

# 2008 Vegetation Surveys

---

## Introduction

Vegetation monitoring is conducted at the Rocky Flats Site to provide information necessary for management of the natural resources. Objectives of the vegetation monitoring in 2008 were to:

- Identify any new plant species records for the Site.
- Identify and document infestations of selected noxious weeds at the Site to assist with planning of noxious weed control applications.
- Document and track the locations where herbicide applications were conducted in 2008.
- Document where revegetation activities were conducted in 2008.
- Conduct photomonitoring for visual documentation of changes in vegetation establishment at the Site.

Revegetation monitoring to evaluate revegetation success across the Site is reported in another section of the annual report.

## Methods

### Weed Mapping

Sitewide weed mapping for selected species is a means of identifying high-priority treatment areas, monitoring the distribution of specific noxious weed species, discovering new weed species, and tracking the effectiveness of weed control. Weed mapping at the Site in 2008 was conducted both on foot and from a vehicle; binoculars were used with mapping on foot and from the vehicle. Sitewide species mapping was conducted when species were flowering or when they were most visible. Other species were mapped as fortuitous observations. During the summer of 2007, the outer portions of what was previously known as the Buffer Zone (now called the Peripheral Operable Unit [POU]), were transferred to the U.S. Fish and Wildlife Service to become the Rocky Flats National Wildlife Refuge. As a result, sitewide weed-mapping efforts in 2008 focused only on the U.S. Department of Energy (DOE)-retained lands in the center of the Site in what is now known as the Central Operable Unit (COU; Figure 1). The species mapped on a sitewide basis in 2008 included diffuse knapweed (*Centaurea diffusa*) and dalmatian toadflax (*Linaria dalmatica*). Additional species that were mapped based on fortuitous observations included Scotch thistle (*Onopordum acanthium*), Dame's rocket (*Hesperis matronalis*), leafy spurge (*Euphorbia uralensis*), tall mustard (*Cardaria chalepensis*), whitetop (*Cardaria draba*), and jointed goatgrass (*Aegilops cylindrica*).

For sitewide mapping, infestation areas were classified into general density categories of high, medium, low, and scattered based on a subjective interpretation of the extent, visual density, need for control, and aggressive nature of the species. In general, a high-density category indicated that an area was dominated by a nearly solid infestation or very high cover of the species. A medium-density category was used where the infestation provided less cover and was less homogeneous. The low-density category was used where individuals of the species were present in fewer numbers and were not visually dominating the landscape, but were beginning to

establish a foothold in the plant community and were in need of control. The scattered-density category indicated a sporadic occurrence of the species. The noxious weed populations and distributions were hand drawn in the field and should not be interpreted as a precise outline of the distribution of these species. Attempts were made to visit the entire COU, but some infestations may have been missed.

## Photographic Documentation

Photographs were taken at selected permanent photo points during the summer of 2008 to document and evaluate any changes resulting from climatic changes, natural resource management, or human activity. Photographs were compared to those taken previously. The time-series photographs can be viewed on the Ecology DVD.

## Results and Discussion

### Site Flora

The complete list of plant species known to occur at the Site as of the end of 2008 is found on the Ecology DVD. The Site species list includes the complete flora of both the COU and POU. As a result of the 2008 fieldwork, one new record of vascular plant species for the Site flora is reported. Palmer's penstemon (*Penstemon palmeri*) was found southeast of the former raw water pond along the west access road in an area that was revegetated during Site closure. The species is often used in revegetation seed mixes and is a native to southwestern United States. Although not native to the Front Range of Colorado, it is not expected to be a problem; however, the area will be observed to see if the plants begin to establish and spread. The following taxonomic name will be used at the Site for the new plant species record<sup>1</sup>:

| Family           | Scientific Name                     | Speccode | Common Name        |
|------------------|-------------------------------------|----------|--------------------|
| Scrophulariaceae | <i>Penstemon palmeri</i><br>A. Gray | PEPA1    | Palmer's penstemon |

Voucher specimens of the species will be deposited at the University of Colorado Herbarium in Boulder, Colorado.

### Weed Mapping and Weed Control

The 2008 weed distribution maps for diffuse knapweed and dalmatian toadflax are shown in Figures 2 and 3, respectively. Table 1 shows the estimated total acreage and acreage-by-density categories for each species, based on the 2007 and 2008 mapping data. The acreage values are only approximate. In 2008, diffuse knapweed was observed on approximately 280 acres at various levels of infestation. The total area of the COU is approximately 1,308 acres. Dalmatian toadflax was mapped on approximately 206 acres at the Site in 2008. Both species showed a decline in acreage compared to the 2007 mapping data. Some of this is likely due to the below-normal precipitation in 2008. Diffuse knapweed reductions are also probably due to spraying efforts that were directed at this species in 2008.

<sup>1</sup> Plant nomenclature follows that of GPFA (1986), Weber (1976), and Weber (1990) in that order of determination, when feasible. The USDA PLANTS Database (USDA NRCS 2009) is used if a species cannot be found in the listed references. Species were verified at the University of Colorado Herbarium in Boulder, Colorado (COLO).

Additional species that were mapped based on fortuitous observations in 2008 included Scotch thistle, Dame's rocket, leafy spurge, tall mustard, whitetop, and jointed goatgrass. Figure 4 shows the locations of these species as mapped in 2008.

During 2008, approximately 321 acres in the COU were treated with herbicides using ground applications. Figure 5 shows the location and herbicides applied at each location in 2008. Table 2 lists the target species, herbicides and application rates applied at each location, and the approximate timing of the application during the year. (**Note:** At several locations multiple herbicides are listed for a location. This does not mean that each herbicide was used across that entire location. Rather, depending on site-specific characteristics such as target weed species, the locations of water bodies, soil types, and the professional judgment of the licensed herbicide applicator, different herbicides were used within that location to provide the control needed.)

The herbicide Milestone (active ingredient is aminopyralid) was used to treat several areas at the Site in 2008. This herbicide first became available on the market in 2006. Its advantages include a low application rate, a low environmental impact, and high effectiveness on many target species at the Site. The fact that it can be sprayed to the water's edge also makes it a good tool for controlling Canada thistle and other weedy species that are often present at the edges of ponds and wetlands. Previously, near water these species have been difficult or impossible to control with other methods. Milestone also seems to have at least a 2-year residual effect on preventing the establishment of target species such as diffuse knapweed at the Site. Other herbicides listed are often mixed with the Milestone to control additional species that are not controlled by Milestone.

