

**Best Practices:  
Manitoba Municipalities  
and Integrated  
Control Strategies  
for Leafy Spurge**

FINAL REPORT

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## Introduction

Leafy spurge (*Euphorbia esula*) is a deep-rooted perennial noxious weed that has rapidly spread across much of North America, especially throughout the western states and provinces. Leafy spurge will readily establish itself in a variety of environments, although it is quick to take advantage of disturbed sites. It can be found in Manitoba in pastures, agricultural lands, along roadsides and in wooded areas.

The purpose of this project was to use a combination of demonstration and extension activities, aimed at increasing awareness at the municipal level about the extent and impact of leafy spurge infestation. The main objectives of this project included:

- Assess the infestation of leafy spurge of four selected municipalities
- Provide field site experience demonstration on what municipalities can do to prevent leafy spurge
- Provide information and demonstration on what municipalities can do to prevent the spread of leafy spurge
- Document and demonstrate existing control measures of each participating municipality; and
- Develop Integrated Pest Management strategies for participating municipalities.

Management of leafy spurge will result in an increase in forage production on marginal soils, and increase the numbers of acres under forage production.

The rural municipalities of Cornwallis, Daly, Oakland and Whitehead were targeted for this project due to the high acreage of leafy spurge infesting each municipality. Surveys of municipal councillors — or if applicable — the district weed supervisors, provided the acreage numbers for the Leafy Spurge Economic Impact Assessment written by the Leafy Spurge Stakeholders Group.

Rural Municipality	Approximate acres of leafy spurge
Whitehead	23,040
Daly	17,510
Cornwallis	50,544
Oakland	10,000

## Project Activities

### *Tours and Presentations to Councils*

Much time was spent touring the rural municipalities and speaking with the municipal councillors or designated councillor/weed supervisor. As a part of this project, each rural municipality received an informational leafy spurge package that is to be shared with any interested land managers. It should also provide the councillors with information about leafy spurge and methods for its control. These packages contained brochures on biological control agents, compact discs produced by Team Leafy Spurge, information about the Leafy Spurge Stakeholders Group (LSSG), as well as the Integrated Pest Management (IPM) Manual produced by the LSSG.

When possible, a brief presentation was given at municipal council meetings before this information was distributed. Although this presentation varied depending upon the audience, it generally followed a standard format.

Introduction	<ul style="list-style-type: none"><li>• Jennifer Pachkowski, Assistant Researcher</li><li>• Leafy Spurge Stakeholders Group (LSSG)</li><li>• Rural Development Institute</li></ul>
Leafy Spurge Stakeholders Group	<ul style="list-style-type: none"><li>• List of members</li><li>• Objectives</li><li>• Publications produced</li></ul>
Economic Impact of Leafy Spurge	<ul style="list-style-type: none"><li>• Prevalence of infestation</li><li>• Economic losses due to leafy spurge</li></ul>
How is this applicable to you?	<ul style="list-style-type: none"><li>• Explanation of the project</li><li>• How their assistance was required</li><li>• What they could expect in return</li></ul>

Another component of this project entailed scheduling tours to showcase rural municipalities that have active leafy spurge control programs. It was our intention to use these areas as demonstration sites to show the participating councillors how to effectively implement a weed control program. We had chosen to tour the weed district encompassing the rural municipalities of Cameron, Sifton and Glenwood as an example of a best practices site. John Johnston, the weed supervisor for this district, had agreed to lead the tour, and provide practical information to the councillors. However, we ran into the problem of finding a suitable time for the councillors to attend. We cancelled two tour dates, one on August 27 and then the rescheduled date of September 17, due to too many cancellations from the councillors. The overwhelming reason for the cancellations related to the councillors' unwillingness to miss the favourable weather for harvesting.

One of the main challenges encountered this summer included contacting the councillors who are involved in agriculture, as the leafy spurge season coincided with haying, harvest etc. The spring of 2002 was subject to cooler temperatures than average, which delayed the start of farming this year. Due to this late start to the

season, most of the councillors were trying to get as much done as possible during June, July and August, while most of the work on this project was being performed.

### **Workshop**

In lieu of the final group tour, the LSSG/RDI hosted a morning meeting/workshop on October 1 in Brandon. The intention of this workshop was to stress the importance of the municipalities developing a consistent leafy spurge control program, with a well thought out plan of action. The target audience was municipal councillors from the rural municipalities who participated in the project.

The participants who were able to attend, however, varied quite a bit from those on the original invitation list, as only one councillor, Rick Coleman, (from the Rural Municipality of Whitehead) was able to attend. Initially, there had been interest from councillors from Daly and Cornwallis, but they unfortunately had to cancel at the last minute. Additional participants included Guy Landry and Fatteneh Zehtab-Jadid, professors from the Brandon University Economics Department; Kim Poppel, the district manager of the Mid Assiniboine River Conservation District; David Hay, a representative from Manitoba Agriculture and Food; John Johnston, weed supervisor for Cameron Glenwood Sifton, as well as Beth Peers and Jennifer Pachkowski, LSSG coordinator and research assistant.

In the first part the meeting, John Johnston spoke about his activities in his weed district and was able to discuss effective methods he uses for leafy spurge control. Johnston began with a brief explanation about his weed district as well as an overview of his weed control activities. Specific questions for Johnston led into an active discussion on the importance of the weed districts, as well as making leafy spurge control a priority for landowners. It was generally concluded that although control is expensive, the benefits far outweigh the potential costs.

The second part of the meeting involved distributing a template for a weed management plan. The weed management plan is based on the template produced by The Nature Conservancy as well as the Colorado Weed Management plan (which itself is based on The Nature Conservancy outline). Pieces of both plans were modified to produce a more targeted template that can be used by rural municipality councillors or private landowners to produce a weed management plan specific to their situation and needs.

### **Weed management plan**

The management plan often refers to using Integrated Weed Management (IWM) techniques, which is also commonly known as Integrated Pest Management (IPM). These techniques refer to the process of applying a combination of management techniques (biological, mechanical, chemical and cultural) in a control regime to increase effectiveness and minimize adverse impacts on non-target species.

An adaptive management approach is used in the management plan, leading the reader through several questions in the development of the plan. The text in the normal font is meant to be included in the weed management plan as a boilerplate, as opposed to the text in italics, which serves as prompts or instructions to the reader. (Refer to Appendix 1).

The site weed management plan begins with an introductory section, allowing the land managers to justify the use of resources towards controlling specific weeds or for general weed control. For private landowners wanting to use this template, this section is optional, as they generally do not have to justify weed control to a board or organization.

The second part of the weed management plan asks the reader to describe the boundaries of the property involved. This description may be as simple as marking it out on a map or photograph, to implementing a GIS image. The overall property may be divided up into several sub-regions based on terrain, cover, etc. Different management plans can be developed for each area. The weed management plan also asks for a description of the resource base such as distinctive biological communities, habitat types, land-use histories and any other distinctive management sub-units on the site which may require separate or modified management plans.

Step three involves inventorying the weed species. The reader should explain how and where the inventory was conducted and attach a map of what weeds are included, and where the weed species were found.

