Taos SWCD Projects 25.01-25.12

Pre-Treatment Monitoring Report – 2025

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for the *Greater Rio Grande Watershed Alliance* and the *Taos SWCD*

Contents

Acronyms and Abbreviations

Acronym, Abbreviation, or Term	Explanation or Definition as used by NMFWRI
BEMP	Bosque Ecosystem Monitoring Program, small rectangular plot types
CSE	Common Stand Exam
CSWCD	Coronado Soil and Conservation District
GIS	Geographic Information Systems
GRGWA	Greater Rio Grande Watershed Alliance
NMFWRI	New Mexico Forest and Watershed Restoration Institute
NMHU	New Mexico Highlands University
NMRAM	New Mexico Rapid Assessment Method, version 2.0
NRCS	Natural Resource Conservation Service
QMD	Quadratic Mean Diameter
PC	Plot center
SWCD	Soil and Water Conservation District
TPA	Trees Per Acre
USDA	United States Department of Agriculture

1 Purpose of Report

This report covers low- and high-intensity pre-treatment vegetation monitoring assessments performed on the Taos invasive phreatophyte removal projects (NMFWRI project numbers 25.01, 25.02, 25.03, 25.04, 25.06, 25.07, 25.08, 25.09, 25.10, 25.11, and 25.12) submitted for individual private landowners by the Taos SWCD to the Greater Rio Grande Watershed Alliance in 2025. Following a discussion of the ecological context, and our monitoring methods, we present pertinent background, observations, and assessment results for the projects.

2 Ecological Context of Bosque Restoration

Neither the challenges nor the importance of working in the bosque and other riparian areas in New Mexico today should be underestimated. According to the New Mexico Department of Game and Fish Conservation Division, wetlands and riparian areas comprise approximately 0.6% of all land in New Mexico (2012).

Despite this small percentage, it is estimated that an average of 55% of New Mexican vertebrate species (can be higher for certain taxa) depend on wetland and riparian habitat for their survival (New Mexico Department of Game and Fish Conservation Services Division, 2012). For example, the relatively few miles of riparian habitat of the San Juan and Gila river valleys helped support up to 17% of the avian species of the entirety of North America in the past, due to their use as feeding grounds for migrating birds (Hubbard, 1971). 62% of 117 vertebrate species in the Middle Rio Grande sampled in a RMRS study were found to be vulnerable to changes in their habitat (Friggens, M. et al, 2013). These areas also provide flood mitigation, filtration of sediment and pollutants, and water for a variety of purposes including groundwater recharge (Patten, 1998). In addition, native vegetation, such as cottonwood forests, holds cultural significance to many communities. As much as these areas are disproportionately important to ecosystems and human communities, they are equally disproportionately impacted by disturbance. Anthropogenic impacts with major consequences for our riparian areas include dams, reservoirs, levees, channelization, acequias and ditches, jetty jacks, riprap and Gabion baskets, urbanization, removal of native phreatophytes, grazing by domestic livestock, excessive grazing pressure by native ungulate populations absent natural predation cycles, beaver removal, logging, mining, recreation, transportation, introduction and spread of invasive exotic species, groundwater extraction, altered fire and flood regimes drought and climate change. (Committee on Riparian Zone Functioning and Strategies for Management, et al., 2002). Approximately 39% of our remaining perennial stream miles are impaired (New Mexico Department of Game and Fish Conservation Services Division, 2012).