In 2007, a small patch of leafy spurge, a state-listed noxious weed, was documented for the first time at the Site. This patch was sprayed in 2007 to control its spread. In 2008, two additional small patches of leafy spurge were found in the northern COU. Because these new patches of leafy spurge had already started going to seed when they were discovered, the seedheads were cut off, bagged, and sent to the landfill for burial. All three leafy spurge areas will be evaluated in 2009 and sprayed as needed. Hand control and weed whacking were also used to control some small patches of Scotch thistle, tall mustard, and whitetop in 2008.

The use of biocontrol insects continues at the Site. Approximately 200, *Mecinus janthinus*, stem mining beetles were released to help control Dalatian toadflax in the COU in spring 2008. At other locations at the Site these beetles have helped to reduce the abundance of the toadflax. Additional biocontrols for different species may be released as they become available. Collections from established populations at the Site may be made and moved to other infestations at the Site where control is needed, as feasible. The integrated weed management approach to controlling noxious weeds at the Site continues to address noxious weed issues through mapping and the use of various control methods.

## Revegetation Activities

During 2008, one location where an earlier revegetation effort had not been successful was redone (Figure 6). Before Site closure this location had been a road and parking area. Part of the area had been disturbed in 2007 during the 991 slump repair project. Poor soil and substrate conditions had limited vegetation establishment. Compost, Sustane fertilizer, and mycorrhizal inoculant were added as soil amendments. The total area of the revegetation project was approximately 3 acres (Table 3). At other locations where vegetation was establishing but still

somewhat sparse, interseeding was done to help increase the vegetation cover. Approximately 109 acres were interseeded by hand or using an ATV-mounted broadcast seeder in 2008 (Figure 6, Table 3). In addition, Sustane fertilizer, a slow-release fertilizer, was applied to approximately 30 acres to assist in revegetation efforts (Figure 7, Table 4). Photos from the photomonitoring conducted at these locations in 2008 are on the Ecology DVD.

In general, the vegetation in the COU is doing well. The lack of precipitation early in the growing season in 2008 hindered some establishment of the cool-season grasses, but late summer rains helped germinate and start the establishment of warm-season species. Monitoring information from the revegetation areas is presented in another section of the annual report.

## Summary

Management of natural resources at the Site involved the use of various management tools in 2008, including weed control and revegetation activities. The threat from noxious weeds continues to be a high management priority at the Site. Although the number of acres that DOE's Office of Legacy Management manages at the Site was reduced in 2007 by the transfer of property to the Rocky Flats National Wildlife Refuge, weed control in both the revegetation areas and natural areas remains a high priority within the COU. Approximately 321 acres in the COU were treated with herbicides in 2008 to control noxious weeds. Additional areas were interseeded, and some locations had soil amendments applied to improve the stands of desirable vegetation. Photomonitoring is used to document the establishment of vegetation at the revegetation locations. Over the next several years the vegetation should continue to fill in and provide a good protective cover on the soils at the Site.

## References

GPFA (Great Plains Flora Association), 1986. *Flora of the Great Plains*, 2nd printing with 1991 supplement, University Press of Kansas, Lawrence, Kansas.

USDA, NRCS (U.S. Department of Agriculture, Natural Resources Conservation Services), 2009. PLANTS Database, <http://plants.usda.gov>, accessed 26 February 2009.

Weber, W.A., 1976. *Rocky Mountain flora, Colorado*, Associated University Press, Boulder, Colorado.

Weber, W.A., 1990. *Colorado flora: Eastern Slope*, University Press of Colorado, Niwot, Colorado.

