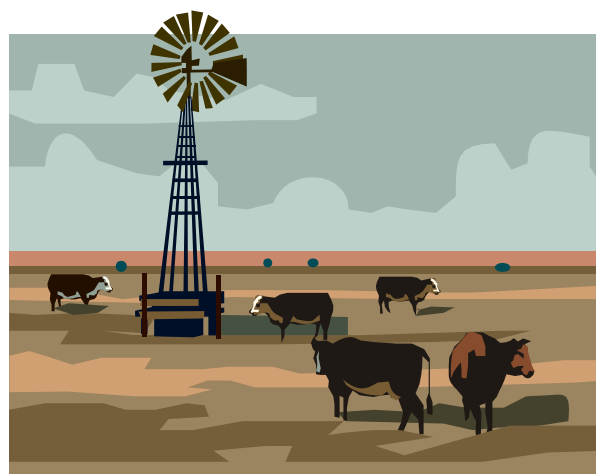


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# Perceptions of Leafy Spurge and Evaluation of the TEAM Leafy Spurge Project by Public Land Managers, Local Decision Makers, and Ranch Operators

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## Table of Contents

	<u>Page</u>
List of Tables .....	ii
List of Figures .....	iii
Abstract .....	iv
Introduction .....	1
Methods .....	1
Results .....	4
Characteristics of Respondents .....	4
Problems Faced by Livestock Grazing Operations .....	7
Nature and Seriousness of Weed Problems .....	11
Weed Control Practices .....	13
Weed Management Information Needs .....	16
Evaluation of TEAM Leafy Spurge Project .....	16
Key Findings .....	27
Conclusions .....	28
References .....	29
Appendix A - Tables .....	31
Appendix B - Questionnaires .....	45
Weed Management Survey - Farm and Ranch Operators .....	46
Weed Management Survey - Public Grazing Land Managers .....	61
Weed Management Survey - State and Federal Land Managers .....	77
Weed Management Survey - Local Decision Makers .....	93

## List of Tables

<u>No.</u>		<u>Page</u>
1	Response Rates for Surveys of Ranchers, Local Decision Makers, and Public Land Managers, 2001 .....	3
2	Respondent Characteristics, Local Decision Makers, Public Land Managers, 2001 .....	5
3	Land and Weed Management Issues, Public Land Managers, 2001 .....	6
4	Land and Weed Management Budget Issues, Public Land Managers, 2001 .....	8
5	Problems Faced by Livestock Grazing Operations, Ranchers, Local Decision Makers, and Public Land Managers, Grazing, 2001 and 1998-1999 .....	9
6	Weed Posing Greatest Problems for Livestock Grazing Operations, Ranchers, Local Decision Makers, Public Land Managers, 2001 and 1998-1999 .....	10
7	Respondents' Perceptions of Weed Problems on Respondent's Ranch, in Area, or on Land Managed by Agency, and Average Acres of Leafy Spurge Reported by Respondents, 2001 .....	12
8	Use of Selected Practices to Control Leafy Spurge, Ranchers and Public Land Managers, 2001 and 1998-1999 .....	14
9	Respondents' Evaluation of Leafy Spurge Control Practices, Ranchers, Local Decision Makers, and Public Land Managers, 2001 and 1998-1999 .....	15
10	Types of Weed Control Information Wanted by Ranchers, Local Decision Makers, and Public Land Managers, 2001 and 1998-1999 .....	17
11	Respondents' Awareness of TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001 .....	18
12	Attendance and Ratings of TEAM Leafy Spurge Events, Ranchers, Local Decision Makers, and Public Land Managers, 2001 .....	20
13	Respondents' Awareness of TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001 .....	21

**List of Tables (Cont.)**

<u>No.</u>		<u>Page</u>
14	Attitudes Regarding TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001 .....	24
15	Applicability of TEAM Leafy Spurge Format to Other Problem Weeds, Ranchers, Local Decision Makers, and Public Land Managers .....	26

**List of Figures**

<u>No.</u>		<u>Page</u>
1	Study Counties, Ranch Operator Perceptions of Leafy Spurge .....	2

## Abstract

Leafy spurge is an exotic, noxious, perennial weed which is widely established in the north central United States and is an especially serious problem in the northern Great Plains (Bangsund et al. 1999). In 1997, the Agriculture Research Service and Animal Plant Health Inspection Service, U.S. Department of Agriculture, initiated a major Integrated Pest Management (IPM) research and demonstration project to develop and demonstrate ecologically based IPM strategies that can produce effective, affordable leafy spurge control.

In 1998 and 1999, a survey of ranchers and public land managers was conducted to evaluate managerial, institutional, and social factors that might affect the rate and extent of implementation of various control strategies. In 2001, a second survey of the same ranchers and public land managers was conducted to (1) assess any changes in land managers' perceptions of weed problems, control alternatives, and related issues, and (2) evaluate the impact of the TEAM Leafy Spurge project on the respondent's weed control practices.

The impacts of noxious weeds on grazing operations, specifically leafy spurge, are not abating, and ranchers seem more aware than ever of the severity of the problem. A slightly larger percentage of respondents in 2001 view leafy spurge as a major problem and the most serious problem for grazing operations than in 1998 and 1999. Heightened awareness among landowners may also be linked to TEAM Leafy Spurge's efforts to inform landowners of the problem and offer affordable, effective weed management techniques.

While the use of biological control methods, specifically flea beetles, has grown, herbicides continue to be the control practice of choice. While slightly fewer respondents reported using herbicides in 2001 than in 1998 and 1999, the vast majority of landowners plan to continue to use herbicides. Over 50 percent of respondents are using biological control, and over 76 percent of respondents indicated flea beetles were either somewhat or very effective in controlling leafy spurge.

Nearly half of the respondents had heard of TEAM Leafy Spurge, and all TEAM Leafy Spurge demonstration sites, events, and publications were favorably rated. A large majority of the respondents agreed that the program had been effective in demonstrating and communicating leafy spurge treatment and control options. Based on the results of the 2001 survey, it would appear that the program has indeed made progress in communicating the type of information landowners need to address what continues to be a significant issue for grazing operations in the Midwest.

**Key Words:** leafy spurge, noxious weeds, weed management, rancher opinion

# **Perceptions of Leafy Spurge and Evaluation of the TEAM Leafy Spurge Project by Public Land Managers, Local Decision Makers, and Ranch Operators**

**Nancy M. Hodur, F. Larry Leistritz, and Dean A. Bangsund<sup>1</sup>**

## **Introduction**

Leafy spurge is an exotic, noxious, perennial weed which is widely established in the north central United States and is an especially serious problem in the northern Great Plains (Bangsund et al. 1999). The unique physiological characteristics of leafy spurge make it difficult to control. While no single control method can eradicate established infestations, expansion can be controlled with a combination of biological and chemical control mechanisms in an integrated pest management (IPM) framework (Messersmith 1989; Lym and Messersmith 1994; Lym and Zollinger 1995; Lym et al. 1997). In 1997, the Agriculture Research Service and the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, initiated a major IPM research and demonstration project, TEAM Leafy Spurge, to develop and communicate ecological, economical, and sustainable leafy spurge management techniques to land managers. The primary goal of TEAM Leafy Spurge (TLS) was to develop and demonstrate ecologically based IPM strategies that can produce effective, affordable leafy spurge control. The TEAM Leafy Spurge project focused on a multi-county area in southwestern North Dakota, southeastern Montana, northeastern Wyoming, and northwestern South Dakota (Figure 1) with major demonstration sites located in Billings and Golden Valley Counties, North Dakota; Carter County, Montana; and Harding County, South Dakota.

In one of the first phases of the overall project and phase one of the socio-economic component of the study, ranchers, local decision makers, and public land managers in the TEAM Leafy Spurge project area were surveyed to evaluate managerial, institutional, and social factors that might affect the rate and extent of implementation of various control strategies (Sell et al. 1998a, Sell et al. 1998b, Sell et al. 1999). In 2001, near the conclusion of the TEAM Leafy Spurge project, a second survey of the same group of ranchers and public land managers was conducted. The 2001 survey was undertaken to (1) assess any changes in land managers' perceptions of weed problems, control alternatives, and related issues, and (2) evaluate the impact of the TEAM Leafy Spurge project on the respondents' weed control practices.

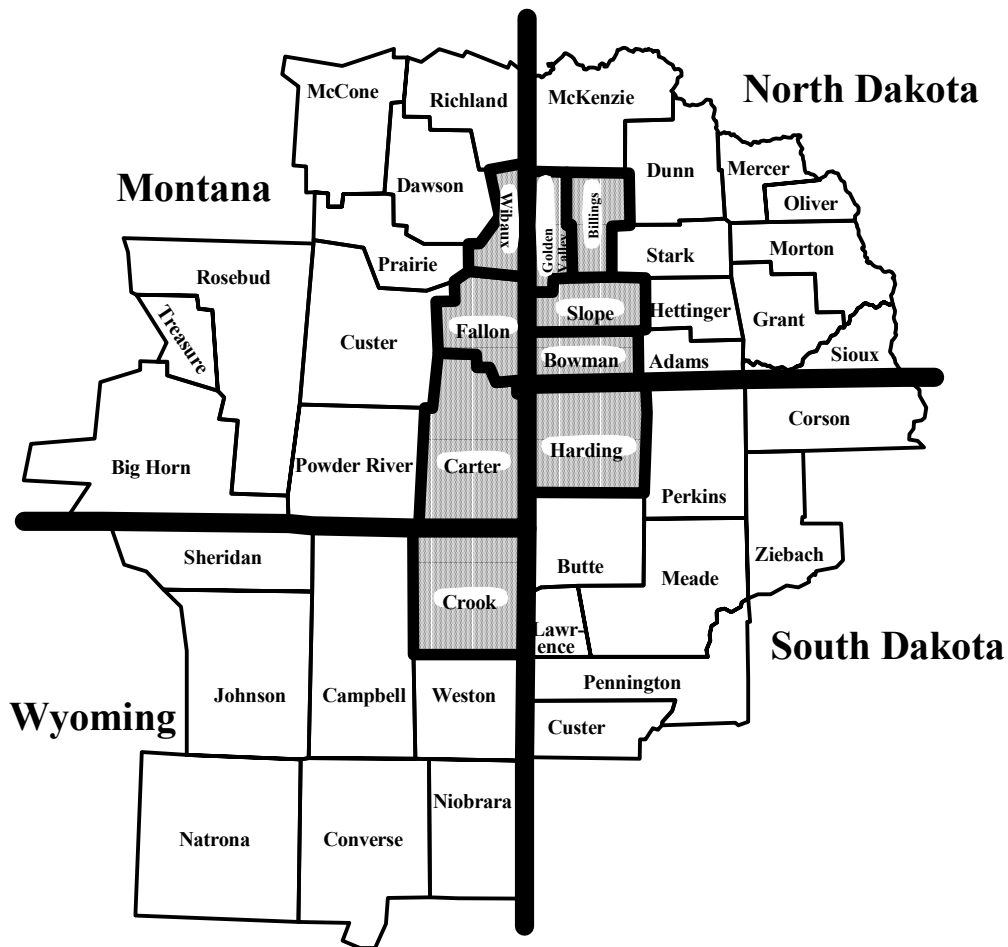
## **Methods**

A questionnaire was mailed to the same sample of ranchers surveyed by Sell et al (1998a, 1999). In addition to a survey of ranchers (Hodur et al. 2002), local decision makers (LDM), public land managers of grazing lands (PLMG), and public land managers of land with primary uses other than grazing (PLMNG) (e.g., recreation, conservation, and transportation) were surveyed. Because public land managers' perspectives and goals are often different, two groups

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of public land managers were surveyed to identify any differences in public land managers' perceptions or impediments to control. PLMG agencies surveyed included the USDA Bureau of Land Management, USDA Forest Service, USDI Bureau of Indian Affairs, North Dakota Department of Corrections, and the State Land Departments in Montana, North Dakota, South Dakota, and Wyoming. The survey of PLMNG included Theodore Roosevelt National Park, Devils Tower National Monument, USDI Bureau of Reclamation, USDI Fish and Wildlife Service, and the Game and Fish Management Departments and Departments of Transportation in Montana, North Dakota, South Dakota, and Wyoming. Agencies which manage public grazing land within or adjacent to the nine-county study area were included in the study. The last group of respondents were local decision makers. State legislators, county extension agents, county commissioners, and county weed board members were surveyed to elicit perspectives and opinions from individuals who make or influence weed control decisions in their localities. Individuals were included in the local decision maker pool if all or part of their district was within the nine-county area.



**Figure 1. Study Counties, Ranch Operator Perceptions of Leafy Spurge Management, 2001**



Each agency was contacted to determine whom within their organization was responsible for land and weed management and to inquire whether those individuals would be willing to complete the weed management questionnaire. If the individuals indicated a willingness to participate, they were mailed a questionnaire. While some Federal agencies had only one or two district or regional offices responsible for lands within the nine-county study area, often several individuals were directly involved in land and weed management. All individuals directly involved in land and weed management within those offices were included in the survey. In each of the three samples (LDM, PLMG, and PLMNG) surveys were sent to the same entities (e.g., County Weed Board, State Land Department) as the earlier surveys (Sell et al. 1998b, 1999). In the interim, of course, there had been some personnel changes. Thus, respondents to the 2001 survey hold the same positions as the respondents in 1998 and 1999 survey but may not necessarily be the same individuals.

Questionnaires were mailed to 927 ranchers, 97 LDM, 37 PLMG, and 21 PLMNG (Appendix B) in July 2001. One follow-up mailing resulted in response rates of 35 percent, 50 percent, 67 percent, and 76 percent, respectively (Table 1). The high response rates associated with the public land managers is likely attributable to the fact that public land managers were contacted by phone prior to the 1998 survey and asked if they would be willing to participate. The public land manager survey essentially represents a census of a specific group rather than a representative sample of a larger group. Local decision makers' response rates may be indicative of the fact that all those surveyed have a vested interest in managing noxious weeds, specifically leafy spurge. While ranchers also have a vested interest in managing noxious weeds, there may be great variability in individual landowners' need for weed management information.

Table 1. Response Rates for Surveys of Ranchers, Local Decision Makers, and Public Land Managers, 2001

Respondents	Percent
Ranchers (n)	29 (254)
Local Decision Makers (n)	50 (97)
Public Land Managers - grazing land (PLMG) (n)	67 (37)
Public Land Managers -non-grazing land (PLMNG) (n)	76 (21)

## Results

The primary focus of the analyses presented in this report was to compare the responses of LDM, PLMG, and PLMNG to the 2001 survey. Rancher responses were also included on selected questions. In addition, ranchers', local decision makers', and public land managers' responses to selected questions were compared to their responses to similar questions in the earlier (1998 and 1999) surveys. (A complete discussion of rancher characteristics and perceptions are detailed in Hodur et al. 2002.)

### Characteristics of Respondents

Half the LDM respondents lived in North Dakota, 30 percent in Montana, 11 percent in Wyoming, and 9 percent in South Dakota (Table 2). As 4 of the 9 study counties are in North Dakota, the distribution of the LDM respondents is consistent with the sample distribution. Local decision makers were typically long-term residents of their respective areas; less than 5 percent of the LDM had lived in their county of residence less than 5 years, while 86 percent had lived there 20 years or more. Average age of LDM was 50 years, and 52 percent had some college education. Farming/ranching (64 percent) and government employment (20 percent) were the most common occupations for LDM (Table 2).

The PLMG respondents, while relatively evenly distributed among the 4 states, most frequently resided in Montana (40 percent), followed by North Dakota (25 percent), and South Dakota (20 percent) (Table 2). Both groups were predominately long-time residents of their respective areas. Only 26 percent of the PLMG and 18 percent of the PLMNG had lived in their county of residence less than 5 years with 53 and 39 percent of PLMG and PLMNG, respectively, residents for 20 years or more. The two groups of public land managers were slightly younger on average than the local decision makers; average ages were 46 and 43 years for PLMG and PLMNG, respectively, compared to 50 years for LDM. College degrees were the norm for the public land managers, 95 percent of PLMG and 88 percent of PLMNG had college degrees. Both groups also had substantial experience in public land management (roughly 16 years on average for each) and in their current positions (roughly 8 years on average for each) (Table 2).

A majority of PLMG respondents were employed by the U.S. Bureau of Land Management and the U.S. Forest Service with the remaining respondents employed by state agencies. The PLMG respondents reported that their offices manage an average of 1.3 million acres of public grazing land and 172,000 acres of other public land, with about 493,500 Animal Unit Months (AUMs) of grazing permitted annually (Table 3). Alternately, the PLMNG were predominately associated with state agencies such as state departments of transportation and state departments for game, fish, and wildlife, and managed substantially fewer acres of public land – about 62,700 acres of other public land and 1,500 acres of public grazing land on average. All of the PLMG and 88 percent of the PLMNG respondents reported using a computer in the course of their land management activities, and all had access to the Internet (Table 3).

Table 2. Respondent Characteristics, Local Decision Makers, Public Land Managers, 2001

Item	Local Decision Makers	Public Land Managers, Grazing	Public Land Managers, Non-grazing
	-----percent-----		
State of Residence			
Montana	30.4	40.0	23.5
North Dakota	50.0	25.0	29.5
South Dakota	8.7	20.0	23.5
Wyoming	10.9	15.0	23.5
(n)	(46)	(20)	(17)
Length of Residence in County			
Less than 5 years	4.5	26.3	17.6
6 to 19 years	11.4	21.1	52.9
20 or more years	84.1	52.6	29.4
(n)	(44)	(19)	(17)
Average length of residency (years)	40.8	15.8	14.7
Age			
30 years or younger	13.3	10.0	11.8
31 to 40 years	11.1	10.0	29.4
41 to 55 years	35.6	70.0	52.9
56 to 65 years	26.7	10.0	5.9
71 years or older	13.8	0.0	0.0
Average age (years)	50.4	46.1	43.5
(n)	(44)	(20)	(17)
Education			
College or graduate school	25.6	95.0	88.2
Vocation/technical/2 year degree	25.6	5.0	5.9
High school graduate	48.8	0.0	5.9
(n)	(44)	(20)	(17)
Occupation			
Farming/ranching	63.6	n/a	n/a
Government	20.4	n/a	n/a
Agricultural services	4.6	n/a	n/a
Professional/business services	2.3	n/a	n/a
Other <sup>1</sup>	9.1	n/a	n/a
Years in public land management	n/a	15.7	16.1
(n)		(20)	(17)
Years in current position	n/a	8.4	7.7
(n)		(20)	(17)

<sup>1</sup>University extension, retired.

Table 3. Land and Weed Management Issues, Public Land Managers, 2001

Item	Public Land Managers, Grazing	Public Land Managers, Non-grazing
	-----acres (000)-----	
Land Managed by Office (Average per respondent)		
Public grazing land	1,332.3	1.5
Other public land	172.3	62.7
(n)	(7)	(12)
AUMs leased for grazing (Average per respondent)	493.5	0.2
(n)	(13)	(5)
 Agency	 -----percent-----	
State agencies	30.0	60.0
USDI- National Park Service	0.0	27.0
USDI-Bureau of Land Management	35.0	0.0
USDA-Forest Service	35.0	0.0
Non-profit association-Nature Conservancy	0.0	13.0
(n)	(20)	(15)
 Portion of Land Management Budget Spent on Weed Control	 14.5	 8.7
(n)	(17)	(16)
 Average Percentage of Weed Control Expenditures for the following:		
Herbicides	47.4	33.1
Biological Control	10.4	7.2
Labor	38.2	41.5
Mechanical Mowing (mowing/cultivation)	3.4	11.9
Other <sup>2</sup>	15.0	1.5
(n) <sup>1</sup>	(19)	(17)
 Use computer for land management	 100.0	 88.2
(n)	(20)	(17)
Internet access	100.0	100.0
(n)	(20)	(17)

<sup>1</sup> Average number of responses for each type of weed control expenditure.

