LMS/ULP/49527

2024 Monitoring Report, Dolores River Restoration on Lease Tract C-SR-13

March 2025

U.S. DEPARTMENT OF ENERGY | Legacy Management

This document has been designed for online viewing.

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Abbreviations

CDA	Colorado Department of Agriculture
DOE	U.S. Department of Energy
DRRP	Dolores River Restoration Partnership
IPM	integrated pest management
LM	Office of Legacy Management
LMS	Legacy Management Support
ULP	Uranium Leasing Program
USC	*United States Code*
USDA	U.S. Department of Agriculture

1.0 Background

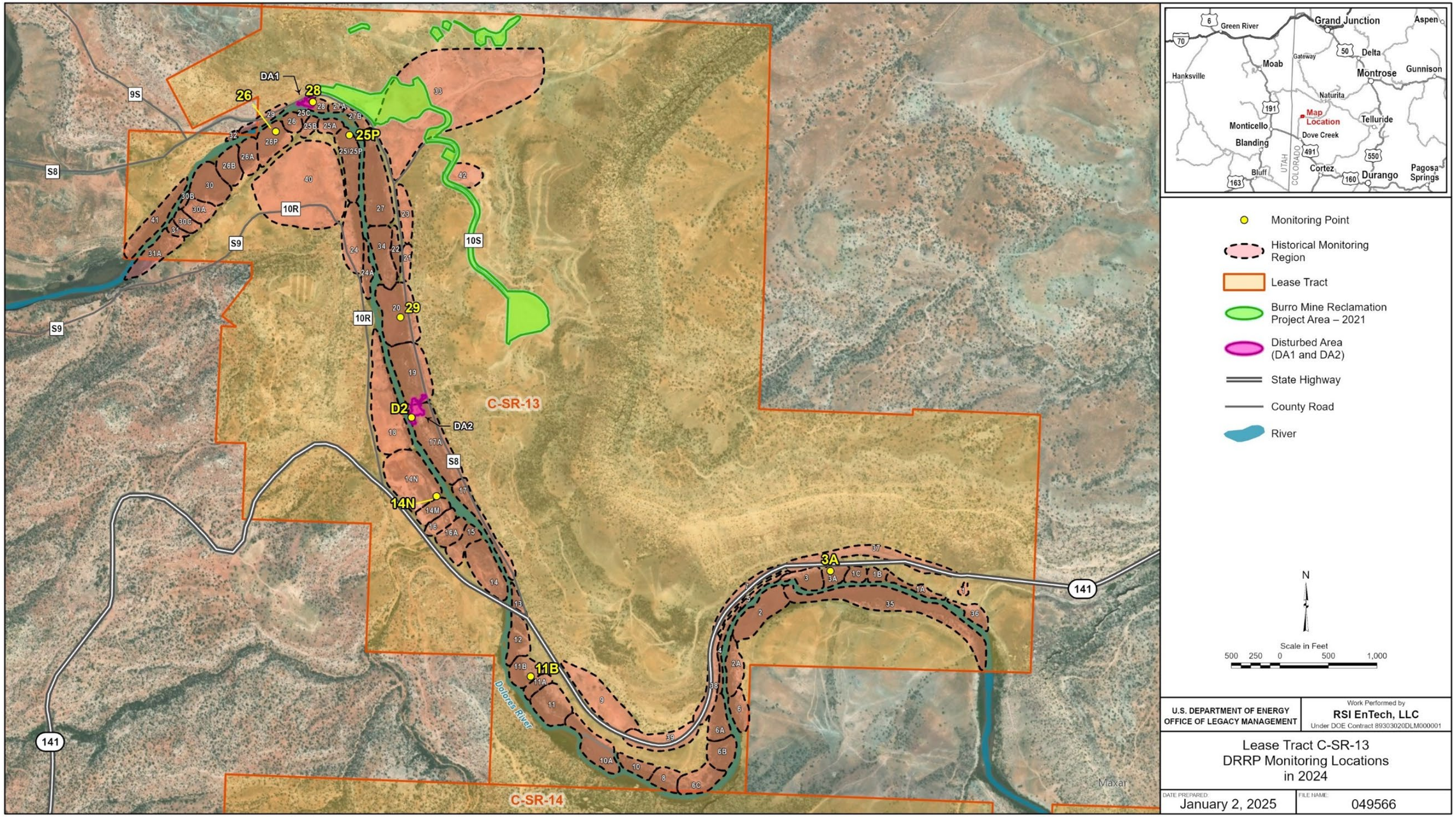
The Dolores River Restoration Partnership (DRRP) is a coalition of public and private organizations working to restore the riparian corridor of the Dolores River in western Colorado and eastern Utah. Approximately 3.3 miles of the Dolores River riparian corridor are within U.S. Department of Energy (DOE) Uranium Leasing Program (ULP) Lease Tract C-SR-13 (Figure 1). Since 2011, DOE's Office of Legacy Management (LM) has supported the DRRP's management goals in Lease Tract C-SR-13 by controlling weeds and restoring ecological communities. LM began annual ecological monitoring in 2012 to document changes in vegetation and guide weed control and restoration activities. LM formally joined the DRRP coalition in 2015 and renewed its memorandum of understanding in 2021 to continue the partnership through 2026 (DOE 2015; DRRP 2021). This report summarizes the most recent monitoring event, which was conducted by the Legacy Management Support (LMS) contractor from October 23–24, 2024.

