

An Assessment of Federal and State Agency Weed Management Efforts in Colorado

A Report to the Colorado General Assembly

Submitted and Prepared By

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EXECUTIVE SUMMARY

In 1996, the Colorado Legislature revised the Colorado Weed Management Act (C.R.S. 35-5.5) and reaffirmed that noxious weeds threaten the continued economic and environmental value of the lands of the state. As part of the changes made to the Act, the Legislature inserted §114.1 which states "on or before January 1, 1998, the state weed coordinator shall survey those counties that include significant amounts of federal land to determine the level of cooperation and compliance by the federal government with this article." This report summarizes the results of that survey (which includes an assessment of both state and federal agencies) and recommends actions to begin improving public agency performance.

Analysis of the data collected from 51 of Colorado's 63 counties (81%) identified numerous statistical differences between public land management agencies in each of the six individual categories measured (awareness, commitment, management plan, allocation of resources, performance, and cooperation) as well as within the overall performance category. These differences are summarized in Table 1 on page 6 and more fully discussed on pp. 5 and 7.

But while some state and federal agencies clearly out-performed others, it is equally evident that no landowner, either public or private, has succeeded in achieving a high degree of compliance and cooperation with local weed management efforts statewide. In fact, no agency achieved an overall score which met or exceeded a "good" rating. Furthermore, six of the fourteen (43%) public and private landowner categories included in this survey failed to achieve even an "adequate" rating. As a result, more than 43 million acres (65%) of Colorado's 66 million acres of public and private lands are deemed by local weed management professionals to be, on average, in less than adequate compliance or cooperation with local weed management efforts.

The results of this analysis suggest that, unless significant improvements are made, the current levels of public and private landowner performance will not prevent the spread or growing abundance of noxious weeds in Colorado. Judging from the results of unchecked spread and increased abundance of noxious weeds in other western states, it is only a matter of time before the State of Colorado experiences similar dramatic losses in its agricultural productivity, biodiversity, economic strength, real estate values, recreational opportunities, and the scenic beauty for which it is well known.

However, it is critical to recognize that while most state and federal agencies have numerous districts or offices that are performing abysmally or poorly, other offices are meeting and exceeding local weed management expectations at every level and in every individual category measured by the survey. Furthermore, as the analysis indicates, local weed management professionals have already begun to identify those factors and attributes of agency weed management efforts that can lead to success (see pp. 9-12).

The "war on weeds" is a war which can be won. However, to win this war, state and federal agencies must make a more concerted and coordinated effort to establish partnerships and enhance their capacity to manage noxious weeds so that they can contribute to successful, local weed management efforts across the state. As identified by the quantitative and qualitative data,

one of the most significant obstacles to implementing such an effort is the lack of consistent and effective action within and across agency jurisdictions. Therefore, each state and federal agency must find ways to substantially increase the consistency with which it manages noxious weeds while it preserves its flexibility to respond and adapt to the variety of different local weed management situations that can be found statewide.

The following recommendations suggest cost-effective means for Colorado's public agencies to implement more consistent and effective noxious weed management efforts:

- ❖ Each state and federal agency should identify its districts, offices, and individual staff members that have developed, implemented, or contributed to successful weed management efforts within their jurisdictions or scope of responsibilities. Every agency has its own success stories from which it can and should learn and benefit.
- ❖ Each agency should make the implementation of successful weed management models or principles a standard objective for all offices, particularly those that have failed to cooperate and comply fully with the Colorado Weed Management Act.
- ❖ Each agency should also seek out and learn from its failures. Without an understanding of why its efforts have failed in the past, the agency is likely to continue to make the mistakes that contribute to ineffective, inefficient, and inconsistent weed management efforts.
- ❖ Each agency should identify how it can best integrate its resources and efforts with those of local landowners and managers in order to contribute most effectively to local efforts.
- ❖ Each agency should identify not only the extent of its noxious weed populations but also the degree to which they should be managed (eradication, containment, suppression). The agency should then determine and secure the resources necessary to meet these objectives.

With minimal but targeted investments, every agency can make substantial improvements in the areas of awareness and commitment, the development and implementation of improved management plans, the efficient allocation of resources, performance, and cooperation. However, if Colorado's state and federal agencies fail to make a more concerted and coordinated effort to establish partnerships and enhance their capacity to manage noxious weeds at the local level, their continued mediocre performance will consign Colorado's lands to an irreversible fate dominated by noxious weeds.

THE SURVEY INSTRUMENT

In compliance with C.R.S. 35-5.5-114.1, the Colorado Department of Agriculture developed and sent a survey instrument (Attachment 1) and instructions (Attachments 2 and 3) to all Colorado counties in November 1997. The survey instrument gathered both quantitative and qualitative data to characterize the cooperation and compliance of state and federal land management agencies with the Colorado Weed Management Act, as evidenced by their cooperation and compliance with local noxious weed management efforts across the state.