<sup>2</sup> Other: GPS and GIS, contract control.

When asked how their office's budget for land management had changed in the last 5 years and to predict budget appropriations for the next 5 years, 50 percent of PLMG indicated that their budget had remained the same with 70 percent that believed their agency's land management budget would not change in the next 5 years (Table 4). Thirty-five percent of PLMG indicated the budget had increased in the past 5 years, and 15 percent said it had decreased. Conversely, 82 percent of PLMNG said their land management budget had increased in the last five years, with 18 percent that indicated their land management budget had remained the same. PLMNG expectations for the future were consistent with past observations; 71 percent of PLMNG indicated they expect land management budgets to increase in the next five years while the remainder foresaw no change.

Respondents were also asked to describe how the share of the land management budget for weed control had changed in the past 5 years and their expectations for the next 5 years. Half of the PLMG and 70 percent of the PLMNG indicated that the share of the land management budget for weed control had increased in the past 5 years (Table 4). Fifty-three percent of PLMNG expect weed control appropriations to increase in the future while 37 percent of PLMG expect weed control appropriations to increase in the future. Only 11 percent of PLMG and none of the PLMNG expected the budget share for weed control to decline. Half of the respondents from each group expect the share to stay the same (53 percent). Both groups of public land managers felt that the two most important factors limiting their ability to control weeds were funding and labor (Table 4). This is consistent with reported weed control expenditures, as both groups reported that a majority of the weed control expenditures were for herbicides and labor, (85 percent for PLMG and 75 percent for PLMNG) (Table 3). Additionally, a larger percentage of PLMG land management budget was spent on weed control than PLMNG, 14.5 percent compared to 8.7 percent, respectively (Table 3).

### **Problems Faced by Livestock Grazing Operations**

Ranchers, local decision makers, and public land managers of grazing land were presented with a series of issues related to problems faced by livestock grazing operations and were asked to rate each issue as either a major problem, not a problem, or a minor problem. The same issues were presented to respondents in the 1998 and 1999 surveys. 'Adverse weather conditions' was most frequently rated as a major problem by LDM (60 percent) and ranchers (55 percent). While 65 percent of PLMG indicated adverse weather conditions were a major problem, 75 percent indicated noxious or invasive weeds were a major problem (Table 5). When asked which problem was the most serious for area livestock grazing operations, PLMG most often identified noxious or invasive weeds (39 percent), followed by adverse weather conditions and livestock prices (22 percent each). LDM most often cited adverse weather (36 percent) as the most serious problem, followed by noxious weeds and livestock prices (20 percent each). The PLMG and LDM appear to view noxious or invasive weeds as a more critical problem than ranchers as only 10 percent of ranchers identified noxious weeds as the most serious problem. Ranchers most frequently cited adverse weather conditions and livestock prices as the most serious problems faced by ranchers (Table 5).

Table 4. Land and Weed Management Budget Issues, Public Land Managers, 2001

Item	Public Land Managers, Grazing	Public Land Managers, Non-grazing
	-----percent of respondents-----	
Change in land management budget, last five years		
Increased	35.0	82.4
Decreased	15.0	0.0
Stayed the same	50.0	17.6
(n)	(20)	(17)
Expected change in land management budget, next five years		
Increase	10.0	70.6
Decrease	20.0	0.0
Stay the same	70.0	29.4
(n)	(17)	(17)
Change in the relative share of the budget for weed control, last five years		
Increased	52.6	70.6
Decreased	15.8	0.0
Stayed the same	31.6	29.8
(n)	(19)	(17)
Expected change in the relative share of the budget for weed control, next five years		
Increase	36.8	52.9
Decrease	10.6	0.0
Stay the same	52.6	47.1
(n)	(19)	(17)
Most Limiting factor in agency's ability to combat problem weeds		
Funding	50.0	37.5
Labor	35.0	37.5
Limiting or restrictive policies	10.0	0.0
Lack of effective controls	5.0	18.7
Other <sup>1</sup>	0.0	6.3
(n)	(20)	(16)

<sup>1</sup> Other: Logistics (no access) and inaccessible terrain/wilderness designation.

Table 5. Problems Faced by Livestock Grazing Operations, Ranchers, Local Decision Makers, and Public Land Managers, Grazing, 2001 and 1998-1999

Issue	<u>Ranchers</u>		<u>Local Decision Makers</u>		<u>Public Land Managers, Grazing</u>	
	2001 <sup>1</sup>	1998-1999 <sup>1</sup>	2001 <sup>1</sup>	1998-1999 <sup>1</sup>	2001 <sup>1</sup>	1998 <sup>1,2</sup>
	-----percent indicating a major problem-----					
Adverse weather conditions	54.7	61.4	60.4	51.7	65.0	34.8
Livestock prices	54.4	85.9	52.1	86.2	40.0	45.0
Cost of feed and supplies	52.6	54.3	52.1	56.9	30.0	17.7
Regulations affecting use of public lands	45.8	34.3	50.0	44.6	20.0	4.8
Noxious or invasive weeds	36.0	23.8	47.9	56.1	75.0	47.8
Predators	26.1	26.3	27.1	38.6	20.0	19.1
Availability of grazing land	23.8	27.5	12.5	25.9	20.0	9.5
Use of CRP for haying or grazing	13.0	14.1	6.3	8.9	5.0	14.3
(n)	(263)	--	(48)	--	(20)	--
	-----percent indicating most serious problem-----					
Adverse weather conditions	25.2	23.7	35.6	17.0	22.2	13.0
Livestock prices	21.7	40.9	20.0	44.7	22.2	30.4
Cost of feed and supplies	16.5	7.8	15.6	14.9	0.0	8.7
Regulations affecting use of public lands	12.6	8.1	4.4	4.3	11.1	0.0
Noxious or invasive weeds	10.4	6.2	20.0	8.5	38.9	26.1
Availability of grazing land	8.3	6.5	4.4	2.1	5.6	13.0
Predators	3.0	4.2	0.0	4.3	0.0	13.0
Use of CRP for haying or grazing	1.3	0.7	0.0	5.6	0.0	0.0
(n)	(263)	--	(45)	--	(18)	--
	-----percent indicating problem had become worse-----					
Regulations affecting use of public lands	58.4	54.1	72.9	63.0	30.0	13.6
Cost of feed and supplies	57.0	59.6	60.4	70.7	25.0	38.9
Noxious or invasive weeds	45.8	35.8	70.8	55.2	70.0	72.7
Predators	34.7	36.8	37.5	46.4	30.0	5.3
Availability of grazing land	29.1	31.3	22.9	19.6	20.0	16.7
Livestock prices	19.1	78.8	14.9	81.5	10.0	40.0
Adverse weather conditions	12.2	20.8	16.7	8.8	15.0	11.8
Use of CRP for haying or grazing	11.9	52.6	8.3	50.0	5.0	6.7
(n)	(263)	--	(48)	--	(20)	--

<sup>1</sup> Detail does not add to total because of multiple responses.

<sup>2</sup> Results are from the 1998 survey only.

Table 6. Weeds Posing Greatest Problems for Livestock Grazing Operations, Ranchers, Local Decision Makers, Public Land Managers, 2001 and 1998-1999

Weeds	Ranchers		Local Decision Makers		Public Land Managers, Grazing Land		Public Land Managers, Non-grazing Land	
	2001	1998-1999	2001	1998-1999	2001	1998 <sup>2</sup>	2001	1998 <sup>2</sup>
-----percent indicating a major problem-----								
Leafy spurge	51.5	41.6	80.8	76.7	80.0	63.6	64.7	75.0
Thistles	34.2	21.4	30.4	28.8	55.0	15.0	70.6	33.0
Field bindweed	26.1	24.8	23.4	15.5	21.1	11.0	17.6	6.7
Sagebrush	13.5	9.9	8.5	6.9	0.0	10.0	0.0	7.5
Annual brome grasses	9.5	10.9	11.9	11.1	22.2	30.0	23.5	38.5
Prickly pear	8.3	5.6	4.3	3.8	5.3	10.5	0.0	0.0
Knapweed(s)	5.5	5.9	6.4	3.6	20.0	9.5	11.8	33.0
Wormwood (absinth)	1.2	0.5	0.0	2.6	0.0	5.9	5.9	0.0
Others <sup>1</sup>	8.4	62.7	0.0	0.0	0.0	33.0	0.0	100.0
(n)	(262)	--	(47)	--	(20)	--	(17)	--
-----percent indicating the most important weed problem-----								
Leafy spurge	53.4	50.8	71.1	88.9	75.0	73.9	52.9	62.5
Thistles	20.2	13.1	15.6	5.6	5.0	13.0	41.2	18.8
Sagebrush	8.4	11.5	4.4	0.0	0.0	0.0	0.0	0.0
Annual brome grasses	7.6	6.4	2.2	1.9	5.0	8.7	0.0	6.3
Field bindweed	2.9	4.0	2.2	0.0	0.0	0.0	0.0	0.0
Knapweed(s)	1.7	3.0	2.2	0.0	10.0	4.4	5.9	12.5
Prickly pear	1.7	2.4	2.2	1.8	0.0	0.0	0.0	0.0
Wormwood (absinth)	0.4	.3	0.0	0.0	0.0	0.0	0.0	0.0
Others <sup>1</sup>	3.8	62.7	1.9	5.0	0.0	0.0	0.0	0.0
(n)	(238)	--	(45)	--	(20)	--	(17)	--

<sup>1</sup> Other weeds: Any weeds, Saltcedar, Houndstongue, Bindweed, Sulfur cinquefoil, Wild licorice, Canada thistle, Burdock, Tansey, Foxtail, Cheatgrass, Cocklebur, Fringed sagebrush.

<sup>2</sup> Results are from the 1998 survey only.



When 2001 survey responses were compared to the 1998 and 1999 surveys, more respondents in each survey group in the 2001 survey indicated noxious weeds were the most serious problem facing grazing operations. More ranchers and LDM in the 2001 survey indicated that noxious weeds had become worse in the last five years than in the 1998 and 1999 surveys, while PLMG perceptions of whether noxious weeds had become worse in the last five years were essentially unchanged, falling within three percentage points of past responses. Respondents in all groups were also more concerned about regulations affecting the use of public lands. More respondents in all groups in the 2001 survey indicated that regulations affecting the use of public lands was a serious problem, the most serious problem, and a problem that had become worse in the last five years than in the 1998 and 1999 surveys (Table 5). Regulations affecting grazing on public land in the study area have received considerable attention over the past few years. At least one Federal land management agency has proposed policy changes that could substantially reduce grazing on public lands (U.S. Department of Agriculture 2002).

### **Nature and Seriousness of Weed Problems**

In addition to commenting on general issues affecting livestock grazing operations, respondents were asked to rate the effect of several weed species on livestock grazing operations in their area. Leafy spurge was identified as a major problem by a majority of local decision makers (81 percent) and ranchers (52 percent), while thistles were most frequently cited by PLMG as a major problem (71 percent) followed by leafy spurge (64 percent) (Table 6). Leafy spurge was identified by a majority of respondents in each group as the weed that is the most serious problem for grazing operations. Respondents' perceptions of the most serious weed problem were not substantially different than their perceptions in the 1998 and 1999 surveys, although respondents appeared to be slightly more concerned about thistles in the 2001 survey. More ranchers, LDM, and PLMNG indicated thistles were the most serious problem in the 2001 survey than in the 1998 and 1999 surveys (Table 6).

In contrast to the question regarding weed problems in their area, the four groups of respondents were asked to rate the seriousness of weed problems on their ranch, on land they manage, or in the case of LDM, land in their area. More respondents perceive noxious weeds as a serious problem for grazing operations in general, than believe noxious weeds are a serious problem on their own land, the land they manage, or land in their area (Table 7). Fifty-one percent of ranchers, 81 percent of LDM, 80 percent of PLMG, and 64 percent of PLMNG indicated noxious weeds were a serious problem for grazing operations (Table 6). However, only 15 percent of ranchers, 54 percent of LMD, 68 percent of PLMG, and 50 percent of PLMNG consider weeds a major problem on their own land (Table 7). These responses would suggest respondents believe noxious weeds are more serious elsewhere than on the land they own or manage. Responses were comparable to those in the 1998 and 1999 surveys except for PLMG. More than twice as many respondents identified weeds as a major problem in 2001 than in 1998 (68 percent vs. 32 percent) (Table 7).

Table 7. Respondents' Perceptions of Weed Problems on Respondent's Ranch, in Area, or on Land Managed by Agency, and Average Acres of Leafy Spurge Reported by Respondents, 2001

Issue	Ranchers	Local Decision Makers	Public Land Manager, Grazing	Public Land Manager, Non-grazing
	-----percent-----			
<b>Perceived Severity of Weed Problem:</b>				
Not a problem	13.8	2.3	0.0	0.0
Minor problem	71.1	43.2	31.6	50.0
Major problem	15.0	54.6	68.4	50.0
(n)	(246)	(44)	(19)	(16)
Respondents that perceive weeds are a major problem—1998 and 1999 surveys	11.0	60.0	31.8 <sup>1</sup>	43.8 <sup>1</sup>
12 Currently have leafy spurge on ranch or on land managed	55.7	NA <sup>2</sup>	100.0	94.1
(n)	(262)		(20)	(17)
	-----acres-----			
Average acres of leafy spurge on farm/ranch or public lands <sup>3</sup>	124	NA <sup>2</sup>	5,827	969
(n)	(124)		(14)	(11)
Total acres of leafy spurge reported by all respondents	15,422		81,590	10,662
(n)	(124)		(14)	(11)
Range of acres of leafy spurge reported by all respondents	0 to 5,000	NA <sup>2</sup>	10 to 50,000	1 to 4,000
(n)	(124)		(14)	(11)

<sup>1</sup> 1998 Survey data only.

<sup>2</sup> Not Applicable - this question was not asked to LDM.

<sup>3</sup> Only those respondents that reported leafy spurge and indicated the size of the infestation are included in the calculation.

Further, leafy spurge infestations were prevalent across all groups. Almost 56 percent of the ranchers, 94 percent of the PLMNG, and 100 percent of the PLMG reported that they had leafy spurge on land they own or manage with average infestations ranging from 124 acres for ranchers to over 5,000 acres for PLMG. Infestations ranged in size from less than an acre to over 50,000 acres (Table 7).

## **Weed Control Practices**

Ranchers and land managers were asked about their current leafy spurge control practices and control practices they expect to use in the future. Responses were compared to those from the 1998 and 1999 surveys. Herbicide use was widespread. Ninety-three percent of ranchers, 94 percent of PLMG, and 100 percent of PLMNG used herbicides to control leafy spurge (Table 8). Use of biological control agents was also prevalent with over half of the ranchers (53 percent), three-fourths of the PLMNG, and 95 percent of the PLMG respondents using biological control agents. The Integrated Pest Management (IPM) concept also appeared to be gaining more widespread acceptance, as 51 percent of ranchers, 75 percent of PLMNG, and 100 percent of PLMG respondents were currently using this approach. Respondents' use of various control practices did not appear to change markedly from practices reported in the 1998 and 1999 surveys. Slightly more ranchers and PLMNG were utilizing biological control in 2001 and fewer respondents in all groups were grazing sheep or goats than in 1998 and 1999. Future plans differed only slightly from current practices. More public land managers in 2001 anticipated tilling and reseeded with competing grasses than in 1998 and 1999, while more ranchers planned to use biological control (insects) and IPM strategies in 2001 than in 1998 and 1999 (Table 8).

Respondents were also asked to evaluate the effectiveness and economic feasibility of common leafy spurge control practices (Table 9). Each group most frequently rated the IPM approach as very effective. Among the four groups, PLMG most often rated biological control with insects very effective (42 percent) and in all groups, except PLMNG, more respondents perceived biological control to be very effective in the 2001 survey than in the 1998 and 1999 surveys. The number of respondents that rated the effectiveness of biological control "very effective" increased substantially among the LDM and the PLMG, and decreased substantially among PLMNG. Why PLMNG perspectives were different than the other groups on that one issue only was unknown, especially when 70 percent of PLMNG indicated they believe "it pays" to use biological control methods. Over 50 percent of the respondents in the other groups also indicated "it pays" to use biological control with insects (Table 9). Perceptions among the groups were fairly consistent regarding IPM strategies and herbicides. Over 50 percent of the respondents in all groups believe "it pays" to spray with herbicides, and the IPM approach was positively perceived as well. Forty-seven percent of ranchers, 70 percent of LDM, 74 percent of PLMG, and 69 percent PLMNG indicated IPM pays. There was less consensus among the group regarding sheep and goat grazing. While 79 percent of PLMG indicated it pays to graze sheep or goats to control leafy spurge, far fewer respondents in the other groups indicated it pays to graze sheep or goats to control leafy spurge (Table 9).

Table 8. Use of Selected Practices to Control Leafy Spurge, Ranchers and Public Land Managers, 2001 and 1998-1999

Control Practice	Ranchers		Public Land Managers. Grazing Land		Public Land Managers, Non-grazing Land	
	2001 <sup>1</sup>	1998 <sup>2</sup> -1999	2001 <sup>1</sup>	1998 <sup>2</sup>	2001 <sup>1</sup>	1998 <sup>2</sup>
-----percent-----						
<b>Currently using control practice:</b>						
Herbicides	93.0	97.4	94.7	100.0	100.0	100.0
Biological control	52.9	47.2	94.7	95.2	75.0	71.4
Sheep or goat grazing	17.8	25.7	73.7	83.3	12.5	37.5
Tillage and reseeding with competing grasses	27.0	13.3	21.1	10.5	18.8	25.0
Integrated Pest Management (IPM)	50.8	n/a	100.0	n/a	75.0	n/a
(n)	(143)		(19)		(16)	
<b>Plan to use control practice in the future:</b>						
Herbicides	95.1	100.0	100.0	93.8	100.0	100.0
Biological control	61.6	54.2	100.0	93.3	75.0	71.4
Sheep or goat grazing	17.0	30.2	73.7	71.4	18.8	37.5
Tillage and reseeding with competing grasses	24.1	15.3	36.8	13.3	31.2	25.0
Integrated Pest Management (IPM)	61.9	n/a	100.0	n/a	75.0	n/a
(n)	(143)		(19)		(16)	

<sup>1</sup> Detail does not add to total because of multiple responses.

<sup>2</sup> Question was phrased slightly different in the 1998 questionnaire. The 1998 questionnaire asked the respondent if they had used a control practice in the past, compared to the 2001 questionnaire that asked the respondent if they were currently using a control practice. Both questionnaires asked if the respondent planned to use a control practice in the future.