Restoration activities in the riparian corridor on Lease Tract C-SR-13 are supported by the Ecosystem Management Team, one of nine Environmental Management System sustainability teams under the joint LM/LMS procedure, *Environmental Management System/Energy Management System Description* (DOE 2024b). They also support LM Goals 1 and 4, to protect human health and the environment and to sustainably manage and optimize the use of land and assets (DOE 2020).

The Dolores River riparian corridor is a transitional area between the Dolores River, with associated wetlands, and surrounding semiarid shrublands. It is important to conserve riparian corridors because they are the most productive habitats in the arid west and provide water, forage, and cover for a wide variety of species. Although they make up less than 2% of the land area in the arid west, their value is much greater than their relative size.

Historically, riparian corridors have been degraded by changes in hydrology resulting from upstream dams, water appropriations, and the introduction of invasive trees like tamarisk (*Tamari ramosissima*), also known as saltcedar, Russian olive (*Elaeagnus angustifolia*), and Siberian elm (*Ulmus pumila*). These trees consume large amounts of water, but tamarisk is especially damaging because it can increase salt levels in soils, which curtail the growth of more ecologically valuable native trees. Historically, ecosystems within riparian corridors have also been degraded by human activities, such as mining, infrastructure projects, and livestock grazing. Humans have introduced noxious and invasive species like Russian knapweed (*Acroptilon repens*), also known as hardheads, Canada thistle (*Cirsium arvense*), and musk thistle (*Carduus nutans*), also known as nodding plumeless thistle. These invasive species disrupt desirable native ecosystems and degrade habitat quality without consuming large amounts of water.

A significant portion of Lease Tract C-SR-13 contains ecosystems dominated by stretchberry (*Forestiera pubescens*), also known as New Mexico privet, which is classified as globally imperiled by the Colorado Natural Heritage Program (CNHP 2024). This ecological community and its component species are tracked for conservation purposes (NatureServe 2024). Its presence makes conserving the Dolores River riparian corridor on Lease Tract C-SR-13 especially important.



Abbreviation: DA = disturbed area

Figure 1. Lease Tract C-SR-13

1.1 History of Restoration

Before 2011, LMS ecologists mapped large stands of noxious and invasive plants along the Dolores River riparian corridor within ULP Lease Tract C-SR-13. Tamarisk was abundant in the riparian corridor. Russian olive and Siberian elm had also become established. Russian knapweed was a major component of the understory plant cover. Also present were Canada thistle, musk thistle, saltlover (*Halogeton glomeratus*), and other noxious and invasive plants.

LM, the LMS contractor, subcontractors, and Gold Eagle Mining Inc. (the leaseholder at the time for Lease Tract C-SR-13) performed weed control and restoration activities beginning in 2011. Invasive trees were mechanically removed with an excavator-mounted mulcher, and stumps were treated with herbicide. Herbicides were also applied to stands of understory weeds. Select areas were reseeded with native species. LM partnered with the Southwest Conservation Corps beginning in 2014 to conduct additional weed control in 2015 to 2016, then in 2018 and 2021. In 2017, LM began to implement habitat improvement projects that included treating stands of burningbush (*Bassia scoparia*) with herbicide and reseeding with native seed mixes containing pollinator-friendly species. LM collaborated with the DRRP and the National Park Service in August 2020 to collect and analyze samples of common reed (*Phragmites australis*) that determined that the stands at the site are composed of both native and nonnative varieties (USU 2020). A detailed list of weed control and restoration activities from 2011 to 2021 is provided in the 2021 monitoring report (DOE 2022).

To protect the Dolores River from potential sediment loads, LM relocated, stabilized, and armored portions of a waste rock pile associated with the Burro Mines Complex within upland portions of Lease Tract C-SR-13. The mine complex was near the riparian corridor, and unconsolidated waste rock material was at the edge of a tributary that conveys stormwater runoff to the river. The reclamation project occurred between June and October 2021 and was unrelated to the DRRP. The footprint of the Burro Mines reclamation project is shown in Figure 1.

