ROCKY FLATS RESTORATION ENHANCEMENT

Component 1: Coordination of Weed Control

2010 Annual Report

Prepared for:
Trustee Council for Natural Resources at Rocky Flats

Submitted to:
Colorado Department of Public Health and Environment
Under PO FEA HAZ 104960

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December 2010

A. INTRODUCTION

This is the 2010 year end report on the first full year of the Weed Control Coordination Program for properties surrounding Rocky Flats National Wildlife Refuge. JCNA has added three owners/managers (Xcel Energy, Mountain Plains Industrial Site, Hogan Ranch) to the thirteen of last year; the names of these sixteen together with a sketch map of their locations are in Appendix 1. In this report we discuss our contact and activity with each of these owners/managers, focusing on visitation, discussion, and assessment of each weed control program.

During this study we have visited fourteen of the sixteen owner/manager sites. Two, TXI and Provide Energy have not responded to telephone inquiries.

In addition to our coordination with owners/managers of the sixteen properties, JCNA conducted a one-day weed symposium last March to which all owners/managers and their staff members were invited. Attendance was open to all others interested in weeds. Discussion of this symposium follows individual reports.

B. OWNER/MANAGER REPORTS

The reports on individual properties surrounding the Refuge are organized below by the numbering system used on the map in Appendix 1.

l. CDOT. The Colorado Department of Transportation performs weed control on three state highways around Rocky Flats: 72, 93 and 128, which parallel the south, west, and north boundaries of the Refuge, respectively. It has maintained its spray program for about 10 years and expends considerable funds on weed control as it is highly important to CDOT. Indiana Street, which parallels the east boundary of the Refuge is not managed by CDOT, and is not so much of a concern since it is downwind of the Refuge.

Myron Cunningham, Noxious Weed Coordinator, took JCNA on a site visit on 25 August. Traffic is so heavy on these highways we could go no slower than 20mph and stop only where there are cross roads or pull-offs. We noted few weeds along the highways, but patches of knapweed at side road junctions. We agreed it was too late to spray again this year, but he will do so in the spring. He uses a boom truck that can spray up to 30' from the truck. Beyond that distance they use back pack sprayers to spray weeds.

CDOT uses various chemicals depending on plants and circumstances. They use 2-4,D with Tordon or 2-4,D with Vanquish, both of which destroy broad leaved weeds, adding the chemical Octave, which acts faster to kill the weeds. Their goal is to promote denser grassland that will keep out the weeds. Much of the right-of-way has good prairie with native forbs, and these areas are not sprayed.

JCNA rates their weed control program in the Rocky Flats area this year as good.

2. BCOS. Boulder City Open Space has two weed coordinators: Laurie Deiter and Eric Fairlee. Laurie Deiter has been with BCOS for many years and has been their weed coordinator on lands west of Highway 93 for several years. This land has some of the best xeric tallgrass prairie in the Rocky Flats area. While there are some noxious weeds along disturbed irrigation ditches, Dieter is carefully monitoring them and using primarily biocontrol measures. She has had the area along Highway 72 that was disturbed in the summer of 2010 by the installation of a water pipeline sprayed for weed control.

The BCOS land east of Highway 93 is under the direction of Eric Fairlee. This year no treatments were applied owing primarily to budget limitations. He did express considerable interest in using *Mecinus***,** the insect grub that Tim Seastedt has found so successful on Dalmatian toadflax.

JCNA rates their weed control program as medium.

3. BCntyOS. Steve Sauer, weed coordinator for BCntyOS, led JCNA on a 7 September trip to a 100 acre field (Mayerhoffer) just west of McCaslin Boulevard and about a mile north of Highway 128. Tordon was sprayed here, which killed virtually all noxious weeds in this area. While this was costly at $30/acre, it should permanently remove large infestations of knapweed. The spray program killed much of the Japanese brome as well. This was a control area adjacent to a "Cows Eat Weeds" active area (discussed below) and provides a good comparison. The Tordon-spraying resulted in a weed-free grassland where grasses should take over former weedy areas and make the grassland even more resistant to weed invasion. Most of the native forbs survived the spray application.