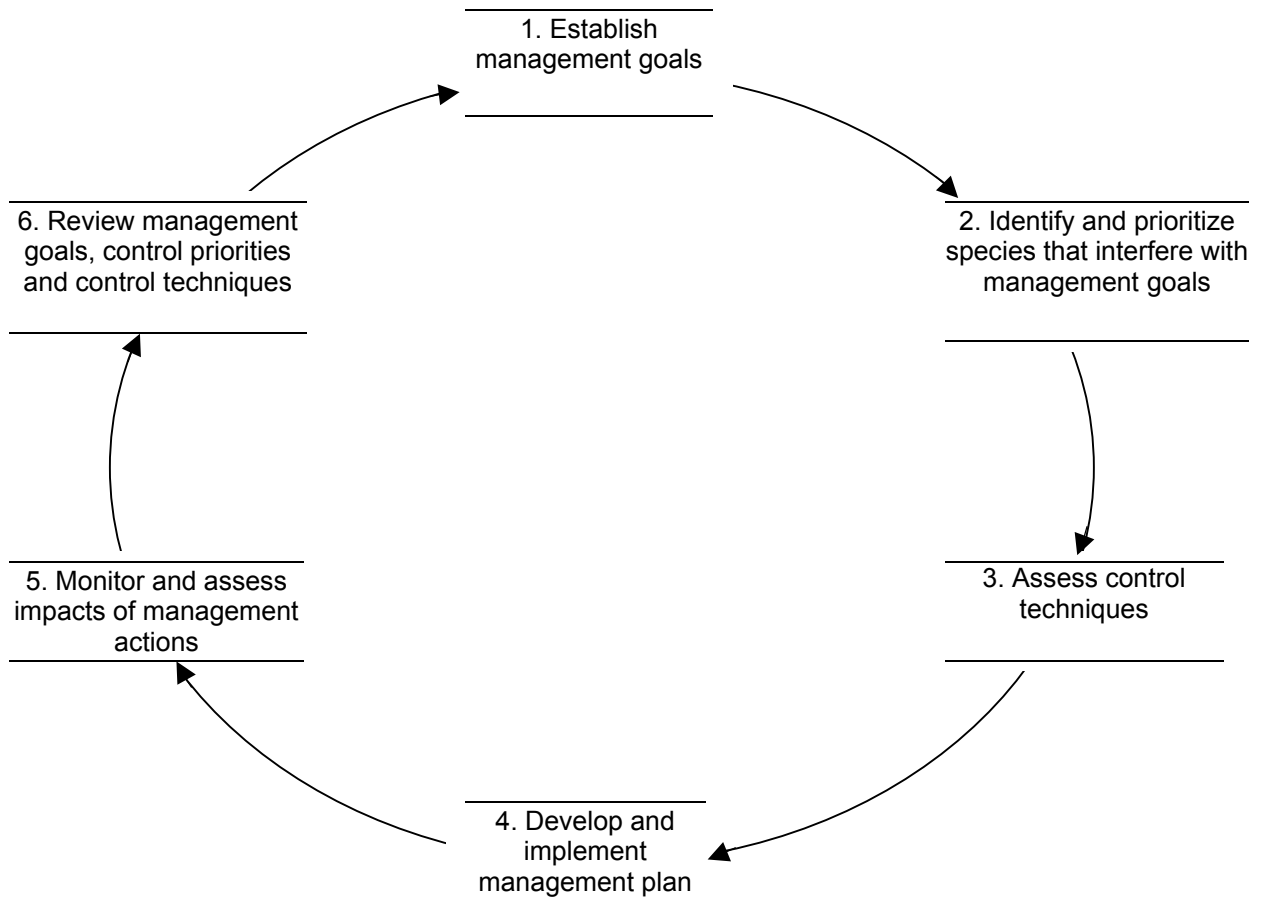
Management goals and weed management objectives for the property follow the inventorying process. Describing the purpose of the property and the conditions one hopes to create helps lead into how the weeds are interfering with the stated management goals. Derived from the management goals, the objectives for the property can then be acknowledged. These objectives should provide specific measurable and achievable goals, which have a targeted location and deadline.

Prioritization of weed management should be set to minimize the total, long-term workload. Prevention of weed establishment is the first suggestion. It also asks the reader to prioritize the plant species to be controlled based on the actual or potential threat that they may pose to the management goals. The highest priority weeds should be those that pose the greatest threat. The location of the weeds are also a factor in the prioritizing process. The weed management plan urges the managers to focus on those weed patches which are small and isolated, as well as those in areas of frequent disturbance.

The next step involves weed management actions. This includes implementing best management practices in an active prevention program. It should also describe the Integrated Weed Management (IWM) practices that will be implemented to control the priority weeds and infestations on the property.

The final integral step of the weed management plan is to monitor the property. This allows the land managers to evaluate progress in meeting management objectives. Based on the results of the monitoring activities, the weed management plan can be modified to fulfill management objectives.

The adaptive management of weeds can be summarized in a flow chart taken from the Nature Conservancy Site Weed Management Plan Template.



The management plan also has a section (see Appendix 1b) to describe each high priority weed species that the land manager may wish to control. The format follows the general steps of the weed management plan, with a few changes. These variations allow for specific descriptions of the plant, as well as specific control methods to be used in the targeting of the weed. Management options should be listed, preferably following IPM techniques. Flexibility should be built into the plan to allow for unanticipated field conditions.



## **Project Results**

In all rural municipalities, the councillors contacted were friendly, co-operative, and willing to talk about the issue of leafy spurge. While all of the councillors agreed that leafy spurge was a problem, the importance placed upon controlling it did not rank high in their list of priorities.

Generally the councillors were aware of many of the different control methods and that realistically, the primary control option available to them is to implement, or continue with, a consistent herbicide application program. It was discovered that some of the municipalities do spray for noxious weeds, but it appears to be hit and miss from year to year. There is no consistency in funding, or a strategic plan. All of the rural municipalities cited that the high costs involved in weed control prohibit a full-scale, consistent control program. They simply do not have enough money, often deeming other issues a higher priority. Other weeds that they wish to control, such as milkweed or kochia, may also have a higher priority than leafy spurge.

Councillors also stated that qualified employees having a valid applicator's license are difficult to find and keep as most rural municipalities can only guarantee summer employment. There is also concern regarding crop liability insurance, that it would be an extra expense to cover the rural municipality in case they had accidental spray drift onto a landowner's crop or shelterbelts.

Among all of the councillors, there was a common interest in using biocontrol, more specifically, the leafy spurge flea beetles (genus *Aphthona*). The councillors find biocontrol appealing because of its low cost and relatively low maintenance requirements. Unfortunately, biological control agents often take years to establish effective populations, and their range is very limited as they have very specific habitat requirements. Available biocontrol agents will not be able to serve as an effective substitute for chemical control, although biocontrol used in conjunction with herbicide applications can be a viable option.

The results of meeting with councillors from each rural municipality are summarized below. Appendix 2 shows a key of the major map features shown, while Appendices 3 through 6 are municipal maps indicating the results of the survey of leafy spurge. A list of individuals contacted through this project is provided in Appendix 7.

### ***Rural Municipality of Cornwallis***

A leafy spurge awareness presentation was made to the Rural Municipality of Cornwallis council on July 16, 2002. The presentation introduced the Rural Development Institute, the Leafy Spurge Stakeholders Group and the work that is done in regard to leafy spurge. The negative impacts of leafy spurge were discussed with the councillors, and the information packages were distributed. After the presentation and a brief question period, the councillors resolved to receive any presentations and correspondence from the LSSG as information. The council also approved the request to speak with the Cornwallis weed supervisor, Brad Moorehead, and tour the municipality to map out the frequency of leafy spurge.