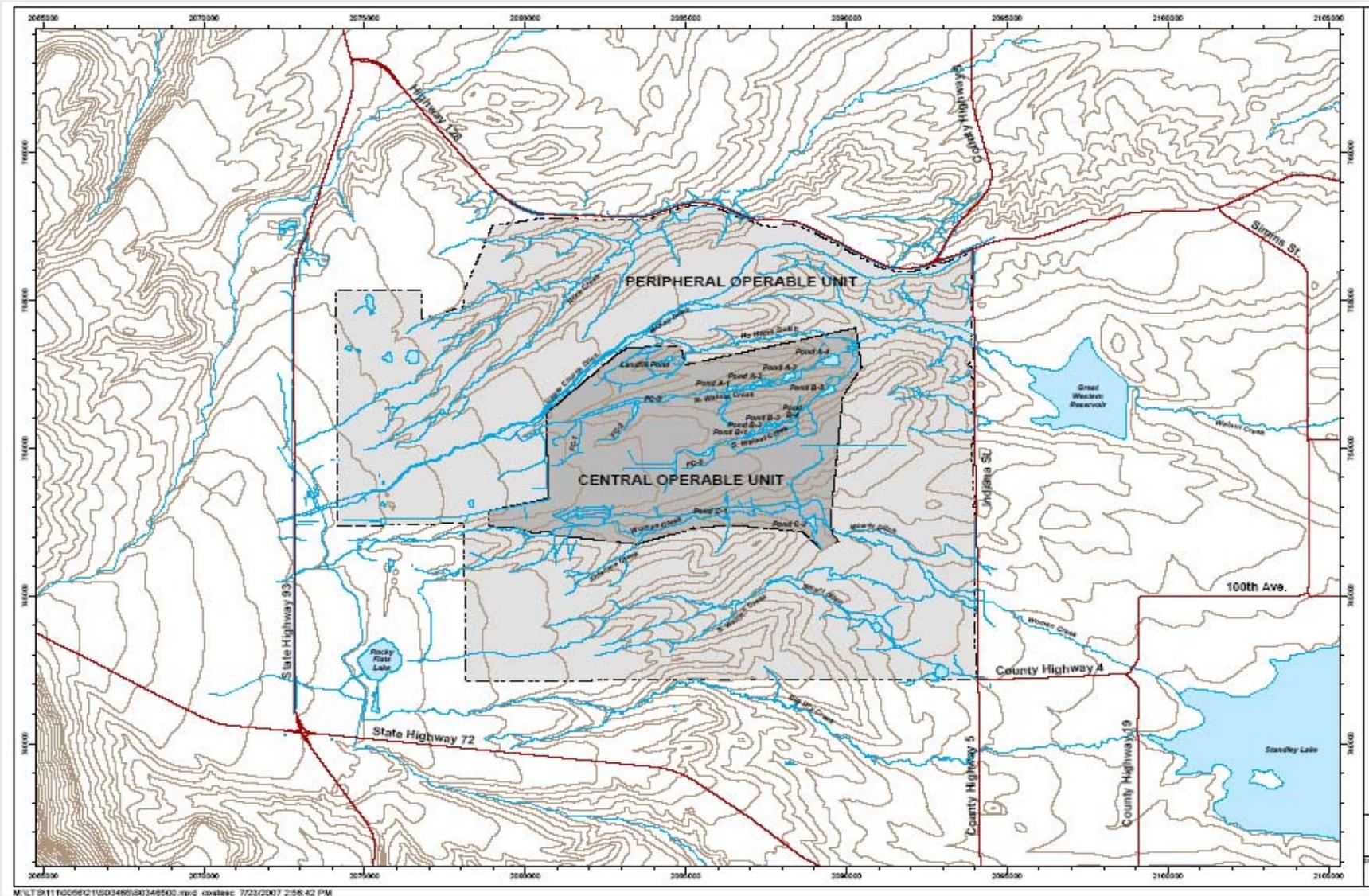
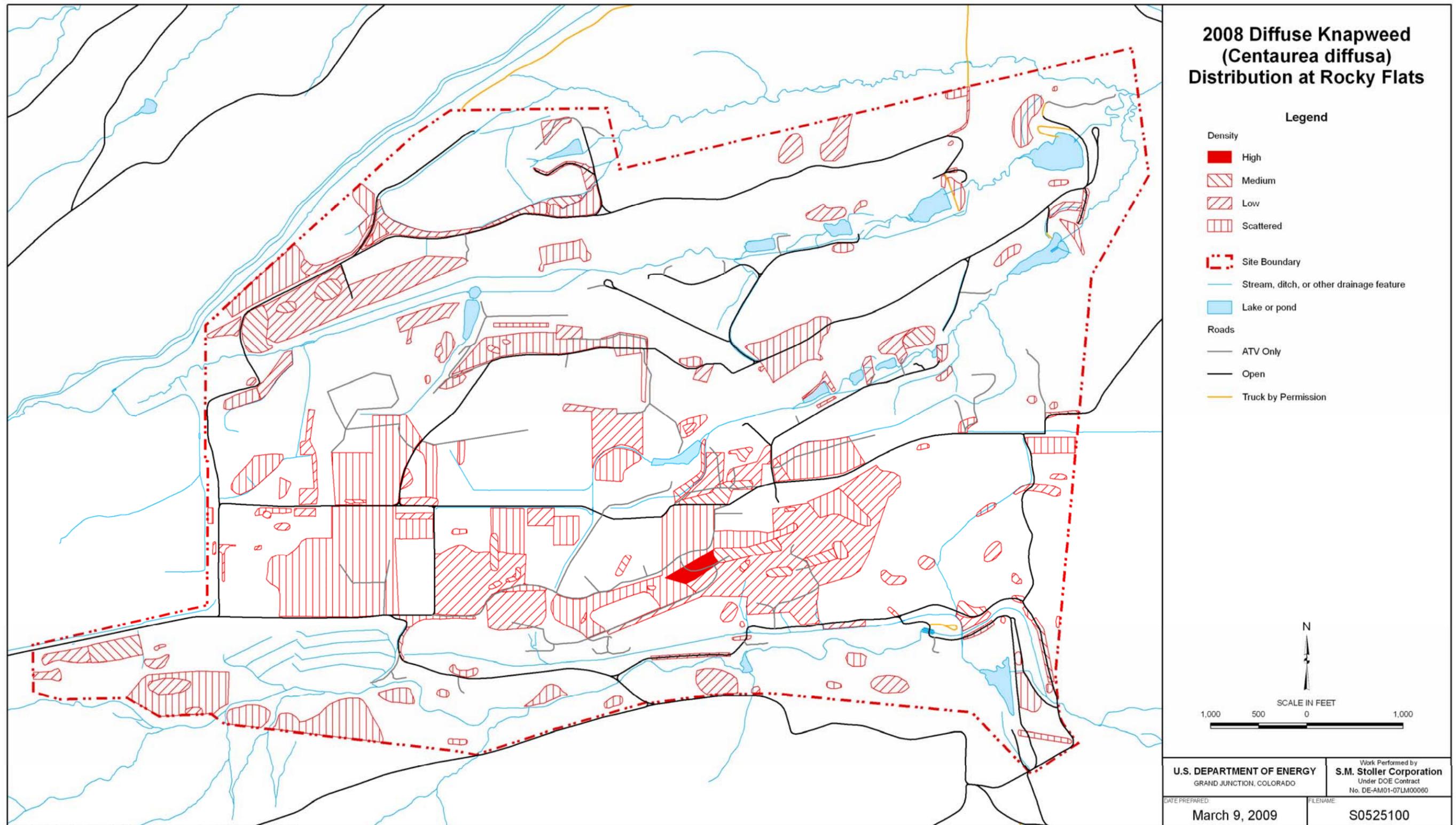
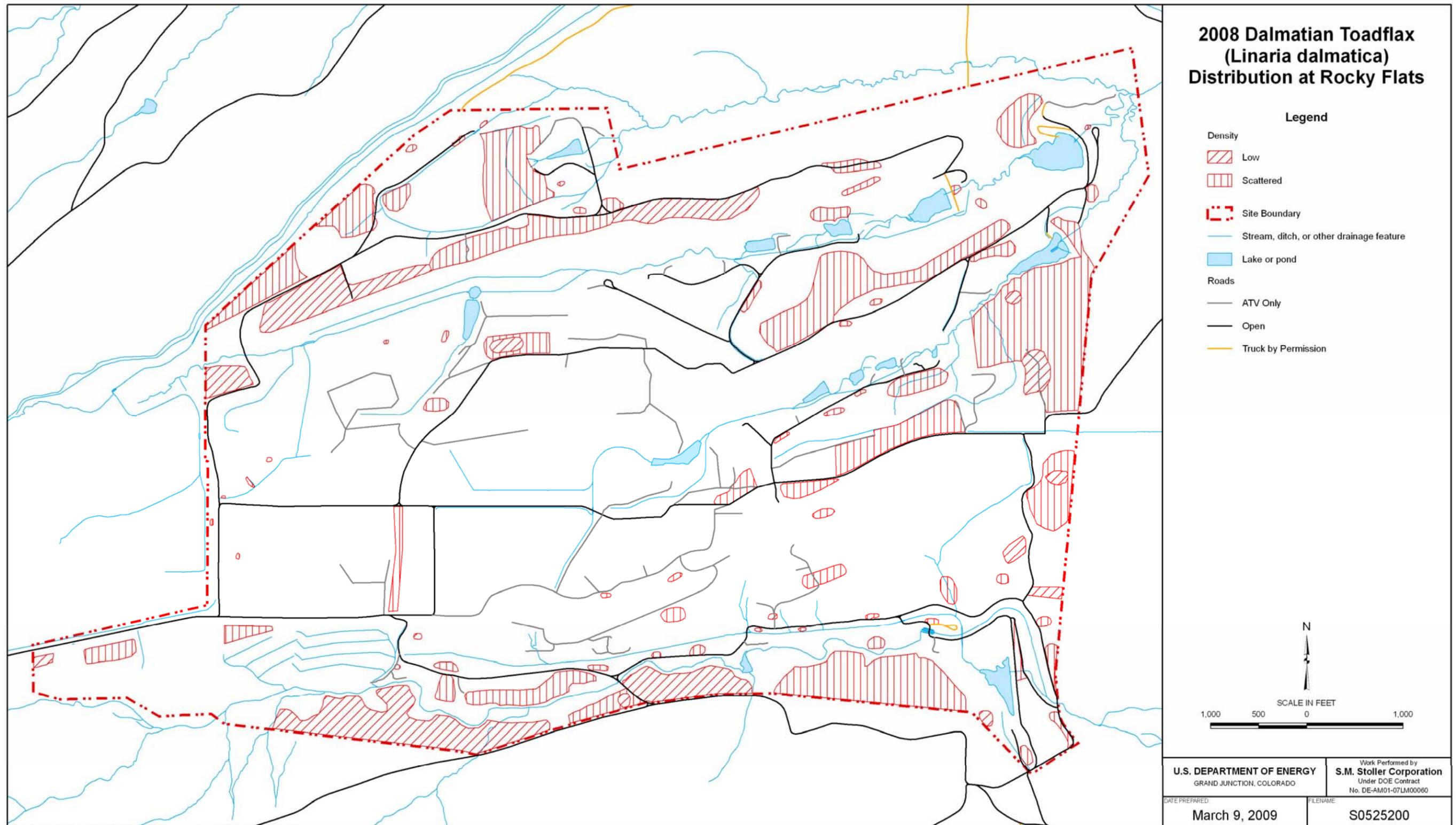