Table 9. Respondents' Evaluation of Leafy Spurge Control Practices, Ranchers, Local Decision Makers, and Public Land Managers, 2001 and 1998-1999

Control Practice	<u>Ranchers</u>		<u>Local Decision Makers</u>		<u>Public Land Managers, Grazing Land</u>		<u>Public Land Managers, Non-grazing Land</u>	
	2001	1998-1999	2001	1998-1999	2001	1998	2001	1998
-----percent indicated control practice is very effective-----								
Spraying with herbicides	25.7	26.8	39.1	29.8	21.1	27.3	58.8	43.8
Biological control (insects)	28.1	20.2	39.1	14.3	42.1	19.1	29.4	61.5
Grazing animals (sheep or goats)	19.4	25.8	6.5	29.6	26.3	33.3	6.3	14.3
Tillage and /or reseeding with competing grasses	2.0	5.7	0.0	2.6	10.5	12.5	0.0	0.0
Integrated Pest Management (IPM)	33.9	n/a	60.9	n/a	68.4	n/a	75.0	n/a
(n)	(257)	--	(46)	--	(19)	--	(17)	--
-----percent indicated control practice "pays"-----								
Spraying with herbicides	54.7	70.4	56.5	68.3	63.2	68.2	70.6	82.4
Biological control (insects)	55.3	62.8	76.1	59.9	79.0	80.0	70.6	92.3
Grazing animals (sheep or goats)	36.3	55.8	32.6	63.6	79.0	85.7	18.8	46.2
Tillage and /or reseeding with competing grasses	13.0	23.2	11.1	12.8	26.3	58.3	18.8	14.3
Integrated Pest Management (IPM)	46.6	n/a	69.9	n/a	73.7	n/a	68.8	n/a
(n)	(257)	--	(46)	--	(19)	--	(17)	--

## **Weed Management Information Needs**

One of the key components of TEAM Leafy Spurge was the dissemination of pertinent weed control strategies and management techniques to land managers. As in the 1998 and 1999 surveys, respondents were queried as to the preferred type and source of weed control information. Responses to the 2001 survey were compared to those in the 1998 and 1999 surveys to gauge changes in respondents' information needs.

While the groups' perspectives varied somewhat, information about the economics and use of herbicides, biological control, and IPM strategies were of interest to respondents in all groups (Table 10). Far fewer respondents were interested in information about sheep grazing and cultivation and reseeding with the exception of PLMG. Sixty-five percent of PLMG were interested in information on the techniques and effectiveness of sheep and goat grazing compared to 20 percent of ranchers, 13 percent of LDM, and 23 percent of PLMNG. The groups' views were more divergent with regard to what form they would prefer to receive information. Area demonstration plots, testimonials, pamphlets and bulletins, and personal visits/on-site help were generally of interest to all groups. The most striking difference among the groups was their interest in digital and electronic media. Seventy percent of PLMG and 56 percent of PLMNG were very interested in website/Internet or e-mail information sources compared to only 17 and 22 percent of ranchers and LDM, respectively (Table 10).

## **Evaluation of TEAM Leafy Spurge Project**

Because outreach efforts were a major component of the TEAM Leafy Spurge program, respondents were asked a series of questions designed to gauge respondent awareness of the program. Overall, awareness of the program was quite high with the vast majority of PLMG and LDM aware of the program, 90 and 85 percent, respectively. Levels of awareness were also good for ranchers (46 percent) and PLMNG (66 percent) (Table 11). Public land managers and local decision makers learned of the program early on, compared to the ranchers. More than 70 percent of both public land manager groups and 64 percent of the LDM first heard of the project in 1997 and 1998. Over 50 percent of the ranchers first heard of the project after 1998. Public land managers most often learned of the TLS project from another state or federal land manager or through a County Weed Board. The LDM group most often first heard of the program through a County Weed Board, while ranchers most frequently identified newspapers and County Agents as their source of information (Table 11). In addition to gauging respondent awareness, a section of the questionnaire measured respondent participation in a number of TLS events, specifically the two Spurgefest events, other TLS meetings, and TLS demonstration sites.

Table 10. Types of Weed Control Information Wanted by Ranchers, Local Decision Makers, and Public Land Managers, 2001 and 1998-1999

Item	Ranchers		Local Decision Makers		Public Land Managers, Grazing Land		Public Land Managers, Non-grazing Land	
	2001	1998-1999	2001	1998-1999	2001	1998 <sup>1</sup>	2001	1998 <sup>1</sup>
-----percent indicated very interested-----								
<b>Type of information:</b>								
Effectiveness of various herbicide treatment programs	40.3	46.2	60.0	79.3	80.0	78.3	64.7	61.1
Economics of herbicide treatments	38.8	44.8	53.3	75.9	60.0	69.6	58.8	31.3
How to get started with biological control	31.0	32.3	51.1	53.5	62.6	52.4	58.8	46.2
Economics of biological control	32.1	35.2	57.8	59.6	73.7	n/a	58.8	n/a
Techniques and effectiveness of sheep and goat grazing	19.8	19.0	13.3	27.1	65.0	62.5	23.5	28.6
Economics of sheep and goat grazing	20.0	21.1	15.6	28.8	45.0	60.9	23.5	28.6
Techniques and effectiveness of cultivation and reseeding	13.8	15.0	22.2	14.0	36.8	45.8	35.9	25.0
Economics of cultivation and reseeding	16.0	15.7	24.4	14.3	26.3	37.5	35.9	31.3
Techniques and effectiveness of Integrated Pest Mgt. (IPM)	30.5	n/a	53.5	n/a	84.2	n/a	64.7	n/a
Economics of Integrated Pest Management (IPM)	31.6	n/a	50.0	n/a	79.0	n/a	64.7	n/a
(n) <sup>2</sup>	(243)	--	(45)	--	(20)	--	(16)	--
<b>Form of Information:</b>								
Pamphlet or bulletin available through Extension office	35.5	45.6	30.4	42.9	70.0	60.9	50.0	62.5
Video cassettes demonstrating various control methods	28.4	33.5	28.3	31.5	55.0	57.1	37.5	43.8
Area demonstration plots showing various control methods	42.6	37.9	67.4	71.2	68.4	78.3	37.5	33.3
Testimonials from fellow ranchers or other land managers	35.7	38.6	63.0	62.1	52.6	42.9	25.0	14.3
Computer decision aids (programs)	15.7	12.3	23.9	7.4	42.1	34.8	37.5	23.5
Personal visits/on-site help from range mgt. specialists	25.4	33.0	66.7	57.6	57.9	72.7	25.0	37.5
Website/Internet	17.2	n/a	21.7	n/a	70.0	n/a	56.3	n/a
e-mail newsletters or notifications	11.9	n/a	28.3	n/a	45.0	n/a	56.3	n/a
(n) <sup>2</sup>	(248)	--	(46)	--	(20)	--	(16)	--

<sup>1</sup> 1998 survey results only.

<sup>2</sup> Detail does not add to total because of multiple responses.

Table 11. Respondents' Awareness of TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001

Item	Ranchers	Local Decision Makers	Public Land Managers, Grazing Land	Public Land Managers, Non-grazing Land
	-----percent-----			
Respondent is aware of TEAM Leafy Spurge (TLS) Project	45.7	84.8	90.0	64.7
(n)	(256)	(46)	(20)	(17)
<b>How Respondent heard of TLS:</b>				
Newspaper	23.7	5.3	0.0	0.0
County agent	22.9	18.4	0.0	0.0
County Weed Board	15.3	47.4	22.2	9.1
State or Federal Land Mngr.	14.4	2.6	55.6	45.4
University Press Release	5.9	5.3	0.0	0.0
Another rancher/neighbor	5.1	2.6	0.0	0.0
State weed control conference	2.5	7.9	0.0	36.4
Internet	0.0	0.0	0.0	9.1
Other <sup>1</sup>	10.2	10.5	22.2	0.0
(n)	(118)	(38)	(18)	(11)
<b>When Respondent first heard about TLS:</b>				
1997	31.5	41.0	44.4	63.6
1998	14.8	23.1	27.8	9.1
1999	32.4	30.8	16.7	18.2
2000	17.6	5.1	5.6	9.1
2001	3.7	0.0	5.6	0.0
(n)	(108)	(39)	(18)	(11)

<sup>1</sup> Other: Radio/TV, Medora Grazing Association, range tour.



The Spurgefest field tour events held in Medora, ND in 1999 and 2001 were more widely attended by LDM and public land managers, than ranchers (Table 12). Almost 37 percent of the LDM, 30 percent of PLMG, and 19 percent of PLMNG attended the 1999 Spurgefest compared to about 7 percent of the ranchers. Ratings of the event were quite favorable, ranging from 5.6 to 6.7 on a 7-point scale (1 = poor and 7 = excellent). Attendance at the 2001 Spurgefest ranged from 35 percent for the PLMG to 2.6 percent for the ranchers, and again the ratings were favorable, ranging from 5.6 (LDM) to 6.9 (PLMG). In addition to Spurgefest, many of the respondents attended TEAM Leafy Spurge presentations at other events or meetings (e.g., County Weed Board meeting, State Weed Association conference). Again, ratings for TLS events or presentations were favorable, with average scores ranging from 5.4 to 6.3 on the 7-point scale.

The North Dakota demonstration sites near Sentinel Butte and Medora were visited most frequently, likely because they were included in the tours held in conjunction with the 1999 and 2001 Spurgefest events. More than 52 percent of the LDM, 44 percent of the PLMG, almost 18 percent of the PLMNG, and almost 13 percent of the ranchers had visited the North Dakota biological control sites. Ratings ranged from 6.1 to 6.7 on the 7-point scale. While the Montana and South Dakota sites were visited by fewer respondents, they also were rated favorably. The Montana site near Ekalaka was visited by 14 percent of LDM, nearly 9 percent of ranchers, and 5 percent of PLMG and PLMNG. Their ratings ranged from 4.3 to 7.0. The South Dakota sites near Buffalo had been visited by almost 16 percent of the PLMG, 9 percent of the LDM, 6 percent of the PLMNG, and 4 percent of the ranchers. Ratings were generally in the range of 5.5 to 6.5, with extreme values of 2.0 and 7.0. (The reader should bear in mind that the ratings are based only on the responses of those individuals that attended the events and answered the survey question, which in some cases were only one or two individuals.) While respondent attendance at any one event or demonstration site may not seem high, 30 percent of ranchers and PLMNG, 70 percent of PLMG, and 72 percent of LDM, respectively, attended at least one TLS event, meeting, or visited one TLS demonstration site (Table 12).

Distribution of TLS brochures and bulletins was also used to gauge respondent awareness of TLS. Brochures and pamphlets were widely distributed to the public land managers and local decision makers, and somewhat less extensively to ranchers (Table 13). The relative size of the local decision maker and public land manager groups likely made identifying and distributing information to those groups far less challenging than the rancher group. Overall, 85 percent of PLMG, 80 percent of LDM, and 47 percent of PLMNG had received TLS brochures or bulletins, while only 24 percent of the ranchers reported receiving these publications. Further, interest in the TLS Website and the Purge Spurge CD <sup>1</sup> was substantially higher among the public land managers than for the local decision makers and ranchers (Table 13). Almost 58 percent of the PLMG and 47 percent of the PLMNG had visited the Website, compared to 13 percent of LDM and 3 percent of ranchers. Similarly, 50 percent of the PLMG and 41 percent of the PLMNG had used the Purge Spurge CD, compared to 9 percent of LDM and less than 3 percent of ranchers. The public land managers' ratings of these two products were also somewhat more favorable than those of the other two groups.

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<sup>1</sup> TEAM Leafy Spurge produced a CD-ROM Leafy Spurge data base with hundreds of research reports, bulletins, photos, maps, and illustrations on leafy spurge and its management.

Table 12. Attendance and Ratings of TEAM Leafy Spurge Events, Ranchers, Local Decision Makers, and Public Land Managers, 2001

	Ranchers		Local Decision Makers		Public Land Managers, Grazing		Public Land Managers, Non-grazing	
	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>
<b>Attendance TLS Event or Meeting:</b> <sup>2</sup>								
1999 Spurgefest	6.7	5.6	36.6	5.9	30.0	6.3	18.8	6.7
2001 Spurgefest	2.6	6.2	21.6	5.6	35.0	6.9	23.5	6.7
TEAM Leafy Spurge presentation at another event or meeting	16.3	5.9	46.0	5.4	31.6	5.4	29.4	6.3
(n) <sup>2</sup>	(240)	(19)	(47)	(13)	(20)	(6)	(17)	(6)
Any Spurgefest event or meeting	21.2	--	60.8	--	60.0	--	29.4	--
<b>Visited TLS Demonstration Sites:</b>								
<i>North Dakota sites (Sentinel Butte/ Medora)</i>								
Biological control	12.9	6.2	52.3	6.1	44.4	6.6	17.6	6.7
Sheep grazing	7.5	4.9	28.6	4.7	35.3	6.8	17.6	6.7
Herbicide treatment	7.9	4.6	39.5	5.4	36.8	6.4	17.6	6.7
(n) <sup>2</sup>	(244)	(27)	(43)	(17)	(18)	(7)	(17)	(3)
<i>Montana site (Ekalaka)</i>								
Biological control	8.7	5.4	14.0	4.3	5.3	7.0	5.3	0.0
Herbicide treatment	8.3	5.3	14.0	4.8	5.3	7.0	5.3	0.0
(n) <sup>2</sup>	(252)	(21)	(43)	(6)	(19)	(1)	(17)	(0)
<i>South Dakota site (Buffalo)</i>								
Biological control	3.6	5.5	7.1	6.0	10.5	6.5	5.9	5.0
Sheep grazing	2.8	6.2	7.1	5.7	15.8	6.3	5.9	2.0
Herbicide treatment	3.6	5.5	9.3	6.3	10.5	6.5	5.9	7.0
(n) <sup>2</sup>	(249)	(7)	(42)	(3)	(18)	(2)	(17)	(1)
Visited at least one demonstration site	23.3	--	61.7	--	52.6	--	23.5	--
Visited at least one demonstration site or attended at least one TLS event or meeting	29.4	--	72.3	--	70.0	--	29.4	--

<sup>1</sup> Based on a scale of 1 to 7, where 1 is poor and 7 is excellent.

<sup>2</sup> Average number of respondents for each event.

Table 13. Respondents' Awareness of TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001

	Ranchers		Local Decision Makers		Public Land Managers, Grazing		Public Land Managers, Non-grazing	
	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>	percent of respondents	average score <sup>1</sup>
Respondent has:								
Received TLS brochures or bulletins	23.8	5.6	80.0	5.7	85.0	5.9	47.1	6.0
(n)	(256)	(59)	(45)	(34)	(20)	(16)	(17)	(8)
Visited TLS Website	3.2	5.8	13.0	5.8	57.9	6.3	47.1	6.6
(n)	(252)	(8)	(46)	(5)	(19)	(10)	(17)	(7)
Heard of the Purge Spurge CD	3.8	--	29.6	--	65.0	--	47.1	--
(n)	(263)	(8)	(44)	(5)	(20)	(10)	(17)	
Used the Purge Spurge CD	2.6	4.9	9.1	5.0	50.0	5.9	41.2	6.1
(n)	(9)	(7)	(13)	(4)	(12)	(10)	(8)	(7)
Percent of respondents that collected or received insects	20.0	--	45.6	--	45.0	--	41.2	--
(n)	(262)		(46)		(20)		(17)	
Percent of respondents that indicated insects have affected leafy spurge stands	60.2	--	86.7	--	84.6	--	54.6	--
(n)	(93)		(30)		(13)		(17)	
Degree to which insects have established	--	4.9	--	5.4	--	4.2	--	5.8
(n)		(53)		(24)		(10)		(6)
Level of leafy spurge control to date from biological control	--	4.4	--	4.8	--	4.2	--	5.8
(n)		(52)		(26)		(10)		(6)
Year respondents received insects	Ranchers		Local Decision Makers		Public Land Managers, Grazing		Public Land Managers, Non-grazing	
	-----Number of respondents-----							
1999	39		17		6		5	-
2000	28		3		4		6	
2001	23		2		4		6	

<sup>1</sup> Average score based on a scale of 1 to 7 where 1 is poor and 7 is excellent.

Because many of the TLS events offered land owners and land managers an opportunity to collect or receive insects, this study offered an excellent opportunity to estimate how many event participants collected or received insects and to what degree the insects have established and the level of control exhibited to date. Some respondents from all groups collected and/or received insects at a TLS event, ranging from 46 percent of LDM and 45 percent of PLMG to 41 percent of PLMNG and 20 percent of ranchers (Table 13). Most of the respondents in each group felt that the insects had affected the leafy spurge stands where they were released, with the percentage of respondents reporting noticeable effects ranging from 87 percent of the LDM and 85 percent of the PLMG to 60 percent of ranchers and 55 percent of PLMNG. Respondents were also asked to rate the degree to which insects have established. All groups rated the degree of establishment positively with average scores ranging from a low of 4.2 (PLMG) to a high of 5.8 (PLMNG) (based on a scale of 1 to 7 where 1 is poor and 7 is excellent).

All four groups were asked to respond to a series of general statements about the effectiveness of TEAM Leafy Spurge. More than two-thirds of the LDM, PLMG, and ranchers agreed that the TLS project had been effective in demonstrating and communicating leafy spurge control options to ranchers and land managers (Table 14). Average scores, based on a scale of 1 to 5 where 1 is “strongly disagree” and 5 is “strongly agree,” ranged from 3.6 (PLMNG) to 4.3 (PLMG), indicating an overall positive assessment of TLS. The program received similar marks when respondents were asked about TLS effectiveness demonstrating herbicide use and biological control agents. Marks were slightly higher for TLS efforts related to biological control, 64 (PLMNG) to 88 (PLMG) percent of respondents agreed that TLS had clearly demonstrated the effectiveness of biological control agents. Average scores ranged from 3.8 to 4.4. While scores were slightly lower for TLS efforts regarding sheep grazing, all groups still rated TLS efforts positively with average scores ranging from 3.2 for PLMNG to 4.1 by PLMG. A majority of respondents in all groups indicated they had personally benefitted from the project, including 82 percent of LDM and 76 percent of PLMG; and more than 92 percent of the LDM, 71 percent of PLMG, and 70 percent of the ranchers agreed that project funding should be extended to continue research and education programs (Table 14).