Brad Moorehead was extremely knowledgeable about the leafy spurge infestation in this area. He stated that 100% of the municipality is infested to some degree or another. Although much of the land is cultivated, he feels that if left alone, leafy spurge would be guaranteed to grow in swiftly.

Because of Moorehead's extensive knowledge of the municipality, the survey of Cornwallis was done in a different manner than that of the other three rural municipalities. Rather than driving road-by-road trying to pinpoint spurge locations, we went directly to the hotspots of leafy spurge. Throughout the tour, Moorehead estimated the percentage of leafy spurge infestation area by area. The municipality was surveyed August 6, 2002 with a follow-up on August 8.

Appendix 3 provides the results of the survey on a map of the municipality. Percentages shown reflect the area of land that Moorehead feels the leafy spurge infests. The property owned by the city of Brandon is covered by grey. Some of the most heavily infested acres of leafy spurge within Cornwallis are owned by the city of Brandon, and do not fall under the jurisdiction of the Cornwallis weed supervisor.

The heaviest concentrations of leafy spurge were found along the Assiniboine riverbank and along parts of highway 457 leading east to Shilo. The further east traveled, the sandier the soil gets in Cornwallis. The percentages of leafy spurge in this area are fairly high, often in the 80-90% range, reflecting the ease of how leafy spurge comes to dominate other species in this environment.

The gravel pits shown on the map are privately owned. Leafy spurge dominates the vegetation here although the gravel pits are sprayed with 2,4-D. The more effective combination of dicamba and 2,4-D cannot be used because of the sandy nature of the soil. Unfortunately, this means that leafy spurge has the potential to be easily transported, whether through seed or root fragments, to wherever the gravel is being carried. The sandy nature of the soil also limits the herbicides that can be used in most other parts of the rural municipality.

Limited in both time and budget, Moorehead spends nearly all of his time spraying the road allowances. He would like to see more diversification on the part of landowners; ideally grazing infested areas with sheep or goats. He has been keeping track of bio-control releases in the municipality, and has found that although they are working to a degree, the process has been fairly slow. Although the weed district has the authority to issue Notices to Destroy under the Noxious Weed Act, Moorehead has stated that he would prefer to work with the landowners in encouraging them to control weeds on their property. In spite of these intentions, he did point out a ¼ section of land that the municipality did take control of because of the heavy weed infestation.

Unlike the other municipalities visited, the majority of councillors here were primarily business owners, and not farmers. This, as well as the fact that Brandon is central to Cornwallis, may affect the importance placed on noxious weeds in the municipality. The impression received was that Cornwallis is more of an urban-rural municipality than a rural one, and although leafy spurge is an important issue, it is perhaps not as immediate as other issues that may arise and demand a higher priority.

## **Rural Municipality of Daly**

As with the Rural Municipality of Cornwallis, a presentation was made to the councillors of the Rural Municipality of Daly at a council meeting on July 9, 2002. In a less formal setting, the information packages were distributed and a general conversation regarding this project ensued. Most of the councillors were farmers who are battling the spurge problem on their own properties. They explained that the Rural Municipality of Daly does not currently have a formal weed control program, although they did investigate contracting with someone to spray their road allowances this past summer with the money they had set aside for this purpose. However, the high cost proved prohibitive to them hiring anyone. They have stated that they hope to have a local person able to do the herbicide application for the summer of 2003.

At the end of the meeting, it was agreed that each ward could be toured with the representative councillor so the spurge infestation could be mapped, as well as providing the councillors with an opportunity to share their knowledge and views regarding the leafy spurge issue.

Appendix 4 provides a map of the Rural Municipality of Daly and the leafy spurge infestations. The northeast corner of the rural municipality and the properties to the north of the town of Rivers are virtually free of leafy spurge except for a few small patches that are being kept under control by local landowners.

The rivers have been included in the map because they help to illustrate the widespread populations of leafy spurge in the municipality. All of the councillors in those wards affected agree that the leafy spurge follows the river valleys and gullies, although the river valleys and gullies have not been marked in red on the map to indicate presence of leafy spurge. The spurge along the waterways is a problem, as the proximity of the spurge to the water limits the use of herbicides, as well as makes it impossible to use mechanical means of control due to the steepness of the riverbanks. Biological control may work in some areas, but it is certainly not feasible for all of the riverbank where there is a lot of bush and shade.

During the tours, the councillors pointed out properties where the landowners were combating leafy spurge using methods such as grazing by sheep or goats, aerial spraying, and competition from crops such as alfalfa. They also mentioned the concerns on behalf of local organic farmers who have requested that the rural municipality not use herbicides to control weeds/brush along their property, as they fear it may drift onto their crops. In these cases, the landowners usually try to control the spurge using moveable electric fencing to contain sheep or goats.

Another issue that definitely took precedence over the issue of weed control was the public debate of building more hog barns in the municipality. Due to the controversy surrounding this issue, a few of the councillors had expressed that they would not be seeking to renew their terms of office. The hog barn issue often overrode other pressing issues.

### ***Rural Municipality of Oakland***

More so than in any of the other municipalities, the councillors of Oakland were difficult to contact because they are all involved in farming and were extremely busy during the summer months. One Oakland councillor explained that the Council feels that the leafy spurge control program that they have in place is sufficient for the time being. He did mention that if any new information regarding control became available, or if we could provide the rural municipality with leafy spurge beetles, it would be more than welcome.

Most of the information distributed, as well as information collected, was through the weed supervisor for the rural municipality, Marlene Biles. Although she holds the title of the weed supervisor, the majority of Biles' responsibility is in office administration. She keeps track of where the two rural municipality employees spray each year, what chemicals they use, how much they have spent in the control program, etc. Still fairly new in her position, she has expressed an interest in becoming more involved in the weed control program of the rural municipality, as well as expanding her knowledge of control methods of particularly noxious weeds such as leafy spurge.

One of the main difficulties of the rural municipality is retaining qualified personnel with an applicator's license. As mentioned, the rural municipality currently has two employees who alternate between herbicide application along the roads and road allowances, as well as doing other work (such as running the graders). The councillor has stated that they try to monitor and kill any new seedlings of leafy spurge before they have the opportunity to establish themselves.

The leafy spurge densities are highest in the north-to-northeast sections of the rural municipality of Oakland, as the soil there is sandier than in the more southern areas. Ward four (the northeast section) north of Wawanesa has the highest contamination rate of all the wards. All of the gravel roads in the areas more heavily infested by leafy spurge are sprayed, and there is spot spraying by the highway (see Appendix 5 for locations of leafy spurge in Oakland). The rural municipality of Oakland was toured August 19 to the 21.

### ***Rural Municipality of Whitehead***

The Rural Municipality of Whitehead does not have a formal weed control program although they have done some spraying. The problem here is that any work done is not consistent, with a rotation of people doing the work. One of the councillors usually holds the title of weed supervisor, as the rural municipality cannot afford to create and maintain this position. Once again, the rural municipality has run into the problem of not being able to hire and retain an employee who is qualified to apply chemicals. They have admitted that they have been lax in the area of weed control, but they have found someone to do herbicide application for the rural municipality in the next year.

The rural municipality was toured relatively late in the season (August 23, 2002) with Rick Coleman, the designated weed supervisor, although earlier in July he had provided a map indicating the major problem areas of leafy spurge. Each councillor was visited to discuss the leafy spurge problem in the Rural Municipality of Whitehead. Throughout the tour, Coleman pointed out areas of other weed infestations, and indicated that he felt that the milkweed infestation was a higher priority problem than the leafy spurge.