By contrast, the "cows" area showed heavy grazing to many noxious weeds, but none were killed and quite a few were missed. While both areas need further examination next year, the contrast strongly indicates Tordon spray is far more effective.

Sauer also continued the controlled grazing adjacent to Highway 128. Some areas north of road were sprayed for knapweed using Milestone. Other weed control activities occurred, including biocontrol, and the county weed program continues to be a good control on the north edge of the Refuge.

JCNA rates their weed control program as good.

4. NREL. National Renewable Energy lands occupy 302 acres in the northwest corner of the Refuge. This area was set aside by DOE as a wind farm many years ago. Nearly all of the undisturbed portions of their site are covered with good to high quality xeric tallgrass prairie with a mixture of grasses and forbs.

NREL has in the past had a high quality weed control program but this year did not do any spraying of weeds, and only some mowing in particular weedy areas. Many new wind towers have been constructed and each is surrounded by a disturbance area, has a road leading to the tower, and disturbance where guy wires support the towers. These areas are particularly vulnerable to noxious weed invasion, and will be reseeded. Joe

Amidei, the weed control manager, assures me that these areas will be monitored and sprayed next year.

JCNA rates their weed control program this year as medium.

5. LaFarge. Lafarge Corporation has mining permits for the area west of the Refuge in Sections 4 and 9. Much of this area has been mined in the past, although no mining has taken place since 2001 and future mining in the area is uncertain. All structures and equipment have been removed and much of the area is bare and awaits reseeding. Casey Felmlee is in charge of weed control and uses Vegetation Services for spray work, as he has for the past six years. He led JCNA on an 11 August trip over and around the permitted areas.

William Wood of Vegetation Services led an earlier trip (22 June) and demonstrated the areas where he uses several chemicals for knapweed and thistles, the major problem in the north. He also sprays for Russian olive by the lakes with Foliar and Triclopyr. His program this year began in April with Milestone spraying for knapweed. In June he sprays thistle, as these plants are then up and most sensitive. In the summer he sprays the Russian olive and tamarisk, with the chemicals noted above. This spraying is 70%-90% effective in killing the plants. In the fall he does another thistle spray. His objective is to create dense grassland prairie as that is the best deterrent to weed invasion.

In summary, the several hundred acres of the LaFarge property have some weedy areas but they have an effective weed control program.

JCNA rates their weed control program as good.

6. Bestway. Bestway Concrete operates the large clay and gravel mining area just west of the Refuge and north of the west entry road into the Refuge. Bestway also now operates the mining operation on this property, whose mineral rights are owned by Charlie McKay. This area has been a major source of knapweed seed blowing into the Refuge in the past, but the present operation has greatly improved weed control on the property.

Bestway uses the firm Foothills Vegetation, Mike Wilkinson owner, to spray weedy areas, especially the east-west berm along the southern edge of property. Mike's crew applied Milestone in late May over the entire berm and essentially eliminated knapweed this year. Fall inspection showed the most frequent plant cover to be *Kochia*, a good weed that forms an early succession ground cover. Many other formerly mined and disturbed areas were also sprayed by Foothills. Manager Vince Eisenhand did additional spray work in many of the active pit areas that have been heavily disturbed and consist of berms, waste piles and other disturbed areas.

The Bestway mining area will have a constant weed problem as long as they are actively mining and processing, but their program this year has been very effective.

JCNA rates their weed control program as good.

7. Candelas. Candelas is located south of the Refuge and Section 16 and north of Highway 72. It occupies several thousand acres. Much of the area adjacent to Highway 72 has been excavated for a water pipeline and has been revegetated. In addition a new highway connects Highway 72 with Indiana Street. These disturbed areas have a heavy knapweed cover, and manager McKay has contracted fall spraying of these areas to eliminate this noxious weed.