New Mexico is fortunate enough to have the Middle Rio Grande Bosque, the largest remaining bosque in the Southwest (USDA USFS, 1996). However, over the past two decades, the number of fires in the bosque has been increasing. Historically, the primary disturbance regime in the bosque has been flooding, not fire, which means the system is not fire-adapted. In fact, native species like cottonwood resprout from their roots after floods and need wet soils to germinate from seed. Flooding also promotes decomposition of organic material and keeps the soil moist, which reduces the likelihood of fire. Today, overbank flow is uncommon in many areas of the Rio Grande due to the heavy alteration of the channel and flow regimes (two obvious examples are the structures defining the upper and lower extent of the Middle Rio Grande: Cochiti Dam and Elephant Butte Reservoir). This has led to low fuel moisture content and high fuel loads, as well as increased human presence in the riparian area. As a result, bosque fires are more common and more severe: they kill cottonwoods and other native species, creating spaces which are filled by non-native species such as salt cedar, Russian olive, Siberian elm, and Tree-of-Heaven.

Efforts geared toward the removal of these nonnative species can help to reduce fire risk, preserve native vegetation, and be part of a larger effort to restore the bosque and the watershed to a more natural and functional ecosystem. The Greater Rio Grande Watershed Alliance (GRGWA) has been working on these issues with a variety of collaborating organizations and agencies within the Rio Grande basin for several years. Since 2013, the New Mexico Forest and Watershed Restoration Institute (NMFWRI) has been working with GRGWA and the Claunch-Pinto Soil and Water Conservation District (SWCD) to begin construction of a geodatabase for all of GRGWA's non-native phreatophyte removal projects as well as to perform the formal pre- and post-treatment monitoring, utilizing the field methods explained below as well as LIDAR analysis where appropriate and available.

3 Monitoring and Field Methods

3.1 Low-intensity Field Methods – Photo Points

Photo points were established to capture images where vegetation shifts were observed and/or at representative locations throughout the site. Waypoints were marked with a GPS unit and named sequentially by site. Photos were taken facing north, east, south, and west at each point. Information about the photo points was collected according to the methods laid out in David Lightfoot's Forest Thinning Project Repeat Photo Points for Restoration Effectiveness Monitoring (David Lightfoot, 2014). Photo points were collected for both pre- and post-treatment.

3.2 High-intensity Field Methods – CSE Plots

Riparian-adapted Common Stand Exams (CSE) were conducted at randomly selected locations on project sites. A 1/100- and 1/10-acre radius plot was established by placing pin-flags at 11' 9" and 37' 3" from the plot center in each cardinal direction. Photos were taken from plot center in each cardinal direction and from 75' north of plot center toward plot center. Ocular estimates were made of understory aerial and ground cover within the 1/10-acre plot.

Overstory canopy cover was estimated using a concave spherical densiometer, with measurements made in four cardinal directions, at the edge of the 1/100-acre plot. This method provides an estimate of canopy cover for a 1/10-acre area centered on the plot. A Hink & Ohmart and modified Hink & Ohmart structure class was determined for the 1/10th acre plot (Appendix I). Finally, all plant species observed within the 1/10th-acre area with over 1% cover were recorded, as were other comments regarding conditions at the plot.

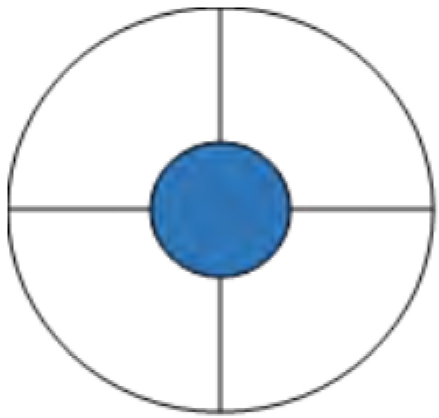


Figure 1: Example of CSE plot layout. The outer circle represents the 1/10-acre plot and the blue circle is the 1/100-acre plot.

3.3 Disclaimer

NMFWRI provides this report and the data collected with the disclaimer that the information contained in these data is dynamic and may change over time. The data are not better than the original sources from which they were derived. It is the responsibility of the data user to use the data appropriately and within the limitations of monitoring data in general, and these data in particular. NMFWRI gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of these data. These data and related graphics are not legal documents and are not intended to be used as such. This includes but is not limited to using these data as the primary basis for the development of thinning prescriptions or timber sales. NMFWRI shall not be held liable for improper or incorrect use of the data described and/or contained in this report.