1.2 Success Goals Met in 2022

LM developed six ecological success goals for the portion of the Dolores River riparian corridor on Lease Tract C-SR-13. Four (goals 1 through 4 of those listed below) were based on DRRP goals (Tamarisk Coalition 2010; DRRP 2014), and two (goals 5 and 6 of those listed below) were ULP-specific goals developed by LM. Annual DRRP monitoring focused on comparing results to these goals until 2022, when all goals were met (DOE 2023). In 2023, DRRP monitoring shifted its focus to describe current conditions, including any that could threaten the continued success of the restoration efforts (DOE 2024a). As a result, success goals are no longer compared to monitoring results. Also in 2023, biological control agents that could benefit the ecological health of the site were investigated, and biological control agents are included in this report.

The six goals that were met in 2022 are:

1. Live tamarisk will be reduced to less than 5% relative cover within the riparian corridor.
2. Invasive, nonnative plants other than tamarisk will be reduced to less than 15% relative cover within the riparian corridor.

3. Greater than 80% of the plant cover within the riparian corridor will be composed of desirable or native species.
4. Total foliar cover within the riparian corridor will be greater than or equal to 30% (or less in particular areas where physical conditions hamper vegetation establishment).
5. Absolute cover of desirable species will be at least 75% of that in nearby reference areas.
6. Noxious weeds will compose less than 1% of the relative cover.

Monitoring in 2023 and 2024 ensures that these goals continue to be met.

1.3 Biological Controls

Biocontrol agents are host-specific insects, mites, or pathogens like fungi that control target plant species but do not harm other species. Biological control is part of a strategy called integrated pest management (IPM), an environmentally sensitive approach that relies on a combination of common-sense strategies to control invasive species. The Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 *United States Code* Section 136 et seq. [7 USC 136 et seq.]) directs federal agencies to use and promote IPM. Under the Plant Protection Act (7 USC 7701 et seq.), federal agencies are encouraged to facilitate biocontrol whenever feasible. The LMS contractor has developed a white paper to implement biocontrol as a widespread strategy at LM sites (DOE 2024c). The goal of IPM is generally to suppress or control invasive plants, not to eradicate them. Biological controls usually require a longer period of time to become established and effective.

Biocontrol is utilized with other IPM methods such as mechanical or chemical control. For example, applying herbicide to the margins of an infestation where biological control agents have been released can stop the stand from expanding while the agents become established. Some biocontrol agents can be used in combination for better success. As an example, the Russian knapweed gall midge and Russian knapweed stem gall wasp achieve more control together (see Section 1.4.2). Biocontrol is more cost-effective than chemical or mechanical control, and it can be effective in areas that are difficult to access. Biocontrol agents can safely be released near water or when chemical use could damage valuable native species such as stretchberry.

The Colorado Department of Agriculture (CDA) Conservation Services Division Biological Control Program, also known as the Palisade Insectary, implements and distributes host-specific biocontrol agents. The facility has been operating since 1945 in Palisade, Colorado, and it currently offers 20 different biocontrol agents for use in Colorado. CDA is also a member of the DRRP.

1.4 Biocontrol Along the Dolores River

Biological controls are being considered for many LM sites, and Lease Tract C-SR-13 is a good candidate for several species. Target plant species along the Dolores River corridor include invasive, nonnative plants such as Russian knapweed, spotted knapweed (*Centaurea stoebe*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), musk thistle, puncturevine (*Tribulus terrestris*), Dalmatian toadflax (*Linaria dalmatica*), yellow toadflax (also known as butter and eggs) (*Linaria vulgaris*), hoary cress (also known as whitetop)

(*Cardaria draba*), leafy spurge (*Euphorbia esula*), Canada thistle, yellow star-thistle (*Centaurea solstitialis*), and tamarisk. Russian knapweed and tamarisk have been controlled on Lease Tract C-SR-13 using mechanical methods and herbicide application; biological controls could improve suppression and resist reinfestation of these species. Other target species (e.g., field bindweed) have been found on Lease Tract C-SR-13, but none have become invasive or require suppression.

Russian olive and cheatgrass (*Bromus tectorum*) are two other potentially invasive species on Lease Tract C-SR-13. A new biocontrol agent for Russian olive is being approved for release in the United States. It is hoped that the new agent will be available for use in 2025. Foreign scientists are researching biocontrol agents for cheatgrass.

During the 2024 monitoring, LMS ecologists evaluated the presence of host-specific biocontrol agents on nonnative and noxious weeds along the Dolores River riparian corridor within Lease Tract C-SR-13. Tamarisk and Russian knapweed were the only invasive plants with U.S. Department of Agriculture (USDA)-approved biocontrol agents observed at the monitoring locations. Biocontrol agents for the target species are discussed in the next section.