These areas are well removed from the Refuge. The land adjacent to the Refuge is undisturbed native prairie with very few weeds. This buffer, along with the prevailing wind direction from the west and north, prevents weed seed from the Candelas project from entering the Refuge. .

JCNA rates this weed control program as medium.

8. State Land Board. The Colorado State Land Board (SLB) owns Section 16 immediately west of the Refuge. Several entities have leases on portions of the property with responsibility for weed control of their areas: United Power, a substation; Xcel Energy, a gas pump area; Denver Water, a mile long water ditch; UP Railroad, a mile long railroad line, USFWS, area along Woman Creek; C. McKay, short period grazing lease; and perhaps others. All of Section 16 is under the control of the SLB.

These managers have been contacted separately and, for the most part, their weed control efforts are described in other parts of this report.

The area west of the UPRR spur and south of the Provide oil lease has seen little disturbance and supports high quality xeric grassland and is generally weed free. The area east and downwind of the abandoned mining area in the center of the section is heavily infested with diffuse knapweed and provides a constant stream of wind blown noxious weed seed to the Refuge immediately to the east. The SLB did not perform any weed control on their property this year that JCNA is aware of.

JCNA rates their weed control program as poor.

9. Denver Water. Tony Stengle, Assistant District Foreman of Denver Water, guided JCNA on the Denver Water canal through Sections 16 and 9 on 19 July. Denver Water is converting the ditch into an underground concrete tunnel, has completed construction on the south half of Section 16, and has seeded the ground atop the conduit. This area will not be sprayed with any chemical until the new grass cover is hardy, probably next year (2011). At the time of our observation (19 July) very little new grass was evident.

On the JCNA trip with Stengle we first looked at the Section 9 portion. On the west side of the ditch some clumps of knapweed and Dalmatian toadflax were present and noted. Stengle states that these will be mowed and not sprayed. The ditch in both sections 9 and 16 has been sprayed with Tremic.

The portion of the ditch passing through Section 16 is mainly clear of knapweed and toadflax, although one sizeable knapweed patch occurs on the west side of the ditch in the middle of the section.

JCNA rates their weed control program as good.

10. UPRR. The Union Pacific railroad spur line goes about three miles north from its junction with their main line that lies south of Highway 72. The spur passes through Sections 21, 16 and 9. DeAngelo Brothers have the weed control contract for this portion. The UPRR generally does a single late spring or early summer herbicide spray from behind a locomotive, but on this spur they do hyrailing with a spray truck.

Their 24 May early spray along the spur was a total kill of all plants within 14' of the line, thus clearing between the rails as well as on most of the adjacent embankments. Spray was applied from booms a foot off the track with a mixture of the following chemicals: DMA4IUM, Glycophosphate 4 and Prodiamine 65WDG. Total vegetation kill is important in this narrow swathe.

The remainder of the ROW, 50' on either side of the track where grassland predominates, was sprayed with a boom from the truck hyrailing on the rails and emitting spray onto any weedy areas noted. JCNA accompanied DeAngelo employee, Carla Hiller, in the boom truck and assisted in locating areas that were sprayed with picloram and 2,4-D. Spray was applied onto only about 1/5 of the area, as most of the area had good grass cover.

JCNA rates their weed control program as good.

11. Provide Energy. This four acre petroleum drill site in the north part of Section 16 is used for roads and storage and is clear of any native vegetation. Weeds cover disturbed areas that are not used. We have been unable to meet with Provide personnel on site, nor discuss their weed control program via telephone. Provide Energy does not appear to have a weed management program at this time.

JCNA rates their weed control program as poor.

12. United Power. JCNA visited the United Power sub-station on 4 June with manager Bryant Robbins and the owner of his spray subcontractor, Josh, of Prime Vegetation. The fenced substation area remains devoid of any vegetation, which is important to United. The other four acres leased by United Power (the northwest 300' of Section 16) have never been treated for weeds, as they were unaware that this area was their responsibility until the fall of 2009. We walked the area and noted locations of knapweed and thistle that will be sprayed in the very near future with Milestone. Most of the area is high quality native prairie which will not be sprayed. The United Power goal will be to eliminate the noxious weeds and covert those areas to good prairie.