One of the primary concerns raised by the councillors is the possibility of liability from acreage owners or from farmers who have crops, such as canola, growing close to or in the ditch. (A member of the Leafy Spurge Stakeholders Group later mentioned that HED Insurance supplies insurance for most rural municipalities and that there is no extra cost for spray liability insurance.) The councillors have also expressed concerns regarding the increase in zero tillage practices causing problems by promoting the growth of leafy spurge.

The heaviest concentrations of leafy spurge occur in the Kemnay sandhills region of the rural municipality. The general area of the sandhills is marked in yellow on the map of Whitehead in Appendix 6. It was the general consensus of the councillors that leafy spurge was inadvertently introduced into the area in the 1930's by a large-scale cattle producer. From the Kemnay sandhills, the leafy spurge rapidly spread outwards to infest surrounding properties. According to the councillors, the leafy spurge infestations also follow the railway tracks, as shown in the map, although the problem seems to diminish towards the southwest corner of the municipality.

Based in the town of Alexander in the Rural Municipality of Whitehead is the newly created Mid Assiniboine River Conservation District. This conservation district encompasses the rural municipalities of Whitehead, Cornwallis, part of Elton, and the city of Brandon. Kim Poppel, the district manager, plans to have leafy spurge control high on her conservation district's priority list. As a result of a meeting on August 13, the Mid Assiniboine River Conservation District was invited to become a member of the Leafy Spurge Stakeholders Group.

## **Conclusion**

There are many reasons as to why rural municipalities should take the initiative to develop and implement a management plan to control leafy spurge. Controlling leafy spurge on roadsides or Crown land may encourage producers to clean up their own properties. Often you hear a producer complaining that it would be futile to get rid of spurge on his property, as it would just move in off the road. If the rural municipality makes the effort to rid the road allowances of spurge, it may help producers realize how important and effective a control program of their own can be.

Controlling leafy spurge on road allowances will also help to prevent the movement of leafy spurge from one area to another, as vehicles inadvertently pick it up and transport it. Catching small populations of leafy spurge can prevent them from turning into a big problem, especially where the weed has the potential to spread from road allowances into adjacent rangeland.

Another reason for municipal management and control plans for leafy spurge may be that it could generate the leverage needed to ask Highways or Railways to clean up their properties. "Do as I do, not as I say." A municipality can also calculate the benefits of using a relatively small amount of money on herbicides to spray the remarkably large area encompassed by the rural municipality.

Perhaps the most powerful argument for controlling leafy spurge involves the economic benefits that will result from management actions. The costs of leafy spurge infestations

have been well documented. By establishing a control program, land managers can prevent the problem from getting worse, or in many cases, eradicate small populations before they can become problems. Leafy spurge populations and their costs will not diminish on their own. Without prevention and management, the negative impacts will steadily increase.

The Noxious Weeds Act of Manitoba states that it is the responsibility of the occupant, owner or land manager to destroy all noxious weeds growing or located on the land. The Act also states that the municipalities take responsibility for all highways, roads, and road allowances not falling under the authority of the provincial government. This is not often enforced due to costs involved and lack of a co-ordinated enforcement agency for all areas. If the property falls under the jurisdiction of a weed district, enforcement is the responsibility of the weed supervisor. Even this does not always ensure enforcement of the Act, as some weed supervisors are loath to alienate landowners or managers by forcing them to spend time and money managing the weeds on their property, preferring to try to work cooperatively with reluctant landowners.

Although there were no definite plans made by any of the municipalities to step up their weed control actions, I believe this project served to remind them of the importance of a strategic leafy spurge control program. The Rural Municipality of Oakland has a fairly strong and consistent weed control program, and their weed supervisor has shown interest in becoming more involved and informed, as she feels that although councils will change, her position should remain constant. The Rural Municipality of Cornwallis will hopefully upgrade their program and better utilize their weed supervisor. Both rural municipalities of Whitehead and Daly have set some money aside for weed control in their districts, and each will hopefully engage in an effective leafy spurge management program in the upcoming season.

## Appendix 1a: Weed Management Plan

(WEED MANAGEMENT PLAN OUTLINE FOR PUBLIC LAND MANAGERS)

(Note: this outline is a modification of a weed management plan template produced by The Nature Conservancy as well as the Colorado Weed Management Plan Outlines)

# WEED MANAGEMENT PLAN FOR

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PREPARED BY (*Authors, Contributors*)

DATE PREPARED

(*Date*)

DATE LAST REVISED

(*Date*)

*(In the following outline, text in normal font is meant to be included in each weed plan as boilerplate; text in italics prompts the reader to do certain things, and should be omitted from the completed plan.)*

## 1. INTRODUCTION

### A. Context of Weed Management (*suggested language; modify to suit your purposes*)

Weeds create large economic losses for agriculture in both cropland and rangeland situations. Noxious weeds often displace native vegetation and degrade habitat for wildlife. Proliferation of alien plant species alters ecosystem processes and threatens certain native species with extirpation. Thus, unchecked weeds threaten our economic livelihood and our biological heritage.

Labour and money for controlling weed species is often seen as the largest hurdle when trying to set up a control program. The Nature Conservancy Template allows land managers to evaluate an area, and then focus their resources more efficiently.

### B. Overview of Approach to Weed Management (*suggested language; modify to suit your purposes*)

Weed control is part of property management. This plan is based on the desired plant species and communities, rather than on simply eliminating weeds. Preventive programs are implemented to keep the management area free of species that are not yet established there but which are known to be pests elsewhere in the area. Priorities are set to reduce or eradicate weeds that have already established on the property, according to their actual and potential impacts on the land management goals for the property, and according to the ability to control them now versus later. Actions will be taken only when careful consideration indicates leaving the weed unchecked would result in more damage than controlling it with best available methods.

The plan follows the adaptive management approach.

1. Weed species are identified through inventory of the property and by gathering information from other sources
2. Land management goals and weed management objectives are established and recorded for the property.
3. Priorities are assigned to the weed species and weed patches based on the severity of their impacts, while considering the ability to control them.
4. Methods are considered for controlling them or otherwise diminishing their impacts and, if necessary, re-order priorities based on likely impacts on target and non-target species.
5. Integrated Weed Management (IWM) plans are developed based on this information.
6. The IWM plans are implemented.
7. The results of management actions are monitored and evaluated in light of weed management objectives for the management area.
8. This information is used to modify and improve weed management objectives, control priorities, and IWM plans, thereby starting the cycle again. The premise behind a this weed management plan is that a structured, logical approach to weed management, based on the best available information, is cheaper and more effective than an ad-hoc approach where one deals with weed problems as they arise.