Figure 1. Locations of the Central Operable Unit and Peripheral Operable Units at the Rocky Flats Site.



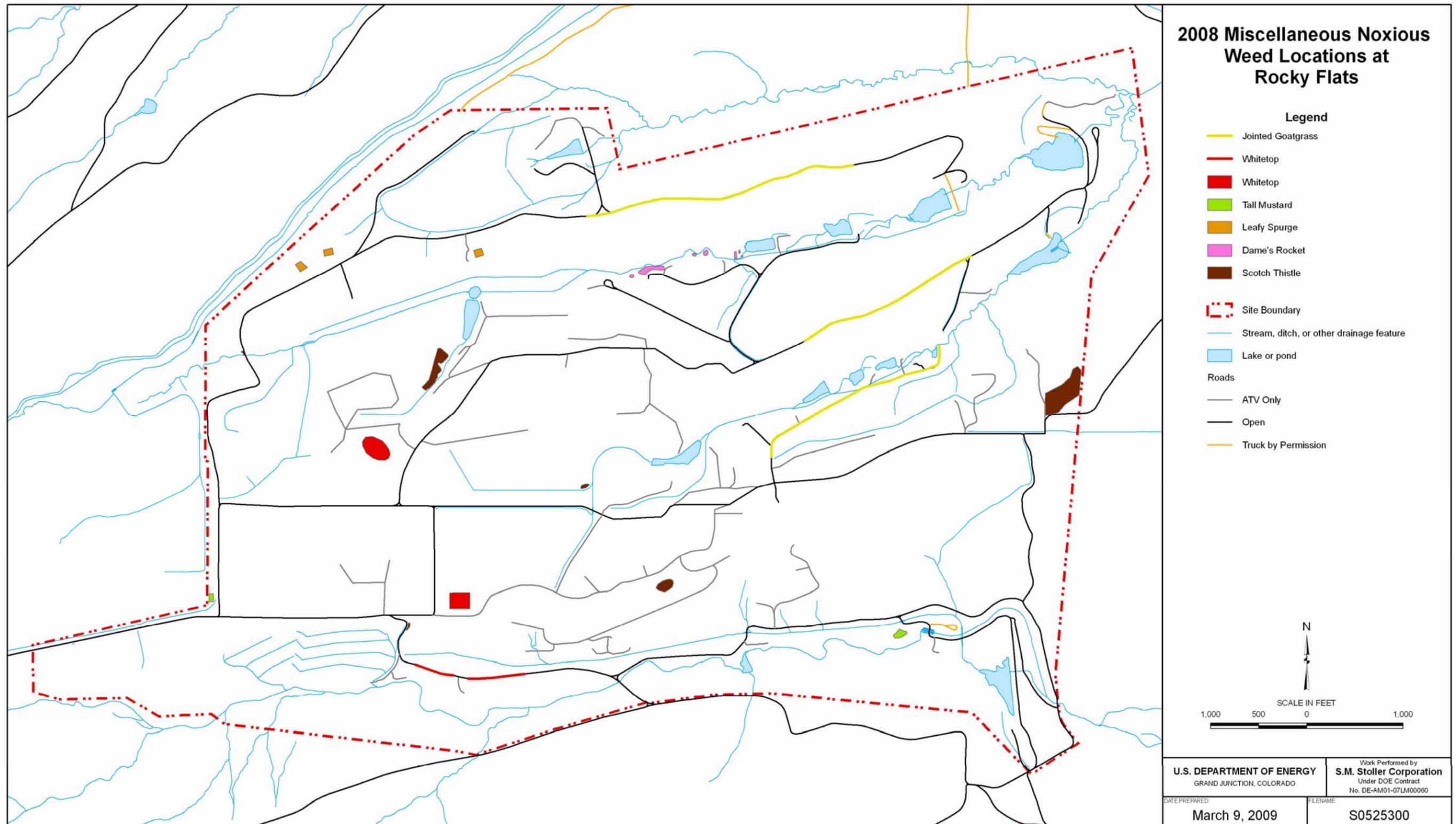
M:\LTS\11110056\121006\105251\10525100.mxd coatesc 3/9/2009 10:35:17 AM

Figure 2. 2008 Diffuse Knapweed (Centaurea diffusa) Distribution at Rocky Flats.