1.4.1 Biocontrol Agents for Tamarisk

Tamarisk is a Class B noxious weed in Colorado and has displaced native species throughout the Dolores River watershed, including Lease Tract C-SR-13. Tamarisk leaf beetles (*Diorhabda carinulata*) overwinter, or diapause, as adults in the duff under tamarisk trees then emerge in late spring to start feeding and begin reproduction. Hatched larvae have three growth stages, or instars, then they pupate in the duff and develop into adults (Figure 2). Both larvae and adults feed on the foliage, turning the leaves brown and dry. The Palisade Insectary implemented the introduction and monitoring of tamarisk leaf beetles along the Dolores River. They were first released in 2006 at two U.S. Bureau Land Management sites near Gateway and Bedrock, Colorado, but they did not establish well. In 2008, large numbers of tamarisk beetles moved along the Dolores River from Utah into Colorado. The beetles caused major defoliation events starting in 2008 at most areas along the Dolores River watershed (Figure 3). The tamarisk leaf beetles are now well established in western Colorado and continue to successfully suppress tamarisk. With biocontrol agents well established and with the success of other controls, the natural restoration of willows and cottonwoods along the Dolores River is occurring. Two other host-specific insects help control tamarisk naturally: tamarisk leaf weevils (*Coniatus splendidulus*) and green leafhoppers (*Opsius stactogalus*). Both were introduced with tamarisk in the late 1800s and are adventive species. CDA began monitoring leafhoppers in 2008 and discovered the weevils in Colorado in 2011. Neither species is offered as a biocontrol agent, but they are monitored; it is likely that both are contributing to tamarisk suppression along the Dolores River.

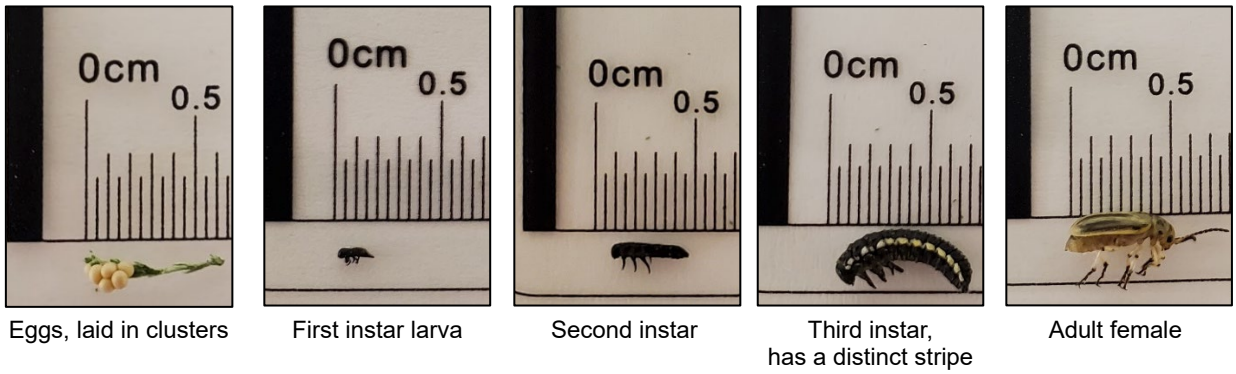


Figure 2. Tamarisk Leaf Beetle Larval Stages and Adult Form (Photo Credit: CDA)

Note: The stand is 90% defoliated.

Figure 3. Defoliation of Tamarisk with Numerous Adult Beetles (Left) and Widespread Defoliation on a Tamarisk Stand (Right) (Photos Credit: CDA)

1.4.2 Biocontrol Agents for Russian Knapweed

Russian knapweed is a Class B noxious weed in Colorado and has displaced native species throughout the Dolores River watershed, including Lease Tract C-SR-13. Two host-specific insects are available to help control this perennial weed: the Russian knapweed gall midge (*Jaapiella ivannikovi*) and the Russian knapweed stem gall wasp (*Aulacidea acroptilonica*). CDA first released the gall midges within the Dolores River watershed outside of Gateway, Colorado, in 2012. The stem gall wasps were first released in 2019 in the watershed, also outside of Gateway, and the wasps were successfully established by 2020.

The Russian knapweed gall midge (Figure 4) lays eggs on the growing tips of the leaves. Feeding larvae then stimulate gall formations, or abnormal growths, on the plant. Galls that form on the basal rosette stunt plant growth and decrease flowering, which inhibits pollination and reproduction. The gall midges need water to survive and are therefore best to release near a water

system. The Russian knapweed gall midges produce four to five generations each season and can successfully establish at grazed or mowed infestations. These characteristics make the Russian knapweed gall midge appropriate for natural control along Lease Tract C-SR-13.