## 2. DESCRIPTION OF THE PROPERTY (or management area)

### A. Boundaries *Briefly describe the location of the property. Attach a copy of a map, aerial photograph or GIS image with boundaries drawn and labeled; note boundaries of any management sub-units that are relevant for this plan. (The property you wish to manage*



*can be divided up into different management areas. These management areas may be divided with respect to terrain, heavily trafficked areas, etc. Each unit may require a different management plan)*

*B. Resource Base In our case, the resource base we are most likely concerned about includes productive rangeland. However, you may wish to briefly describe distinctive biological communities, habitat types, land-use histories, valued species, major threats, and other notable characteristics of the site. Describe special features of any management sub-units on the site.*

### **3. INVENTORY OF WEED SPECIES**

*A. Inventory of Weed Species Briefly explain how you conducted the inventory, e.g., the areas searched, the ways in which you searched, and the weed species you targeted during the inventory. Attach a list of the weed species found on the property plus problem weeds species in the local area that are likely to invade the property. Note on the list which weed species were actually found on the property.*

*B. Map of Weed Infestations Attach copy or copies of map, aerial photograph or GIS image with locations of weed infestations noted by species. Map these infestations and note the area of each infestation. You can use symbols to denote infestation size or you can estimate the size of each infestation in acres and record this estimate on the map. You can use symbols to denote the size of infestations. For infestations that are larger than five acres in size, draw a line around the boundaries of the infestation; use a square to denote infestations from 1- 5 acres; a triangle for infestations from 0.1 – 1 acre; and x to denote infestations less than 0.1 acre. A solid line can be used to demarcate narrow infestations along linear features such as roads, trails, streams or lake edges. Label each infestation with the weed species it contains. You can use colored pencils to create color-coded maps to facilitate visualizing the number and locations of infestations of various weed species. Use the same color consistently for the same weed species. Estimate the size (in acres) of each weed infestation. It may be most useful to make one map showing the locations of all weed species populations. Alternatively, one map may be too cluttered, and it may make sense to prepare separate maps for each weed species, or groups of similar species. Refer to these maps as you develop specific control strategies for high-priority species in section 6 below (Weed management Actions). This information should be updated annually.*

### **4. MANAGEMENT GOALS AND WEED MANAGEMENT OBJECTIVES FOR THE PROPERTY**

*A. Land Management Goals Goals are statements that generally describe the conditions you are trying to create on the management area, not just things related to weeds. Goals generally deal with human values, natural resources and financial resources. Land management goals may already exist for the management unit. If not, develop management goals, focusing on what you are managing for; clearly state what you want on the site. For example, you may be managing for the following:*

- 1. Make more efficient use of limited resources.*
- 2. Increase rangeland (forage production for livestock or wildlife).*

3. Biological communities (e.g., grassland, riparian areas) and the processes (e.g., fire, flooding) that maintain them);
4. A species or suite of species that are rare or otherwise valued;
5. Timber production; and
6. Public recreation and scenic beauty.

B. Description of how certain plant species (“weeds”) interfere with management goals

*Describe generally how weeds interfere with your land management goals. Use this section to justify the use of labor and resources to eliminate or control certain plant species in terms of your management goals, as well as legal requirements. Briefly describe how these species degrade the property, or could do so if allowed to proliferate. Revisit this section and, if necessary, revise it after completing Section 5 below (Priorities for Weed Management). If you determine the impacts of weed species on the property are not as damaging as you had initially thought and need not be controlled, you can use this section to explain that, too.*

C. Weed Management Objectives *Objectives are statements that are specific, measurable, and achievable, have a deadline and specify a location. They provide a link between very general goal statements and weed management action steps. Establish measurable weed management objectives for the weeds on the property that you decide to control. Objectives should follow from the land management goals above. Each management goal will probably have one or more weed management objectives. One or more weed management objectives will be established for each weed species you decide to control.*

*For example, your objective may be to reduce leafy spurge along a 1-mile stretch of road from 90% cover to 10% cover in five years.*

**5. PRIORITIES FOR WEED MANAGEMENT** *Priorities are set in the hope of minimizing the total, long-term workload.*

A. Prevention (*Suggested language; modify to suit your purposes*) The most important weed management action is to prevent weeds from becoming established in the first place. The old adage that “an ounce of prevention is worth a pound of cure” certainly applies to weed management. *Describe the types measures that will be effective in preventing weeds from becoming established on your property.*

B. Weed Species Priorities (*Suggested language; modify to suit your purposes*) Weed management priorities based on the actual or potential threat that weeds pose to the management goals for the property. Two factors are used to set priorities, namely the weed species and the locations of weed infestations. Weeds species are important because they vary considerably in the threat they pose to the resource values of the property. In addition, weed species vary greatly in their susceptibility to control measures. Weed species that pose the greatest threat to achieving the management goals for the property and that need to be controlled immediately are the highest priority for management.

*Summarize the weed ranking information in Table 1 of this plan outline Designate the high-priority weed species (H) or assign each weed species a High, Medium or Low priority by writing an H, M, or L after each weed species name. In this paragraph,*

*explain briefly how you determined priorities for the weed species. If you made a graph of degree of threat and difficulty of control, attach a copy.*

**C. Weed Infestation Priorities** *The location of a weed infestation is also very important. The highest priority weed patches are those that are small and isolated from larger infestations of the same high-priority weed species and which occur on or could affect the highest-valued resource on the property. Weed patches located in high traffic or in areas of frequent disturbance where weeds can easily be spread also rank high on the priority list.*

*Attach a copy of the map, aerial photograph or GIS image of the property and indicate the locations of the High, Medium and Low priority weed patches and note the weed species in each patch. In this paragraph, explain how you assigned your weed infestation priorities.*

## **6. WEED MANAGEMENT ACTIONS**

**A. Prevention** *Use best management as the basis of your weed prevention program. Prepare a list of preventive measures that you will take to employ to stop weeds from becoming established on your property, such as performing periodic inventories of the property to find new weed species, re-seeding bare ground or changing livestock management activities. Note the weed species that are most important to find before they become established. You may wish to specify certain locations where the measures will be most effective.*

**B. Weed control** *(suggested language; modify to suit your purposes)* Integrated Weed Management (IWM) is a process by which one selects and applies a combination of management techniques (biological, chemical, mechanical, and cultural) that, together, will control a particular weed species or infestation efficiently and effectively, with minimal adverse impacts to non-target organisms. IWM seeks to combine two or more control actions, which will interact to provide better control than any one of the actions, might provide. IWM does not necessarily require the eradication of a weed species or a particular infestation of weeds, although these might be objectives in some cases. IWM is species-specific, tailored to exploit the weaknesses of a particular weed species, site specific, and designed to be practical and safe

*Briefly (1 paragraph per species) describe or outline the Integrated Weed Management (IWM) actions you intend to take to control the priority weeds and infestations on your property. Note which species you plan to control, where and over what period you plan to do so, the methods you plan to use, which species you plan to monitor and, how you plan to do so. You may also briefly explain why you do not plan to control certain species. Fill in sections A-G of the two-page summary sheet for each weed that you intend to control. (See the "Integrated Pest Management Plans for High-Priority Weed Species" form below. Copy this summary for additional weed species summaries.) Summarize the labor, materials, cost, and schedule information in Tables 2-4. Revise Table 2 (Labor and Cost Projections to Implement Weed Management Plan) annually after comparing estimated to actual costs (obtained from Table 3). Make copies of Table 3 (Annual Cost and Labor Worksheet) for each control project or target weed and use them to account for yearly costs and labor. Schedule information is summarized in Table 4 (Weed Management Plan Implementation Schedule). Revise Table 4 annually.*

## **7. MONITORING** *(Suggested language; modify to suit your purposes)*

Monitoring is the repeated collection and analysis of information to evaluate progress in meeting resource management objectives. Periodic observation of the weeds being managed is necessary to evaluate the effectiveness of a weed control program. If management objectives are not being met, weed control actions need to be modified. Without some type of monitoring, there is no way of knowing whether control actions are contributing to the fulfillment of management objectives.