Their program is excellent within the one acre transformer station and appears that it will be appropriate in the remainder of their lease area.

JCNA rates their weed control program as medium.

13. TXI-Boulder. JCNA did talk with Randy Moulton, Manager of the TXI mine. He suggested a later call to set up a site visit after some control work was completed on the 35 acre site east of Highway 93.. There has been no response to my subsequent telephone calls.

JCNA rates their weed control program as poor.

14. XCEL Energy. Xcel has a very small natural gas pump station in a 30' x 30' fenced portion of the northwest corner of Section 16. They have not treated this area for many years, and last year it was totally covered with knapweed. They sprayed heavily this summer and will continue to put it on their observation and control list until the noxious weeds are totally gone.

JCNA rates their weed control program as very good.

15. Mountain Plains Industrial Center. This proposed industrial center occupies the western 1350' strip along Highway 93 in Section 9. The land is covered with good native prairie that is grazed periodically by the owner, C. McKay. Knapweed and Dalmatian toadflax are confined primarily to disturbed areas along roads and railroad tracks, and McKay has a spray program in operation on part of these weedy areas.

JCNA rates his weed control program as fair.

16. Hogan Ranch. Bill Hogan, whose ranch occurs west from Highway 93, also owns about 70 acres in Section 4 east and alongside of the highway. He sold the southeast corner of this land to Old Tyme Lumber some time ago, and their area is totally covered with logs, slabs, boards and equipment. There is no vegetation on this site.

Hogan's acreage is good native grassland but has no available water for grazing animals. He only uses it for grazing horses, as there is a tunnel under the highway and horses will return to his ranch for water. There are some scattered knapweed plants present, and Hogan relies entirely on insect control, particularly flower eating grubs, for knapweed control. This biocontrol technique has been fairly successful in the past. On disturbed areas by the railroad tracks, beyond their right-of-way, there are some dense patches of knapweed that need control.

JCNA rates his weed control program as fair.

Summary Table

Owner/ Lessee	Danger to Refuge	Coopera-tiveness	Noxious Weed Presence	Weed Control Program
1. CDOT	HIGH	HIGH	Few	GOOD
2. BCOS	MEDIUM	HIGH	Few	MEDIUM
3. BCntyOS	HIGH	HIGH	Few	GOOD
4. NREL	HIGH	HIGH	Few	MEDIUM
5. LAFARGE	HIGH	HIGH	FEW	GOOD
6. BESTWAY	HIGH	HIGH	MEDIUM	GOOD
7. CANDELAS	LOW	HIGH	FEW	MEDIUM
8. SLB	HIGH	NONE	HIGH	POOR
9. DWATER	MEDIUM	HIGH	FEW	GOOD
10. UPRR	MEDIUM	HIGH	FEW	GOOD
11. PROVIDE	LOW	NONE	MEDIUM	POOR
12. UPOWER	MEDIUM	HIGH	FEW	MEDIUM
13. TXI	MEDIUM	NONE	HIGH	POOR
14. Xcel	LOW	HIGH	FEW	VERY GOOD
15. MTN PLNS	LOW	HIGH	MEDIUM	FAIR
16. HOGAN	LOW	HIGH	MEDIUM	FAIR

Explanation:

1. Danger to Refuge. Rated on basis of wind direction, proximity and size of area relative to Refuge—HIGH, MEDIUM, LOW.

2. Cooperativeness refers to responsiveness and allowing or providing a tour of property—HIGH or NONE..

3. Noxious Weed Presence: Rated HIGH if many scattered patches, MEDIUM if less; and FEW if only a few scattered patches.

4. Weed Control Program: Rated VERY GOOD if little can be done to improve program; GOOD, if weed control is effective with an active program; MEDIUM if an active program but not as effective as it could be; FAIR if an active program but not effective in certain areas; POOR if no program.