The quantitative portion of the survey instrument was tailored to reflect the presence of significant federal holdings for each of Colorado's 63 counties. For example, only those counties with significant National Park Service holdings such as Rocky Mountain National Park (Larimer County), Dinosaur National Monument (Moffat County), and Mesa Verde National Park (Montezuma County) were requested to assess the compliance and cooperation of this particular federal landowner with local noxious weed management efforts. Although the Colorado Legislature did not request an evaluation of state agencies with similar land management responsibilities, each survey was also tailored to reflect the presence of significant state holdings. Consequently, each county received a survey that reflected its own unique public land ownership matrix. In addition, every survey form included lines to assess the cooperation and compliance of private landowners as well as the performance of the Soil Conservation Districts/Natural Resources Conservation Service, the most prominent state and federal agencies which own no land but provide technical and financial assistance to private landowners.

Note: For the purposes of this report, the words “landowner” and “manager” refer to all public agencies and private landowners included in the survey instrument, unless otherwise noted. Consequently, these terms refer to the Soil Conservation Districts and the Natural Resources Conservation Service (although they neither own nor manage land) as well as private landowners and public land management agencies.

Counties numerically assessed the degree of compliance and cooperation of federal, state, and private landowners with local weed management efforts in several categories related to:

1. *awareness* of the negative impacts caused by noxious weeds on a broad spectrum of natural resources and values including agricultural productivity and wildlife habitat;
2. *commitment* to resolving noxious weed-related problems;
3. efforts to develop and implement an effective noxious weed *management plan*;
4. the *allocation of resources* necessary to carry out noxious weed management efforts;
5. actual *performance* of noxious weed management efforts; and
6. *cooperation* with local agencies, landowners, and weed management professionals.

The qualitative portion of the survey instrument gathered additional information related to the performance and efforts of state and federal agencies. Counties were simply asked to describe what these landowners and managers were doing well, what they were doing poorly, and what improvements could be made to enhance their performance.

Surveys were sent primarily to county weed supervisors but also to county administrators, commissioners, or extension agents if no other noxious weed management authority had been identified for a given county. After the first set of surveys were returned to the department, the state weed coordinator contacted unresponsive counties to request that they complete and return the surveys in order to maximize participation and sample size.

RESULTS AND DISCUSSION

51 of 63 counties (81%) responded to this survey. However, particularly in the quantitative portion of the survey, some respondents failed to fill out assessments completely. A number of respondents frankly admitted that they did not know how well some landowners and managers were performing in compliance with the Colorado Weed Management Act. Others simply left spaces blank. The failure of county representatives to assess state and federal agency compliance and cooperation may indicate two things:

1. There is a lack of communication between county weed management professionals and some state and federal agency offices in various locations of the state; and
2. Some agencies, even with significant local holdings, simply are not very visible. This may be particularly true of agencies such as the Bureau of Reclamation whose properties in some parts of the state are managed by Colorado State Parks or the Colorado Division of Wildlife.

These indications are supported by the qualitative data collected by the surveys. Agencies with highly prominent holdings such as the National Park Service and the Colorado Department of Transportation were almost always assessed. Conversely, some eastern counties with Bureau of Land Management holdings and/or scattered State Land Board holdings did not assess these agencies, perhaps due to their lack of visibility. It was also quite clear from remarks such as "won't respond" that lack of communication between agencies and county weed management professionals also prevented some counties from accurately assessing state and federal agency cooperation and compliance.

Regardless of the occasional gap in information left by some counties in various quantitative categories, the 51 returned surveys provided a wealth of both quantitative and qualitative information. Counties supplied information relating to the degree of cooperation and compliance of state and federal agencies with the Colorado Weed Management Act, the positive and negative performances of these agencies, and areas in which the counties felt landowners and managers could make substantial improvements.

Analysis of Quantitative Data

For each individual category (awareness, commitment, management plan, allocation of resources, performance, and cooperation), numerical scores for every state and federal agency as well as private landowners were compiled and assigned according to the responding county. Scores were then statistically adjusted¹ (in each category for each landowner or manager) to reduce the effect of observer bias upon the analysis.² Once adjusted, the scores were then

¹ Statistical analyses performed on SAS, Proprietary Software Release 6.12, SAS Institute Inc., Cary, NC, USA.

² While some evaluators may tend to score an agency rather high in a given situation, others tend to score low. This is based on individual evaluator differences, not differences among agency performance levels. Known as observer bias, this effect has been reduced as much as possible so that the scores provided by the various counties can be legitimately compared. This adjustment is particularly important in order to fairly evaluate those agencies such as the National Park Service and Department of Defense whose land holdings are typically quite small or scattered.

averaged within each category to provide an overview of each landowner's performance with respect to each of the six categories. Finally, the average scores of the six categories for each landowner were averaged to provide an overall evaluation of the landowner's cooperation and compliance with local weed management efforts and, hence, the Colorado Weed Management Act. These data are presented in Table 1 below.