*Briefly (1-3 paragraphs) outline the general approach you will use to evaluate the effectiveness of the weed control actions you are planning, in terms of the weed management objectives you have set for the property. In section H of the two-page Integrated Pest Management Plan for each weed species you plan to control, you will specify your weed management objective(s) for each weed species and how you plan to determine if the objective have been met so you don't need to repeat them here. Make sure the monitoring you propose will give you the information you need to evaluate success in meeting your weed management objectives with the lowest cost and effort.*

*Monitoring may include methods such as yearly photographs of certain areas. They are especially useful if taken from permanent locations, to make comparisons easier. Written records of patch size and density are also useful.*

## **8. REFERENCES** (if any literature citations are used)

## **9. APPENDICES**

### **Appendix 1. INTEGRATED WEED MANAGEMENT PLANS FOR HIGH PRIORITY WEED SPECIES**

### **Appendix 2. EMERGENCY INFORMATION: DIRECTIONS AND MAP TO NEARBY HOSPITALS OR CLINICS**

**Appendix 3. HERBICIDE USE PROTOCOLS** (if herbicide use is planned) *After noting which herbicide(s) will be used and roughly how much will be used, outline any state and local requirements for applicator licensing and/or posting of treated areas. Then, BRIEFLY describe how the herbicide(s) will be stored, mixed and transported. Describe how excess herbicide and any equipment or clothing that has become contaminated will be disposed of. Describe emergency first aid procedures and plans for responding to spills or contamination. List who may apply the herbicide(s), and what protective gear will be available for them.*

**Appendix 4. HERBICIDE LABELS** (if herbicide use is planned) *Attach copies of the herbicide label(s) here.*

### **Appendix 5. HERBICIDE USE RECORD FOR RURAL MUNICIPALITIES**

**Appendix 6. MATERIAL SAFETY DATA SHEETS** *Attach MSDS sheets here.*

### **Appendix 7. COPIES OF FOR RURAL MUNICIPALITIES FOR COLLECTING MONITORING DATA** (optional)

## Appendix 1b: IPM Plans for High Priority Weed Species

(copy this and next page for additional species)

### INTEGRATED WEED MANAGEMENT PLANS FOR HIGH-PRIORITY WEED SPECIES

Scientific name: Euphorbia esula

Common name: Leafy Spurge

Date \_\_\_\_\_ Updated \_\_\_\_\_

A. PRIORITY \_\_\_\_\_

#### B. DESCRIPTION

*In 2-3 lines, list habitat, life history, flower color and period, and other useful identifying characteristics.*

Identifying characteristics of leafy spurge include:

**Stems:** 16-32 inches (40-81cm) at maturity, hairless.

**Leaves:** Alternate, narrow,  $\frac{3}{4}$  - 3 inches long (2-7.5cm).

**Flowers:** Small, green, inconspicuous and arranged in numerous small clusters to form an umbel. A pair of yellow-green bracts subtend each flower.

**Roots:** Extensive lateral root system.

**Other:** All parts of the plant contain a white, milky latex.

Plants emerge in early April. By May, the distinctive yellow-green bracts appear, with flowers emerging approximately two weeks later. The main flowering is complete by mid-July, although some plants produce flowers until frost.

Leafy spurge can be found in nearly any habitat, although it is most aggressive in areas of full sun with semi-arid, sandy soils.

#### C. CURRENT DISTRIBUTION ON THE PROPERTY

*Refer to maps, identify high-priority locations for control.*

#### D. DAMAGE & THREATS

*Outline damage caused and threats posed by the high-priority weed species.*

**Agricultural:** Leafy spurge invades pasture, making it worthless for cattle and horse grazing. Land values will subsequently be reduced.

**Ecological:** The aggressive growth habit of leafy spurge allows it to displace other vegetation in a variety of habitats. This leads to degradation of wildlife habitat, loss of rangeland species diversity, and threatens the abundance of native plants.

Leafy spurge can rapidly form a monoculture in many areas.

## **E. WEED MANAGEMENT OBJECTIVE**

*Establish a weed management objective for this species that supports one or more of the land management goals for the property in sections 4.A and 4.B. above. The objective should be clear and measurable. Include the 1) impact on the area, numbers, density, cover, etc. that you want to achieve; 2) area in which you hope to achieve this; and 3) time period in which you hope to achieve it. For example an objective for*

## **F. MANAGEMENT OPTIONS**

Viable control options are:

(1) No treatment;

(2) (Treatment alternative 1);

(3) (Treatment alternative 2); etc. Briefly discuss the alternatives, indicate the preferred Integrated Weed Management alternative and the conditions (size of area treated, location, timing of treatment during growing season, total anticipated cost, etc.) under which they may be used. Allow flexibility for persons carrying out the plan; conditions in the field may differ from those you anticipated.

## **G. CONTROL ACTIONS PLANNED**

*Briefly describe the priority weed species and weed infestations to be controlled, materials and methods to be used, and an approximate schedule for control and monitoring activities. If several methods are to be tested, outline the design of the planned experiment or demonstration.*

## **H. MONITORING**

*Establish one or more monitoring actions for each weed management objective. Keep the monitoring simple - otherwise you probably won't do it. If you use forms to collect monitoring data, include copies in Appendix 5 of this plan.*

## **I. RESOURCE NEEDS**

*Estimate the amount of time [for staff, interns and volunteers] and money that will be required to carry out the planned control, monitoring and evaluation for this species. This information should be included in Tables 2 and 3.*

## **J. RESULTS OF EVALUATION**

This section is to be filled in later, preferably within 1 year, when monitoring data have been collected and evaluated. The evaluation should be used to determine whether any of the sections B-I above should be modified.

*(copy this and next page for additional species)*

## **INTEGRATED WEED MANAGEMENT PLANS FOR HIGH-PRIORITY WEED SPECIES**

**Scientific name:** \_\_\_\_\_

**Common name:** \_\_\_\_\_

**Date** \_\_\_\_\_

**Updated** \_\_\_\_\_

**A. PRIORITY** \_\_\_\_\_

### **B. DESCRIPTION**

*In 2-3 line, list habitat, life history, flower color and period, and other useful identifying characteristics.*

### **C. CURRENT DISTRIBUTION ON THE PROPERTY**

*Refer to section 3.A. and maps, aerial photo or GIS image in section 3.B.; identify high-priority locations for control.*

### **D. DAMAGE & THREATS**

*Outline damage caused and threats posed by the high-priority weed species. Refer to the weed species profiles in Appendix 4 for this information.*

### **E. WEED MANAGEMENT OBJECTIVE**

Establish a weed management objective for this species that supports one or more of the land management goals for the property in sections 4.A and 4.B. above. The objective should be clear and measurable. Include the 1) impact on the area, numbers, density, cover, etc. that you want to achieve; 2) area in which you hope to achieve this; and 3) time period in which you hope to achieve it. For example an objective for Russian olive might be to reduce the density of established Russian olive plants on the management unit to less than 1 plant per acre within 2 years.