Respondents in each of the four groups were asked to indicate how the TLS project had affected their weed control strategies (Appendix Tables A1-A12). Responses were compared to similar questions in the 1998 and 1999 surveys to gauge any changes in weed control strategies. Roughly half of the ranchers and LDM and one-third of the public land managers, both for grazing and non-grazing land, indicated TLS had influenced their decision to use herbicides (Appendix Tables A1-A4). Among the ranchers, LDM, and PLMG who indicated that TLS had influenced their plans, most often respondents indicated they currently were planning to use herbicides to stop infestations from spreading and integrating herbicides with other control measures. Among PLMNG, the most frequent response was that they planned to change herbicide application rates. Among those who said that TLS had not influenced their plans to use herbicides, the most common explanation was that they were already using herbicides (ranging from 74 percent of ranchers to 100 percent of PLMNG). When the reasons why TLS had not influenced respondents’ plans were compared to the reasons why respondents were not using herbicides in the 1998 and 1999 surveys, respondents were generally less negative about constraints to using herbicides, especially the rancher group. For example, nearly 60 percent of

Table 14. Attitudes Regarding TEAM Leafy Spurge, Ranchers, Local Decision Makers, and Public Land Managers, 2001

	Ranchers		Local Decision Makers		Public Land Managers, Grazing		Public Land Managers, Non-grazing	
	percent agree	average score <sup>1</sup>	percent agree	average score <sup>1</sup>	percent agree	average score <sup>1</sup>	percent agree	average score <sup>1</sup>
The project has been effective in demonstrating and communicating leafy spurge treatment and control options to ranchers and land managers	69.2	3.9	81.6	4.0	70.6	4.3	50.0	3.6
The project has clearly demonstrated the effectiveness of herbicides in controlling leafy spurge	54.7	3.6	60.5	3.6	76.5	4.1	50.0	3.5
The project has clearly demonstrated the effectiveness of biological control agents (flea beetles) in controlling leafy spurge	63.6	3.9	81.6	4.4	88.2	4.5	64.3	3.8
The project has clearly demonstrated the effectiveness of sheep grazing in controlling leafy spurge	43.2	3.4	41.7	3.3	64.7	3.9	21.4	3.2
I (my agency) have/has benefitted from the project	42.1	3.4	82.1	4.2	76.5	4.1	57.1	3.8
Project funding should be extended to continue research and education programs	69.2	4.1	92.3	4.5	70.6	4.3	57.1	3.9
	(n) <sup>2</sup>	(128)	(38)		(17)		(14)	

<sup>1</sup> Average score based on a scale of 1 to 5 where 1 is strongly disagree and 5 is strongly agree.

<sup>2</sup> Average number of respondents for each item.

ranchers cited environmental restrictions as an impediment to herbicide use in 1998 and 1999, while only 29 percent cited environmental restrictions as an impediment to herbicide use in the 2001 survey. Environmental impediments were cited far less frequently by both public land manager groups. Also in the 1998 survey, 85 and 82 percent of the PLMG and PLMNG, respectively, indicated that environmental restrictions prevented herbicide use, compared to only 27 and 37 percent, respectively, in the 2001 survey. Fewer ranchers, LDM, and PLMG indicated that herbicides were not economical in the 2001 survey than in the 1998 and 1999 surveys. Herbicide costs appear to be less of an impediment to public land managers as well. Seventy-one percent of PLMG and 45 percent of PLMNG indicated that herbicide cost was prohibitive in the 1998 survey. Less than a third of the respondents in each group indicated herbicide cost was prohibitive in the 2001 survey.

Responses were similar when respondents were asked about TLS influence on biological control practices (Appendix Tables A5-A8). Over half of the respondents in each group indicated TLS has influenced their decision to use biological control agents with a majority of respondents in each group indicating they are now planning to use biological control as a result of TLS. Additionally, half of the ranchers and 80 percent of the LDM indicated they were now going to try biological control because insects are free and readily available.

Among those who indicated that TLS had not altered their plans, frequent explanations were that infestations were too small or not suitable for biological control (53 percent of ranchers, 57 percent of LDM, and 80 percent of PLMNG). LDM signaled some uncertainty about the effectiveness of biological control remains, as 71 percent of LDM said their constituents still were not convinced that biological control will work. Thirty-two percent of ranchers also indicated they were not influenced by TLS because they also were still not convinced biological control will work. As was the case with herbicides, many of the reasons cited in the 1998 and 1999 surveys as impediments to using biological control appear to be less prevalent. For example, in the 1998 and 1999 surveys one-third of the ranchers indicated they did not know how to use biological control agents or where to collect insects. In the 2001 survey, only 7 percent of ranchers indicated they were not using biological control agents because they did not know how to use them and only 3 percent said they did not know where to collect insects. Responses were similar for the LDM group. Limited comparative data was available for the public land manager groups.

Responses regarding TLS impact on decisions regarding sheep grazing by PLMNG had a different pattern than the other groups. The nature of their land holdings and/or agency management objectives may preclude the use of sheep grazing in many instances. Thus, while 47 percent of ranchers, 50 percent of LDM, and 65 percent of PLMG felt TLS had satisfactorily demonstrated the effectiveness of grazing sheep to control leafy spurge, only 23 percent of PLMNG agreed with this statement. Similarly, 39 percent of ranchers, 53 percent of PLMG, and 64 percent of LDM felt that TLS had satisfactorily provided information on how to properly implement a sheep grazing program, but only 15 percent of PLMNG concurred. Finally, 17 percent of ranchers, 29 percent of LDM, and 35 percent of PLMG indicated that TLS had influenced their plans to graze sheep to control leafy spurge, compared to only 8 percent of PLMNG.

While TLS may not have influenced as many respondents' decisions to use sheep or goat grazing to control leafy spurge, many indicated the reasons for not grazing sheep were factors outside the control of the respondent. Ranchers, LDM, and PLMG all indicated TLS did not influence their decision because there were simply too many constraints (fencing, stock, and equipment) to sheep grazing. Only among the PLMNG group was the most frequent response that land managers still were not convinced sheep grazing will work. Other constraints were that the infestation was too small (36 percent of ranchers and 40 percent of PLMG), do not have resources to manage sheep (75 percent of LDM), or land was not suitable for grazing (36 percent of PLMNG). As was the case with biological control and herbicides, respondents seemed generally less negative in the 2001 survey regarding constraints associated with using sheep grazing as a leafy spurge control practice. For example, while ranchers' most frequent response to why they were not incorporating sheep grazing is still "too many constraints to grazing", only 41 percent of respondents responded accordingly compared to 72 percent in the 1998 and 1999 surveys. And while 40 percent of PLMG indicated they "did not know enough about sheep grazing" in the 1998 survey, only 20 percent responded accordingly in the 2001 survey. Even among the PLMNG, impediments to sheep grazing seem to be moderating. In 1998, 29 percent of PLMNG respondents indicated they were not using sheep grazing as a control method because of negative impacts on non-target species. Only 18 percent responded accordingly in the 2001 survey.

Among respondents that indicated TLS had not influenced their plans to graze sheep, the most frequent explanations were that the respondent was currently using sheep as a control measure, that they were convinced of the efficacy of sheep grazing but did not have the resources needed to implement a grazing program, or that they were planning to begin a grazing program as a result of TEAM Leafy Spurge (Appendix Tables A9-A12).

The last issue addressed by the survey was the applicability of the TLS approach to other weeds (Table 15). Respondents in all groups overwhelmingly agreed that the TLS approach would be applicable to both Canada thistle and knapweeds. The percentage who felt the TLS format would be suitable for Canada thistle ranged from 85 percent of LDM to 100 percent of PLMG. For knapweeds, the percentages ranged from 82 percent for LDM and PLMG to 92 percent for PLMNG. When asked about changes to increase the effectiveness of the TLS approach if it were adapted to another weed, ranchers and PLMNG most often indicated that the addition of a monthly bulletin, newsletter, or e-mail notice would be desirable. Local decision makers most often suggested more outreach activities (field days, workshops), as well as more demonstration sites. The PLMG most frequently indicated more demonstration sites were desirable, followed by more frequent field tours (Table 15).

Table 15. Applicability of TEAM Leafy Spurge Format to Other Problem Weeds, Ranchers, Local Decision Makers, and Public Land Managers

	Ranchers	Local Decision Makers	Public Land Managers, Grazing	Public Land Managers, Non-grazing
	-----percent "yes"-----			
<b>Weed:</b>				
Canada Thistle	93.8	84.6	100.0	91.7
Knapweeds (n) <sup>1</sup>	88.2 (146)	82.4 (36)	82.4 (17)	92.3 (13)
<b>Suggested changes to TEAM Leafy Spurge format:</b>				
Monthly bulletin, newsletter, or e-mail	44.9	34.2	55.0	53.9
More outreach activities (field days, workshops)	41.5	71.1	50.0	38.5
More demonstration sites	39.8	65.8	66.7	38.5
More frequent field tours	34.8	39.5	61.1	38.5
Better interaction/accessibility to researchers	32.2	39.5	55.6	46.2
Other sources of insects in addition to self-collection	26.3	36.8	22.2	15.4
More opportunities to collect insects (n) <sup>1,2</sup>	24.6 (118)	39.5 (38)	33.3 (18)	23.1 (13)

<sup>1</sup> Average number of respondents per question.

<sup>2</sup> Detail does not add to total because of multiple responses.



## Key Findings

Leafy spurge continues to pose major problems for ranchers, local decision makers, and public land managers throughout the northern Great Plains. The survey results indicate that noxious weeds are increasingly perceived as an important problem. Public land managers most frequently indicated noxious weeds were the most serious problem facing the grazing livestock industry in their area. While local decision makers most frequently cited adverse weather conditions as the most serious problem faced by ranchers in their area, nearly twice as many cited noxious weeds as the most serious issue in the 2001 survey than in the 1998 and 1999 surveys. Heightened awareness of the severity of the noxious weed issue was evident in all study groups.

In evaluating weed control practices, all groups of survey respondents reported extensive use of biological control and the IPM approach, and they plan to continue to use these control practices in the future. While biological control and the IPM approach also were used extensively by all groups and evaluated as economically attractive by substantial percentages of respondents in each group, herbicides continue to be the control practice of choice. Ninety-three percent of ranchers and 100 percent of public land managers currently use herbicides, and all plan to continue using herbicides to control leafy spurge. However, the growing use of biological control and IPM strategies indicate landowners and land managers are using alternative control practices to complement herbicide treatment programs.

The TLS project used a number of communication strategies to disseminate information, ranging from demonstration plots, to bulletins and research reports, to a Website and a CD with a wide range of information on leafy spurge and control alternatives. While respondents' information preferences did not change markedly from the 1998 and 1999 surveys, the preferred formats for information varied according to study group. For example, the percentage of survey respondents who had visited the TLS Website ranged from 58 percent of PLMG and 47 percent of PLMNG, to only 13 percent of LDM, and 3 percent of ranchers. Similarly, the percentage of respondents who had used the Purge Spurge CD ranged from 50 percent of PLMG and 41 percent of PLMNG, to 9 percent of LDM and less than 3 percent of ranchers. While it appears that public land managers are far more interested in electronic media at the present time, considering the growing number of ranch operators that use a computer for ranch management and have access to the Internet, that disparity may moderate in the future.

TEAM Leafy Spurge appeared to successfully influence landowners' weed control plans as relatively high percentages of respondents indicated that TEAM Leafy Spurge had influenced their plans to use various leafy spurge control strategies. This was particularly evident in regard to biological control—80 percent of local decision makers and 65 percent of public grazing land managers, as well as 54 percent of PLMNG and 42 percent of ranchers, indicated that TLS had influenced their plans to use biological agents to control leafy spurge. It also appears that many of the constraints to using biological control have moderated. The number of ranchers, local decision makers, and public land managers that indicated they were not using biological control because they either were not able to collect sufficient quantities of insects, did not know where to collect insects, or did not know how to use them, is substantially less than in the 1998 and 1999 surveys.

The TEAM Leafy Spurge project also has been successful in reaching a substantial percentage of its target audience. Ninety percent of public grazing land managers, 85 percent of local decision makers, 65 percent of PLMNG, and 46 percent of ranchers indicated they were aware of TLS. (Among ranchers reporting leafy spurge on their ranch, 59 percent were aware of TLS.) TLS events and demonstration sites were also well attended with one-third of ranchers and PLMNG and roughly 70 of LMD and PLMG attending at least one TLS event or demonstration site. In addition, 80 percent of the local decision makers and 85 percent of the public grazing land managers had received brochures or bulletins from the TLS project. All TLS events and publications were well received with above average ratings from respondents in all study groups. Further, more than 92 percent of local decision makers, 71 percent of public grazing land managers, and 70 percent of ranchers supported extended funding, and a large majority of respondents believe the TEAM Leafy Spurge model would be applicable to other problem weeds.

### **Conclusions**

While more options for leafy spurge control are currently available than even just a few years ago, leafy spurge continues to be a problem for ranchers and land managers throughout the survey area. The goal of TEAM Leafy Spurge was to develop and deliver economical, effective leafy spurge control techniques to both private land owners and public land managers. Based on the results of the 2001 survey, it would appear that the program has successfully reached a substantial portion of its target audience. The program also developed and communicated weed management strategies to a substantial number of land owners and land managers in an effort to address what continues to be a significant issue for not only private land managers' grazing operations, but for public land managers as well.

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## **APPENDIX A - TABLES**

Appendix Table A-1. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Herbicides, Ranchers, 2001, 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b>Herbicides</b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge (n = 83)	68.3	n/a
TEAM Leafy Spurge has satisfactorily provided information on how to properly use herbicides to control leafy spurge (n=80)	66.3	n/a
TEAM Leafy Spurge has influenced plans to use herbicides on leafy spurge in the future (n=80)	52.5	n/a
<b>If Yes:</b>		
Plan to use herbicides to stop infestations from spreading	60.0	n/a
Plan to integrate herbicides with other control methods	55.0	n/a
Plan to spray more of my leafy spurge	12.5	n/a
Plan to switch herbicides	15.0	n/a
Plan to change herbicide application rates	10.0	n/a
Plan to use herbicides on different infestations	10.0	n/a
Plan to reduce herbicide use and switch to other controls (n=40) <sup>3</sup>	10.0	n/a
<b>If No:</b>		
Currently using herbicides	74.2	n/a
Currently using other control methods	38.7	n/a
Infestations are inaccessible to sprayers	32.3	45.9
Environmental restrictions prevent herbicide use	29.0	58.9
Do not have time to spray	25.8	26.9
Not economical to use herbicides	25.8	43.5
Infestations are too large, herbicides would be prohibitively expensive	22.6	46.3
Not convinced herbicides are effective	19.4	25.3
Cost share programs are no longer available	19.3	30.4
Potential damage to non-target species	12.9	n/a
Cannot afford to purchase herbicides	9.7	n/a
Lack equipment, expertise, or access to certified applicators (n=31) <sup>3</sup>	9.7	24.1

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a, 1999).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-2. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Herbicides, Local Decision Makers, 2001, 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b><u>Herbicides</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge (n = 41)	63.4	n/a
TEAM Leafy Spurge has satisfactorily provided information on how to properly use herbicides to control leafy spurge (n=41)	75.6	n/a
TEAM Leafy Spurge has influenced plans to use herbicides on leafy spurge in the future (n=40)	45.0	n/a
<b>If Yes:</b>		
Plan to integrate herbicides with other control methods	88.2	n/a
Plan to use herbicides to stop infestations from spreading	64.7	n/a
Plan to spray more of my leafy spurge	47.1	n/a
Plan to reduce herbicide use and switch to other controls	35.3	n/a
Plan to switch herbicides	23.5	n/a
Plan to use herbicides on different infestations	23.5	n/a
Plan to change herbicide application rates (n=17) <sup>3</sup>	11.8	n/a
<b>If No:</b>		
Currently using herbicides	74.2	n/a
Infestations are too large, herbicides costs prohibitive	65.0	75.9
Infestations are inaccessible to sprayers	60.0	50.0
Cannot afford to purchase herbicides	45.0	n/a
Currently using other control methods	40.0	n/a
Environmental restrictions prevent herbicide use	40.0	n/a
Not convinced herbicides are effective	40.0	20.7
Not economical to use herbicide	30.0	41.4
Do not have time to spray	25.0	39.7
Lack equipment, expertise, or access to certified applicators	25.0	22.4
Potential damage to non-target species	15.0	22.4
Cost share programs are no longer available (n=20) <sup>3</sup>	10.0	n/a

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a, 1999).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-3. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Herbicides, Public Land Managers, Grazing Land 2001, 1998

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b><u>Herbicides</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge (n = 17)	82.4	n/a
TEAM Leafy Spurge has satisfactorily provided information on how to properly use herbicides to control leafy spurge (n=17)	76.5	n/a
TEAM Leafy Spurge has influenced plans to use herbicides on leafy spurge in the future (n=17)	35.3	n/a
<b>If Yes:</b>		
Plan to integrate herbicides with other control methods	100.0	n/a
Plan to use herbicides to stop infestations from spreading	83.3	n/a
Plan to switch herbicides	66.7	n/a
Agency plans to spray more leafy spurge	50.0	n/a
Plan to change herbicide application rates	33.3	n/a
Plan to use herbicides on different infestations	33.3	n/a
Plan to reduce herbicide use and switch to other controls (n=6) <sup>3</sup>	16.7	n/a
<b>If No:</b>		
Currently using herbicides	90.9	n/a
Infestations are inaccessible to sprayers	27.3	66.7
Environmental restrictions prevent herbicide use	27.3	85.7
Infestations are too large, herbicides costs prohibitive	27.3	71.4
Currently using other control methods	18.2	n/a
Do not have labor resources to spray <sup>4</sup>	18.2	28.3
Not economical to use herbicide	18.2	57.1
Agency lacks fund to purchase herbicides	18.1	n/a
Lack equipment, expertise, or access to certified applicators	18.1	28.6
Agency not convinced herbicides are effective <sup>5</sup>	9.1	38.1
Potential damage to non-target species	9.1	42.9
Agency policy prevents herbicide use (n=11) <sup>3</sup>	0.0	n/a

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a.)

<sup>3</sup> Average number of respondents for each variable.

<sup>4</sup> 1998 survey stated the question in terms of “do not have time”.

<sup>5</sup> 1998 survey stated the question in terms of “herbicides are ineffective”.



Appendix Table A-4. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Herbicides, Public Land Managers, Non-Grazing Land 2001, 1998

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b><u>Herbicides</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge (n = 13)	46.2	n/a
TEAM Leafy Spurge has satisfactorily provided information on how to properly use herbicides to control leafy spurge (n=13)	38.5	n/a
TEAM Leafy Spurge has influenced plans to use herbicides on leafy spurge in the future (n=12)	33.3	n/a
<b>If Yes:</b>		
Plan to change herbicide application rates	100.0	n/a
Plan to use herbicides to stop infestations from spreading	50.0	n/a
Plan to integrate herbicides with other control methods	50.0	n/a
Plan to reduce herbicide use and switch to other controls (n=4) <sup>3</sup>	25.0	n/a
<b>If No:</b>		
Currently using herbicides	100.0	n/a
Infestations are inaccessible to sprayers	37.5	54.6
Environmental restrictions prevent herbicide use	37.5	82.8
Infestations are too large, herbicides cost is prohibitive	12.5	45.5
Currently using other control methods	12.5	n/a
Agency not convinced herbicides are effective	12.5	36.4
Potential damage to non-target species	12.5	63.6
Not economical to use herbicides	0.0	n/a
Lack equipment, expertise, or access to certified applicators (n=8) <sup>3</sup>	0.0	18.2

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-5. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Biological Control, Ranchers, 2001 and 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b><u>Biological Control with Insects</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using biological agents (flea beetles) to control leafy spurge (n=82)	80.7	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly use biological agents to control leafy spurge (n=82)	78.1	n/a
TEAM Leafy Spurge has influenced my plans to use biological agents to control leafy spurge in the future (n=77)	58.4	n/a
<b>If Yes:</b>		
Currently planning to use biological control as a result of TLS Because insects are free and readily available,	75.0	n/a
I am now trying biocontrol	50.0	n/a
Plan to change how I collect and release insects	15.0	n/a
Plan to modify where I use insects (n=40) <sup>3</sup>	10.0	n/a
<b>If No:</b>		
Infestation is too small to use biological control (insects)	53.6	n/a
Still not convinced biological control will work	32.1	n/a
Currently using other control methods	32.1	n/a
Infestations not suitable for biological control	19.4	15.2
Biological control with insects works too slowly	17.8	42.4
Already using insects	16.1	n/a
Do not have time to collect/release insects	10.7	20.0
Do not know how to use biological control (insects)	7.1	29.5
Limited access to insects, cannot collect sufficient numbers	7.1	43.3
Insects have not been effective on my infestations in the past	7.1	n/a
Do not know where to collect insects	3.6	31.4
Biological control agents are not economical	3.6	10.5
Afraid biological control agents will harm other plants	3.6	14.8
Biological control agents will spread without my help (n=40) <sup>3</sup>	0.0	4.8

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. 1998a, 1999.