C. NOXIOUS WEED SYMPOSIUM

The weed symposium held on Friday 5 March in the Broomfield auditorium focused on the noxious weeds of the Rocky Flats area. It was an ideal auditorium with excellent sound and video systems. The symposium was free to all and sponsored jointly with the City of Broomfield. JCNA provided a box lunch for those who prepaid for it.

The symposium was attended by 88 registrants, and perhaps 15 additional people who did not register. Registrants came from a wide variety of locales and places. Several were from land owners and managers in the NRD program, several from open space agencies, a few weed contractors, and some from the general public.

The program (Appendix 2) consisted of six individual speakers in the morning, and a round table discussion where the audience asked various questions of the roundtable speakers in the afternoon.

Dr. Paul Kilburn of JCNA presided over the morning's slate of speakers. The first speaker, Dr. D. Buckner of Boulder, presented an ecological foundation for the plants and weeds growing in the Rocky Flats area. The next speaker, Kelly Uhing, State Weed Coordinator described weed activities around the state and discussed the State's goals at the present time. She also clarified Colorado's Noxious Weed Act. Next, Alicia Doran, Jefferson County Weed Coordinator, described the development of a sound weed program. The well-known Dr. George Beck, Professor of Weed Biology at CSU, then talked about the many considerations for a sound weed program, from insects to plant competition and succession. The next speaker was Jody Nelson, consultant to Legacy Management, who described the successes and problems of weed control at Rocky Flats. The final morning speaker was Dr. Dan Bean, head of the Palisade Insectory, who described some of the successes and failures of an insect control program. All of these speakers illustrated their talks with well-prepared PowerPoint presentations.

At the afternoon roundtable, opened and summarized by Dr. Jean Tate of JCNA, all five speakers gave a short introduction of their efforts in weed control and then responded to questions from the audience. The roundtable consisted of landowner Charlie McKay, Bob Fieweg of NREL, Steve Sauer of Boulder County Open Space, Dr. Tim Seastedt of the University of Colorado, and Jerry Bader of Jefferson County Open Space.

Three special display tables in the lobby allowed all present to observe additional weed information. All had ample illustrations. Nathan Kelbe, Broomfield Weed Coordinator, had one on their weed program. Kelly Uhing had a table on the Colorado weed control program. John Vickery had one on the Colorado Native Plant Society. The illustrated book "Noxious Weeds of Colorado" was sold at the registration table for $4 and the money and checks given to Dr. Beck for the Colorado Weed Management Association, which published the book.

The primary goals of the symposium, to facilitate communication, networking, and the exchange of information, were accomplished. Many good comments were received regarding the symposium from both attendees and speakers, some of whom suggested we need another symposium like this one next year!

D. BIOLOGICAL CONTRAL OPERATIONS

JCNA continues to explore the use of biological methods for noxious weed control, particularly as a supplementary technique to the commonly used chemical and mechanical control methods. The following two methods were explored during the growing season.

1. INSECT STUDY. A visit was made to Dr. Tim Seastedt's research area in the ponderosa pine woodland on Left Hand Canyon road north of Boulder. Dr. Seastedt, an

ecologist with expertise in insect control of weeds along the Front Range, has published several scientific papers on the subject. We were able to observe active depredation by many insects on the following weeds: spotted knapweed, a close relative of diffuse knapweed; Dalmatian toadflax; and musk and other thistles.

The insect damage is caused by beetle adults or larvae that can do great damage to the plants when they emerge in the spring with maximum appetites. These insects are mainly specific to particular plant species. *Rhonocylis* adults eat leaves and cause much damage to musk thistle, less to other thistles. *Mecinus* is another beetle that feeds on Dalmatian toadflax and does great damage both to the leaves, and internally, as it bores into stems, greatly reducing the strength of the plant. Tim considers this beetle capable of providing almost total control of Dalmatian toadflax. Spotted knapweed has two major insect enemies, both also effective on diffuse knapweed. *Cyphocleomus* is a root eating beetle that greatly weakens the plant. *Larinus is* a beetle that feeds on flowers and can be effective in reducing flower and seed production..