### **F. MANAGEMENT OPTIONS**

Viable control options are:

(1) No treatment;

(2) (Treatment alternative 1);

(3) *(Treatment alternative 2); etc. Briefly discuss the alternatives, indicate the preferred Integrated Weed Management alternative and the conditions (size of area treated, location, timing of treatment during growing season, total anticipated cost, etc.) under which they may be used. Allow flexibility for persons carrying out the plan; conditions in the field may differ from those you anticipated.*

## **G. CONTROL ACTIONS PLANNED**

*Briefly describe the priority weed species and weed infestations to be controlled, materials and methods to be used, and an approximate schedule for control and monitoring activities. If several methods are to be tested, outline the design of the planned experiment or demonstration.*

## **H. MONITORING**

*Establish one or more monitoring actions for each weed management objective. Keep the monitoring simple - otherwise you probably won't do it. If you use forms to collect monitoring data, include copies in Appendix 5 of this plan.*

## **I. RESOURCE NEEDS**

*Estimate the amount of time [for staff, interns and volunteers] and money that will be required to carry out the planned control, monitoring and evaluation for this species. This information should be included in Tables 2 and 3.*

## **J. RESULTS OF EVALUATION**

*This section is to be filled in later, preferably within 1 year, when monitoring data have been collected and evaluated. The evaluation should be used to determine whether any of the sections B-I above should be modified.*









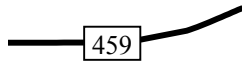


## Appendix 2: Key to Rural Municipality Maps

Gravel pits (with leafy spurge)



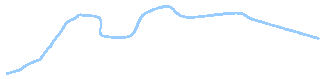
Highway



Railroad tracks



River



Road

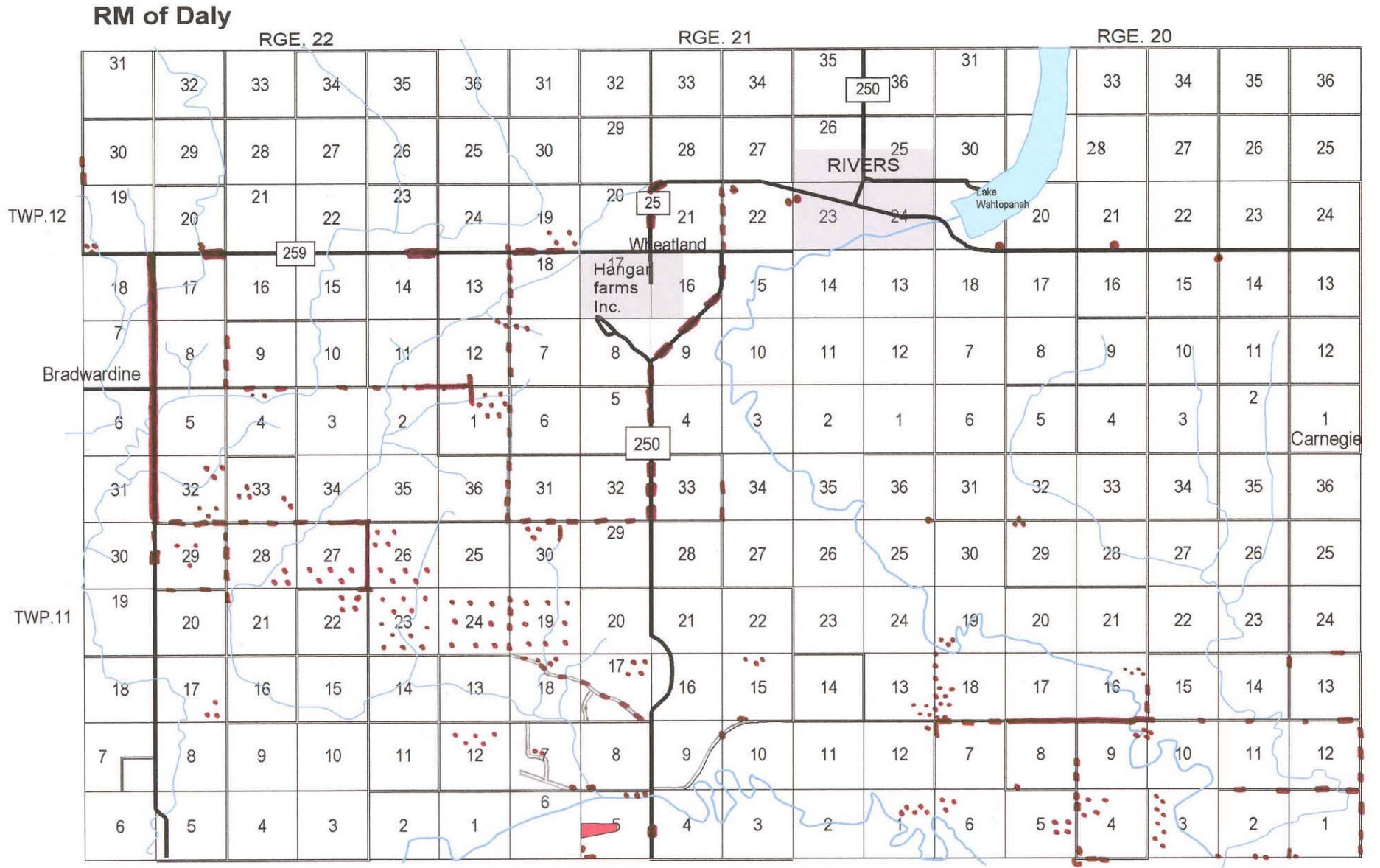


Wherever leafy spurge was spotted, the map is marked in red pen. This is limited mainly to road allowances, although if leafy spurge was visible from the road on private property, it is marked.





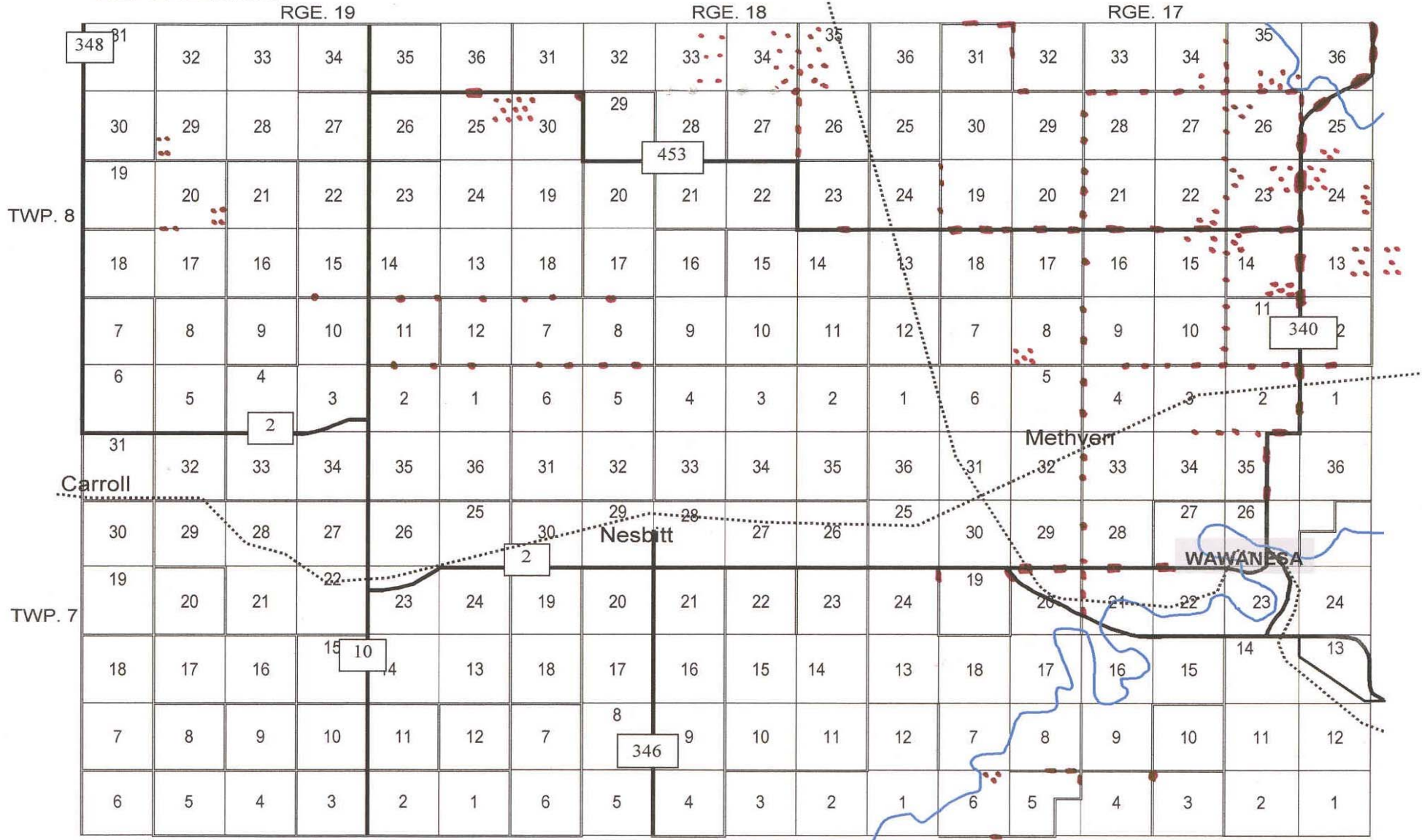
# Appendix 4: Rural Municipality of Daly map