<sup>3</sup> Average number of respondents for each variable.

Table A-6. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Biological Control, Local Decision Makers, 2001 and 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b><u>Biological Control with Insects</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using biological agents (flea beetles) to control leafy spurge (n=41)	80.5	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly use biological agents to control leafy spurge (n=39)	84.6	n/a
TEAM Leafy Spurge has influenced my plans to use biological agents to control leafy spurge in the future (n=39)	79.5	n/a
<b>If Yes:</b>		
Currently planning to use biological control as a result of TLS	80.7	n/a
Because insects are free and readily available,		
I am now trying biocontrol	80.7	n/a
Plan to modify where I use insects	48.4	n/a
Plan to change how I collect and release insects (n=31) <sup>3</sup>	22.6	n/a
<b>If No:</b>		
Still not convinced biological control will work	71.4	n/a
Infestations not suitable for biological control	57.1	n/a
Infestation is too small to use biological control (insects)	42.9	n/a
Currently using other control methods	28.6	n/a
Biological control with insects works too slowly	28.6	55.1
Already using insects	28.6	n/a
Do not have time to collect/release insects	28.6	22.5
Insects have not been effective on my infestations in the past	28.6	n/a
Limited access to insects, cannot collect sufficient numbers	28.6	57.1
Do not know how to use biological control (insects)	14.3	55.1
Do not know where to collect insects	14.3	46.9
Biological control agents are not economical	14.3	4.1
Biological control agents will spread without my help (n=7) <sup>3</sup>	14.3	8.2

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a, 1999).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-7. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Biological Control, Public Land Managers, Grazing, 2001 and 1998

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b><u>Biological Control with Insects</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using biological agents (flea beetles) to control leafy spurge (n=17)	88.2	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly use biological agents to control leafy spurge (n=17)	82.4	n/a
TEAM Leafy Spurge has influenced my plans to use biological agents to control leafy spurge in the future (n=17)	64.7	n/a
<b>If Yes:</b>		
Currently planning to use biological control as a result of TLS	72.7	n/a
Plan to change how I collect and release insects	45.5	n/a
Plan to modify where I use insects	45.5	n/a
Because insects are free and readily available, I am now trying biocontrol (n=11) <sup>3</sup>	18.2	n/a
<b>If No:</b>		
Already using insects	66.7	n/a
Infestation is too small to use biological control (insects) (n=6) <sup>3</sup>	33.3	n/a

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-8. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Biological Control, Public Land Managers, Non-grazing, 2001 and 1998

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b><u>Biological Control with Insects</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of using biological agents (flea beetles) to control leafy spurge (n=13)	76.9	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly use biological agents to control leafy spurge (n=13)	69.2	n/a
TEAM Leafy Spurge has influenced my plans to use biological agents to control leafy spurge in the future (n=13)	53.8	n/a
<b>If Yes:</b>		
Currently planning to use biological control as a result of TLS	71.4	n/a
Plan to modify where I use insects	57.1	n/a
Plan to change how I collect and release insects	14.3	n/a
Because insects are free and readily available, I am now trying biocontrol (n=7) <sup>3</sup>	18.2	n/a
<b>If No:</b>		
Infestation is too small to use biological control (insects)	80.0	n/a
Already using insects	20.0	n/a
Currently using other control methods	20.0	n/a
Do not know how to use biological control (insects)	20.0	23.5
Limited access to insects	0.0	33.3
Biocontrol takes too long	0.0	11.1
Do not know where to collect insects (n=5) <sup>3</sup>	0.0	23.5

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-9. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Sheep Grazing, Ranchers, 2001 and 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b>Sheep Grazing</b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of sheep grazing to control leafy spurge (n=73)	47.9	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly implement a sheep grazing program to control leafy spurge (n=73)	39.1	n/a
TEAM Leafy Spurge has influenced my plans to graze sheep to control leafy spurge in the future (n=73)	17.1	n/a
<b>If Yes:</b>		
Am currently using sheep as a control method	63.6	n/a
While grazing works, do not have resources to implement a grazing program	36.7	n/a
I am planning to use sheep grazing as a result of TLS (n=11) <sup>3</sup>	18.2	n/a
<b>If No:</b>		
Too many constraints (fencing, stock, equipment)	43.4	72.2
Infestation is too small	35.9	n/a
Do not want another enterprise on ranch	30.2	n/a
Do not like sheep or goats	28.3	35.9
Do not have resources to manage sheep	22.6	n/a
Still not convinced sheep grazing will work	22.6	19.3
Sheep or goat grazing is too time consuming	15.1	39.9
Sheep will compete with cattle for forage	15.1	37.2
Do not know enough about sheep management	11.3	41.7
Sheep grazing will negatively affect non-target species	11.3	n/a
Pasture acreage is too small to graze sheep	9.4	n/a
Sheep grazing is too costly, not economical	5.7	21.1
Sheep grazing was ineffective in the past (n=53) <sup>3</sup>	3.8	n/a

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a, 1999).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-10. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Sheep Grazing, Local Decision Makers, 2001 and 1998 and 1999

Item	2001 <sup>1</sup>	1998 and 1999 <sup>2</sup>
	-----percent-----	
<b><u>Sheep Grazing</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of sheep grazing to control leafy spurge (n=36)	50.0	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly implement a sheep grazing program to control leafy spurge (n=33)	63.6	n/a
TEAM Leafy Spurge has influenced my plans to graze sheep to control leafy spurge in the future (n=35)	28.6	n/a
<b>If Yes:</b>		
While grazing works, do not have resources to implement a grazing program	70.0	n/a
I am planning to use sheep grazing as a result of TLS	40.0	n/a
Am currently using sheep as a control method (n=10) <sup>3</sup>	40.0	n/a
<b>If No:</b>		
Do not have resources to manage sheep	75.0	n/a
Too many constraints (fencing, stock, equipment)	62.5	84.2
Still not convinced sheep grazing will work	62.5	n/a
Do not like sheep or goats	54.2	n/a
Do not know enough about sheep management	33.3	47.4
Sheep will compete with cattle for forage	29.2	n/a
Sheep or goat grazing is too time consuming	20.8	33.3
Infestation(s) too small	20.8	n/a
Sheep grazing will negatively affect non-target species	20.8	22.8
Sheep grazing was ineffective in the past	20.8	n/a
Do not want another enterprise on ranch	16.7	n/a
Sheep grazing is too costly, not economical	12.5	14.0
Pasture acreage is too small to graze sheep	4.2	n/a
Infestations not suitable for sheep grazing (n=24) <sup>3</sup>	4.2	n/a

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a, 1999).

<sup>3</sup> Average number of respondents for each variable.

Appendix Table A-11. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Sheep Grazing, Public Land Managers, Grazing Land, 2001 and 1998.

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b><u>Sheep Grazing</u></b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of sheep grazing to control leafy spurge (n=17)	64.7	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly implement a sheep grazing program to control leafy spurge (n=17)	52.9	n/a
TEAM Leafy Spurge has influenced my plans to graze sheep to control leafy spurge in the future (n=17)	35.3	n/a
<b>If Yes:</b>		
Am currently using sheep as a control method	83.3	n/a
Am planning to use sheep grazing as a result of TLS	66.7	n/a
While grazing works, do not have resources to implement a grazing program (n=6) <sup>3</sup>	33.3	n/a
<b>If No:</b>		
Too many constraints (fencing, stock, equipment)	50.0	72.0
Infestation(s) too small	40.0	n/a
Pasture acreage is too small to graze sheep	40.0	n/a
Do not have resources to manage sheep	30.0	n/a
Do not know enough about sheep management	20.0	40.3
Still not convinced sheep grazing will work	10.0	n/a
Sheep grazing will negatively affect non-target species	10.0	19.1
Agency policy prevents sheep grazing	10.0	9.5
Sheep grazing was ineffective in the past	10.0	4.8
Sheep grazing is too costly, not economical	10.0	38.1
Sheep or goat grazing is too time consuming (n=10) <sup>3</sup>	n/a	33.3

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a).

<sup>3</sup> Average number of respondents for each variable.



Appendix Table A-12. Impact of TEAM Leafy Spurge Project on Weed Control Strategies using Sheep Grazing, Public Land Manager, Non-grazing Land, 2001 and 1998.

Item	2001 <sup>1</sup>	1998 <sup>2</sup>
	-----percent-----	
<b>Sheep Grazing</b>		
TEAM Leafy Spurge has satisfactorily demonstrated the effectiveness of sheep grazing to control leafy spurge (n=13)	23.1	n/a
TEAM Leafy Spurge has satisfactorily provided me with information on how to properly implement a sheep grazing program to control leafy spurge (n=13)	15.4	n/a
TEAM Leafy Spurge has influenced my plans to graze sheep to control leafy spurge in the future (n=13)	7.7	n/a
<b>If Yes:</b>		
Am currently using sheep as a control method	100.0	n/a
Am planning to use sheep grazing as a result of TLS (n=1) <sup>3</sup>	100.0	n/a
<b>If No:</b>		
Still not convinced sheep grazing will work	54.6	n/a
Land is not suitable for grazing	36.4	n/a
Do not have resources to manage sheep	36.4	n/a
Too many constraints (fencing, stock, equipment)	27.3	14.3
Acreage is too small to graze sheep	18.2	n/a
Do not know enough about sheep management	18.2	n/a
Sheep grazing will negatively affect non-target species	18.2	28.6
Infestation(s) too small	9.1	n/a
Agency policy prevents sheep grazing	9.1	28.6
Sheep grazing was ineffective in the past	9.1	n/a
Sheep grazing is too costly, not economical	9.1	14.3
Grazing cannot or has never been considered	n/a	41.7
Sheep or goat grazing is too time consuming (n=11) <sup>3</sup>	n/a	14.3

<sup>1</sup> Only respondents that indicated they were aware of TEAM Leafy Spurge (Question 13) are included in the distribution of responses.

<sup>2</sup> Source: Sell et al. (1998a).

<sup>3</sup> Average number of respondents for each variable.

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## **APPENDIX B - QUESTIONNAIRES**

<b>WEED MANAGEMENT SURVEY</b> (Farm and Ranch Operators)
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The following questions pertain to grazing and weed management issues in **your local area**.

1. Please rate each of the following problems/issues that may affect livestock grazing operations in your area: (circle the appropriate number)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4

2. Which problem/issue listed in Question 1 do you feel is the **most serious** problem affecting grazing operations in your area? (**Circle** the appropriate letter)

3. Have these problems/issues in your area improved, remained the same or become worse over the past five years?

	Improved	Remained the Same	Become Worse	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4

4. Which weeds pose problems for livestock grazing operations in your area? (please rate each of following weeds)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. annual brome grasses	1	2	3	4
b. knapweeds	1	2	3	4
c. leafy spurge	1	2	3	4
d. prickly pear	1	2	3	4
e. sagebrush	1	2	3	4
f. thistles	1	2	3	4
g. wormwood (absinth)	1	2	3	4
h. field bindweed	1	2	3	4
i. others (please specify _____)	1	2	3	4

5. Which weed listed above currently poses the **most serious** problem for grazing operations in your area? (**Circle** the appropriate letter)

The following questions pertain only to **your farm or ranch operation**.

6. How serious is the weed problem on your farm or ranch? (please circle)

not a problem                      minor problem                      major problem

Please estimate how many **acres** of the following weeds are on your farm/ranch?

	Grazing Land	Hay Land
a. annual brome grasses	_____	_____
b. knapweeds	_____	_____
c. leafy spurge	_____	_____
d. prickly pear	_____	_____
e. sagebrush	_____	_____
f. thistles	_____	_____
g. wormwood	_____	_____
h. field bindweed	_____	_____
i. others (please specify)	_____	_____

7. Do you currently have any leafy spurge on your farm or ranch?

\_\_\_\_\_ Yes  
 \_\_\_\_\_ **No** (if **No**, go to Question 9)

8. Are you *currently using* any of the following general practices to control leafy spurge:  
 (Please circle the appropriate response)

a. herbicides

Yes	No			
		If no, do you plan to use herbicides in the future	Yes	No
		If yes, do you plan to continue to use herbicides	Yes	No

b. biological control with insects (such as flea beetles)

Yes	No			
		If no, do you plan to use biological control with insects in the future	Yes	No
		If yes, do you plan to continue to use biological control with insects	Yes	No

c. sheep or goat grazing

Yes	No			
		If no, do you plan to graze sheep or goats in the future	Yes	No
		If yes, do you plan to continue to graze sheep or goats	Yes	No

d. tillage and/or reseeding with competing grasses

Yes	No			
		If no, do you plan to till or reseed in the future	Yes	No
		If yes, do you plan to continue tilling and reseeding	Yes	No

e. Integrated Pest Management (IPM) approach utilizing at least two control methods listed above

Yes	No			
		If no, do you plan to use IPM practices in the future	Yes	No
		If yes, do you plan to continue to use IPM practices	Yes	No

9. Even if you have no leafy spurge on your farm or ranch, how would you rate the **effectiveness** of the following practices in controlling leafy spurge?

	Not Effective	Somewhat Effective	Very Effective	Don't Know
a. spraying with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. control with grazing animals such as sheep or goats	1	2	3	4
d. tillage and/or reseeding with competing grasses	1	2	3	4
e. Integrated Pest Management (IPM) using two or more control methods	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

10. Even if you have no leafy spurge on your farm or ranch, do you think it **pays** to use the following leafy spurge control practices?

	Yes, It Pays	Pays Marginally	Does Not Pay	Don't Know
a. spray with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. graze animals such as sheep or goats	1	2	3	4
d. till and/or reseed with competing grasses	1	2	3	4
e. Integrated Pest Management (two or more controls)	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

11. What type of weed management information would you like to obtain?

	Not Interested	Somewhat Interested	Very Interested
a. techniques and effectiveness of various herbicide treatment programs	1	2	3
b. economics of herbicide treatments	1	2	3
c. how to get started with biological control using insects	1	2	3
d. economics of biological control with insects	1	2	3
e. techniques and effectiveness of sheep and goat grazing	1	2	3
f. economics of sheep and goat grazing	1	2	3
g. techniques and effectiveness of cultivation and reseeding	1	2	3
h. economics of cultivation and reseeding	1	2	3
i. techniques and effectiveness of Integrated Pest Management programs	1	2	3
j. economics of Integrated Pest Management programs	1	2	3
k. others (please specify _____)	1	2	3

12. In what form would you like to receive weed control information?

	Not Interested	Somewhat Interested	Very Interested
a. pamphlet or bulletin available through an Extension office or county agent	1	2	3
b. video cassettes demonstrating the various control methods	1	2	3
c. area demonstration plots showing the effectiveness of various control methods	1	2	3
d. testimonials from fellow ranchers or other land managers	1	2	3
e. computer decision aids (programs) that can be used to evaluate the feasibility or economics of various controls	1	2	3
f. personal visits and on-site help by range management specialists	1	2	3
g. website/internet	1	2	3
h. email newsletters or notifications	1	2	3
i. others (please specify _____)	1	2	3



The following questions pertain to The Ecological Areawide Management (TEAM) Leafy Spurge Integrated Pest Management Program. TEAM Leafy Spurge is a USDA-Agricultural Research Service Program focused on leafy spurge in the Little Missouri River drainage of Wyoming, Montana and the Dakotas. Its goal is to research, develop and demonstrate ecologically based Integrated Pest Management strategies that can be used to achieve effective, affordable and sustainable leafy spurge control.

13. Are you aware of The Ecological Areawide Management (TEAM) Leafy Spurge Project?

Yes            No (If No, skip to question #15)

If yes, when did you first hear about the project?

1997 \_\_\_\_\_  
 1998 \_\_\_\_\_  
 1999 \_\_\_\_\_  
 2000 \_\_\_\_\_  
 2001 \_\_\_\_\_

14. How did you first hear about the project? (mark only one)

another rancher or neighbor _____	county agent _____
newspaper _____	university press release _____
Internet _____	county weed board meeting _____
State Weed Control _____	state or federal land manager _____
Association conference _____	other _____

15. Have you attended any of the following TEAM Leafy Spurge events in the last four years?

*If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Attended								
	Yes	No	Excellent						
◆ 1999 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ 2001 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ TEAM Leafy Spurge presentation at another event or meeting	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

If you attended a spurgefest meeting, do you have any suggestions or ideas that would improve Spurgefest?

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16. Have you visited either of the North Dakota demonstration sites near Sentinel Butte and/or Medora? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

17. Have you visited the Montana demonstration site near Ekalaka? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

18. Have you visited the South Dakota demonstration site near Buffalo? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

19. Have you received any TEAM Leafy Spurge brochures, handouts or bulletins? *If yes, please rate how informative/helpful this information was for your weed control efforts.*

	Yes	No	Excellent					Poor	
	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

20. Have you visited the TEAM Leafy Spurge website at [www.team.ars.usda.gov](http://www.team.ars.usda.gov)? *If yes, please rate how informative/helpful this website was for your weed control efforts.*

	Yes	No	Excellent					Poor	
	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

21. Have you heard of the Purge Spurge CD?

Yes      No      (if No, please go to question # 23)

22. Have you used the Purge Spurge CD?                      Yes              No

*If yes, please rate how informative/helpful this activity was for your weed control efforts.*

Excellent					Poor		
7	6	5	4	3	2	1	

23. Did you collect or receive insects at any TEAM Leafy Spurge sponsored event?

Yes      No

If yes, when did you receive and distribute the insects? Please check all that apply.

1999 \_\_\_\_\_  
 2000 \_\_\_\_\_  
 2001 \_\_\_\_\_

24. Have the insects had any effect on the leafy spurge?                      Yes              No

*If yes, to what degree have the insects established at the release site(s).*

Have definitely established					Have not established		
7	6	5	4	3	2	1	

*If yes, please rate the level of control to date.*

Excellent					Poor		
7	6	5	4	3	2	1	

The following questions are designed to assess the impact of the TEAM Leafy Spurge project on your weed control strategies.

### Herbicides

25. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge?

Yes      No

26. Has TEAM Leafy Spurge satisfactorily provided you with information on how to properly use herbicides to control leafy spurge?

