Reprinted with permission from: NDSU Agricultural Economics Report No. 406-S. September 1998.

Perceptions of leafy spurge by ranch operators and local decision makers: An update: Summary

RANDALL S. SELL, DEAN A. BANGSUND, F. LARRY LEISTRITZ, and DAN NUDELL

Sell and Bangsund are research scientists and Leistritz is a professor at the Department of Agricultural, Economics, North Dakota State University, Fargo; Nudell is a research station scientist at the Hettinger Research, Extension Center, North Dakota State University, Hettinger.

(*Article begins on following page.)

Agricultural Economics Report No. 406-S **September 1998**

Perceptions of Leafy Spurge by Public Land Managers, Local Decision Makers, and Ranch Operators

Randall S. Sell, Dean A. Bangsund, F. Larry Leistritz, and Dan Nudell*

Introduction

Leafy spurge (*Euphorbia esula* L.) is an exotic, noxious perennial weed that has become widely distributed in the northern Great Plains. Considerable research has been conducted to develop effective controls for leafy spurge; however, current control techniques have proven ineffective in eradicating the plant. Despite advancements in the efficacy of leafy spurge controls and an increased awareness of the destructive capabilities of the weed, much of the Upper Midwest remains infested and continues to combat expanding infestations. This lack of success in controlling or eradicating the plant begs the question why? or at least what can be done - now?

In 1997, The Ecological Areawide Management of Leafy Spurge project (more commonly called **TEAM Leafy Spurge**) was initiated to pull together state, federal, and local agencies and private landowners to develop and integrate sustainable leafy spurge management methods, and to transfer economically and ecologically proven technologies to land managers. This study compares the results of a previous survey of ranchers to an additional survey of local decision makers (LDM), public land managers of grazing land (PLMG), and public land managers of non-grazing land (PLMNG). The objective of these surveys was to evaluate managerial, institutional, and social factors that may affect the rate and extent of implementation of various control strategies in the **TEAM Leafy Spurge** demonstration counties.

Methods

This study focuses on a five-county area in North Dakota (Billings and Golden Valley Counties), Montana (Carter County), South Dakota (Harding County), and Wyoming (Crook County) (Figure 1). A total of 565 ranchers, LDM, PLMG, and PLMNG were surveyed, and 267 completed surveys were obtained (47%). The previously surveyed ranch operators represented 187 of the completed surveys (see Sell et al. 1998). Completed surveys were also obtained from 38 LDM, 24 PLMG, and 18 PLMNG.

The goal in selecting the group of LDM was to solicit perspectives and opinions of individuals who were in a position to make or influence decisions about or relating to the control of leafy spurge and other weeds. The survey pool of LDM included state legislators, county agents, county commissioners, county weed board members, and township board members. LDM were included in the potential survey pool if part of their district was within or included the five-county study area.

The survey of PLMG addressed those agencies which managed public grazing land in or adjacent to the five-county study area. These agencies/departments included the United States Department of the Interior - Bureau of Land Management, United States Forest Service, North Dakota Department of Corrections, United States Bureau of Indian Affairs, and State Land Departments in Montana, North Dakota, South Dakota, and Wyoming. The survey of PLMNG included Theodore Roosevelt National Park, Devils Tower National Monument, United States

*Sell and Bangsund are research scientists and Leistritz is a professor at the Department of Agricultural Economics, North Dakota State University, Fargo; Nudell is a research station scientist at the Hettinger Research Extension Center, North Dakota State University, Hettinger.

Department of the Interior - Bureau of Reclamation, United States Department of the Interior - Fish and Wildlife Service , Game and Fish Management Departments and Departments of Transportation in Montana, North Dakota, South Dakota, and Wyoming.