Important Note: Scores may vary among landowners in any given category but it is critical to recognize which are statistically significant (or different) and which are not. It would be unfair to characterize any one landowner's efforts as superior or inferior to another's if the scores are not statistically significant.³ In Table 1, all average scores which statistically differ, in both individual categories and the overall category, are marked accordingly.

It is important to understand that scores were independently generated for each landowner, i.e., respondents were not asked to rank public and private landowners against one another. Hence, the adjusted average scores for each landowner can be used to evaluate the landowner's performance in each category as well as to provide a relative measure of one landowner's performance versus another's. Although sample size, variance, and other factors could confound such an analysis, the statistical adjustments applied in this analysis coupled with a conservative *p*-value make such comparisons among landowner scores valid. It would be useful, however, to collect and compare survey data over several years in order to develop a more accurate and detailed appreciation of the differences among landowner scores, particularly those with small sample sizes.

Conclusions Regarding Quantitative Data

As indicated in Table 1, there are numerous statistical differences among landowners in each of the six individual categories as well as within the overall category. A comparison of overall landowner scores, which summarize the extent of landowner compliance and cooperation with local noxious weed management efforts across all six categories, reveals several statistically significant findings:

1. **Overall:** The Bureau of Land Management, U.S. Forest Service, Colorado Division of Wildlife, Colorado Department of Transportation, and Colorado State Parks comply and cooperate with local weed management efforts significantly more than the State Land Board, Department of Defense, and private landowners.
2. **Overall:** The National Park Service, Bureau of Reclamation, and private landowners also comply and cooperate with local weed management efforts significantly more than the State Land Board.

Without such an adjustment, a simple analysis is more likely to mischaracterize such agencies' weed management efforts based upon the relatively few scores submitted by a small pool of evaluators.

³ Although there may be a number of factors which contribute to a finding of statistical significance, or difference, the most common relate to sample size and variance. As discussed in this report, there was a relatively high degree of variability in both sample size and variance. For example, sample size for the Bureau of Indian Affairs was three while the Colorado Department of Transportation was scored by 49 counties. Furthermore, the variance of scores among evaluators typically ranged from 1 to 5 for numerous agencies.

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Source: Colorado Department of Agriculture, April 1999

Table 1. Summary of adjusted averaged scores describing the degree of public agency and private landowner cooperation and compliance with the Colorado Noxious Weed Act as evaluated by 51 Colorado counties in 1997-8. Averaged scores are presented for all six individual categories and one overall average category. Landowners are sorted in descending order by overall score.

LANDOWNER	n ¹	AWARENESS ²	COMMITMENT ²	MANAGEMENT PLAN ²	ALLOCATION OF RESOURCES ²	PERFORMANCE ²	COOPERATION ²	OVERALL ²
Soil Conservation Districts/NRCS	43	4.12 ^a	3.81 ^a	3.48 ^c	3.37 ^a	3.50 ^a	4.13 ^a	3.74 ^a
Department of Energy	1	4.73	3.40	3.52	4.42	2.44	3.45	3.65
Bureau of Land Management	29	3.75 ^c	3.47 ^b	3.56 ^b	3.23 ^c	3.24 ^c	3.86 ^d	3.48 ^b
U.S. Forest Service	38	3.93 ^b	3.43 ^c	3.26 ^e	2.57 ^{abc}	3.15 ^g	3.93 ^b	3.40 ^c
Colorado Division of Wildlife	42	3.56 ^{ae}	3.38 ^f	3.28 ^d	2.98 ^e	3.20 ^d	3.92 ^c	3.39 ^d
National Park Service	7	3.70 ^d	3.27 ^g	3.82 ^a	2.90	3.41 ^b	3.44	3.32 ^g
CO Department of Transportation	49	3.43 ^{ag}	3.40 ^e	2.76 ^{bc}	3.26 ^b	3.15 ^f	3.71 ^e	3.29 ^{ae}
Colorado State Parks	22	3.48 ^{af}	3.42 ^d	3.20 ^f	2.67	3.16 ^e	3.58 ^f	3.25 ^f
Bureau of Reclamation	10	2.99 ^{ab}	2.97	2.69	3.16 ^d	2.94 ^h	3.38	2.96 ^{ah}
U.S. Fish & Wildlife Service	4	3.33	2.74	2.79	2.53	2.71	3.37	2.91
Private Landowners	50	2.91 ^{abceg}	2.64 ^{abcdef}	2.41 ^{abcdef}	2.63 ^{abf}	2.66 ^{acdfgi}	3.09 ^{abcde}	2.70 ^{abcdefi}
Bureau of Indian Affairs	3	2.97	2.42	2.55	2.34	1.97 ^a	2.17 ^{abcd}	2.40 ^a
State Land Board	31	2.38 ^{abcdefg}	2.10 ^{abcdefg}	2.04 ^{abcdefg}	1.95 ^{abcdef}	1.96 ^{abcdefghi}	2.49 ^{abcdef}	2.14 ^{abcdefghi}
Department of Defense	4	2.68 ^a	2.33 ^a	2.50	1.53 ^{abce}	1.46 ^{abcdefghi}	1.93 ^{abcdef}	2.07 ^{abcdef}

1 = Abysmal; 2 = Poor; 3 = Adequate; 4 = Good; 5 = Outstanding

¹ Sample size: number of counties which scored a given landowner.