Yes      No

27. Has TEAM Leafy Spurge influenced your plans to use herbicides on leafy spurge in the future?

Yes

No

If no, what best describes your situation (check all that apply)

- I am currently using herbicides
- infestation is too large, herbicides would be prohibitively expensive
- infestations are inaccessible to sprayers
- lack equipment, expertise or access to certified applicators
- I am not convinced herbicides are effective
- I cannot afford to purchase herbicides
- I do not have time to spray
- environmental restrictions (spraying near water, trees, sensitive crops) prevent herbicide use
- potential damage to non-target species
- it is not economical to use herbicides
- cost share programs are no longer available or have been reduced
- I am currently using other control methods
- other \_\_\_\_\_

If yes, what best describes your situation (check all that apply)

- I plan to spray more of my leafy spurge as a result of TEAM Leafy Spurge
- I plan to use herbicides to stop my infestations from spreading
- I plan to switch herbicides
- I plan to change herbicide application rates
- I plan to change on which infestations I use herbicides
- I plan to reduce herbicide use and switch to other controls
- I plan to integrate herbicides with other control agents such as flea beetles and /or sheep grazing
- other \_\_\_\_\_

## Biological Control with Insects

28. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using biological agents such as flea beetles to control leafy spurge?

Yes      No

29. Has TEAM Leafy Spurge satisfactorily provided you with information on how to properly use biological agents such as flea beetles to control leafy spurge?

Yes      No

30. Has TEAM Leafy Spurge influenced your plans to use biological control agents such as flea beetles on leafy spurge in the future?

Yes

No

if no, what best describes your situation (check all that apply)

infestation is too small to use biological control (insects)

still not convinced biological control with insects will work

I do not know how to use biological control with insects

I do not know where to collect insects

I do not have time to collect or release biological agents

limited access to biological agents/can not collect sufficient numbers of agents

infestations are not suitable for biological control

insects have not been effective on my infestations in the past

biological control agents (insects) are not economical to use

I am currently using other control methods

I was already using insects; TEAM Leafy Spurge hasn't changed anything

biological control with insects works too slowly

biological agents will eventually spread to my land without my help

I am afraid the agents will harm other plants

other ( \_\_\_\_\_ )

if Yes, what best describes your situation (check all that apply)

I am currently using or planning to use biological control with insects on my leafy spurge as a result of TEAM Leafy Spurge

I am going to modify where I use insects

I am going to change how I collect and release insects

because insects are free and readily available, I am now trying biological control methods

other ( \_\_\_\_\_ )

## Sheep Grazing

31. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of grazing sheep to control leafy spurge?

Yes

No

32. Has TEAM Leafy Spurge satisfactorily provided you with information on how to properly implement a sheep grazing program to control leafy spurge?

Yes

No

33. Has TEAM Leafy Spurge influenced your plans to graze sheep on leafy spurge in the future?

Yes

No

if no, what best describes your situation (check all that apply)

- my pasture acreage is too small to graze sheep
- my infestation is too small to graze sheep
- I am still not convinced sheep grazing will work
- I do not know enough about sheep management to implement a program
- do not have the resources to manage sheep or goats
- sheep grazing will negatively affect non-target species
- sheep grazing programs have been ineffective on my infestations in the past
- sheep grazing to control leafy spurge is too costly, not economical to use
- sheep will compete with cattle for forage
- there are too many constraints to starting a sheep grazing program-- fencing, stock, equipment, etc.
- I do not like sheep or goats
- sheep or goat grazing is too time consuming
- I do not want another enterprise on the ranch
- other \_\_\_\_\_

if Yes, what best describes your situation (check all that apply)

- I am using or planning to use sheep grazing on my leafy spurge as a result of TEAM Leafy Spurge
- I am convinced grazing works, but do not have the resources to implement and manage a grazing program
- I am currently using sheep as a control method
- other \_\_\_\_\_

**Issues and Attitudes Toward the TEAM Leafy Spurge Project.**

34. Please rate each of the following statements describing the TEAM Leafy Spurge Integrated Pest Management program.

	Strongly Disagree	Somewhat Disagree	Neither Dis/Agr	Somewhat Agree	Strongly Agree
The project has been effective in demonstrating and communicating leafy spurge treatment and control options to ranchers	1	2	3	4	5
The project has clearly demonstrated the effectiveness of herbicides in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of biological control agents such as flea beetles in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of sheep grazing in controlling leafy spurge	1	2	3	4	5
I have personally benefitted from the project	1	2	3	4	5
Project funding should be extended to continue research and education programs	1	2	3	4	5

35. Would the TEAM Leafy Spurge format be applicable for new programs that would focus on other problem rangeland weeds?

<u>Targeted weed</u>	<u>Helpful</u>	
Knapweed(s)	Yes	No
Canada thistle	Yes	No
Other _____	Yes	No

36. What changes would you like to see if another project like TEAM Leafy Spurge was developed for other problem rangeland weeds? (please check all that apply)

- \_\_\_\_\_ more demonstration sites
- \_\_\_\_\_ better interaction with and accessibility to the researchers
- \_\_\_\_\_ more outreach activities like field days and workshops
- \_\_\_\_\_ more frequent field tours of demonstration sites
- \_\_\_\_\_ more opportunities to collect insects
- \_\_\_\_\_ other sources of insects in addition to self-collection
- \_\_\_\_\_ a monthly bulletin, newsletter or e-mail notifications
- \_\_\_\_\_ other



We would now like to ask a few general questions about the characteristics of your farm/ranch. These responses will help us to compare ranch characteristics. Also included in this section are financial questions about your farming/ranching activities in 2000. If you are in a partnership or corporation, please answer for the entity and **not** just for your share. **PLEASE BE ASSURED THAT RESPONSES WILL BE AVERAGED OVER SEVERAL COUNTIES AND YOUR INDIVIDUAL RESPONSES WILL BE KEPT STRICTLY CONFIDENTIAL.** These responses help compare attitudes and perceptions based on respondent characteristics.

37. In 2000 how many acres did you:

	Hay Land/ Cropland	Grazing Land	Total
a. Own	_____	_____	_____
b. Rent or lease from others	_____	_____	_____
c. Rent or lease to others	_____	_____	_____

38. How many head of livestock did you graze in 2000?

	Estimated Number of Head
Cattle and calves	_____
Sheep and lambs	_____
Horses	_____
Others (specify _____)	_____

39. Did you use any public (federal and/or state) land for grazing in 2000? Yes / No

If **Yes**, how many acres \_\_\_\_\_ or number of permitted AUMS \_\_\_\_\_ ?



40. Do you use a computer to assist you in the operation of your farm or ranch? Yes / No

If **yes**, do you have access to the Internet? Yes / No

41. Which of the following categories best describes your **gross farm income** (exclude hunting and oil/gas lease income) in 2000?

- |                           |                           |
|---------------------------|---------------------------|
| a. \$50,000 or less       | e. \$200,001 to \$250,000 |
| b. \$50,001 to \$100,000  | f. \$250,001 to \$300,000 |
| c. \$100,001 to \$150,000 | g. \$300,001 to \$350,000 |
| d. \$150,001 to \$200,000 | h. Over \$350,000         |

42. Which of the following categories best describes your **net farm income** (gross cash farm income less gross cash farm expenses) in 2000?

- |                         |                         |
|-------------------------|-------------------------|
| a. negative             | e. \$20,001 to \$30,000 |
| b. \$0 to \$5,000       | f. \$30,001 to \$40,000 |
| c. \$5,001 to \$10,000  | g. \$40,001 to \$50,000 |
| d. \$10,001 to \$20,000 | h. Over \$50,000        |

43. Approximately what percentage of your gross farm income in 2000 came from grazing livestock?

\_\_\_\_\_ percent

44. In what county and state do you live? \_\_\_\_\_ County \_\_\_\_\_ State

Please feel free to offer any additional thoughts or comments you may have regarding weed management and/or TEAM Leafy Spurge. This is your opportunity to address any issues not covered in this questionnaire. **Your response is important and will be kept strictly confidential.**

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**Thank you** for completing this questionnaire, your cooperation is sincerely appreciated.

Please return this questionnaire in the enclosed prepaid envelope.

For a copy of the study results, please provide your name and mailing address below or you may contact the Department of Agribusiness and Applied Economics at North Dakota State University in Fargo, ND. Phone 701-231-7357, Fax 701-231-7400 or E-mail: [nhodur@ndsuxt.nodak.edu](mailto:nhodur@ndsuxt.nodak.edu) or visit our departmental listing of research reports on the world wide web at <http://agecon.lib.umn.edu/ndsu.html>

We anticipate a final report will be available to the public in the first half of 2002.

**WEED MANAGEMENT SURVEY**  
(Public Grazing Land Managers)

Please answer the following questions pertaining to grazing and weed management issues on land your agency manages and land in your local area (*both public and private*).

1. Please rate each of the following problems/issues that may affect livestock grazing operations on land (*both public and private*) in the district managed by your office. (circle the appropriate number)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4

2. Which problem/issue listed above do you believe is the **most serious** problem affecting grazing operations in the district managed by your office? (**Circle** the appropriate letter)

3. Have these problems improved, remained the same or become worse over the past five years?

	Improved	Remained the Same	Become Worse	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4



8. Is your agency *currently using* any of the following general control practices to control leafy spurge on grazing land managed by your office:

- a. herbicides
- |     |    |  |        |
|-----|----|--|--------|
| Yes | No |  |        |
|     |    |  |        |
|     |    | If no, do you plan to use herbicides in the future | Yes No |
|     |    | If yes, do you plan to continue to use herbicides  | Yes No |
- b. biological control with insects (such as flea beetles)
- |     |    |   |        |
|-----|----|---|--------|
| Yes | No |   |        |
|     |    |   |        |
|     |    | If no, do you plan to use biological control with insects in the future | Yes No |
|     |    | If yes, do you plan to continue to use biological control with insects  | Yes No |
- c. sheep or goat grazing
- |     |    |  |        |
|-----|----|--|--------|
| Yes | No |  |        |
|     |    |  |        |
|     |    | If no, do you plan to graze sheep or goats in the future | Yes No |
|     |    | If yes, do you plan to continue to graze sheep or goats  | Yes No |
- d. tillage and/or reseeding with competing grasses
- |     |    |   |        |
|-----|----|---|--------|
| Yes | No |   |        |
|     |    |   |        |
|     |    | If no, do you plan to till or reseed in the future    | Yes No |
|     |    | If yes, do you plan to continue tilling and reseeding | Yes No |
- e. Integrated Pest Management (IPM) approach utilizing at least two control methods listed above
- |     |    |   |        |
|-----|----|---|--------|
| Yes | No |   |        |
|     |    |   |        |
|     |    | If no, do you plan to use IPM practices in the future | Yes No |
|     |    | If yes, do you plan to continue to use IPM practices  | Yes No |

9. Even if your agency currently has no leafy spurge, how would you rate the **effectiveness** of the following practices in controlling leafy spurge?

	Not Effective	Somewhat Effective	Very Effective	Don't Know
a. spraying with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. control with grazing animals such as sheep or goats	1	2	3	4
d. tillage and/or reseeding with competing grasses	1	2	3	4
e. Integrated Pest Management (IPM) using two or more control methods	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

10. Even if your agency currently has no leafy spurge, do you think it **pays** to use the following leafy spurge control practices?

	Yes, It Pays	Pays Marginally	Does Not Pay	Don't Know
a. spray with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. graze animals such as sheep or goats	1	2	3	4
d. till and/or reseed with competing grasses	1	2	3	4
e. Integrated Pest Management (two or more controls)	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

11. What type of weed control information would you or your agency like to obtain?

	Not Interested	Somewhat Interested	Very Interested
a. techniques and effectiveness of various herbicide treatment programs	1	2	3
b. economics of herbicide treatments	1	2	3
c. how to get started with biological control using insects	1	2	3
d. economics of biological control with insects	1	2	3
e. techniques and effectiveness of sheep and goat grazing	1	2	3
f. economics of sheep and goat grazing	1	2	3
g. techniques and effectiveness of cultivation and reseedling	1	2	3
h. economics of cultivation and reseedling	1	2	3
i. techniques and effectiveness of Integrated Pest Management programs	1	2	3
j. economics of Integrated Pest Management programs	1	2	3
k. others (please specify _____)	1	2	3

12. In what form would you or your agency like to receive weed control information?

	Not Interested	Somewhat Interested	Very Interested
a. pamphlet or bulletin available through an Extension office or county agent	1	2	3
b. video cassettes demonstrating the various control methods	1	2	3
c. area demonstration plots showing the effectiveness of various control methods	1	2	3
d. testimonials from other land managers	1	2	3
e. computer decision aids (programs) that can be used to evaluate the feasibility or economics of various controls	1	2	3
f. personal visits and on-site help by range management specialists	1	2	3
g. website/internet	1	2	3
h. email newsletters or notifications	1	2	3
i. others (please specify _____)	1	2	3

The following questions pertain to The Ecological Areawide Management (TEAM) Leafy Spurge Integrated Pest Management Program. TEAM Leafy Spurge is a USDA-Agricultural Research Service Program focused on leafy spurge in the Little Missouri River drainage of Wyoming, Montana and the Dakotas. Its goal is to research, develop and demonstrate ecologically based Integrated Pest Management strategies that can be used to achieve effective, affordable and sustainable leafy spurge control.

13. Are you aware of The Ecological Areawide Management (TEAM) Leafy Spurge Project?

Yes

No (If No, skip to question #15)

If yes, when did you first hear about the project?

1997 \_\_\_\_\_

1998 \_\_\_\_\_

1999 \_\_\_\_\_

2000 \_\_\_\_\_

2001 \_\_\_\_\_

14. How did you first hear about the project? (mark only one)

another public land manager \_\_\_\_\_ county agent \_\_\_\_\_

newspaper \_\_\_\_\_ university press release \_\_\_\_\_

Internet \_\_\_\_\_ county weed board meeting \_\_\_\_\_

State Weed Control \_\_\_\_\_ rancher or landowner \_\_\_\_\_

Association conference \_\_\_\_\_ other \_\_\_\_\_

15. Have you attended any of the following TEAM Leafy Spurge events in the last four years?

*If yes, please rate how informative/helpful this activity was for your weed control efforts.*

Attended

	Attended		Rating						
	Yes	No	Excellent						Poor
◆ 1999 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ 2001 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ TEAM Leafy Spurge presentation at another event or meeting	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

If you attended a spurgefest event, do you have any suggestions or ideas that would improve Spurgefest? \_\_\_\_\_

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16. Have you visited either of the North Dakota demonstration sites near Sentinel Butte or Medora? *(If yes, please rate how helpful this activity was for your weed control efforts.)*

	Yes	No	Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

17. Have you visited the Montana demonstration site near Ekalaka? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

18. Have you visited the South Dakota demonstration site near Buffalo? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

19. Have you received any TEAM Leafy Spurge brochures, handouts or bulletins? *If yes, please rate how informative/helpful this information was for your weed control efforts.*

Yes	No	Excellent							Poor
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

20. Have you visited the TEAM Leafy Spurge website at [www.team.ars.usda.gov](http://www.team.ars.usda.gov)? *If yes, please rate how informative/helpful the website was for your weed control efforts.*

Yes	No	Excellent							Poor
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

21. Have you heard of the Purge Spurge CD?

Yes No (if No, please go to question # 23)

22. Have you used the Purge Spurge CD? Yes No

*If yes, please rate how informative/helpful the CD was for your weed control efforts.*

Excellent					Poor		
7	6	5	4	3	2	1	

23. Did you receive insects at any TEAM Leafy Spurge sponsored event?

Yes No

*If yes, when did you receive and distribute the insects? Please check all that apply.*

1999 \_\_\_\_\_

2000 \_\_\_\_\_

2001 \_\_\_\_\_

24. Have the insects had any effect on the leafy spurge? Yes No

*If yes, to what degree have the insects established at the release site(s).*

Have definitely established					Have not established		
7	6	5	4	3	2	1	

*If yes, please rate the level of control to date.*

Excellent					Poor		
7	6	5	4	3	2	1	

The following questions are designed to assess the impact of the TEAM Leafy Spurge project on your agency's weed control strategies.

### Herbicides

25. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge?

Yes      No

26. Has TEAM Leafy Spurge satisfactorily provided you and/or your agency with information on how to properly use herbicides to control leafy spurge?

Yes      No

27. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use herbicides on leafy spurge in the future?

Yes

No

If no, what best describes your agency's situation (check all that apply)

- my agency is currently using herbicides
- infestation is too large, herbicides would be prohibitively expensive
- infestations are inaccessible to sprayers
- lack equipment, expertise or access to certified applicators
- agency is not convinced herbicides are effective
- agency lacks funding to purchase herbicides
- do not have labor resources to spray
- environmental restrictions (spraying near water, trees, sensitive crops) prevent herbicide use
- potential damage to non-target species
- agency policy prevents herbicide use
- it is not economical to use herbicides
- agency is currently using other control methods
- other \_\_\_\_\_

If yes, what best describes your agency's situation (check all that apply)

- agency is planning to spray more leafy spurge as a result of TEAM Leafy Spurge
- agency is planning to use herbicides to stop infestations from spreading
- agency is planning to switch herbicides
- agency is planning to change application rates
- agency is planning to change on which infestations herbicides are used
- agency is planning to reduce herbicide use and switch to other controls
- agency is planning to integrate herbicides with other control agents such as flea beetles and /or sheep grazing
- other \_\_\_\_\_

**Biological Control with Insects**

28. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using biological control agents such as flea beetles to control leafy spurge?

Yes    No

29. Has TEAM Leafy Spurge satisfactorily provided you and/or your agency with information on how to properly use biological control agents such as flea beetles to control leafy spurge?

Yes    No

30. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use biological control agents such as flea beetles on leafy spurge in the future?

Yes

No

if no, what best describes your agency's situation (check all that apply)

infestation is too small to use biological control (insects)

still not convinced biological control with insects will work

do not know how to use biological control with insects

do not know where to collect insects

do not have time to collect or release biological agents

limited access to biological agents/can not collect sufficient numbers of agents

infestations are not suitable for biological control

insects have not been effective on infestations in the past

biological control agents (insects) are not economical to use

agency is currently using other control methods

agency was already using insects; TEAM Leafy Spurge has not changed anything

biological control with insects works too slowly

biological agents will eventually spread to land without agency's help

afraid the agents will harm other plants

other ( \_\_\_\_\_ )

if yes, what best describes your agency's situation (check all that apply)

currently using or planning to use biological control with insects on leafy spurge as a result of TEAM Leafy Spurge

agency is planning to modify where insects are used

agency is planning to change how insects are collected and released

because insects are free and readily available, agency is now willing to try biological control methods

other ( \_\_\_\_\_ )

## Sheep Grazing

31. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using sheep grazing to control leafy spurge?

Yes

No

32. Has TEAM Leafy Spurge satisfactorily provided your agency with information on how to properly implement a sheep grazing program to control leafy spurge?

Yes

No

33. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use sheep grazing on leafy spurge in the future?