Analysis was also done according to our standard protocols. Note that the values reported in the tables are expressed on a per acre basis but represent only areas sampled. We do not scale up these values to calculate volume of wood over the project area and warn readers of this report that they are not intended for that purpose. The accompanying tables show summaries of our data, and some differences are discussed below; however, differences that seem apparent here may not stand up to rigorous statistical tests. For some estimates, the standard deviation exceeds the mean (i.e., the coefficient of variation is greater than 100 percent), and sampling errors for some estimates exceed 100 percent. Therefore, data should be used and results interpreted with appropriate caution.

3.4 Personnel Involved

2025 New Mexico Forest and Watershed Restoration Institute Monitoring & GIS Work:

- Abigail Han, Monitoring & GIS Specialist
- Jax Gaglianese-Woody, Ecological Monitoring Technician
- Clay Goetsch, Riparian Crew Lead
- Vincent Vispo, Assistant Crew Lead
- Kathryn Mahan, Monitoring Program Manager
- Corey Beinhart, Data Manager

Other persons contacted:

- Dierdre Tarr, District Manager for Claunch-Pinto SWCD, Greater Rio Grande Watershed Alliance
- Todd Haines, Field Coordinator, Greater Rio Grande Watershed Alliance
- Tyler Zander, Soil Health Coordinator for Taos SWCD

4 Site Description and Project History: 25.01-25.12 Taos

Projects 25.01-25.12 are located in Rancho de Taos, NM. The semi-arid climate means that snowpack from the mountains is important as a source for spring irrigation water to farmlands. This water is distributed through a centuries-old network of acequias (Acequias of Taos, 2026). The project sites are all small private landholdings dispersed in riparian habitat fed by the acequias, the Rio Grande del Rancho, or the Rio Pueblo de Taos. These small strips of land are the result of a customary practice whereby the head of the family would divide land equally among all heirs (Taos Soil & Water Conservation District, 2025).

The elevation of Rancho de Taos is approximately 6,900 feet. The average precipitation in Taos is 12.3 inches annually, with average high temps in July around 85° and average low temps in January around 10° (Taos, New Mexico – Climate Summary).