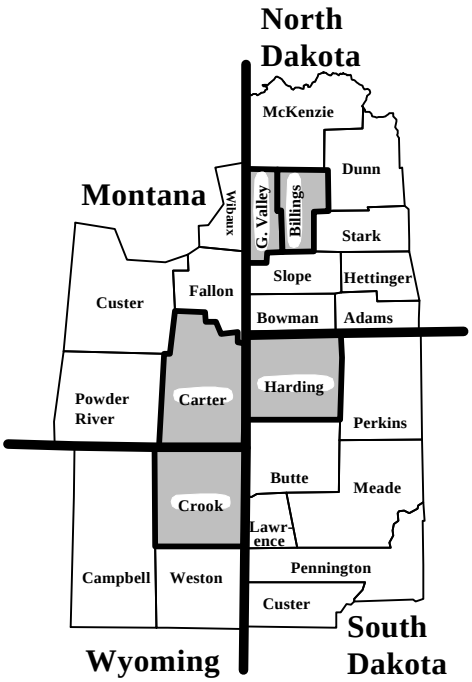

Figure 1. Counties Included in TEAM Leafy Spurge

Results

The surveys were designed to **(1)** assess how weed problems rank among other concerns facing ranchers by ranchers, LDM, and PLMG, **(2)** identify which weeds generate the most problems, with particular emphasis on leafy spurge, **(3)** identify what measures the respondent takes to prevent the spread of leafy spurge, **(4)** determine which leafy spurge control strategies the respondents consider effective and economical, **(5)** determine the reasons for not using various leafy spurge controls, **(6)** determine where ranchers, decision makers, and public land managers get weed management information, what information they desire, and in what form they wish to receive it, **(7)** compare opinions and perceptions on general weed management and leafy spurge control among the different groups surveyed, and **(8)** identify the impact of financial constraints on public land managers' weed management goals.

General Characteristics

Survey response rates were 41, 68, 83, and 86 percent for the ranchers, LDM, PLMG, and PLMNG, respectively. All of the PLMG respondents and 94 percent of the PLMNG reported having leafy spurge on their land. The characteristics of the respondent groups included:

! Agency represented:

PLMG

Bureau of Land Management	48%
Forest Service	22%
State Land Departments	8%

PLMNG

Federal and State Game & Fish Departments	38%
National Park Service	31%
State Departments of Transportation	19%

! Average acreage operated/ managed (per respondent):

Ranchers	6,912 acres
PLMG	1,306,404 acres
PLMNG	84,905 acres

! Reporting leafy spurge on their land:

Ranchers	56%
PLMG	100%
PLMNG	94%

! Average percentage of total land infested with leafy spurge:

Ranchers	3.9%
PLMG	1.5%
PLMNG	13.0%

General Ranching Issues

Ranchers, LDM, and PLMG were asked to indicate which ranching issues were a *major*, *minor*, or *not a* problem. The overall responses were:

! Ranchers and LDM agreed that the worst problem was livestock prices (79% of ranchers and 87% of LDM indicated it was a *major* problem).

! PLMG thought that the worst problem was noxious weeds (48% of PLMG indicated it was a *major* problem).

! About 31% of ranchers thought that noxious weeds were a *major* problem versus 58% of LDM.

! Ranchers and LDM listed the two worst problems facing ranchers as livestock prices and adverse weather conditions, while PLMG thought livestock prices and noxious weeds were the two worst problems.

Ranchers were also asked if those same issues had *become worse*, *stayed the same*, or *improved* over the last 5 years. The overall responses were:

! Ranchers and LDM agreed that livestock prices and cost of feed and supplies had become worse over the last 5 years.

! Nearly twice as many PLMG thought that noxious weeds (73%) had become worse over the past 5 years as the second worst problem - livestock prices (40%).

When the views of LDM from the four states were compared, the following perceptions were noted:

! LDM from Montana, South Dakota, and Wyoming were much more likely than North Dakota's LDM to believe that predators were a *major* problem facing ranchers.

! Similarly, a greater percentage of LDM from Montana, South Dakota, and Wyoming felt that predators had become a worse problem in the last 5 years than North Dakota's LDM.

! Overall, only about 10% of LDM thought that noxious weeds was the *most* important problem facing ranchers.

Ranking of Problem Weeds

All respondents were asked to indicate which weeds were a *major*, *minor*, or *not a* problem in their area. The overall responses were:

! Leafy spurge received the most consideration as a *major* weed problem among all respondent groups; however, LDM, PLMG, and PLMNG were much more likely than ranchers to believe leafy spurge was a *major* problem (49% of ranchers considered it a *major* problem versus 87% of LDM, 64% of PLMG, and 75% of PLMNG who thought it was a *major* problem).

! The rank of problem weeds was even more conspicuous when respondents were asked which weed was the *single most important weed*. About 64% of all respondents considered leafy spurge the *most* serious problem weed, compared to 11% who ranked thistles as the *most* important weed. Other weeds (such as annual brome grass and sagebrush) were considered the *most* important problem weeds by 6 to 8% of respondents.

! Approximately 60% of ranchers, PLMG, and PLMNG ranked the weed problem in their area as *minor*; however, about two-thirds of LDM ranked the weed problem in their area as *major*.