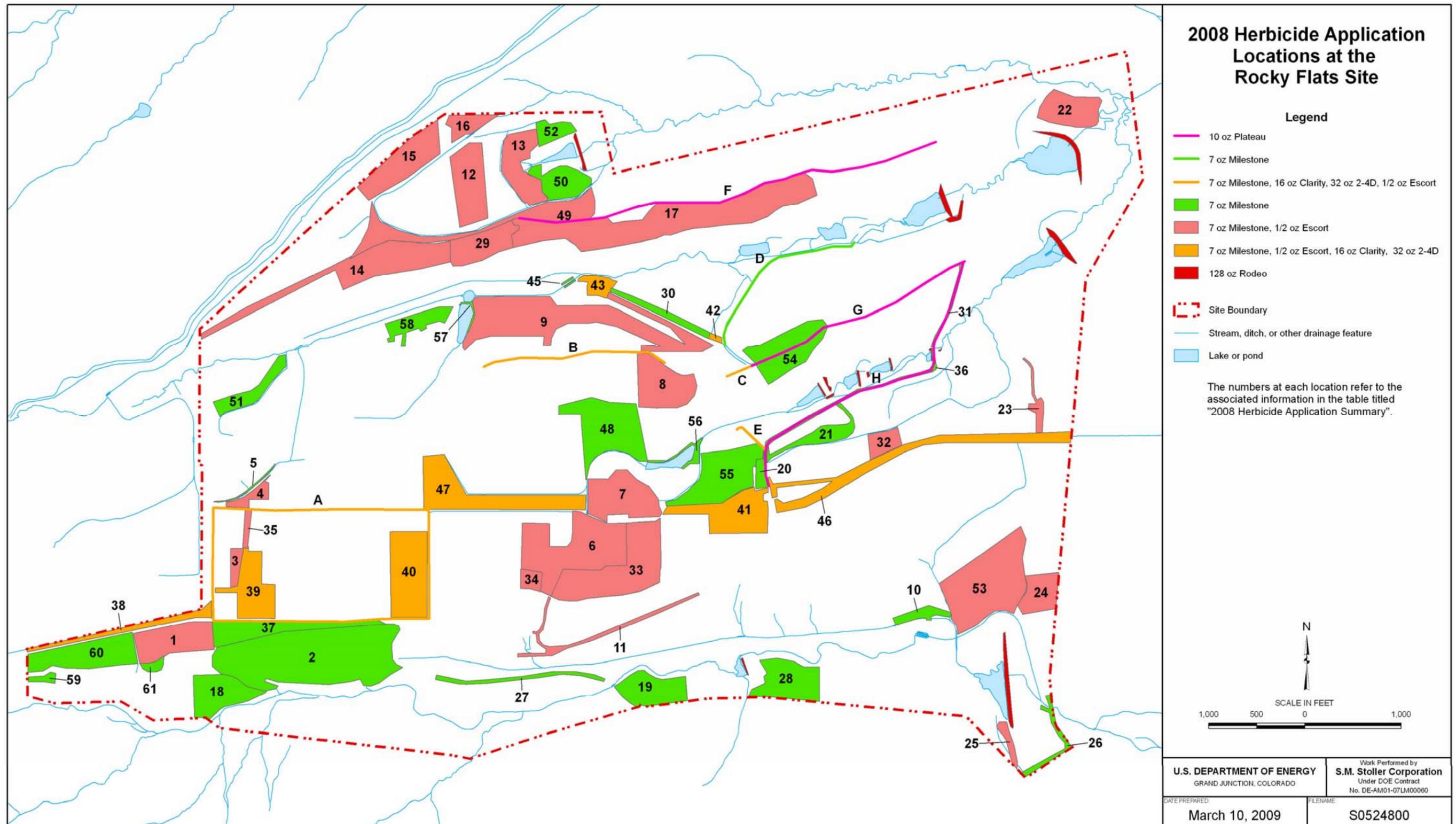
M:\LTS\11110056\121006\IS05252\IS0525200.mxd coatesc 3/9/2009 10:38:52 AM

Figure 3. 2008 Dalmatian Toadflax (*Linaria dalmatica*) Distribution at Rocky Flats.



M:\LT\S\11110056\121006\S05253\S0525300.mxd coatesc 3/9/2009 10:42:04 AM

Figure 4. 2008 Miscellaneous Noxious Weed Locations at Rocky Flats.



M:\LTS\11110056\121006\IS05248\IS0524800.mxd coatesc 3/10/2009 12:03:56 PM

Figure 5. 2008 Herbicide Application Locations at the Rocky Flats Site.