² Within each column, values followed with the same letter are statistically different ($p=0.01$). Note that when more than two values are followed by the same letter, the highest average score is statistically greater than the others. For example, the Colorado Division of Wildlife has done a significantly better job of developing and implementing management plans than the State Land Board and private landowners. It is critical to note which scores are statistically significant and which are not. It would be unfair to characterize any one landowner's efforts as superior or inferior to another's if the scores are not statistically significant.

These statistically significant observations of overall compliance and cooperation are substantiated by significant differences among these landowners in individual categories such as awareness, performance, and even cooperation. Frequently, agencies such as the Bureau of Land Management, U.S. Forest Service, Colorado Division of Wildlife, and Colorado Department of Transportation scored significantly higher than the State Land Board, Department of Defense, and private landowners within individual categories. However, it is important to note where these generalities are overcome or complemented by other statistically significant differences:

1. **Awareness:** The staff of the U.S. Forest Service is significantly more aware of the negative impacts caused by noxious weeds on a broad spectrum of natural resources and values such as biodiversity and agricultural productivity than the staff of the Bureau of Reclamation.
2. **Management Plan:** The Bureau of Land Management has done a significantly better job of developing and implementing an effective noxious weed management plan for its properties than the Colorado Department of Transportation.
3. **Allocation of Resources:** The Bureau of Land Management and Colorado Department of Transportation have done a significantly better job of securing and allocating resources necessary to carry out noxious weed management efforts than the U.S. Forest Service.
4. **Allocation of Resources:** Private landowners have done a significantly better job of securing and allocating resources necessary to carry out noxious weed management efforts than the State Land Board.
5. **Performance:** Private landowners have done a significantly better job of managing weeds on their properties than the State Land Board and the Department of Defense.
6. **Cooperation:** The Bureau of Land Management, Colorado Division of Wildlife, and U.S. Forest Service have been significantly more cooperative with local weed management professionals, agencies, and landowners than the Bureau of Indian Affairs.

With additional data in subsequent years, it would be possible to develop a more detailed comparison of the extent of landowner compliance and cooperation with local noxious weed management efforts. However, the sample size and variance of the collected data from 1997-98 preclude a more detailed analysis at this time.

Although counties submitted quantitative assessments of the Soil Conservation Districts and Natural Resources Conservation Service, it would be inappropriate to draw more than a few broad conclusions regarding the degree to which these agencies comply and cooperate with local noxious weed management efforts for the following reasons:

1. Unlike all other public agencies included in the survey, these two agencies do not directly manage or own land; and
2. The high scores attributed to these two agencies undoubtedly result in part from the efforts they make to provide technical assistance to private landowners. Other agencies simply are not designed to provide such assistance.

Given the significant differences between these two agencies and the other public land management agencies in this survey, any comparison would strongly resemble an effort to compare apples with oranges. A more meaningful comparison for future surveys may be to compare the efforts of these service-oriented agencies with those of the Colorado State University Cooperative Extension, another service-oriented agency.

While an analysis of averaged scores reveals significant differences in performance among agencies, there also exists a consistent pattern across agencies. Although Table 1 does not indicate the range of scores that counties attributed to each agency, the variability of scores among local offices and districts for any given agency is remarkable. For virtually any agency with a respectable sample size (greater than 20), scores in each category typically ranged from one to five, i.e., abysmal to outstanding. This consistent pattern of widely ranging scores indicates that most agencies have districts or other management units that are failing to carry out even the most basic weed management efforts while other offices are cooperating and performing in an outstanding fashion. This simple conclusion regarding inconsistency or variance of an agency's efforts is strongly supported by qualitative data described below and contributes heavily to the recommendations made in this report.

Analysis of Qualitative Data

County weed management professionals had much to say, both positive and negative, about the performance of public landowners. Comments from all 51 surveys were initially separated into three categories:

1. Responses to the question, "What have state or federal agencies done well?"
2. Responses to the question, "What have state or federal agencies done poorly?"
3. Responses to the question, "What improvements should the agencies make?"

The responses in each category were then sorted and compiled according to subject matter. While there are always extraneous remarks found in these types of qualitative data, these data were remarkably free of such remarks. Consequently, remarks were compiled by simply assessing the concerns addressed by each remark and categorizing them appropriately (see below).

Conclusions Regarding Qualitative Data

The nature of the qualitative data is remarkably consistent: what many counties found to be very positive aspects of an agency's performance in some areas of the state were the source of persistent criticism when such aspects were lacking in other localities. For example, many respondents praised the degree of cooperation exhibited by specific agency districts or regions while other respondents criticized the lack of cooperation and communication they received from other offices of the same agency. It is clear from an examination of the qualitative data that the conflicting remarks made by different counties may explain and contribute in large part to the wide range (variance) of quantitative scores noted above for every agency with larger sample sizes ($n > 20$).