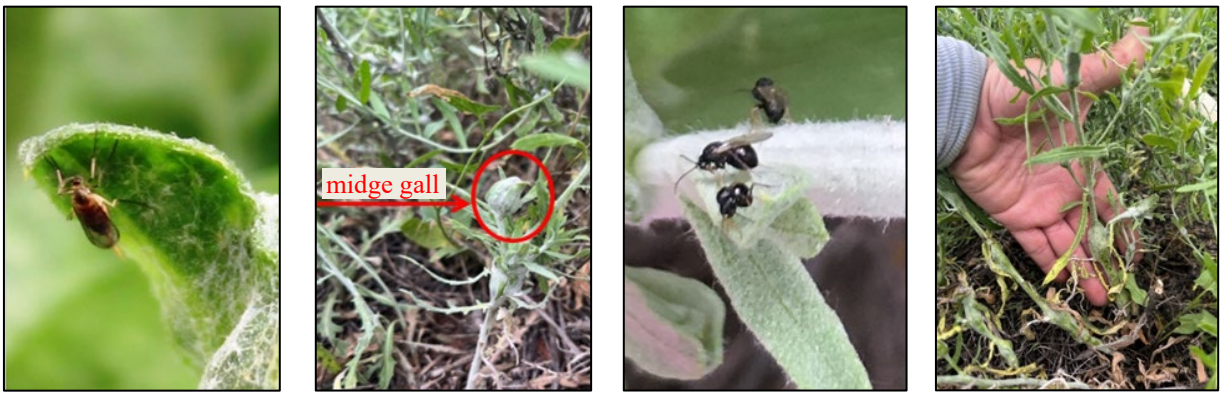


Figure 4. Left to Right: Russian Knapweed Gall Midge, Russian Knapweed Plant near Gateway with Russian Knapweed Midge Gall, Russian Knapweed Stem Gall Wasps, and a Stem Gall the Size of a Fingerling Potato Outside of Gateway (Photo Credit: CDA)

Russian knapweed stem gall wasps lay eggs in the main and lateral stems of the plant. The adults need tender stems for egg laying; therefore, the optimal release window is spring to early summer. The larvae feed within the stems, which stimulates gall formation. The larvae tap into the water and sugar source of the stems, stunting plant growth, decreasing biomass, and reducing flower production (Figure 4). This biocontrol agent performs best near river or water systems, but it can establish at dry sites, unlike the Russian knapweed gall midge. The Russian knapweed stem gall wasp is also appropriate to naturally control Russian knapweed at Lease Tract C-SR-13.

The Russian knapweed gall midges cohabitate with Russian knapweed stem gall wasps in infestation areas and achieve control of Russian knapweed together. The Russian knapweed gall midges, released in 2012, showed little evidence of galling until Russian knapweed stem gall wasps were introduced in 2019. Stem galls from the wasps stunt leaf formation and cause the growth of more tender leaves, which attract the adult midges. Greater Russian knapweed suppression is achieved with the midges attacking the leaf and the wasps feeding inside the stem compared to either biocontrol agent being used independently.

A third biocontrol agent found on Russian knapweed along the Dolores River in 2024 is an adventitious species, Russian knapweed rust fungus (*Puccinia acroptili*), which infects both the upper and lower leaf surfaces of the plant. The rust fungus spores are microscopic, but the brown pustules containing them can be seen on infected plants (Figure 5). The rust fungus causes leaf dieback and could reduce the plant's ability to photosynthesize, leading to a faster senescence process. The fungus can be found on midge or wasp galls at infestations near water systems. The biocontrol agent is not offered at the Palisade Insectary, but it is studied at monitoring sites.

Figure 5. Russian Knapweed Infected with Puccinia Acroptili *Fungus at Monitoring Point 14N*

2.0 Monitoring Methods

Since success criteria for revegetation were achieved in 2022 (DOE 2023), monitoring methods have included compiling lists of plant species within numbered monitoring regions that were previously established at the site (Figure 1), noxious weed mapping, and photomonitoring. Ecologists also use biocontrol surveys (presence/absence observations).

Ecologists took photographs at select locations (shown in Figure 1). At each point, four photographs were recorded in each of the four cardinal directions (north, south, east, and west), plant species lists were collected, and ecologists noted any evidence of wildlife and host-specific biocontrol agents on target weed species. Ecologists also recorded observations about the surrounding ecology. Several representative photographs are included in this report, but all are retained as records in the project files.

A list of plant and animal species observed during the 2024 field visit was compiled. It includes plants occurring near photomonitoring points, plants observed in the monitoring regions, and wildlife species observed within the entire riparian corridor. Scientific nomenclature and common names of the plants follow the USDA Natural Resources Conservation Service PLANTS Database (USDA 2025).

