |
| Growth stage: | Seedling | Rosette | Adult (Non flowering) | Adult (Flowering) | Seeding | Post seeding | Flower color: | |
| Number of plants: | 1 | 2-5 | 6-20 | 20-50 | more than 50 | specify or estimate if possible: | | |
| Area of infestation: | under 1 m ² | 1-10 m ² | 10-100 m ² | 100-1000 m ² | more than 1 ha | specify or estimate if possible: | | |
| Habitat: | Pasture | Crop | Garden | Aquatic | Riparian | Bushland | Grassland | Other: |
| Other invasive alien or native plants nearby: | | | | | | | | |
| Land use: | Agriculture | Roadside | Recreation | Conservation | Residential | Industrial | Other use: | |
| Source of introduction and suspected vector (if known or suspected, how long has it been there?, how did it get there?): | | | | | | | | |
| Other important information (e.g., vegetation type): | | | | | | | | |
| Photos taken: Yes/No | | | | | | | | |

QUESTIONS? View the Invasive Plant Alert Network at www.xxxxx or contact the EDRR Program Coordinator on XXXX

POST THIS SHEET and SPECIMEN TO:

Name:
 Organization:
 Email:
 Fax:
 Address:

Source: This form is adapted from 'Weed Alert Rapid Response reporting sheet', Weed Alert Rapid Response Plan Victoria 2004 / 2005 and 'Invasive Plant Report Form', Wisconsin Plants of the Future project.