1. What have state or federal agencies done well?

Public landowners were repeatedly commended for a variety of actions related to their weed management programs as well as their contributions to local weed management efforts. Specifically, county weed management professionals valued agencies that provide or exhibit the following characteristics (arranged from most to least frequently mentioned):

- A.) Strong and consistent cooperation with other public/private interests to actively manage local problems, as indicated by:
 - i.) Written cooperative agreements;
 - ii.) Representation on local noxious weed boards;
 - iii.) Active participation and responsibility in the development of educational resources and workshops for the public as well as agency staff;
 - iv.) Willingness to share resources and expertise; and
 - v.) Engaged staff who create positive work environments (flexible, little paperwork, etc.) that facilitate weed management efforts across jurisdictional boundaries.

- B.) An aggressive attitude and "can-do" mentality, as indicated by:
 - i.) Widespread awareness of noxious weed problems among staff at all levels;
 - ii.) Recent improvements in agency interest and funding;
 - iii.) "Taking the initiative" when new noxious weed management needs arise;
 - iv.) Allocation of available dollars to resolve problems quickly;
 - v.) Demonstrated commitment to resolving noxious weed problems; and
 - vi.) Efforts to secure additional resources for local projects (grant-writing, etc.).

- C.) Financial assistance provided to local weed control programs and projects, as indicated by:
 - i.) Consistent and predictable funding; and
 - ii.) Efforts to ensure that federal funds go to on-the-ground management efforts first.

- D.) The preparation of management plans for agency properties or otherwise developing an organized approach to noxious weed management.

- E.) Excellent management of specific species or problems, such as:
 - i.) The Colorado Division of Wildlife's efforts to manage purple loosestrife in the Denver metropolitan area; and
 - ii.) SCD/NRCS efforts to promote management of Mediterranean sage in Boulder County among private landowners.

- F.) Clear and frequent communication with county staff, as exhibited by:
 - i.) Assigned agency staff members responsible for weed management information.

- G.) Implementation of programs that prevent new problems from arising, such as:
 - i.) The certified weed-free hay program among many state and federal agencies.

The most frequently cited examples of what state and federal agencies have done well were active cooperation and an action-oriented posture toward noxious weed management which effectively address local weed management concerns. For example, even when local U.S. Forest Service budgets did not permit an effective or desirable allocation of resources, active participation by U.S. Forest Service staff with local weed advisory boards was clearly appreciated by more than one surveyed county.

2. What have state or federal agencies done poorly?

Not surprisingly, many public landowners were criticized for their failures to develop and implement effective weed management programs that exhibit many of the characteristics appreciated and described above. Specifically, county weed management professionals criticized agencies for their:

- A.) Poor noxious weed management efforts, as exhibited by:
 - i.) Lack of management plans or a failure to implement them;
 - ii.) Poor response times to weed outbreaks and poor timing of applications;
 - iii.) Lack of qualified personnel to manage noxious weeds;
 - iv.) Unreliable coordination within a given agency, i.e., a checkerboard approach among agency districts;
 - v.) Poor coordination with other landowners and managers when noxious weeds cross jurisdictional boundaries;
 - vi.) Poor management of specific noxious weed problems; and
 - vii.) Failure to mitigate practices that enhance noxious weed spread (road maintenance activities, movement of heavy equipment, etc).

- B.) Lack of adequate or stable funding to support effective noxious weed management efforts on agency properties or leased lands.

- C.) Poor cooperation with local noxious weed management staff and/or failure to acknowledge a problem, as exhibited by:
 - i.) Poor communication with other entities including agency offices in the same resource area or management unit; and
 - ii.) Policies and practices that simply attempt to make the problem someone else's responsibility.

- D.) Heavy reliance upon county programs to manage agency properties, as exhibited by:
 - i.) Numerous contracts with multiple agencies; and
 - ii.) Failure of contracting agencies to fully participate in the identification of noxious weed problems or to mitigate practices that promote weed spread.

- E.) Lack of education for staff as well as the public that:
 - i.) Identifies the appropriate contacts to whom known and suspected noxious weed infestations should be reported; and
 - ii.) Informs the public of an agency's management efforts.

- F.) Failure to follow commitments with resources or failure of federal dollars to reach on-the-ground efforts as a result of deductions by higher levels of bureaucracy such as Washington, D.C. and regional offices.

Failures such as these undoubtedly resulted in low quantitative scores for many different agencies. Furthermore, given the high variance of scores in every category for most agencies, it is unlikely that any agency is exempt from such failures. For any given agency, it is almost a certainty that one or more of its local offices have failed to cooperate and communicate with local weed management officials, develop and implement a management plan, or secure adequate resources to accomplish the agency's weed management objectives. Moreover, given the heavy reliance of agencies upon local weed management resources, it is also a certainty that any given agency has overextended its reliance somewhere within the state.

