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Fact Sheet-03-41

The Estimated Costs of Treating Invasive Weeds in Elko County, Nevada

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Introduction

The Elko District of the Bureau of Land Management (BLM) recently documented the rapid expansion of noxious weeds in Elko County in their Weed Inventory Report (Bureau of Land Management, 2001). They surveyed the 5.5 million acres of BLM district lands in Elko County for invasive weeds in 1998 and then again in 2001. Roadways and stream banks were surveyed most frequently because of the constant disturbance common in these areas. The average increase in noxious, invasive weed growth from 1998 to 2001 in Elko County was determined for all weed-types present in the area surveyed. Included were 13 species that expanded during the three years by an average of 24 percent.

Using data from the Weed Inventory Report, we estimate the future costs of invasive weed management in this paper. The estimate includes control and revegetation management costs over the next 15 years.

Methods and Materials

For the purposes of this report, a 50-acre infestation is used to illustrate the cost of mapping, weed control and revegetation compared to a similar untreated area. The estimate also assumes a single application of herbicides and a single attempt at revegetation. This is not commonly the case. Follow-up spot treatments on both weed control projects and revegetation are typically necessary. Also, in our economic comparisons, we do not

include in the cost of the no-action plan the cost of lost rangeland forage, lost wildlife habitat or ecosystem degradation, and the increased risks of fire. We only considered the cost of controlling weeds.

In estimating the control cost of the weed infestation, data from the BLM's Weed Inventory Report and estimates of present costs were used at a five percent discount rate over the years. SRK Consulting estimated the cost of mapping at \$2.50 per acre in a proposal to the BLM in 2002. The present costs for herbicide, labor, equipment, and maintenance, seed, and fuel were obtained from suppliers in April 2002. The Elko Field Office, from past experience, estimated the labor costs, the number of hours of labor needed, the types of equipment and their associated costs, herbicide costs, and future plans for the use of the land. The costs of equipment, labor, and fuel were calculated as averages of the current price from estimates for each from various dealers. The fuel usage of an ATV was assumed to be 50 miles per gallon. It was assumed for this report that one full tank of gas (3 gallons) would be used. (This is more than the actual amount that is used for treating 50 acres; however, it also accounts for travel to and from the site.) The cost of equipment was the initial purchase, amortized over two years. The cost was broken down to a daily use cost and charged accordingly. The equipment was to be used for six days, three for chemical application and three for broadcast seeding. The purchase price and maintenance cost estimates for an ATV were

obtained from local dealers, ATV repair shops, and the Elko BLM Field Office.

The official revegetation plans for BLM land in Elko County and private landowners are not presently completed. Thus, the plan included in this report was created using suggestions for that area from literature and knowledgeable range scientists. The seed mix included in this report is considered typical based on various recommendations for seed mixtures (Table 1). The price for the seed and herbicide was calculated as an average of quotes from several firms that sell seeds for revegetation and herbicides for rangeland weed control. Seed costs are shown in Table 1. This estimation is subject to extreme variations year to year, depending upon demand, use of land, site considerations (riparian, steppe and upland seedings have unique seed mixes), use of native species in the mixture, and availability of seed. In this plan, the recommended seed mixture would be applied as a broadcast seeding with ATVs.

The herbicide selected for the cost estimation in Table 2 was Tordon 22K[®]. However, Transline[®] is often used because it has been shown to be effective on a variety of invasive weeds without adversely affecting many non-target species. Tordon 22K[®] is not registered for use in California, but is available in Nevada. Rights-of-way application procedures and doses were assumed to follow label

recommendations. Tordon 22K[®], 2,4-D amine 4[®] and a combination herbicide mixture of Transline[®] plus 2,4-D amine 4[®] were also used to display the variation in the costs associated with the chemicals selected (Table 2). As part of the summary cost in Table 2, the cost per acre column compares the expenses that are incurred on a per acre basis. This can be used to roughly estimate the cost of weed management for actual weed infestations in Elko County, which are well into the tens of thousands of acres.

The cost of a management plan was calculated in this report as well as a no-action plan, e.g., doing nothing. By not responding to the problem today, the value of the land, loss of revenue from forage, and the value of an investment today are forgone.

Results and Discussion

The costs for doing nothing over time were calculated. As seen in Figure 1, not taking action can be financially devastating, especially over time. The expected costs to control a 50-acre weed infestation over 15 years, given a 24 percent increase in size over three years, is estimated to be roughly \$7,500 to eradicate and revegetate. (This is a single application of herbicide and single attempt to revegetate. Follow-up treatments are not included in these totals, although most likely, repeat

Table 1. Costs of a recommended seed mix for rangeland seedings¹ (2002 dollars).

Species	Quantity lb / acre	Pure Live Seed ²	
		Cost / lb	Cost / acre
Crested Wheatgrass	1.0	1.60	1.60
Siberian Wheatgrass	0.75	1.91	1.43
Thickspike Wheatgrass	1.0	6.81	6.81
Blue Bunch Wheatgrass	1.0	11.44	11.44
Alfalfa (Ladak)	0.75	1.82	1.37
White Yarrow	0.1	15.00	1.50
Forage Kochia	1.0	18.00	18.00
Fourwing Saltbush	1.5	14.00	21.00
Wyoming Big Sagebrush	0.25	60.00	15.00
Rubber Rabbit Brush	0.125	60.00	7.50
Total pounds	7.475	Total cost	\$85.65

1. Mix recommended by Mike Cox, Nevada Division Of Wildlife and Ken Gray, Big Game Biologist for Nevada Division of Forestry. Many rangelands are seeded at rates from 4 to 20 lbs/acre and costs should be adjusted accordingly.