When the views of LDM were compared by state, the following perceptions were noted:

! All LDM from North Dakota and Wyoming indicated that leafy spurge was their *most* important weed problem. South Dakota's LDM had the lowest percentage who indicated that leafy spurge was their *most* important weed problem (60%).

! About one-third of Montana's LDM indicated that the weed problem in their area was *major*, versus more than two-thirds of North Dakota, South Dakota and Wyomings' LDM who indicated the weed problem in their area as *major*.

Belief of Cause of Leafy Spurge Expansion

Respondents were asked to indicate the most important reasons for continued leafy spurge expansion in their area.

! According to ranchers, LDM, and PLMNG, the leading cause of leafy spurge expansion was "spread from adjoining land."

! PLMG believed the main causes of leafy spurge expansion were "not recognized as a problem until too late" and "spread by man's action."

Views on the Most Effective and Economical Leafy Spurge Controls

Respondents were asked to rate the effectiveness of various control methods for leafy spurge. Opinions were solicited regardless of whether the respondent had leafy spurge. Herbicides, biological control, grazing, and tillage were assigned a rank of *not effective*, *partially effective*, or *very effective*.

! More ranchers (27%) and LDM (31%) believed that herbicides were *very effective* in controlling leafy spurge than PLMG and PLMNG. More PLMG (33%) ranked grazing with sheep and/or goats as *very effective* than other control methods. Most PLMNG (62%) thought that biological control was *very effective*.

! Very few respondents thought that tillage was a *very effective* control (less than 6% overall).

! Most ranchers (70%) believed "it pays" to spray herbicides while most LDM (61%) and PLMNG (92%) indicated "it pays" to use biological control and 86% of PLMG thought grazing sheep and/or goats would pay.

A comparison of LDM perceptions of control alternatives' effectiveness and economics revealed several differences.

! No LDM respondents from North or South Dakota thought that grazing with sheep or goats was *very effective*. Alternatively, more than 50% of LDM from Montana and Wyoming believed grazing with sheep or goats was *very effective*.

! No LDM respondents from Montana or South Dakota thought that biological control was *very effective*. Alternatively, more than 40% of LDM from North Dakota and Wyoming indicated biological control was *very effective*.

Ranchers, PLMG, PLMNG were asked to identify the controls they have used in the past and indicate if they were planning to use those controls in the future.

! Over 97% of all respondents have used herbicides on leafy spurge.

! About 95% of PLMG and 78% of PLMNG have used biological controls on leafy spurge.

! More than 80% of PLMG have grazed sheep or goats to control leafy spurge.

! More than 90% of all respondents are planning to use herbicides in the future.

! All groups are more likely to use biological control than to use sheep or goats.

! Of all the groups, PLMG are most likely to use grazing of sheep or goats to control leafy spurge.

Reasons for not Using Leafy Spurge Controls

In an effort to better understand why respondents may not use various controls on leafy spurge, a list of likely reasons was presented for each control. The respondents were asked to indicate all of the reasons that apply. The top reasons for not using each control method for each respondent group are listed with the percentage of respondents from that group indicating that reason.

! Reasons for not using **herbicides**:
1) Environmental restrictions (water, trees, sensitive crops) (62% of ranchers, 86% of PLMG, and 83% of PLMNG).
2) Acreage of infestations too large--prohibitively expensive (78% of LDM).

! Reasons for not using **biological controls**:
1) Limited access to collect biological agents (60% of LDM and 33% of PLMNG).
2) Biological control takes too long (48% of ranchers and 53% of PLMG).

! Reasons for not using **sheep and goats**:
1) Lack the proper equipment (fences, water, shelter) (71% of ranchers, 83% of LDM, and 76% of PLMG).
2) Against Departmental/Agency policy (70% of PLMNG).

! Reasons for not using **tillage, reseeding, mowing, burning**,:
1)Land is not suitable for tillage (85% of ranchers, 97% of LDM, 81% of PLMG, and 73% of PLMNG).

Where do Ranchers, LDM, and PLM Get Their Information

Given a list of possible *information sources*, respondents were asked to indicate how frequently they used that source with regard to weed management. Respondents were also asked *what information* they would like to receive pertaining to leafy spurge control and in *what form* they would like the information.

Information Source:

! More than 50% of all respondents use the Extension Service/county agent frequently (Extension Service was used most often by ranchers, LDM, and PLMNG).

! Professional meetings/associations was used frequently by 64% of PLMG.