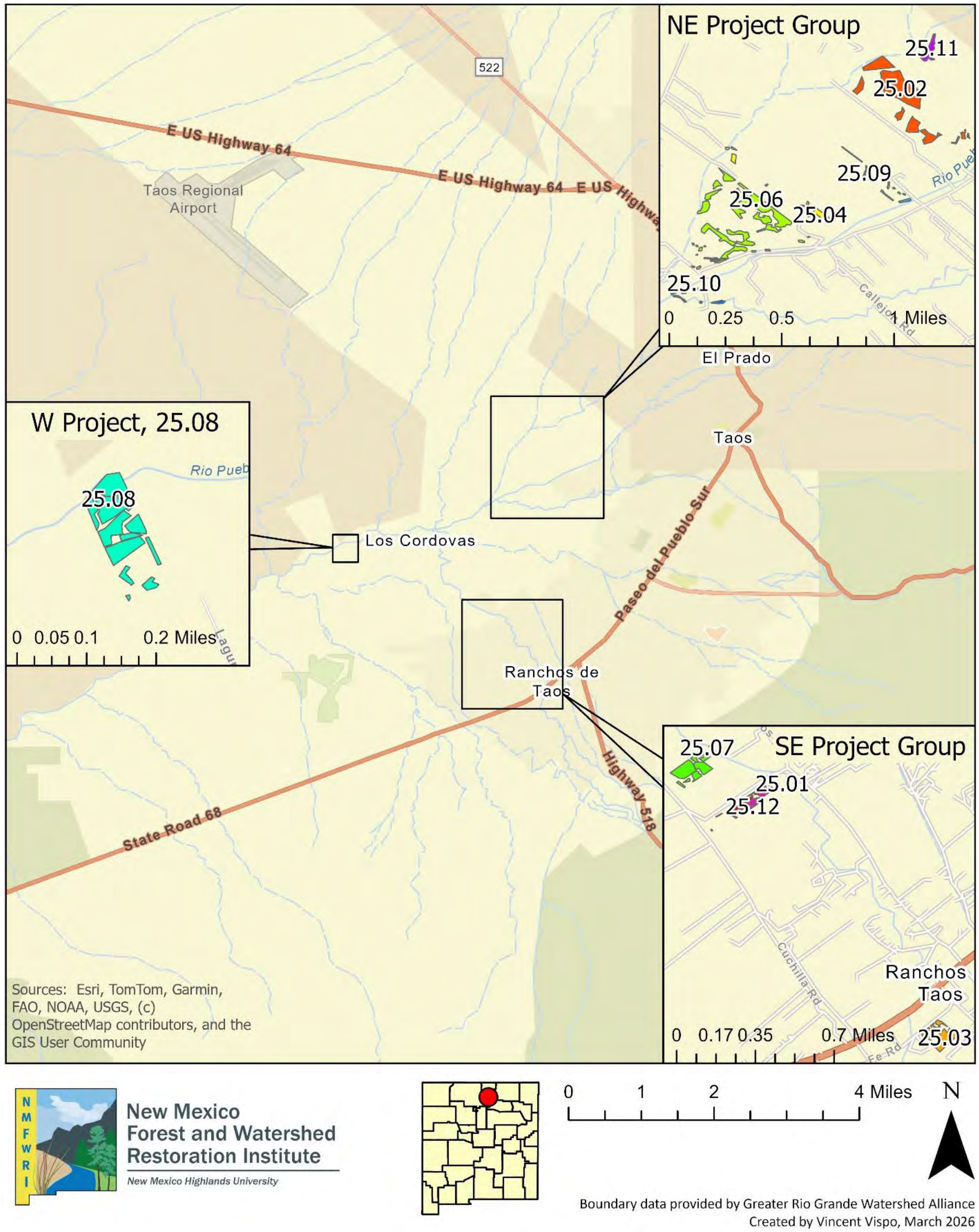
According to the NRCS Web Soil Survey, the project areas include several soil map units but are dominated by silty clay loam soil texture. The dominant ecological site, at over 80% of the treatment area, is R036XB008NM Meadow. R036XB008NM – Meadow is an ecological site commonly located on stream terrace, valley floors and alluvial flats positions. The soils are deep, somewhat poorly to poorly drained. The seasonal water table fluctuates between 12 and 40 inches for most of the growing season (USDA, n.d.).

The initial plan for these projects– which may have changed if boundaries were refined – included treatment of approximately 74 acres on private parcels totaling 442 acres. The land is generally open and used for grazing cattle, sheep, and horses. Stands of Russian olive are dispersed unequally across the sites, with 49 acres classified as having “light” cover, 18 as “medium,” and 7 as “heavy.” The target treatment date for removal was August 2025, although this was delayed until at least after November 5th, as that was the last day of pre-treatment monitoring.

Short-term objectives are to remove Russian olive, both to reclaim land for farm and ranch use and to reduce the impacts of that invasive species on the water table. The long-term objective is to keep the land invasive-free through yearly follow-up treatments. Although the projects specifically target Russian olive, contractors are also directed to remove any Siberian elm or salt cedar found in the treatment areas. Most properties are to be treated the same, with the plan being to masticate or chip the invasive trees and spray the cut stumps with herbicide, although for two of the sites herbicide is not to be used per the landowners’ wishes. Chipped or masticated material is to be spread on site. Where steep slopes exist, contour felling is advised to limit the possibility of erosion.