Biocontrol surveys were performed at monitoring points 11B, 14N, 28, and 29 (Figure 1). Visual surveys were performed to detect biocontrol agents on Russian knapweed. A visual estimation of infestation size and biocontrol abundance was performed at each of the four monitoring points. Tamarisk biocontrol surveys were not performed due to the insects being in overwintering mode during the monitoring event.

3.0 Results and Discussion

The annual monitoring event found no evidence that any of the six success criteria had been compromised along Lease Tract C-SR-13 in 2024. Weed control is summarized in Section 3.1. Biocontrol assessment results from the 2024 monitoring event are summarized in Section 3.2. The results of photomonitoring, species lists, and other observations are described in Sections 3.3 and 3.4.

3.1 Weed Control

Weed control along Lease Tract C-SR-13 has mostly shifted from a management approach (i.e., mechanical removal and repeated herbicide application) to a maintenance phase. Russian knapweed has been mostly eradicated from the lease tract, aiding in natural suppression. Infestations of Russian knapweed were observed at monitoring points 11B, 14N, 28, and 29. Each infestation was composed of 20 to 50 individual plants, and biocontrol agents were observed naturally suppressing the infestations at monitoring points 14N and 28. Monitoring in 2024 found infestations significant enough to recommend chemical and biocontrol treatment.

3.2 Biocontrol Survey Results

Two of the three agents used to control Russian knapweed were found at two monitoring points along the lease tract: Russian knapweed rust fungus and Russian knapweed gall midges. Russian knapweed rust fungus was found to be infecting most of the plants at monitoring point 14N. Some of the plants showed more advanced fungus damage than other newly infected plants. The advanced plants looked highly stressed, or senesced, by the fungus. The newly infected plants were still green and showed signs of early leaf dieback (Figure 6).

Note: The plants on the left are newly infected compared to the last plant on the right, which displays advanced damage with total dieback, and there is intermediate rust fungus damage on the plants in the center.

Figure 6. Rust Fungus Damage Progression from Left to Right

Disturbed soils are highly susceptible to invasive weed infestations. Monitoring point 28 is within an area of disturbed soils (Disturbed Area 1). Russian knapweed gall midges were observed on an infestation, composed of 30 to 50 individuals, at monitoring point 28. Senesced rosette galls were found on some of the plants. Galled plants were discovered at this location in 2023 (Figure 7). The galled plants were stunted in growth and had no flowers due to the biocontrol agent. Native grasses and forbs, such as saltgrass (*Distichlis spicata*) and sweetclover (*Melilotus officinalis*), have begun to reestablish (Figure 8).

Areas devoid of vegetation at monitoring point 28 (Disturbed Area 1) make the area more susceptible to erosion. Bare ground makes up approximately half of the ground surface in this area, and erosion rills were observed throughout the area.

In the fall of 2024, LM reached out to the landowners of Disturbed Area 1 and Disturbed Area 2, offering to have the disturbed areas reclaimed and seeded with native vegetation. Both landowners elected to forgo any reclamation and vegetation at the sites. LM followed up with formal documentation with the landowners to that effect.