2. PLS = pure live seed (% seed in mixture (purity) X % germination)/100).

Table 2. Costs of weed management and revegetation for 50 acres of invasive weed infested lands in Elko County, Nevada (2002 dollars).

Activity/Material	Costs / 50 Acres		
Mapping	125.00		
Labor	96.00		
Machinery (3 days/season)	22.71		
Maintenance (3 days/season)	8.57		
Fuel	5.28		
Subtotal	\$257.56		
Revegetation			
Seed ¹	4282.50		
Broadcast Seeding	257.56		
Subtotal	\$4540.06		
Chemical²	Rights-of-Way	Rangeland	
Tordon 22K [®]	2175.00 (\$43.50/A)	3262.50 (\$65.25/A)	
2,4-D Amine 4 [®]	400.00 (\$8.00/A)	580.00 (\$11.60/A)	
Transline [®]	2701.50 (\$54.03/A)	2701.50 (\$54.03/A)	
Transline [®] / 2,4-D Amine 4 [®]	2773.50 (\$55.47/A)	2773.50 (\$55.47/A)	
Total Costs³	\$6972.62	\$8059.68	

1. See Table 1 for the recommended seed mix and its cost.

2. All estimates are based on the application rate recommended by The Montana, Utah, and Wyoming Cooperative Extension Weed Management Handbook, 2001-2002.

3. **Total costs** are calculated using Tordon 22K[®] as the herbicide.

spot control and revegetation will be necessary.) Various conditions such as drought, floods, dramatic increases in costs of herbicide, labor and seed can all modify the actual cost of eradicating weeds and reseeding the infested area. Consequently, these results must be considered very conservative, with the expectation that great variations are likely.

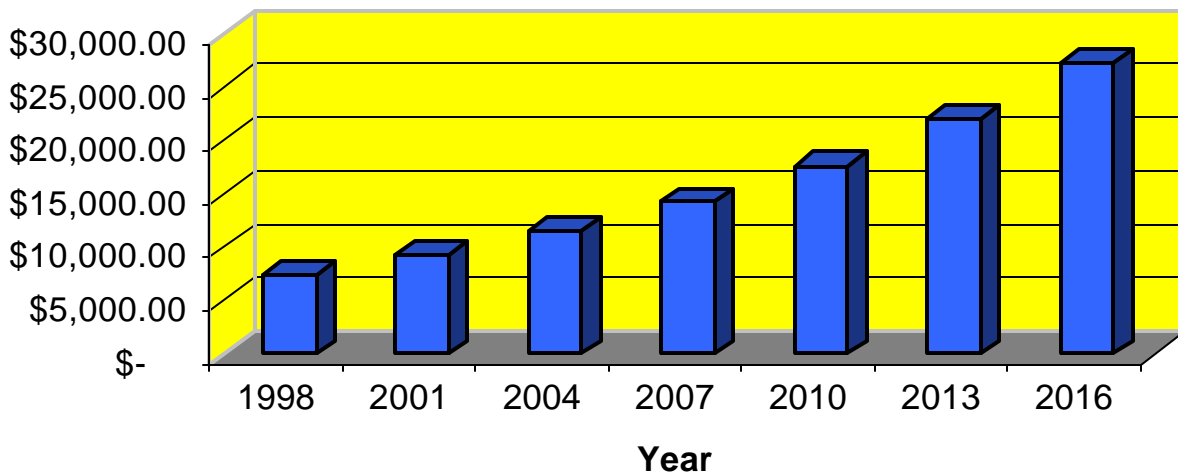
At the current rate of spread (24 percent every three years), the cost to eradicate and revegetate a stand of noxious weeds that was initially 50 acres will increase each year if not eradicated today (Table 3). Figure 1 shows the increase in control costs over time if the start of the control projects is delayed today. The cost of \$7,000 will increase to \$9,298.91 in three years. If the infestation continues to spread at this rate, in 18 years this initial 50-acre stand will have spread to 182 acres

and will conservatively cost over \$27,000 to restore to productive land or a healthy ecosystem. By not taking action to control or eradicate noxious weeds today in Elko County, the cost will grow excessively. The BLM, Elko County, and private land managers will have significant lost forage and increased costs if they change their plan of action in the future and decide to aggressively manage invasive weeds after waiting several years (Table 3). This estimate only considers out-of-pocket costs and does not take into account the impact these weeds have on grazing, wildlife, recreation and the ecosystems in general. This estimate reflects the cost of eradicating and restoring 50 acres of land infested with noxious weeds, today, tomorrow, and 18 years into the future.

Table 3. The costs of not controlling weed infestations in Elko County, assuming a constant weed expansion rate of 24 percent over three years (2002 dollars).

Year	Expansion multiplier	Acres infested	Costs		
			Chemical application	Revegetation	Total
1998	1.00	50.0	\$2,959.06	\$4,540.06	\$7,499.12
2001	1.24	62.0	\$3,669.23	\$5,629.67	\$9,298.91
2004	1.54	77.0	\$4,556.95	\$6,991.69	\$11,548.64
2007	1.91	95.5	\$5,651.80	\$8,671.51	\$14,323.32
2010	2.36	118.0	\$6,983.38	\$10,714.54	\$17,697.92
2013	2.94	147.0	\$8,699.64	\$13,347.78	\$22,047.41
2016	3.64	182.0	\$10,770.98	\$16,525.82	\$27,296.80

Figure 1. Rise in costs of Elko County weed management if invasive weeds are not controlled on fifty acres today.



References

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