3. What improvements should the agencies make?

County weed management professionals made a number of suggestions regarding improvements that public agencies could make to increase the effectiveness of their weed management efforts and compliance with the Colorado Weed Management Act. They include:

- A.) Increasing financial and personnel resources to improve the effectiveness of management efforts such that agencies are better able to prepare management plans, conduct staff training, and manage their own weed problems successfully. Related suggestions include:
- i.) Streamlining budgets so that funds are available to each agency district for on-the-ground weed management efforts;
 - ii.) Pooling resources from all affected programs of an agency such as recreation, wildlife and watchable wildlife, timber, i.e., not just the range program;
 - iii.) Utilizing existing funds such as the Habitat Partnership Program (HPP), Environmental Quality Incentives Program (EQIP)/Wildlife Habitat Incentive Program (WHIP), and Land and Water Fund, in part for weed management; and
 - iv.) Dedicating full-time personnel to deal with noxious weeds - a perennial problem.
- B.) Improving coordination and cooperation among federal, state, and local government agencies through the:
- i.) Development of formal MOUs and resource sharing arrangements;
 - ii.) Active communication that informs counties of plans and actions each season;
 - iii.) Use of similar technology and strategies for an integrated and compatible approach to noxious weed management;
 - iv.) Assistance in the development of cooperative plans among private and public landowners in watersheds or among contiguous parcels; and
 - v.) Cooperative arrangements that, at a minimum, ensure containment of weeds.

- C.) Improving performance by:
- i.) Decreasing management response times to infestations;
 - ii.) Taking the initiative more frequently;
 - iii.) Committing to specific local noxious weed management plans or projects;
 - iv.) Reducing unnecessary red tape so that more energy is focussed on the weeds rather than the paperwork; and
 - v.) Improving staff capabilities so that weed management actions are more effective.
- D.) Improving educational efforts so that all employees and citizens recognize local noxious weed problems and can report weed infestations to a specific person or office.
- E.) Creating a noxious weed specialist position that coordinates agency weed management policy, develops management plans for properties, and conducts training to educate staff and weed management personnel.
- F.) Reducing reliance on county programs to become more self-sufficient and allow counties to work more closely with private landowners (note that this varies according to local needs).

The range and implications of implementing these suggestions are considerable but vary according to existing agency performance as well as agency objectives and capacity. Clearly, some recommendations are more involved than others but they do identify ways in which agencies can better cooperate with local weed management efforts across the state.

Summary of Results and Discussion

While some public agencies have clearly out-performed others, not only in individual categories (awareness, commitment, management plan, allocation of resources, performance, and cooperation) but also in overall performance, it is equally evident that no landowner, either public or private, has succeeded in achieving a high degree of compliance and cooperation with local weed management efforts statewide. In fact, no landowner achieved an overall score which met or exceeded a "good" rating (equal to a 4.0). Furthermore, six of the fourteen (43%) public and private landowner categories⁴ included in this survey failed to achieve even an "adequate" rating (equal to a 3.0). As a result, more than 43 million acres (65%) of Colorado's 66 million acres of public and private lands⁵ are deemed by local weed management professionals to be, on average, in less than adequate compliance or cooperation with local weed management efforts.

Unfortunately, it is unlikely that even merely adequate efforts to comply and cooperate with the Colorado Weed Management Act and local weed management programs would prevent the spread of noxious weeds in Colorado. Consequently, the results of this analysis suggest that, unless significant improvements are made, the current levels of landowner performance will

⁴ 6 of 14 landowners had an overall score of less than 3.0. These six landowners are the Bureau of Reclamation, private landowners, Bureau of Indian Affairs, State Land Board, Department of Defense, and U.S. Fish and Wildlife Service.

⁵ The landowners noted in the preceding footnote own or actively control more than 43 million acres in Colorado. Sources are the Colorado Division of Local Government, 1996 and Bureau of Reclamation, 1998.

simply ensure that noxious weeds continue to spread and become well-established in this state. Judging from the results of unchecked spread and increased abundance of noxious weeds in other western states, it is only a small matter of time before the State of Colorado experiences similar dramatic losses in its agricultural productivity, biodiversity, economic strength, real estate values, recreational opportunities, and the scenic beauty for which it is well known.

RECOMMENDATIONS AND CONCLUSIONS

The overall mediocre performance of public land management agencies is disturbing and a cause for serious concern. Unless significant changes are made to raise the level at which state and federal agencies cooperate and comply with the Colorado Weed Management Act, the State of Colorado cannot expect to prevent, contain, or even substantially slow the spread of noxious weeds. Consequently, it cannot hope to prevent or reduce the negative impacts associated with noxious weeds. However, it is critical to recognize that while most state and federal agencies have numerous districts or offices that are performing abysmally or poorly, other offices are meeting and exceeding local weed management expectations at every level and in every individual category measured by the survey. Furthermore, as the analysis of qualitative data above indicates, local weed management professionals have already begun to identify those factors and attributes of agency weed management efforts that can lead to success.