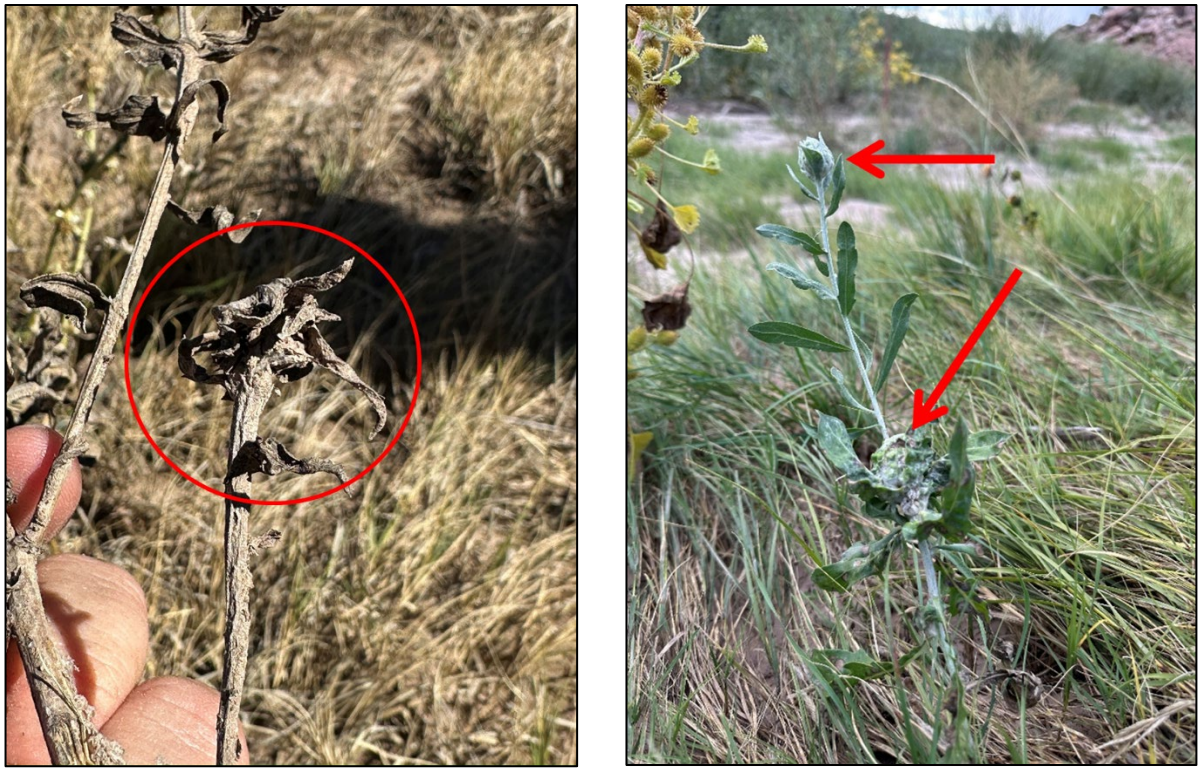


Figure 7. Russian Knapweed Senesced Midge Gall in 2024 (Left) and Midge Galls in 2023 on Plants Preventing Flowering and Stunting Growth (Right) at Monitoring Point 28

Figure 8. Monitoring Point 28 with Patches of Native Vegetation and Bare Ground in 2023 (Left) and 2024 (Right)

Existing biocontrol agents are suppressing Russian knapweed and tamarisk throughout the riparian corridor on Lease Tract C-SR-13. A few small tamarisk trees were observed, and no infestations have increased; therefore, it seems the host-specific tamarisk beetles are aiding in suppression. Only small infestations of up to 50 Russian knapweed plants were observed. These infestations have increased since 2023. Ecologists recommend chemical control and biocontrol for 2025. The plants most likely are remnants of past, larger populations and were present in the seed bank. It can be inferred that biocontrol agents are present on nearby landowners' infestations because agents have not been released on Lease Tract C-SR-13 and can easily cross property borders. The success of biocontrol agents will continue to be assessed during future monitoring.

3.3 Photomonitoring

Photographs taken at the same points over time suggest several trends. A significant reduction in the cover of noxious weeds, especially Russian knapweed, is evident, and native vegetation has become established in its place (Figure 9 and Figure 10). Russian knapweed was dominant in the understory at many points in 2012, but it has been reduced to a minor component through weed control efforts. Also, less bare ground was visible in the understory in 2023 and 2024 than in previous years, indicating the continued establishment of native vegetation.

Figure 9. Monitoring Point 14N in 2012 (Left) and 2022 (Right)

Figure 10. Monitoring Point 14N in 2023 (Left) and 2024 (Right)

Figure 11 and Figure 12 show monitoring point 11B, an area where Russian knapweed was mostly eliminated by herbicide treatment. After treatment, large patches of bare ground were present throughout the understory. Seasonal flooding events along the Dolores River watershed help to remove toxins, deposit nutrients into the soil, and aid in soil health recovery while reducing the impact from livestock grazing along the lease tract. Sand dropseed (*Sporobolus cryptandrus*) and other native grasses have begun to establish at the monitoring point and were more abundant in 2023 and 2024 than in 2022.

Figure 11. Monitoring Point 11B Dominated by Russian Knapweed in 2012 (Left) and Showing Large Amounts of Bare Ground After Knapweed Eradication in 2022 (Right)

Figure 12. Monitoring Point 11B Showing Native Grasses Beginning to Establish in the Understory in 2023 (Left) and Showing an Increase in Native Grasses in 2024 (Right)

Visual comparisons showed that monitoring point 25P had more bare ground in 2022 compared to 2023 and 2024 (Figure 13). This area was also affected by seasonal flooding, which prevented livestock access and grazing for a portion of the growing season. Narrowleaf willow (*Salix exigua*), narrowleaf cottonwood (*Populus angustifolia*), native desirable trees, and other native plant species were beginning to establish at the monitoring location.