! About 30% of all respondents listed the county weed board as the *most* important source of information.

Type of Information:

! Most respondents (55%) wanted information on the effectiveness of various herbicide treatment programs.

! LDM (75%) and PLMG (70%) wanted information on the economics of various herbicide treatments.

! More than 60% of PLMG wanted information on the techniques and effectiveness of control with sheep or goats and the economics of using sheep and goats.

! About 50% of LDM, PLMG, and PLMNG wanted information on how to get started with biological control.

Form of information:

! The most popular form of information for ranchers (48%) and PLMNG (63%) was a pamphlet or bulletin available through their Extension Service or county agent.

! Demonstration plots showing the effectiveness of various treatments was indicated as a popular form of information transfer by 71% of LDM and 78% of PLMG.

! Testimonials from other ranchers and land managers was also an important form of information to 62% of LDM.

! Nearly 75% of PLMG indicated a good form of information transfer would be personal visits and on-site help from range management specialists - less than 40% of ranchers and PLMNG thought this would be an effective form of information transfer.

Public Land Management Budgets

The grazing and non-grazing public land managers were asked about past and expected future changes in their land management budgets. They were also asked to indicate the relationship of their weed control budget to the total land management budget.

! PLMG were more likely to have experienced a decrease in their land management budget in the past 5 years (35%) than the PLMNG (11%).

! PLMNG were more likely to expect an increase in their land management budget in the next 5 years (50%) than the PLMG (4%).

! Overall, 93% of public land managers expected the proportion of their overall budget dedicated to weed control to increase or remain the same in the next 5 years.

! Currently, about 7% of public land managers' budgets are dedicated to weed control, with about 50% of that expense for labor.

Opinions and Perceptions About Weed Management

Respondents were asked to indicate if they agreed or disagreed with several statements regarding weed management, land management, and leafy spurge. The statements were ranked based on a score of 1 to 5, where 1 was strongly disagree and 5 was strongly agree. The top five statements that respondents agreed and disagreed with are presented.

Respondents Agree	Score				Respondents Disagree	Score			
	Rancher	LDM	PLMG	PLMNG		Rancher	LDM	PLMG	PLMNG
I am concerned about controlling weeds in rangeland	4.8	NA*	4.7	4.9	Public land managers are doing a good job of controlling weeds on public land	1.7	1.9	2.8	1.6
State and Federal government agencies are not doing enough to control problem weeds on public grazing land	4.5	4.3	3.5	2.7	Weed infestations have no effect on the market(sale) value of rangeland	1.7	1.4	2.0	3.1
Leafy spurge is a long-term management problem	4.6	4.7	4.8	4.8	It seldom makes economic sense to control weeds on rangeland	1.9	1.4	1.7	1.6
Biological agents released to control leafy spurge are safe for crops and native plants	4.2	4.3	4.6	4.5	Leafy spurge is virtually impossible to control with current control methods and techniques	2.7	2.4	2.4	2.6
The expected payoff from biological control of leafy spurge justifies investment of public funds	4.2	4.4	4.6	4.2	It doesn't pay to control weeds on my land when my neighbor doesn't control his weeds	2.7	NA	2.6	4.1

*NA means question was 'not asked'

Conclusions

Among a list of general ranching problems, dealing with weeds ranked in the middle. PLMG were more likely to consider weeds as an important problem faced by ranchers, second only to livestock prices. Most PLMG and LDM agreed that weed problems have worsened during the past 5 years. While there was disagreement on the relative importance of weeds among the ranchers, LDM, and PLMG, all indicated weeds are an important problem and agreed that they are not the most serious problem ranchers face.

Leafy spurge was ranked as the most important weed for all respondent groups. The LDM, PLMG, and PLMNG were more likely to rank leafy spurge as the most important problem weed. While leafy spurge clearly out ranked all other weeds in importance, other weeds were mentioned as a concern especially to PLM, such as thistles, annual brome grass, and knapweeds.