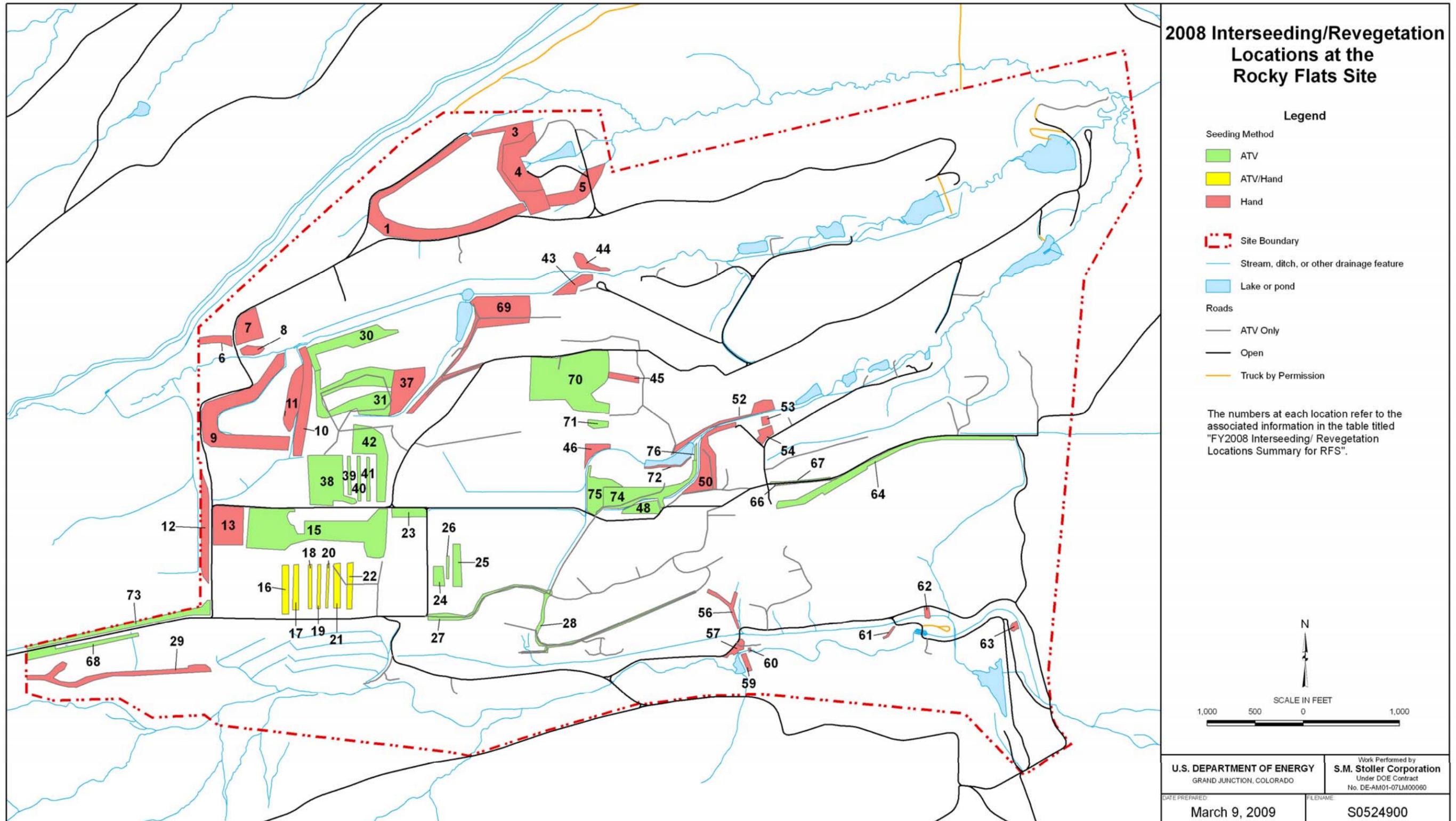


Figure 6. 2008 Interseeding/Revegetation Locations at the Rocky Flats Site.

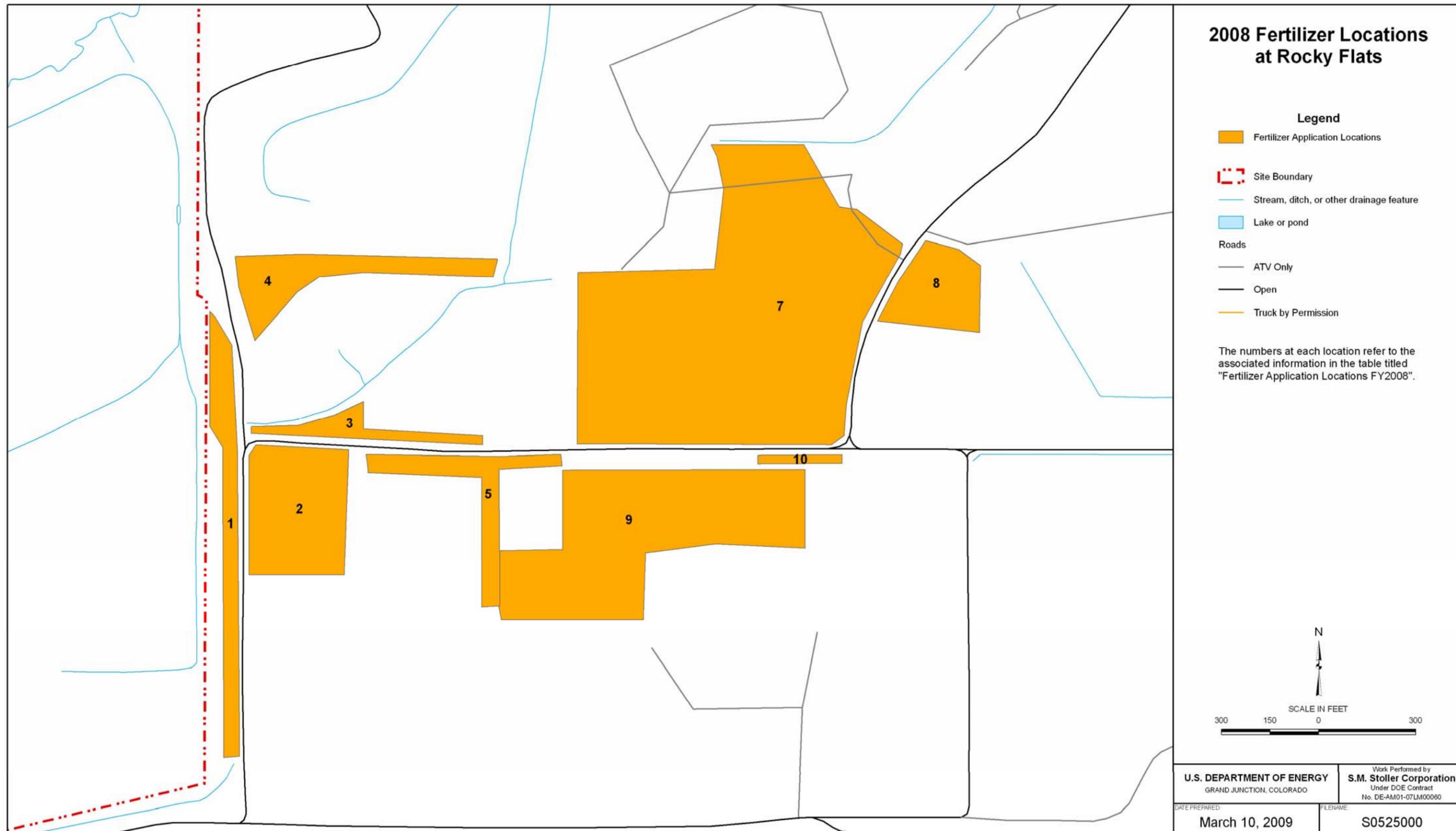


Figure 7. 2008 Fertilizer Locations at the Rocky Flats Site.

**Table 1. COU Noxious Weed Acreage Summary**

| <b>Species</b>     | <b>Density (acres)</b> |               |            |                  | <b>Total</b> |
|--------------------|------------------------|---------------|------------|------------------|--------------|
|                    | <b>High</b>            | <b>Medium</b> | <b>Low</b> | <b>Scattered</b> |              |
| Diffuse knapweed   |                        |               |            |                  |              |
| 2007               | 2.2                    | 41.2          | 248.8      | 167.7            | 459.9        |
| 2008               | 1.8                    | 20.6          | 110.0      | 147.5            | 279.9        |
| Dalmatian toadflax |                        |               |            |                  |              |
| 2007               | 77.1                   | 51.0          | 0.0        | 109.0            | 237.1        |
| 2008               | 0                      | 0             | 54.3       | 151.8            | 206.1        |