Yes

No

if no, what best describes your agency's situation (check all that apply)

- acreage is too small to graze sheep
- infestation is too small to graze sheep
- agency still is not convinced sheep grazing will work
- do not know enough about sheep management to implement a program
- do not have the resources to manage sheep or goats
- agency policy prevents sheep or goat grazing
- sheep or goat grazing will negatively affect non-target species
- sheep grazing programs have been ineffective on agency infestations in the past
- sheep grazing to control leafy spurge is too costly and not economical to use
- there are too many constraints to starting a sheep grazing program started-- fencing, stock, equipment, etc.
- land is not suitable for grazing (road ditches, historic sites, public access etc.)
- other \_\_\_\_\_

if yes, what best describes your agency's situation (check all that apply)

- agency is using or planning to use sheep grazing on leafy spurge as a result of TEAM Leafy Spurge
- agency is convinced grazing works, but does not have the resources to implement and manage a grazing program
- agency is currently using sheep as a control method
- other \_\_\_\_\_

**Issues and Attitudes Toward the TEAM Leafy Spurge Project.**

34. Please rate each of the following statements describing the TEAM Leafy Spurge Integrated Pest Management program.

	Strongly Disagree	Somewhat Disagree	Neither Dis/Agr	Somewhat Agree	Strongly Agree
The project has been effective in demonstrating and communicating leafy spurge treatment and control options	1	2	3	4	5
The project has clearly demonstrated the effectiveness of herbicides in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of biological control agents such as flea beetles in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of sheep grazing in controlling leafy spurge	1	2	3	4	5
My agency has benefitted from the project	1	2	3	4	5
Project should be extended to continue research and education programs	1	2	3	4	5

35. Would the TEAM Leafy Spurge format be applicable for new programs that would focus on other problem rangeland weeds?

<u>Targeted weed</u>	<u>Helpful</u>	
Knapweed(s)	Yes	No
Canada thistle	Yes	No
Other _____	Yes	No

36. What changes would you like to see if another project like TEAM Leafy Spurge was developed for other problem rangeland weeds? (please check all that apply)

- more demonstration sites
- better interaction with and accessibility to the researchers
- more outreach activities like field days and workshops
- more frequent field tours of demonstration sites
- more opportunities to collect insects
- other sources of insects in addition to self-collection
- a monthly bulletin, newsletter or e-mail notifications
- other



The following questions pertain to the characteristics of the land that your agency manages and the resources available for weed control. These responses will help us to compare responses based on agency characteristics. **Your responses will be kept strictly confidential.**

37. In 2000, how many acres of each did your office manage (*only the land your office manages, not all the public land managed by your agency*)?

- a. public grazing land \_\_\_\_\_ other public land \_\_\_\_\_
- b. if you lease or rent some of this land for livestock grazing, how many AUMs did you lease/rent? \_\_\_\_\_

38. What agency do you work for? \_\_\_\_\_

39. Do **you** use a computer to assist you in the management of the agency's land?

Yes      No

40. Do **you** have access to the Internet?

Yes      No

41. How has your office's annual budget appropriation for land management changed during the past five years? (please circle one)

increased                                      decreased                                      remained the same

42. How do you expect your office's annual budget appropriation for land management to change during the next five years? (please circle one)

increase                                      decrease                                      remain the same

43. Approximately what portion of your office's budget for land management is spent on weed control?

% \_\_\_\_\_

44. What percentage of your weed control expenditures apply to each of the following:

- \_\_\_\_\_ % for herbicides
- \_\_\_\_\_ % for biological control
- \_\_\_\_\_ % for labor
- \_\_\_\_\_ % for mechanical control (mowing, cultivating)
- \_\_\_\_\_ % for other \_\_\_\_\_ (please specify)
- 100% Total

45. How has the relative share of the weed control budget changed in the past five years? (please circle one)

increased                                      decreased                                      remained the same

46. How do you expect the relative share of the weed control budget to change during the next five years? (please circle one)

increase                                      decrease                                      remain the same

47. What is the most limiting factor in your agency's ability to combat problem weeds? (please circle one)

- a. lack of effective controls
- b. limiting or restricting land management or weed control policies
- c. labor
- d. funding
- e. other \_\_\_\_\_ (please specify)





We would now like to ask a few questions about you to allow us to compare survey responses. **All responses are strictly confidential.**

48. In what county and state do you live? \_\_\_\_\_County \_\_\_\_\_ State
49. How long have you lived in this county? \_\_\_\_\_ Years
50. What is your age? \_\_\_\_\_ Years
51. Which of the following categories best describes the highest level of education you have completed?
- a. Did not complete high school
  - b. High school graduate
  - c. Vocational/Technical or 2-year college degree
  - d. Bachelor's Degree (4-year college program)
  - e. Graduate School (Masters and/or Doctorate Degree)
52. How many years have you been involved with managing public land? \_\_\_\_\_
53. What is your current job title? \_\_\_\_\_
54. How many years have you been at your current position/title? \_\_\_\_\_
55. What best describes your area of expertise? (please circle one)
- a. agriculture/agronomy
  - b. biology/zoology
  - c. entomology
  - d. ecology
  - e. environmental studies
  - f. range management
  - g. wildlife conservation
  - h. natural resource management
  - i. civil/environmental engineering
  - j. other \_\_\_\_\_(Please specify)

Please feel free to offer any additional thoughts or comments you may have regarding weed management and/or TEAM Leafy Spurge. This is your opportunity to address any issues not covered in this questionnaire. **Your response is important and will be kept strictly confidential.**

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**Thank you** for completing this questionnaire. Your cooperation is sincerely appreciated.

Please return this questionnaire in the enclosed postpaid envelope.

For a copy of the study results, please provide your name and mailing address below or you may contact the Department of Agribusiness and Applied Economics at North Dakota State University in Fargo, ND. Phone 701-231-7357, Fax 701-231-7400 or E-mail: [nhodur@ndsnext.nodak.edu](mailto:nhodur@ndsnext.nodak.edu) or visit our departmental listing of research reports on the world wide web at <http://agecon.lib.umn.edu/ndsu.html>

We anticipate a final report will be available to the public in the first half of 2002.

**WEED MANAGEMENT SURVEY**  
(State and Federal Land Managers)

Please answer the following questions pertaining to grazing and weed management issues on land your agency manages and land in your local area.

1. Please *select one* of the following which best describes the type of land your agency manages.
  - a. pasture or rangeland
  - b. cropland
  - c. forest or wooded areas
  - d. lands associated with wildlife production (refuges, production areas, wetlands)
  - e. highways, roads, ditches, rest areas, other right of ways
  - f. historic sites or scenic areas
  - g. campgrounds and/or parks and recreation areas
  - h. other \_\_\_\_\_ (please specify)
  
2. Which of the following categories are major goals or priorities affecting your agency's land management strategies? (please circle those that apply)
  - a. soil and water conservation/watershed management
  - b. preservation of natural, historic, or scenic areas
  - c. create and support wildlife populations
  - d. livestock grazing
  - e. timber production
  - f. maintenance and safety of roads and highways
  - g. outdoor recreation and/or tourism
  - h. other \_\_\_\_\_ (please specify)
  
3. Please indicate which of the goals listed above is the **most important** to your agency? (Circle the appropriate letter)

4. Which weeds pose problems on land, (both public and private) in your local area? (please rate each of following weeds)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. annual brome grasses	1	2	3	4
b. knapweeds	1	2	3	4
c. leafy spurge	1	2	3	4
d. prickly pear	1	2	3	4
e. sagebrush	1	2	3	4
f. thistles	1	2	3	4
g. wormwood (absinth)	1	2	3	4
h. field bindweed	1	2	3	4
i. others (please specify _____)	1	2	3	4

5. Which weed listed above currently poses the **most serious** land management problem on the land your agency manages? (**Circle** the appropriate letter)

6. How serious is the weed problem on the land that your agency manages? (please circle)

not a problem

minor problem

major problem

Please estimate how many **acres** of land managed by your office are infested with the following weeds:

	Grazing Land	Hay Land
a. annual brome grasses	_____	_____
b. knapweeds	_____	_____
c. leafy spurge	_____	_____
d. prickly pear	_____	_____
e. sagebrush	_____	_____
f. thistles	_____	_____
g. wormwood	_____	_____
h. field bindweed	_____	_____
i. others (please specify)	_____	_____

7. Does your agency currently have any leafy spurge on land that your office manages?

\_\_\_\_ Yes

\_\_\_\_ No (if No, go to Question 9)

8. Is your agency *currently using* any of the following general practices to control leafy spurge:  
 (Please circle the appropriate response)

a. herbicides

Yes	No			
		If no, do you plan to use herbicides in the future	Yes	No
		If yes, do you plan to continue to use herbicides	Yes	No

b. biological control with insects (such as flea beetles)

Yes	No			
		If no, do you plan to use biological control with insects in the future	Yes	No
		If yes, do you plan to continue to use biological control with insects	Yes	No

c. sheep or goat grazing

Yes	No			
		If no, do you plan to graze sheep or goats in the future	Yes	No
		If yes, do you plan to continue to graze sheep or goats	Yes	No

d. tillage and/or reseeding with competing grasses

Yes	No			
		If no, do you plan to till or reseed in the future	Yes	No
		If yes, do you plan to continue tilling and reseeding	Yes	No

e. Integrated Pest Management (IPM) approach utilizing at least two control methods listed above

Yes	No			
		If no, do you plan to use IPM practices in the future	Yes	No
		If yes, do you plan to continue to use IPM practices	Yes	No

9. Even if your agency currently has no leafy spurge on the land it manages, how would you rate the **effectiveness** of the following practices in controlling leafy spurge?

	Not Effective	Somewhat Effective	Very Effective	Don't Know
a. spraying with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. control with grazing animals such as sheep or goats	1	2	3	4
d. tillage and/or reseeding with competing grasses	1	2	3	4
e. Integrated Pest Management (IPM) using two or more control methods	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

10. Even if your agency has no leafy spurge on the land it manages, do you think it **pays** to use the following leafy spurge control practices?

	Yes, It Pays	Pays Marginally	Does Not Pay	Don't Know
a. spray with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. graze animals such as sheep or goats	1	2	3	4
d. till and/or reseed with competing grasses	1	2	3	4
e. Integrated Pest Management (two or more controls)	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

11. What type of weed management information would you and/or your agency like to obtain?

	Not Interested	Somewhat Interested	Very Interested
a. techniques and effectiveness of various herbicide treatment programs	1	2	3
b. economics of herbicide treatments	1	2	3
c. how to get started with biological control using insects	1	2	3
d. economics of biological control with insects	1	2	3
e. techniques and effectiveness of sheep and goat grazing	1	2	3
f. economics of sheep and goat grazing	1	2	3
g. techniques and effectiveness of cultivation and reseeding	1	2	3
h. economics of cultivation and reseeding	1	2	3
i. techniques and effectiveness of Integrated Pest Management programs	1	2	3
j. economics of Integrated Pest Management programs	1	2	3
k. others (please specify _____)	1	2	3

12. In what form would you and/or your agency like to receive weed control information?

	Not Interested	Somewhat Interested	Very Interested
a. pamphlet or bulletin available through Extension office or county agent	1	2	3
b. video cassettes demonstrating the various control methods	1	2	3
c. area demonstration plots showing the effectiveness of various control methods	1	2	3
d. testimonials from other land managers	1	2	3
e. computer decision aids (programs) that can be used to evaluate the feasibility or economics of various controls	1	2	3
f. personal visits and on-site help by range management specialists	1	2	3
g. website/internet	1	2	3
h. email newsletters or notifications	1	2	3
i. others (please specify _____)	1	2	3

The following questions pertain to The Ecological Areawide Management (TEAM) Leafy Spurge Integrated Pest Management Program. TEAM Leafy Spurge is a USDA-Agricultural Research Service Program focused on leafy spurge in the Little Missouri River drainage of Wyoming, Montana and the Dakotas. Its goal is to research, develop and demonstrate ecologically based Integrated Pest Management strategies that can be used to achieve effective, affordable and sustainable leafy spurge control.

13. Are you aware of The Ecological Areawide Management (TEAM) Leafy Spurge Project?

Yes            No (If No, skip to question #15)

If yes, when did you first hear about the project?

1997 \_\_\_\_\_  
 1998 \_\_\_\_\_  
 1999 \_\_\_\_\_  
 2000 \_\_\_\_\_  
 2001 \_\_\_\_\_

14. How did you first hear about the project? (mark only one)

another state or federal land mgr	_____	county agent	_____
newspaper	_____	university press release	_____
Internet	_____	county weed board meeting	_____
State Weed Control	_____	rancher or land owner	_____
Association conference	_____	other	_____

15. Have you attended any of the following TEAM Leafy Spurge events in the last four years?

***If yes, please rate how informative/helpful this activity was for your weed control efforts.***

	Attended								
	Yes	No	Excellent						Poor
◆ 1999 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ 2001 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ TEAM Leafy Spurge presentation at another event or meeting	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

If you attended a spurgefest meeting, do you have any suggestions or ideas that would improve Spurgefest?

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16. Have you visited either of the North Dakota demonstration sites near Sentinel Butte and/or Medora? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

17. Have you visited the Montana demonstration site near Ekalaka? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

18. Have you visited the South Dakota demonstration site near Buffalo? *If yes, please rate how informative/helpful this activity was for your weed control efforts.*

	Yes	No	Excellent					Poor	
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

19. Have you received any TEAM Leafy Spurge brochures, handouts or bulletins? *If yes, please rate how informative/helpful this information was for your weed control efforts.*

Yes	No	Excellent					Poor	
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

20. Have you visited the TEAM Leafy Spurge website at [www.team.ars.usda.gov](http://www.team.ars.usda.gov)? *If yes, please rate how informative/helpful the website was for your weed control efforts.*

Yes	No	Excellent					Poor	
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

21. Have you heard of the Purge Spurge CD?

Yes      No      (if No, please go to question # 23)

22. Have you used the Purge Spurge CD?      Yes      No

*If yes, please rate how informative/helpful the CD was for your weed control efforts.*

Excellent							Poor
7	6	5	4	3	2	1	

23. Did you collect or receive insects at any TEAM Leafy Spurge sponsored event?

Yes      No

If yes, when did you receive and distribute the insects? Please check all that apply.

1999 \_\_\_\_\_

2000 \_\_\_\_\_

2001 \_\_\_\_\_

24. Have the insects had any effect on the leafy spurge?      Yes      No

*If yes, to what degree have the insects established at the release site(s).*

Have definitely established							Have not established
7	6	5	4	3	2	1	

*If yes, please rate the level of control to date.*

Excellent							Poor
7	6	5	4	3	2	1	

The following questions are designed to assess the impact of the TEAM Leafy Spurge project on your weed control strategies.

### Herbicides

25. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using herbicides to control leafy spurge?

Yes      No

26. Has TEAM Leafy Spurge satisfactorily provided you and/or your agency with information on how to properly use herbicides to control leafy spurge?

Yes      No

27. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use herbicides on leafy spurge in the future?

Yes

No

If no, what best describes your agency's situation (check all that apply)

- my agency is currently using herbicides
- infestation is too large, herbicides would be prohibitively expensive
- infestations are inaccessible to sprayers
- lack equipment, expertise or access to certified applicators
- agency is not convinced herbicides are effective
- agency lacks funding to purchase herbicides
- do not have labor resources to spray
- environmental restrictions (spraying near water, trees, sensitive crops) prevent herbicide use
- potential damage to non-target species
- agency policy prevents herbicide use
- agency is currently using other control methods
- other \_\_\_\_\_

If yes, what best describes your agency's situation (check all that apply)

- agency is planning to spray more leafy spurge as a result of TEAM Leafy Spurge
- agency is planning to use herbicides to stop infestations from spreading
- agency is planning to switch herbicides
- agency is planning to change herbicide application rates
- agency is planning to change on which infestations herbicides are used
- agency is planning to reduce herbicide use and switch to other controls
- agency is planning to integrate herbicides with other control agents such as flea beetles and /or sheep grazing
- other \_\_\_\_\_

## Biological Control with Insects

28. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of using biological agents such as flea beetles to control leafy spurge?

Yes      No

29. Has TEAM Leafy Spurge satisfactorily provided you and/or your agency with information on how to properly use biological agents such as flea beetles to control leafy spurge?

Yes      No

30. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use biological control agents such as flea beetles on leafy spurge in the future?

Yes

No

if no, what best describes your agency's situation (check all that apply)

infestation is too small to use biological control (insects)

still not convinced biological control with insects will work

do not know how to use biological control with insects

do not know where to collect insects

do not have time to collect or release biological agents

limited access to biological agents/can not collect sufficient numbers of agents

infestations are not suitable for biological control

insects have not been effective on infestations in the past

biological control agents (insects) are not economical to use

agency is currently using other control methods

agency was already using insects; TEAM Leafy Spurge has not changed anything

biological control with insects works too slowly

biological agents will eventually spread to land without agency's help

afraid the agents will harm other plants

other ( \_\_\_\_\_ )

if yes, what best describes your agency's situation (check all that apply)

currently using or planning to use biological control with insects on leafy spurge as a result of TEAM Leafy Spurge

agency is planning to modify where insects are used

agency is planning to change how insects are collected and released

because insects are free and readily available, agency is now willing to try biological control methods

other ( \_\_\_\_\_ )

**Sheep Grazing**

31. Has TEAM Leafy Spurge satisfactorily demonstrated the effectiveness of grazing sheep to control leafy spurge?

Yes                      No

32. Has TEAM Leafy Spurge satisfactorily provided you and/or your agency with information on how to properly implement a sheep grazing program to control leafy spurge?

Yes                      No

33. Has TEAM Leafy Spurge influenced your plans and/or your agency's plans to use sheep grazing on leafy spurge in the future?

Yes

No

if no, what best describes your agency's situation (check all that apply)

- acreage is too small to graze sheep
- infestation is too small to graze sheep
- agency still is not convinced sheep grazing will work
- do not know enough about sheep management to implement a program
- do not have the resources to manage sheep or goats
- agency policy prevents sheep or goat grazing
- sheep grazing will negatively affect non-target species
- sheep grazing programs have been ineffective on agency infestations in the past
- sheep grazing to control leafy spurge is too costly and not economical to use
- there are too many constraints to starting a sheep grazing program-- fencing, stock, equipment, etc.
- land is not suitable for grazing (road ditches, historic sites, public access, etc.)
- other \_\_\_\_\_

if yes, what best describes your agency's situation (check all that apply)

- agency is using or planning to use sheep grazing on leafy spurge as a result of TEAM Leafy Spurge
- agency is convinced grazing works, but does not have the resources to implement and manage a grazing program
- agency is currently using sheep as a control method
- other \_\_\_\_\_

**Issues and Attitudes Toward the TEAM Leafy Spurge Project.**

34. Please rate each of the following statements describing the TEAM Leafy Spurge Integrated Pest Management program.

	Strongly Disagree	Somewhat Disagree	Neither Dis/Agr	Somewhat Agree	Strongly Agree
The project has been effective in demonstrating and communicating leafy spurge treatment and control options	1	2	3	4	5
The project has clearly demonstrated the effectiveness of herbicides in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of biological control agents such as flea beetles in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of sheep grazing in controlling leafy spurge	1	2	3	4	5
My agency has personally benefitted from the project	1	2	3	4	5
Project funding should be extended to continue research and education programs	1	2	3	4	5

35. Would the TEAM Leafy Spurge format be applicable for new programs that would focus on other problem rangeland weeds?

<u>Targeted weed</u>	<u>Helpful</u>	
Knapweed(s)	Yes	No
Canada thistle	Yes	No
Other _____	Yes	No

36. What changes would you like to see if another project like TEAM Leafy Spurge was developed for other problem rangeland weeds? (please check all that apply)

- more demonstration sites
- better interaction with and accessibility to the researchers
- more outreach activities like field days and workshops
- more frequent field tours of demonstration sites
- more opportunities to collect insects
- other sources of insects in addition to self-collection
- a monthly bulletin, newsletter or e-mail notifications
- other



The following questions pertain to the characteristics of the land that your agency manages and the resources available for weed control. These responses will help us to compare responses based on agency characteristics. **Your responses will be kept strictly confidential.**

37. In 2000, how many acres of each did your office manage (*only the land your office manages, not all the public land managed by your agency*)?