2. COWS EAT WEEDS. Kathy Voth of Boulder has initiated a program of training cows to eat weeds through a ten day special diet program that starts with a grain-molasses mix and gradually adds noxious weeds to their meal. She has prepared a DVD that illustrates the technique in more detail.

In mid-July JCNA observed in the field an experimental application of Voth's program on Boulder County Open Space land using 100 cattle from the local Hogan ranch. The cattle heavily grazed a fenced area for a short time. The grazing cropped knapweed, Dalmatian toadflax, scotch thistle, gumweed, sage, horehound and several other weeds. Some knapweeds retained only two or three flower buds. Not all weeds were eaten to the ground and the long term impact of this grazing program on noxious weeds needs further study. In my discussion with Bill Hogan, whose cattle were used in this experimental area, he was very optimistic about the technique.

The area is fenced with an electric fence, powered by a solar cell, so that cattle can be enclosed, their grazing area limited and the fence easily moved. This novel approach could become a good, inexpensive method of biocontrol of noxious weeds.

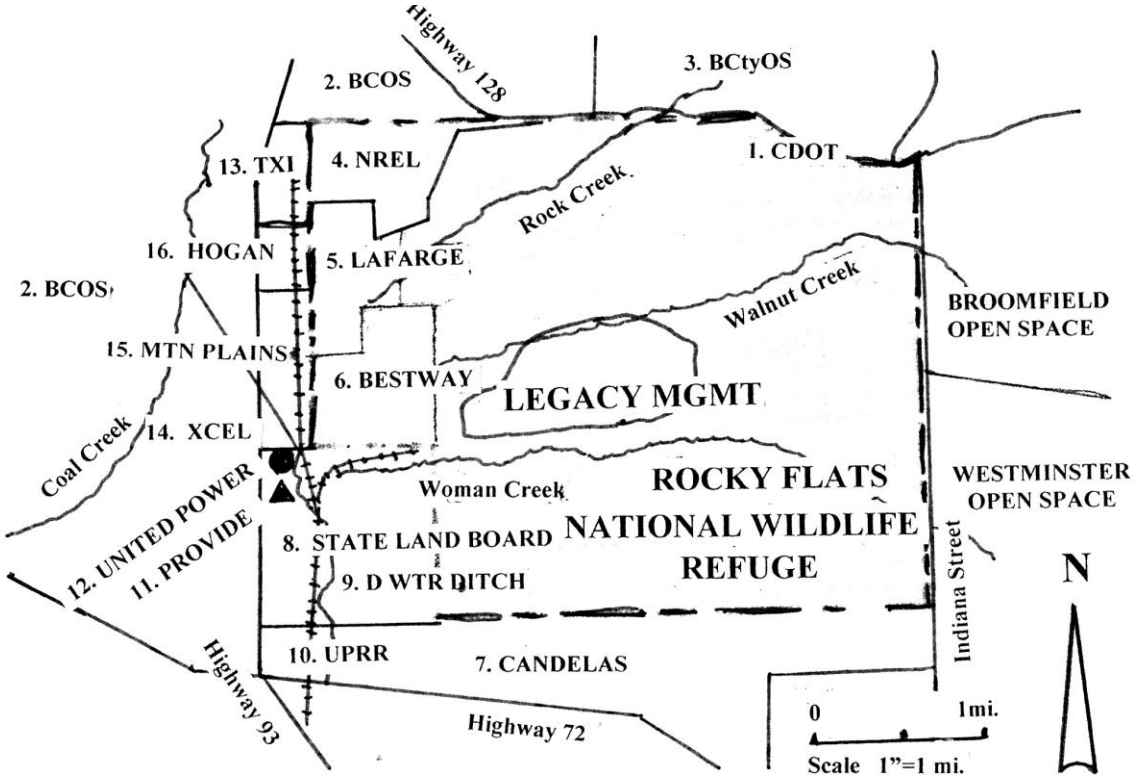
In JCNA's subsequent discussions with Voth in December, her comment about the experiment was that it was too late and too little. She felt the program should start earlier, about mid-May, and that the number of cattle should be greatly increased for the program to achieve better results.