Table 2. FY2008 Herbicide Application Summary

| Location                      | Type of Area | Target Species*     | Treatment**  | Actual Acreage Treated | Time of Year Treated |
|-------------------------------|--------------|---------------------|--|------------------------|----------------------|
| 1                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 5.8                    | Spring08 Phase I     |
| 2                             | Polygon      | CEDI1               | 7 oz Milestone   | 27.3                   | Spring08 Phase I     |
| 3                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 1.3                    | Spring08 Phase I     |
| 4                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 1.3                    | Spring08 Phase I     |
| 5                             | Polygon      | CEDI1               | 7 oz Milestone   | 0.3                    | Spring08 Phase I     |
| 6                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 12.5                   | Spring08 Phase I     |
| 7                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 7.0                    | Spring08 Phase I     |
| 8                             | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 6.5                    | Spring08 Phase I     |
| 9                             | Polygon      | CEDI1, CIAR1        | 7 oz Milestone, 1/2 oz Escort                            | 19.5                   | Spring08 Phase I     |
| 10                            | Polygon      | CEDI1               | 7 oz Milestone   | 1.3                    | Spring08 Phase I     |
| 11                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 2.5                    | Spring08 Phase I     |
| 12                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 6.0                    | Spring08 Phase I     |
| 13                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 5.0                    | Spring08 Phase I     |
| 14                            | Polygon      | CEDI1, VETH1        | 7 oz Milestone, 1/2 oz Escort                            | 10.5                   | Spring08 Phase I     |
| 15                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 6.5                    | Spring08 Phase I     |
| 16                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 2.0                    | Spring08 Phase I     |
| 17                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 22.0                   | Spring08 Phase I     |
| 18                            | Polygon      | CEDI1               | 7 oz Milestone   | 5.0                    | Spring08 Phase I     |
| 19                            | Polygon      | CEDI1               | 7 oz Milestone   | 4.5                    | Spring08 Phase I     |
| 20                            | Polygon      | CEDI1               | 7 oz Milestone   | 0.7                    | Spring08 Phase I     |
| 21                            | Polygon      | CEDI1               | 7 oz Milestone   | 2.5                    | Spring08 Phase I     |
| 22                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 4.5                    | Spring08 Phase I     |
| 23                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 1.0                    | Spring08 Phase I     |
| 24                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 3.5                    | Spring08 Phase I     |
| 25                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 1.0                    | Spring08 Phase I     |
| 26                            | Polygon      | CEDI1               | 7 oz Milestone   | 1.3                    | Spring08 Phase I     |
| 27                            | Polygon      | CEDI1               | 7 oz Milestone   | 1.5                    | Spring08 Phase I     |
| 28                            | Polygon      | CEDI1               | 7 oz Milestone   | 5.5                    | Spring08 Phase I     |
| 29                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 5.0                    | Spring08 Phase I     |
| 30                            | Polygon      | CEDI1               | 7 oz Milestone   | 1.8                    | Spring08 Phase I     |
| 31                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 0.5                    | Spring08 Phase I     |
| 32                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 2.0                    | Spring08 Phase I     |
| 33                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 11.0                   | Spring08 Phase I     |
| 34                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 1.0                    | Spring08 Phase I     |
| 35                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 0.5                    | Spring08 Phase I     |
| 36                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 2.0                    | Spring08 Phase II    |
| 37                            | Polygon      | CEDI1               | 7 oz Milestone   | 5.0                    | Spring08 Phase II    |
| 38                            | Polygon      | CEDI1, KOSC1, LASE1 | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 2.5                    | Spring08 Phase II    |
| 39                            | Polygon      | CEDI1, KOSC1, LASE1 | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 5.3                    | Spring08 Phase II    |
| 40                            | Polygon      | CEDI1, KOSC1, LASE1 | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 7.8                    | Spring08 Phase II    |
| 41                            | Polygon      | CEDI1, KOSC1        | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 7.3                    | Spring08 Phase II    |
| 42                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 0.3                    | Spring08 Phase II    |
| 43                            | Polygon      | CEDI1, CIAR1, KOSC1 | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 1.3                    | Spring08 Phase II    |
| 44                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 0.1                    | Spring08 Phase II    |
| 45                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 0.1                    | Spring08 Phase II    |
| 46                            | Polygon      | CEDI1, KOSC1, LASE1 | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 8.0                    | Spring08 Phase II    |
| 47                            | Polygon      | KOSC1, CEDI1        | 7 oz Milestone, 1/2 oz Escort, 16 oz Clarity, 32 oz 2-4D | 9.0                    | Spring08 Phase II    |
| 49                            | Polygon      | CEDI1, VETH1, CIAR1 | 7 oz Milestone, 1/2 oz Escort                            | 7.5                    | Fall08 Phase I       |
| 50                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 3.5                    | Fall08 Phase I       |
| 51                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 3.0                    | Fall08 Phase I       |
| 52                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 1.8                    | Fall08 Phase I       |
| 53                            | Polygon      | CEDI1               | 7 oz Milestone, 1/2 oz Escort                            | 15.0                   | Fall08 Phase I       |
| 54                            | Polygon      | CEDI1               | 7 oz Milestone   | 6.5                    | Fall08 Phase I       |
| 55                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 8.0                    | Fall08 Phase I       |
| 56                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 0.7                    | Fall08 Phase I       |
| 57                            | Polygon      | CIAR1, CEDI1        | 7 oz Milestone   | 0.4                    | Fall08 Phase I       |
| 48                            | Polygon      | CEDI1, CIAR1        | 7 oz Milestone   | 9.0                    | Fall08 Phase I       |
| 58                            | Polygon      | CEDI1               | 7 oz Milestone   | 3.3                    | Fall08 Phase I       |
| 59                            | Polygon      | CEDI1               | 7 oz Milestone   | 1.0                    | Fall08 Phase I       |
| 60                            | Polygon      | CEDI1               | 7 oz Milestone   | 6.5                    | Fall08 Phase I       |
| 61                            | Polygon      | CEDI1               | 7 oz Milestone   | 0.5                    | Fall08 Phase I       |
| A                             | Road         | CEDI1, KOSC1        | 7 oz Milestone, 16 oz Clarity, 32 oz 2-4D, 1/2 oz Escort | 4.5                    | Spring08 Phase II    |
| B                             | Road         | CEDI1, KOSC1        | 7 oz Milestone, 16 oz Clarity, 32 oz 2-4D, 1/2 oz Escort | 2.0                    | Spring08 Phase II    |
| C                             | Road         | CEDI1, KOSC1        | 7 oz Milestone, 16 oz Clarity, 32 oz 2-4D, 1/2 oz Escort | 0.5                    | Spring08 Phase II    |
| D                             | Road         | CEDI1, KOSC1        | 7 oz Milestone   | 1.4                    | Spring08 Phase II    |
| E                             | Road         | CEDI1, KOSC1        | 7 oz Milestone, 16 oz Clarity, 32 oz 2-4D, 1/2 oz Escort | 0.5                    | Spring08 Phase II    |
| F                             | Road         | AECY1               | 10 oz Plateau  | 3.5                    | Fall08 Phase I       |
| G                             | Road         | AECY1               | 10 oz Plateau  | 1.7                    | Fall08 Phase I       |
| H                             | Road         | AECY1               | 10 oz Plateau  | 2.5                    | Fall08 Phase I       |
| Total Acreage Treated in 2008 |              |                     |  | 321.4                  |                      |

\* Species Codes: AECY1 = Jointed Goatgrass, CEDI1 = Diffuse knapweed, CIAR1 = Canada thistle, KOSC1 = Kochia, LASE1 = Wild Lettuce, VETH1 = Mullein

\*\* Each herbicide listed was not sprayed across the entire area. The first herbicide listed was the primary herbicide used across the entire area. The additional herbicides were used at selected locations within each area to target specific species.