- a. public grazing land \_\_\_\_\_ other public land \_\_\_\_\_
- b. if you lease or rent some of this land for livestock grazing, how many AUMs did you lease/rent? \_\_\_\_\_

38. What agency do you work for? \_\_\_\_\_

39. Do **you** use a computer to assist you in the management of the agency's land?

Yes      No

40. Do **you** have access to the Internet?

Yes      No

41. How has your office's annual budget appropriation for land management changed during the past five years? (please circle one)

increased

decreased

remained the same

42. How do you expect your office's annual budget appropriation for land management to change during the next five years? (please circle one)

increase

decrease

remain the same

43. Approximately what portion of your office's budget for land management is spent on weed control?

% \_\_\_\_\_

44. What percentage of your weed control expenditures apply to each of the following:

\_\_\_\_\_ % for herbicides

\_\_\_\_\_ % for biological control

\_\_\_\_\_ % for labor

\_\_\_\_\_ % for mechanical control (mowing, cultivating)

\_\_\_\_\_ % for other \_\_\_\_\_ (please specify)

100% Total

45. How has the relative share of the weed control budget changed in the past five years? (please circle one)

increased

decreased

remained the same

46. How do you expect the relative share of the weed control budget to change during the next five years? (please circle one)

increase

decrease

remain the same



47. What is the most limiting factor in your agency's ability to combat problem weeds? (please circle one)
- a. lack of effective controls
  - b. limiting or restricting land management or weed control policies
  - c. labor
  - d. funding
  - e. other \_\_\_\_\_(please specify)



We would now like to ask a few questions about you to allow us to compare survey responses. **All responses are strictly confidential.**

48. In what county and state do you live? \_\_\_\_\_County \_\_\_\_\_ State

49. How long have you lived in this county? \_\_\_\_\_ Years

50. What is your age? \_\_\_\_\_ Years

51. Which of the following categories best describes the highest level of education you have completed?

- a. Did not complete high school
- b. High school graduate
- c. Vocational/Technical or 2-year college degree
- d. Bachelor's Degree (4-year college program)
- e. Graduate School (Masters and/or Doctorate Degree)

52. How many years have you been involved with managing public land? \_\_\_\_\_

53. What is your current job title? \_\_\_\_\_

54. How many years have you been at your current position/title? \_\_\_\_\_

55. What best describes your area of expertise? (please circle one)
- a. agriculture/agronomy
  - b. biology/zoology
  - c. entomology
  - d. ecology
  - e. environmental studies
  - f. range management
  - g. wildlife conservation
  - h. natural resource management
  - i. civil/environmental engineering
  - j. other \_\_\_\_\_(Please specify)

Please feel free to offer any additional thoughts or comments you may have regarding weed management and/or TEAM Leafy Spurge. This is your opportunity to address any issues not covered in this questionnaire. **Your response is important and will be kept strictly confidential.**

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**Thank you** for completing this questionnaire. Your cooperation is sincerely appreciated.

Please return this questionnaire in the enclosed postpaid envelope.

For a copy of the study results, please provide your name and mailing address below or you may contact the Department of Agribusiness and Applied Economics at North Dakota State University in Fargo, ND. Phone 701-231-7357, Fax 701-231-7400 or E-mail: [nhodur@ndsuxext.nodak.edu](mailto:nhodur@ndsuxext.nodak.edu) or visit our departmental listing of research reports on the world wide web at <http://agecon.lib.umn.edu/ndsu.html>

We anticipate a final report will be available to the public in the first half of 2002.

**WEED MANAGEMENT SURVEY**  
(Local Decision Makers)

Please answer the following questions on grazing and weed management issues in **your local area**.

1. Please rate each of the following problems/issues that may affect livestock grazing operations in your area: (circle the appropriate number)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4

2. Which problem/issue listed above do you feel is the **most serious** problem affecting grazing operations in your area? (**Circle** the appropriate letter)

3. Have these problems/issues in your area improved, remained the same or become worse over the past five years?

	Improved	Remained the Same	Become Worse	Don't Know
a. adverse weather conditions	1	2	3	4
b. availability of grazing land	1	2	3	4
c. cost of feed and supplies	1	2	3	4
d. livestock prices	1	2	3	4
e. noxious or invasive weeds	1	2	3	4
f. predators	1	2	3	4
g. regulations affecting use of public lands	1	2	3	4
h. use of CRP for haying and grazing	1	2	3	4
i. others (please specify _____)	1	2	3	4

4. Which weeds currently pose problems for livestock grazing operations in your area? (please rate each of following weeds)

	Not a Problem	Minor Problem	Major Problem	Don't Know
a. annual brome grasses	1	2	3	4
b. knapweeds	1	2	3	4
c. leafy spurge	1	2	3	4
d. prickly pear	1	2	3	4
e. sagebrush	1	2	3	4
f. thistles	1	2	3	4
g. wormwood (absinth)	1	2	3	4
h. field bindweed	1	2	3	4
i. others (please specify _____)	1	2	3	4

5. Which weed listed above currently poses the **most serious** problem for grazing operations in your area? (**Circle** the appropriate letter)

6. How serious is the weed problem in your area? (please circle)

not a problem

minor problem

major problem

7. How would you rate the **effectiveness** of the following practices in controlling leafy spurge?

	Not Effective	Somewhat Effective	Very Effective	Don't Know
a. spraying with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. control with grazing animals such as sheep or goats	1	2	3	4
d. tillage and/or reseeding with competing grasses	1	2	3	4
e. Integrated Pest Management (IPM) using two or more control methods	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

8. Do you think it **pays** to use the following leafy spurge control practices?

	Yes, It Pays	Pays Marginally	Does Not Pay	Don't Know
a. spray with herbicides	1	2	3	4
b. biological control with insects	1	2	3	4
c. graze animals such as sheep or goats	1	2	3	4
d. till and/or reseed with competing grasses	1	2	3	4
e. Integrated Pest Management (IPM) using two or more control methods	1	2	3	4
f. other controls (please specify _____)	1	2	3	4

9. What type of weed management information would you, or the people you represent, like to obtain?

	Not Interested	Somewhat Interested	Very Interested
a. techniques and effectiveness of various herbicide treatment programs	1	2	3
b. economics of herbicide treatments	1	2	3
c. how to get started with biological control using insects	1	2	3
d. economics of biological control	1	2	3
e. techniques and effectiveness of sheep and goat grazing	1	2	3
f. economics of sheep and goat grazing	1	2	3
g. techniques and effectiveness of cultivation and reseedling	1	2	3
h. economics of cultivation and reseedling	1	2	3
i. techniques and effectiveness of Integrated Pest Management programs	1	2	3
10. economics of Integrated Pest Management programs	1	2	3
k. others (please specify _____)	1	2	3

10. In what form would you, or the people you represent, prefer to receive weed control information?

	Not Interested	Somewhat Interested	Very Interested
a. pamphlet or bulletin available through an Extension office or county agent	1	2	3
b. video cassettes demonstrating the various control methods	1	2	3
c. area demonstration plots showing the effectiveness of various control methods	1	2	3
d. testimonials from land managers or ranchers	1	2	3
e. computer decision aids (programs) that can be used to evaluate the feasibility or economics of various controls	1	2	3
f. personal visits and on-site help by range management specialists	1	2	3
g. website/internet	1	2	3
h. e-mail newsletters or notifications	1	2	3
i. others (please specify _____)	1	2	3



The following questions pertain to The Ecological Areawide Management (TEAM) Leafy Spurge Integrated Pest Management Program. TEAM Leafy Spurge is a USDA-Agricultural Research Service Program focused on leafy spurge in the Little Missouri River drainage of Wyoming, Montana and the Dakotas. Its goal is to research, develop and demonstrate ecologically based Integrated Pest Management strategies that can be used to achieve effective, affordable and sustainable leafy spurge control.

11. Are you aware of The Ecological Areawide Management (TEAM) Leafy Spurge Project?

Yes                      No (If No, skip to question #13)

If yes, when did you first hear about the project?

1997 \_\_\_\_\_ 1998 \_\_\_\_\_ 2001 \_\_\_\_\_  
 1999 \_\_\_\_\_ 2000 \_\_\_\_\_

12. How did you first hear about the project? (mark only one)

rancher or neighbor	_____	county agent	_____
newspaper	_____	university press release	_____
Internet	_____	county weed board meeting	_____
State Weed Control Association Conference	_____	public land manager	_____
		other	_____

13. Have you attended any of the following TEAM Leafy Spurge events in the last four years?  
*If yes, please rate how helpful this activity was for your weed control efforts.*

	Attended		Rating						
	Yes	No	Excellent						
◆ 1999 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ 2001 Spurgefest in Medora	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1
◆ TEAM Leafy Spurge presentation at another event or meeting	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

If you attended a spurgefest meeting, do you have any suggestions or ideas that would improve Spurgefest?

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14. Have you visited either of the North Dakota demonstration sites near Sentinel Butte or Medora? *If yes, please rate how helpful this activity was for your weed control efforts.*

	Yes	No	Rating							
			Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

15. Have you visited the Montana demonstration site near Ekalaka? *If yes, please rate how helpful this activity was for your weed control efforts.*

	Yes	No	Rating							
			Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

16. Have you visited the South Dakota demonstration site near Buffalo? *If yes, please rate how helpful this activity was for your weed control efforts*

	Yes	No	Rating							
			Excellent							Poor
biological control (insects)	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
sheep grazing	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	
herbicide treatment	<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1	

17. Have you or the people you represent received any TEAM Leafy Spurge brochures, handouts or bulletins? **If yes, please rate how informative/helpful this information was for your (or the people you represent) weed control efforts.**

Yes	No	Excellent						Poor
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

18. Have you visited the TEAM Leafy Spurge website at [www.team.ars.usda.gov](http://www.team.ars.usda.gov)? **If yes, please rate how informative/helpful the website was for your (or the people you represent) weed control efforts.**

Yes	No	Excellent						Poor
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

19. Have you heard of the Purge Spurge CD?

Yes    No    (if No, please go to question # 21)

20. Have you used the Purge Spurge CD? **If yes, please rate how informative/helpful the CD was for your (or the people you represent) weed control efforts.**

Yes	No	Excellent						Poor
<input type="checkbox"/>	<input type="checkbox"/>	7	6	5	4	3	2	1

21. Did you receive insects at any TEAM Leafy Spurge sponsored event?

Yes    No

If yes, when did you receive and distribute the insects? Please check all that apply.

1999 \_\_\_\_\_  
 2000 \_\_\_\_\_  
 2001 \_\_\_\_\_

22. Have the insects had any effect on the leafy spurge?      Yes      No  
**If yes, to what degree have the insects established at the release site(s)?**

Have definitely established				Have not established			
7	6	5	4	3	2	1	

**If, yes, please rate the level of control to date.**

Excellent						Poor
7	6	5	4	3	2	1



The following questions are designed to assess the impact of the TEAM Leafy Spurge project on your weed control strategies.

### Herbicides

23. Has TEAM Leafy Spurge satisfactorily demonstrated to you and/or the people you represent the effectiveness of using herbicides to control leafy spurge?

Yes      No

24. Has TEAM Leafy Spurge satisfactorily provided you and/or the people you represent with information on how to properly use herbicides to control leafy spurge?

Yes      No

25. Has TEAM Leafy Spurge influenced your plans or the plans of the people you represent to use herbicides on leafy spurge in the future?

Yes      No

If no, what best describes the situation (check all that apply)

- people are currently using herbicides
- infestations are too large, herbicides would be prohibitively expensive
- infestations are inaccessible to sprayers
- lack equipment, expertise or access to certified applicators
- the people I represent are not convinced herbicides are effective
- the people I represent cannot afford to purchase herbicides
  
- the people I represent do not have time to spray
- environmental restrictions (spraying near water, trees, sensitive crops) prevent herbicide use
- potential damage to non-target species
- herbicide use is not economical
- cost share programs are no longer available or have been reduced
- other control methods are currently in use
- other \_\_\_\_\_

If yes, what best describes your situation (check all that apply)

- the people I represent plan to spray more leafy spurge as a result of TEAM Leafy Spurge
- the people I represent plan to use herbicides to stop infestations from spreading
- the people I represent plan to switch herbicides
- the people I represent plan to change herbicide application rates
- the people I represent plan to change on which infestations herbicides are used
- the people I represent plan to reduce herbicide use and switch to other controls
- the people I represent plan to integrate herbicides with other control agents such as flea beetles and /or sheep grazing
- other \_\_\_\_\_

## Biological Control with Insects

26. Has TEAM Leafy Spurge satisfactorily demonstrated to you and/or the people you represent the effectiveness of using biological agents such as flea beetles to control leafy spurge?

Yes      No

27. Has TEAM Leafy Spurge satisfactorily provided you and/or the people you represent with information on how to properly use biological agents such as flea beetles to control leafy spurge?

Yes      No

28. Has TEAM Leafy Spurge influenced your plans or those of the people you represent to use biological control agents such as flea beetles on leafy spurge in the future?

Yes

No

if no, what best describes your situation (check all that apply)

infestations in the area are too small to use biological control (insects)

the people I represent are still not convinced biological control with insects will work

the people I represent do not know how to use biological control with insects

the people I represent do not know where to collect insects

the people I represent do not have time to collect or release biological agents

the people I represent have limited access to biological agents/cannot collect sufficient numbers of agents

infestations are not suitable for biological control

insects have not been effective on infestations in the area in the past

the people I represent do not believe biological control agents (insects) are economical to use

the people I represent are currently using other control methods

the people I represent were already using insects; TEAM Leafy Spurge has not changed anything

the people I represent believe that biological control agents work too slowly

the people I represent believe biological agents will eventually spread to their land without help

the people I represent are afraid the agents will harm other plants

other (\_\_\_\_\_)

if Yes, what best describes your situation (check all that apply)

the people I represent are currently using or planning to use biological control with insects on leafy spurge as a result of TEAM Leafy Spurge

the people I represent are modifying where they use insects/flea beetles

the people I represent are changing how they collect and release insects

because insects are free and readily available, the people I represent are now trying biological control methods

other (\_\_\_\_\_)

## Sheep Grazing

29. Has TEAM Leafy Spurge satisfactorily demonstrated to you and/or the people you represent the effectiveness of sheep grazing to control leafy spurge?

Yes                      No

30. Has TEAM Leafy Spurge satisfactorily provided you and/or the people you represent with information on how to properly implement a sheep grazing program to control leafy spurge?

Yes                      No

31. Has TEAM Leafy Spurge influenced your plans or those of the people you represent to graze sheep on leafy spurge in the future?

Yes                      No

if no, what best describes your situation (check all that apply)

- pasture acreage in the area is too small to graze sheep
- infestations in the area are too small to graze sheep
- the people I represent are still not convinced sheep grazing will work
- the people I represent do not know enough about sheep management to implement a program
- the people I represent do not have the resources to manage sheep or goats
- sheep grazing will negatively affect non-target species
- sheep grazing programs have been ineffective on infestations in the area in the past
- sheep grazing to control leafy spurge is too costly, not economical to use
- sheep will compete with cattle for forage
- there are too many constraints to starting a sheep grazing program--fencing, stock, equipment, etc.
- the people I represent do not like sheep or goats
- sheep or goat grazing is too time consuming
- the people I represent do not want an additional enterprise on the ranch
- infestations in the area are not suitable for sheep grazing
- other \_\_\_\_\_

if Yes, what best describes your situation (check all that apply)

- the people I represent are planning to use sheep grazing on leafy spurge as a result of TEAM Leafy Spurge
- the people I represent are convinced grazing works, but do not have resources to implement and manage a grazing program
- the people I represent are currently using sheep as a control method
- other \_\_\_\_\_

**Issues and Attitudes Toward the TEAM Leafy Spurge Project.**

32. Please rate each of the following statements describing the TEAM Leafy Spurge Integrated Pest Management program.

	Strongly Disagree	Somewhat Disagree	Neither Dis/Agr	Somewhat Agree	Strongly Agree
The project has been effective in demonstrating and communicating leafy spurge treatment and control options to ranchers and land managers	1	2	3	4	5
The project has clearly demonstrated the effectiveness of herbicides in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of biological control agents such as flea beetles in controlling leafy spurge	1	2	3	4	5
The project has clearly demonstrated the effectiveness of sheep grazing in controlling leafy spurge	1	2	3	4	5
The people that I represent have benefitted from the project	1	2	3	4	5
Funding for the project should be extended to continue research and education programs	1	2	3	4	5

33. Would the TEAM Leafy Spurge format be applicable for new programs that would focus on other problem rangeland needs?

<u>Targeted weed</u>	<u>Helpful</u>	
Knapweed(s)	Yes	No
Canada thistle	Yes	No
Other _____	Yes	No

34. What changes would you like to see if another project like TEAM Leafy Spurge was developed for other problem rangeland weeds? (please check all that apply)

- more demonstration sites
- better interaction/accessability with the researchers
- more outreach activities like field days and workshops
- more frequent field tours of demonstration sites
- more opportunities for ranchers and land managers to collect insects
- other sources of insects in addition to self-collection
- a monthly bulletin, newsletter or e-mail notifications
- other



We would now like to ask a few questions about you for statistical purposes. These questions help us to compare attitudes and perceptions based on respondent characteristics. **Your responses will be kept strictly confidential.**

35. In what county and state do you live? \_\_\_\_\_ County \_\_\_\_\_ State

36. How long have you lived in this county? \_\_\_\_\_ Years

37. What is your age? \_\_\_\_\_ Years

38. Which of the following categories best describes the highest level of education you have completed?

- a. Did not complete high school
- b. High school graduate
- c. Vocational/Technical or 2-year college degree
- d. Bachelor's Degree (4-year college program)
- e. Graduate School (Masters and/or Doctorate Degree)

39. Which of the following categories best describes your current occupation?

- a. Farming/ranching
- b. Agricultural services/supply
- c. Professional/business services
- d. Government
- e. Energy
- f. Other \_\_\_\_\_ (please specify)

Please feel free to offer any additional thoughts or comments you have regarding weed management and/or TEAM Leafy Spurge. This is your opportunity to address any issues not covered in this questionnaire. **Your response is important and will be kept strictly confidential.**

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**Thank you** for completing this questionnaire. Your cooperation is sincerely appreciated.

Please return this questionnaire in the enclosed postpaid envelope.

For a copy of the study results, please provide your name and mailing address below or you may contact the Department of Agribusiness and Applied Economics at North Dakota State University in Fargo, ND. Phone 701-231-7357, Fax 701-231-7400 or E-mail: [nhodur@ndsuxext.nodak.edu](mailto:nhodur@ndsuxext.nodak.edu) or visit our departmental listing of research reports on the world wide web at <http://agecon.lib.umn.edu/ndsu.html>

We anticipate a final report will be available to the public in the first half of 2002.