The "war on weeds" is a war which can be won. However, to win this war, public land management agencies must make a more concerted and coordinated effort to establish partnerships and enhance their capacity to manage noxious weeds so that they can contribute to successful, local weed management efforts across the state. As identified by the survey, one of the most significant obstacles to implementing such an effort is the lack of consistent and effective action within and across agency jurisdictions. In order to win this war, each state and federal agency must find ways to substantially increase the consistency with which it manages noxious weeds while it preserves its flexibility to respond and adapt to the variety of different local weed management situations that can be found statewide. The following recommendations suggest cost-effective means for Colorado's public agencies to implement more consistent and effective noxious weed management efforts:

1. **Statewide:** Each state and federal agency should actively seek out and identify which of its districts, offices, and individual staff members have developed, implemented, or contributed to successful weed management efforts within their jurisdictions or scope of responsibilities. Every agency has its own success stories from which it can and should learn and benefit. If these lessons are thoughtfully applied to similar situations, each agency may be able to accomplish very positive results largely within its existing means at the local level.
2. **Statewide:** Each agency should make the implementation of successful weed management models or principles a standard objective for all offices, particularly those that have failed to cooperate and comply fully with the Colorado Weed Management Act.
3. **Statewide:** Each agency should also seek out and learn from its failures. Without an understanding of why its efforts have failed in the past, the agency is likely to continue to make the mistakes that contribute to ineffective, inefficient, and inconsistent weed

management efforts. Simply refraining from making such mistakes a second time may enhance an agency's efforts to cooperate with local weed management efforts.

4. **Locally and statewide:** Each agency should identify how it can best integrate its resources and efforts with those of local landowners and managers. In some situations, it may be most effective (for both the agency and local weed management professionals) to simply provide staff training and public education but transfer sufficient resources to local weed management professionals (public or commercial) to accomplish the necessary on-the-ground objectives. In other situations, it may be more effective for the agency itself to lead an effective and coordinated weed management effort such as the Colorado Division of Wildlife's purple loosestrife eradication effort in the Denver metropolitan area.
5. **Locally and statewide:** Each agency should identify not only the extent of its noxious weed populations but also the degree to which they should be managed (eradication, containment, suppression). The agency should then determine and secure the resources necessary to meet these objectives. Necessary resources may include equipment, supplies, staff, and additional funding as well as partnerships with local weed management professionals and landowners. Without a clear set of objectives, particularly at the local level, an agency simply will not secure and mobilize sufficient resources to meet its weed management responsibilities under the Colorado Weed Management Act.

With minimal but targeted investments, every agency can make substantial improvements in the areas of awareness and commitment, the development and implementation of improved management plans, the efficient allocation of resources, performance, and cooperation. In fact, many of the qualitative responses made by county weed management professionals provide an excellent place for each agency to begin its search for improvement. Their observations are direct and their suggestions are simple and self-explanatory. Most importantly, these suggestions can be implemented by most offices, districts, and staffs at little expense and within existing resource constraints.

ACKNOWLEDGMENTS

Appreciation is extended to each of the 51 counties that provided both qualitative and quantitative data to this survey effort. In particular, county responses regarding landowner performance helped to understand more fully the reasons underlying the range of scores provided for individual agencies spread across the state. These responses also provide a substantive basis for agency improvement.

Statistical services were rendered by James zumBrunnen, Associate Director of the Center for Applied Statistical Expertise at Colorado State University.

Assistance with layout and editing was provided by Patty Ann Maher and Janet Jackson of the Colorado Department of Agriculture.

1997 Survey of Cooperation and Compliance of Colorado Landowners

How would you characterize each landowner's:

LANDOWNER	AWARENESS	COMMITMENT	MANAGEMENT PLAN	ALLOCATION OF RESOURCES	PERFORMANCE	COOPERATION
U.S. Forest Service						
Bureau of Land Management						
Bureau of Reclamation						
National Park Service						
U.S. Fish & Wildlife Service						
State Land Board						
Colorado Division of Wildlife						
Colorado State Parks						
Colorado Department of Transportation						
SCD/NRCS						
Private						

1=Abysmal 2=Poor 3=Adequate 4=Good 5=Outstanding

What have state or federal agencies done well?

What have state or federal agencies done poorly?

What improvements should the agencies make?

County: _____

Respondent: _____

Date: ___/___/___

TO: All county weed supervisors and weed management staff
FROM: Eric Lane, State Weed Coordinator
DATE: November 3, 1997
RE: Assessing the level of cooperation and compliance of state and federal agencies with the Colorado Noxious Weed Law and county weed management efforts

When the Colorado Legislature revised the Colorado Noxious Weed Act in 1996, it specifically directed the state weed coordinator to “survey those counties that include significant amounts of federal land to determine the level of cooperation and compliance by the federal government with the Colorado Noxious Weed Law.” Enclosed is a survey that will help to assess how well federal agencies are living up to their weed management responsibilities as landowners in the state of Colorado. State agencies also play important roles in managing noxious weeds and have a responsibility to work with the counties to accomplish common weed management objectives. The enclosed survey is tailored to your county, particularly with regard to the presence or absence of significant holdings for federal and state agencies such as the National Park Service, Colorado State Parks, and Department of Defense that have scattered but significant holdings in our state. Your assessment will be combined with those of other respondents to determine the level of cooperation and compliance by state and federal agencies with the Colorado Noxious Weed Law. In addition, I have added a line for you to assess the extent to which private landowners as a whole have cooperated with the county and complied with the state’s act.