Far more of the PLMNG than any other group were convinced that biological control was the most effective method of controlling leafy spurge. The PLMNG along with LDM also had the greatest share of respondents who believed that biological control was economical. More PLMG indicated that grazing with sheep or goats was effective and economical than the other control methods. While less than one-third of ranchers indicated that herbicides were a very effective leafy spurge control, more than two-thirds thought that spraying with herbicides was economical. Respondents seemed to understand that spraying with herbicides would not eradicate leafy spurge; however, if nothing was done to control further expansion of leafy spurge, then more forage production will be forfeited in the future. More than 80 percent of public land managers indicated they are not able to use herbicides in some situations because of environmental restrictions. This has forced the PLMNG to attempt to control leafy spurge with biological agents (insects). The PLMG also use insects, but are more likely to believe that grazing with sheep or goats will be economical. The majority of all respondents indicated it was economical to attempt control of leafy spurge with herbicides, biological control, and grazing and the majority plan to use herbicides and biological control to combat the weed in the future.

The reasons for not using the various leafy spurge controls generally fell into environmental, educational, and financial categories. In many cases, little can be done to remove the environmental constraints (especially those presented by topography, water, trees, and other circumstances). However, the financial constraints can be addressed through cost-share programs either offered locally or through state agencies. Other considerations for not using some controls included lacking sufficient knowledge to work with the various controls (e.g., grazing and biological controls). Those obstacles can be addressed by workshops, demonstrations, and other educational opportunities provided by universities and government agencies.

Ranchers, LDM, and PLMNG depend heavily on their Extension Service or county extension agents and local weed control officers for information on weed control. The effectiveness and economics of herbicide and biological controls were the *types of information* most requested by all respondents. The PLMG were also very interested in techniques and economics of using sheep or goats for leafy spurge control. The most requested *forms of information* would be pamphlets/bulletins available locally, demonstration plots, and testimonials by other ranchers/land managers.

Overall, a vast majority of the respondents were concerned about controlling weeds on rangeland and indicated that leafy spurge is a long-term management problem. The PLMG were more interested in all types of information related to herbicides, biological control, grazing sheep or goats, and other methods of controlling leafy spurge. The LDM were more likely to believe that the weed problem in their area was a *major* problem and that leafy spurge was the *most* important weed. The PLMNG had a greater share of their operating acreage infested with leafy spurge, spent a greater share of their budget on weed control, were more likely to believe that biological control was effective and economical, and were less likely to indicate funding as an impediment to combating problem weeds. However, environmental restrictions and damage to non-target species were indicated as impediments to herbicide treatments by more than two-thirds of the PLMNG.

The results of this survey and the survey of ranchers indicates that financial constraints on weed control are prevalent in both private and public land management. Also, the amount of knowledge needed to adopt various treatment programs appears to be lacking in both public and private managers. Education and awareness on how to use and where to find biological controls would facilitate more adoption of biological agents to control leafy spurge. Likewise, assistance in obtaining equipment and knowledge of sheep/goat management would help in allowing many managers to use sheep and/or goats to curb further leafy spurge expansion.

Disagreements between the survey groups were not substantial and many share similar concerns in controlling the weed. The **TEAM Leafy Spurge** project could enhance the adoption of all leafy spurge control methods by addressing the concerns exhibited by each of the groups surveyed. Although cooperation among private and public managers was not specifically addressed in this study, all survey groups recognized the threat leafy spurge presents and most agree on the causes of spreading. By facilitating cooperative efforts between managers of adjoining lands and by pooling resources, perhaps many of the hardships created by leafy spurge can be reversed.

How to Obtain Additional Information

This document is a summary of two more comprehensive reports on the survey of ranchers, and the survey of local decision makers and public land managers. The main report contains additional information, including comparisons of attitudes and perceptions of local decision makers by state. Additional copies of this summary and single copies of the main report, Perceptions of Leafy Spurge by Public Land Managers, Local Decision Makers, and Ranch Operators, are available free of charge. A summary report of the survey of ranchers, Ranch Operators' Perceptions of Leafy Spurge, is also available on request. Please address your inquiry to Carol Jensen, Department of Agricultural Economics, P.O. Box 5636, North Dakota State University, Fargo, ND 58105-5636, (Phone 701-231-7441, Fax 701-231-7400), E-mail: cjensen@ndsuext.nodak.edu or these documents are available on the world wide web at http://agecon.lib.umn.edu/ndsu.html

Acknowledgments

This study contributes to an integrated pest management (IPM) demonstration project, titled *The Ecological Areawide Management of Leafy Spurge* (**TEAM Leafy Spurge**). Funding for this work was provided by **TEAM Leafy Spurge**. We also appreciate the input provided by our colleagues at North Dakota State University and those at cooperating institutions and agencies.

Sincere appreciation is extended to all the ranchers, land managers, and local decision makers who took the time to complete and mail back the questionnaire. Without their input, this portion of the project would not have been possible.