Table 3. FY2008 Interseeding/Revegetation Locations Summary for RFS

| Location    | Acres | Seed Mix     | Seeding Method | Date Seeded | Comments   |
|-------------|-------|--------------|----------------|-------------|--|
| 1           | 6.6   | Flat         | Hand           | 1/21-22/08  |  |
| 3           | 3.5   | Flat         | Hand           | 1/31-2/4    |  |
| 4           | 3.3   | Hillslope    | Hand           | 2/21-22/08  |  |
| 5           | 2.3   | Hillslope    | Hand           | 2/18/08     |  |
| 6           | 0.6   | Flat         | Hand           | 3/12/08     |  |
| 7           | 1.8   | Flat         | Hand           | 3/12/08     |  |
| 8           | 0.4   | Hillslope    | Hand           | 3/12/08     |  |
| 9           | 6.6   | Hillslope    | Hand           | 1/24-25/08  |  |
| 10          | 2.6   | Hillslope    | Hand           | 3/12-13/08  |  |
| 11          | 1.8   | Wetland/Flat | Hand           | 2/08        |  |
| 12          | 1.8   | Flat         | Hand           | 1/23/08     |  |
| 13          | 2.9   | Flat         | Hand           | 1/24-30-08  |  |
| 15          | 9.9   | Flat         | ATV            | 2/27/08     |  |
| 16          | 0.8   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 17          | 0.7   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 18          | 0.4   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 19          | 0.4   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 20          | 0.3   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 21          | 0.8   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 22          | 0.6   | Flat         | ATV/Hand       | 1/27-28/08  |  |
| 23          | 0.8   | Flat         | ATV            | 3/11/08     |  |
| 24          | 0.5   | Flat         | ATV            | 3/25/08     |  |
| 25          | 0.9   | Flat         | ATV            | 3/25/08     |  |
| 26          | 0.1   | Flat         | ATV            | 3/25/08     |  |
| 27          | 1.3   | Flat         | ATV            | 3/25/08     |  |
| 28          | 1.7   | Hillslope    | ATV            | 3/25/08     |  |
| 29          | 2.6   | Hillslope    | Hand           | 1/30/08     |  |
| 30          | 2.8   | Hillslope    | ATV            | 3/26/08     |  |
| 31          | 5.7   | Flat         | ATV            | 3/26/08     |  |
| 37          | 2.7   | Hillslope    | Hand           | 1/31-2/25   |  |
| 38          | 4.3   | Flat         | ATV            | 3/11/08     |  |
| 39          | 0.3   | Flat         | ATV            | 3/11/08     |  |
| 40          | 0.3   | Flat         | ATV            | 3/11/08     |  |
| 41          | 0.4   | Flat         | ATV            | 3/11/08     |  |
| 42          | 3.2   | Flat         | ATV            | 3/25/08     |  |
| 43          | 0.9   | Hillslope    | Hand           | 1/23/08     |  |
| 44          | 0.6   | Hillslope    | Hand           | 1/23/08     |  |
| 45          | 0.5   | Flat         | Hand           | 1/30/08     |  |
| 46          | 0.6   | Hillslope    | Hand           | 2/22/08     |  |
| 48          | 0.9   | Flat         | ATV            | 3/11/08     |  |
| 50          | 2.6   | Hillslope    | Hand           | 1/22/05     |  |
| 52          | 1.2   | Hillslope    | Hand           | 3/10/08     |  |
| 53          | 0.1   | Hillslope    | Hand           | 3/10/08     |  |
| 54          | 0.4   | Hillslope    | Hand           | 3/10/08     |  |
| 56          | 0.5   | Hillslope    | Hand           | 1/24/08     |  |
| 57          | 0.3   | Hillslope    | Hand           | 3/4/08      |  |
| 59          | 0.2   | Hillslope    | Hand           | 3/4/08      |  |
| 60          | 0.0   | Hillslope    | Hand           | 3/4/08      |  |
| 61          | 0.1   | Hillslope    | Hand           | 3/4/08      |  |
| 62          | 0.2   | Hillslope    | Hand           | 3/4/08      |  |
| 63          | 0.1   | Hillslope    | Hand           | 3/4/08      |  |
| 64          | 3.3   | Flat         | ATV            | 4/29/08     |  |
| 66          | 0.1   | Flat         | ATV            | 4/29/08     |  |
| 67          | 0.2   | Flat         | ATV            | 4/29/08     |  |
| 68          | 1.5   | Flat         | ATV            | 4/21/08     |  |
| 69          | 5.5   | Hillslope    | Hand           | 4/2/08      |  |
| 70          | 9.4   | Flat         | ATV            | 5/12/08     |  |
| 71          | 0.3   | Flat         | ATV            | 5/12/08     |  |
| 72          | 0.2   | Wetland      | Hand           | 3/10/08     |  |
| 73          | 2.2   | Flat         | ATV            | 4/2/08      |  |
| 74          | 3.2   | Flat         | ATV            | 8/29/08     | Completely redone - added compost, Sustane fertilizer, and mycorrhizal inoculant |
| 75          | 1.8   | Flat         | ATV            | 3/11/08     |  |
| 76          | 0.1   | Flat         | ATV            | 3/11/08     |  |
| Total Acres | 112.6 |              |                |             |  |

**Table 4. Fertilizer Application Locations FY2008**

| <b>Location</b> | <b>Fertilizer</b> | <b>Application Method</b> | <b>Acres</b> | <b>Date Applied</b> |
|-----------------|-------------------|---------------------------|--------------|---------------------|
| 1               | Sustane           | ATV spreader              | 1.7          | 7/20/2008           |
| 2               | Sustane           | ATV spreader              | 2.7          | 9/16/2008           |
| 3               | Sustane           | ATV spreader              | 0.7          | 7/2/2008            |
| 4               | Sustane           | ATV spreader              | 1.6          | 7/2/2008            |
| 5               | Sustane           | ATV spreader              | 1.2          | 9/16/2008           |
| 7               | Sustane           | ATV spreader              | 14.4         | 6/24/2008           |
| 8               | Sustane           | ATV spreader              | 1.4          | 6/24/2008           |
| 9               | Sustane           | ATV spreader              | 6.4          | 9/16/2008           |
| 10              | Sustane           | ATV spreader              | 0.2          | 9/16/2008           |
|                 |                   | Total Acres               | 30.2         |                     |