Your input is critical to informing the Legislature about the level of cooperation and compliance our communities receive from state and federal landowners. Please take the time to reply to this survey and let us know what you think of the extent and effectiveness of state and federal weed management programs in your area. This survey is an important avenue for each county to express its thoughts on the ability of state and federal agencies to manage noxious weeds. Without your input, the Legislature will have a more difficult time understanding your needs as well as those of the agencies. If you are pleased with the ways agencies in your area have responded to the noxious weed problem, then commend them publicly. If more must be done, the Legislature and the Colorado Department of Agriculture need to know.

In order to assure that your responses will be effective and comparable to those of other counties, first read the enclosed directions and the descriptions of each category on the survey. Then, fill out the form with your responses. Return the form to the Colorado Department of Agriculture **by November 21st** in the enclosed envelope. If you have any questions about the survey, don’t hesitate to contact me. Thank you in advance for your time and thoughts on this matter. I look forward to receiving your responses to our survey.

Directions for filling out the enclosed survey:

The first section of the survey simply requires a numerical response in each category for each agency. Each agency should be assessed in six categories that reflect their awareness, commitment, strategy and planning, allocation of resources, overall performance, and cooperation with regard to weed management on their lands. When assigning a score in each category, ask yourself how you would characterize each agency's:

1. **awareness** of the negative impacts caused by noxious weeds? Does the agency recognize the problems caused by weeds and their extent? Do recreation specialists, wildlife biologists, and other resource managers understand the impacts of weeds on a variety of natural resources and their uses or is it still a "range" problem? Do they understand the concerns of their private neighbors regarding the impacts of weeds on agricultural productivity and native biodiversity?
2. **commitment** to resolving weed problems? Has the agency expressed its concern about weeds publicly or privately? Does it openly acknowledge the weed problems it faces? Is it committed to developing and allocating resources toward staff education, public education, and management (including prevention, detection, control, and restoration)?
3. efforts to develop and implement a **management plan** for its properties? Is a plan in place or being developed? Does the plan reflect the reality of weed management needs?
4. **allocation of resources** to weed management efforts? Has the agency allocated sufficient resources in terms of technical expertise and funding as well as on-the-ground management that adequately address the weed management problems on its properties? Are there plans to increase the availability of such resources?
5. **performance**? How well is the agency actually managing the weeds on their properties? Have they done enough to manage the weed populations?
6. **cooperation**? How well does the agency staff communicate with the county about its weed management needs, plans, and actions? Is the agency interested or committed to coordinated activities? Have they sought a cooperative agreement with you?

The score you assign to each agency in these categories should range in whole number increments from 1 to 5, the worst to the best, respectively. For example, if you believe the State Land Board has done an outstanding job of developing and implementing a weed management plan for its properties, you would assign a "5" in the "management strategy" category. However, the Board might only earn a "3" in the "performance" category if its overall effectiveness at managing weed populations is only adequate.

Please note: The extent to which private landowners as a whole have cooperated with the county and complied with the state's act should be similarly assessed. Use the same criteria as for agencies.

In addition to assessing agencies with land management responsibilities, please assess the Soil Conservation Districts (SCD) and Natural Resources Conservation Service (NRCS) as well. While these organizations manage no public land per se, they play an important role in assisting private landowners in every county. Please assess their ability to assist landowners in each county. Note that the “management plan” category should reflect their ability to help landowners develop such plans and strategies. Similarly, the “performance” category should reflect their ability to provide assistance to landowners.

The second section is an opportunity for you to provide qualitative responses about the performance and efforts of state and federal agencies. Reflecting on your numerical assessment and thinking back on your experiences with state and federal agencies, tell us what the agencies are doing right and what they are doing wrong. If you could change some facets of agency performance and effort, what would you change? What changes do you think would bring the greatest benefit? Use as much of the space provided as you need and feel free to use additional space on the back side of the survey.

Please note: limit the scope of your responses in both sections to the experiences of your county with those agency districts and properties within the county, i.e., do not try to assess the performance of the agency as a whole in your region or statewide. You are encouraged to discuss these questions and your answers with county extension agents, weed board members, or others that may be able to provide a greater historical perspective or relate their experience with individual agencies, etc.

On the final lines, please indicate who completed the survey and include a day-time phone number at which they can be reached. Thank you for your time and attention. **Please return** survey in the enclosed envelope **by November 21st**.