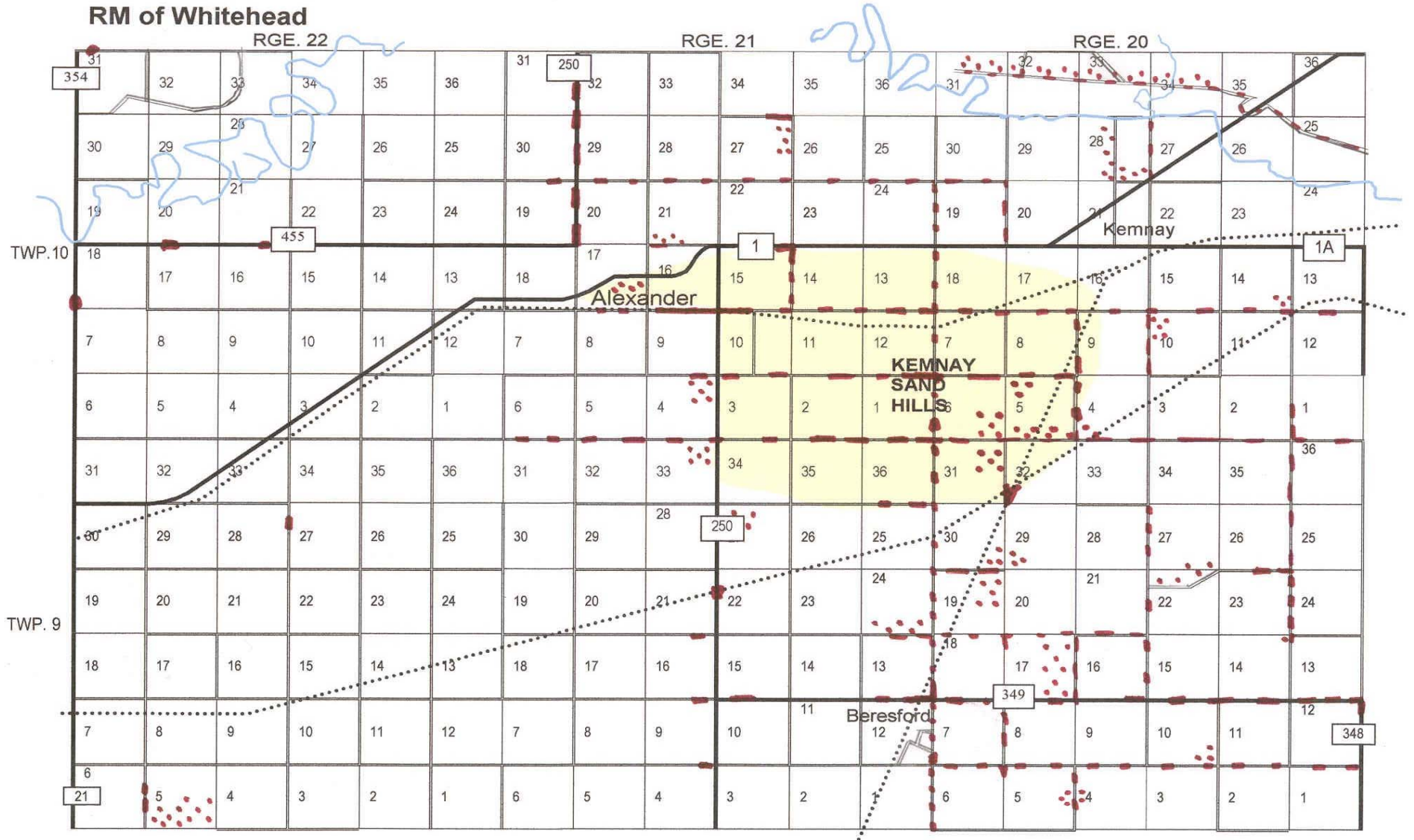


# Appendix 5: Rural Municipality of Oakland Map

## RM of Oakland



Appendix 6: Rural Municipality of Whitehead map



## Appendix 7: List of Contacts

Rural Municipality of Cornwallis *	Reeve Chief Administrative officer Councillors  Weed supervisor	D.J. McIntosh R.L. Wallis Emil Eggert, Bob Brown, Bruce Curtis, Wally Selent Dave Camp, Tracy Douglas Brad Moorehead
Rural Municipality of Daly *	Reeve Chief Administrative officer Councillors	Marlin Beever John MacLellan Harold Dyck, Dennis Goring, Dennis Veitch, Rodney Veitch, Wesley Paddock, Evan Smith, Dwight Verboom
Rural Municipality of Whitehead *	Reeve Chief Administrative officer Councillors	Wayne Dobbie James Madder William Thompson, Richard Coleman, Robert Willman, Gordon Hansen, Jim James, Gordon Speers
Rural Municipality of Oakland *	Reeve Chief Administrative officer Councillors	Dave Inkster Marlene Biles Clay Cory, Dana Fisher, Stan Kozak, Keith Elder, Ian Grossart, Frank Binda
MB Agriculture and Food	Soil and Water Specialist	David Hay
Brandon University	Professors of Economics	Guy Landry, Fatteneh Zehtab-Jadid
Mid-Assiniboine River Conservation District	District Manager Board Chairman	Kim Poppel Wes Williamson
Weed District of Cameron/Glenwood/Sifton	Weed Supervisor	John Johnston

\*These names do not reflect the current council, as municipal elections were held in the fall of 2002.

## **Appendix 8: References**

Colorado Weed Management Plan. Available at:

[http://parks.state.co.us/cnap/IWM\\_handbook/IWM\\_index.htm](http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm).

The Leafy Spurge Stakeholder's Group's Impact Assessment Working Group. (November 27, 1999). "Leafy Spurge Impact Assessment." Brandon, Manitoba.

The Nature Conservancy; Wildland Weeds Management & Research. Site Weed Management Plan Template. (Updated June 9, 1999)

The Noxious Weeds Act. (1987) Province of Manitoba. Available at:

<http://web2.gov.mb.ca/laws/statutes/ccsm/n110e.php>