Figure 13. Monitoring Point 25P in 2022 (Left), 2023 (Center), and 2024 (Right), Showing the Natural Establishment of Narrowleaf Willow After Weed Treatment

3.4 Species Lists

Table 1 lists the dominant plant species observed in 2024. In addition to the species in Table 1, an abundance of plant species was observed in the riparian corridor in 2024. Species with high ecological value include those that were seeded in disturbed areas and species that potentially increase with habitat enhancements. Seeded species include Indian ricegrass (*Achnatherum hymenoides*), western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), and needle and thread (*Hesperostipa comata*). Examples of high-quality native species found in the riparian corridor that could increase with habitat enhancements are stretchberry, skunkbush sumac (*Rhus trilobata*), big sagebrush (*Artemisia tridentata*), hoary tansyaster (*Machaeranthera canescens*), Wyoming Indian paintbrush (*Castilleja linariifolia*), Fremont cottonwood (*Populus fremontii*), and narrowleaf willow (Figure 14). Invasive species found in trace amounts include tamarisk, Russian knapweed, cheatgrass, saltlover, and jointed goatgrass (*Aegilops cylindrica*).

Table 1. Dominant Plant Species Observed in the Riparian Corridor of Lease Tract C-SR-13 in 2024

Scientific Name	Common Name	Notes
Forestiera pubescens Nutt.	Stretchberry	Native desirable tree, dominant species in the stretchberry wet shrubland community
Distichlis spicata (L.) Greene	Saltgrass	Native perennial grass
Sporobolus cryptandrus (Torr.) A. Gray	Sand dropseed	Native perennial grass
Salix exigua Nutt.	Narrowleaf willow	Native desirable tree, dominant in wetter areas
Melilotus officinalis (L.) Lam.	Sweetclover	Introduced, annual invasive weed (not noxious)
Machaeranthera canescens (Pursh) A. Gray	Hoary tansyaster	Native perennial forb
Bassia scoparia (L.) A.J. Scott	Burningbush	Introduced, annual invasive weed (not noxious)
Sarcobatus vermiculatus (Hook.) Torr.	Greasewood	Native desirable shrub
Ericameria nauseosa (Pall. Ex Pursh) G.L. Nesom & Baird	Rubber rabbitbrush	Native desirable shrub
Acer negundo L.	Boxelder	Native desirable tree
Atriplex canescens (Pursh) Nutt.	Fourwing saltbush	Native desirable shrub
Salsola tragus L.	Prickly Russian thistle	Introduced, annual invasive weed (not noxious)
Artemisia tridentata Nutt.	Big sagebrush	Native desirable shrub
Rhus trilobata Nutt.	Skunkbush sumac	Native desirable shrub
Sporobolus airoides	Alkali sacaton	Native desirable grass
Populus angustifolia	Narrowleaf cottonwood	Native desirable tree

Observations of wildlife were also recorded during monitoring in 2024, including coyote (*Canis latrans*) and black bear (*Ursus americanus*) scat. Tracks, scat, or sightings of mule deer (*Odocoileus hemionus*) and cottontail rabbit (*Sylvilagus* sp.) were also observed. Multiple species of birds were seen or heard, including common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), and pinyon jay (*Gymnorhinus cyanocephalus*), a special-status species.

Figure 14. High-Quality Native Species in the Riparian Corridor in 2024: Fremont Cottonwood (Left) and Wyoming Indian Paintbrush (Right)

4.0 Recommendations

The following recommendations are made for future work at Lease Tract C-SR-13:

Weed control: Weed control efforts have reduced populations of noxious and invasive weeds to maintenance levels. Therefore, repeated, aggressive control measures are no longer cost-effective or necessary. It is recommended that the riparian corridor of Lease Tract C-SR-13 be treated by spot spraying with herbicide or mechanical control methods or by releasing biocontrol agents on a regular basis to prevent weeds from reestablishing in any area. Therefore, its recommended that chemical and biocontrol methods be used to treat Russian knapweed at monitoring points 11B, 14N, 28, and 29.

Monitoring: To ensure that the success goals continue to be met, it was recommended in 2023 that monitoring be performed every 3 years. However, with the change in monitoring methods from time-intensive, quantitative methods to quick qualitative methods, ecologists now recommend continuing photomonitoring, collecting species lists, and performing biocontrol assessments annually. This will ensure that success criteria continue to be met and any issues are identified early.

Habitat restoration: It might be appropriate to reallocate monitoring and maintenance resources and focus on habitat restoration projects, enhancing or establishing stands of stretchberry, or enhancing specific habitat for special-status species, such as pinyon jays or monarch butterflies (*Danaus plexippus*). To support LM's beneficial reuse initiatives and current federal initiatives and guidance, future projects could emphasize pollinator habitat or enhance habitat for migratory birds.

Livestock grazing: Although properly managed grazing can be compatible with restoration goals, overgrazing can adversely affect restoration efforts. Ecologists have observed evidence of overgrazing in some portions of the riparian corridor on Lease Tract C-SR-13. LM does not control livestock grazing on Lease Tract C-SR-13, but ecologists could meet with DRRP representatives, U.S. Bureau of Land Management biologists, and local landowners to discuss possible restrictions or alternative grazing strategies.

5.0 References

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