E. RECOMMENDATIONS FOR THE 2011 PROGRAM

- Discuss proposed weed control programs for the coming year with each of the owner/managers.
- During the growing season visit all sites with owners/managers to better assess noxious weed location and abundance.

- Observe sites when actual weed control is taking place whether spraying, mowing or insect release to assess effectiveness of treatment application methodology.
- Discuss chemicals used and spray program with applicators.
- Observe sites following control activities to assess effectiveness of these various treatments.
- Prepare an end-of-year report summarizing JCNA analysis of the programs.

APPENDIX 1



OWNERS/MANAGERS AT ROCKY FLATS

1. **CDOT**. Jim Walker, State Weed Coordinator. CDOT owns ROW on 93 and 128.
2. **BCOS**. Laurie Dieter and Eric Fairlee, Weed Control. OSwest and north of Refuge.
3. **BCtyOS**. Steve Sauer, Bldr County Open Space. North of Hiway 128.
4. **NREL**. Mike McGrady, maint Spvr, Wind Farm, NW corner of Refuge.
5. **LAFARGE**. Casey Felmlee, gravelling south of NREL, w of Refuge.
6. **BESTWAY CONCRETE.** Myron Moorhead, Mgr. Mine just west of Refuge.
7. **CANDELAS.** Charlie McKay, owner. Development on south border.
8. **STATE LAND BOARD**. David Rodenberg, mgr. Section on SW corner.
9. **DENVER WATER**. Kevin Keefe, Land Mgr. 150' water ditch in Secs 9/16.
10. **UPRR**. Union Pacific RR. Dan Thompson, Track Maint, 100' spur in Secs 9/16.
11. **PROVIDE ENERGY.** Mel Richards, Land Mgr. 4 acre oil drill site in Sec 16.
12. **UNITED POWER**. Bryant Robbins, Power Station in northeast part of Sec 16.
13. **TXI AGGREGATE**. Randy Moulton, Mgr. 36 acre site west of NREL.
14. **XCEL ENERGY**. Adam Pena. Small gas pump station in NW corner of Sec 16.
15. **MTN PLAINS INDUSTR. CTR.** C. McKay. W 160 acres of Sec 9.
16. **HOGAN RANCH.** Bill Hogan. Ranch W of 93; 70 acres E in Sec 4,

APPENDIX 2

JCNA and City of Broomfield Weed Symposium
March 5, 2010
Broomfield Library
Broomfield, Colorado

AGENDA

7:45 am – 8:30 am	**Registration**
	General Session
8:30 am – 8:40 am	Introduction, *Paul Kilburn, JCNA*
8:40 am – 9:05 am	Rocky Flats Ecology and Weeds, *Dr. David Buckner*
9:05 am – 9:35 am	Colorado's Noxious Weed Program, *Kelly Uhing, State Weed Coordinator*
9:35 am – 10:00 am	Eradication Requirements, *Alicia Doran, Jeff Cty Weed Coordinator*
10:00 am – 10:30 am	**Break**
10:30 am – 11:10 am	Successional Weed Management, *Dr.George Beck, CSU Bioagrisciences*
11:10 am -11:30 am	Weed Control at Rocky Flats, *Jody Nelson, Ecologist-Rocky Flats Site*
11:30 am – 12:00 am	Biological Control, *Dr. Dan Bean, CDA Insectory*
12:00 am – 1:00 pm	**Lunch**
1:00 pm – 2:30 pm	**Round Table Discussion:** *Charlie McKay, Church Ranch; Steve Sauer, Boulder County Open Space; Robert Fiehweg, NREL; Dr. Tim Seastedt, CU, Jerry Bader, Jefferson Cty Open Space*
2:30 pm – 2:40 pm	Concluding Remarks, *Dr. D. Jean Tate, JCNA*

JCNA 25 Jan 10