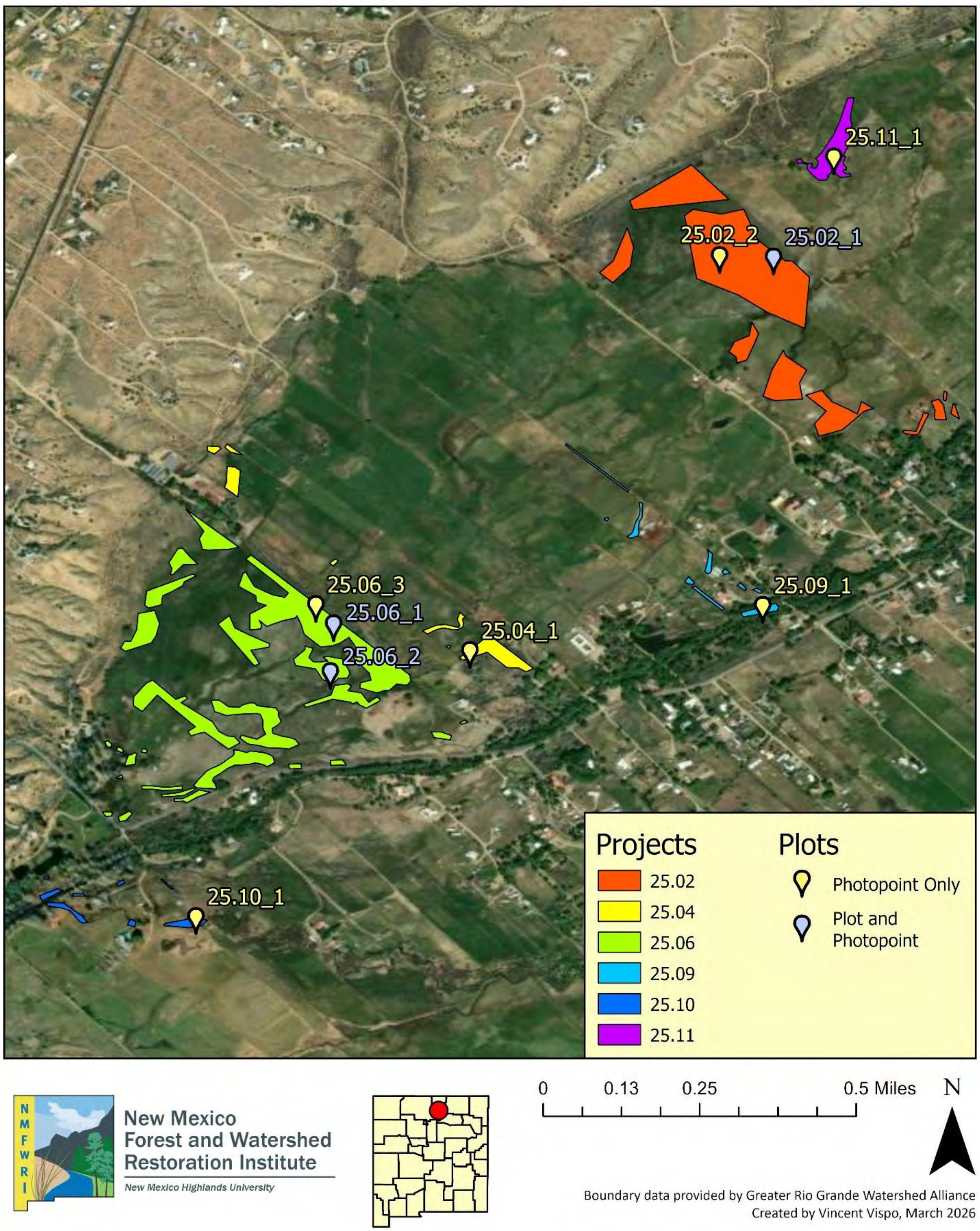
Access was not permitted by the landowner on project 25.05, and therefore no data is reported for that project.

Taos Area Project Locations



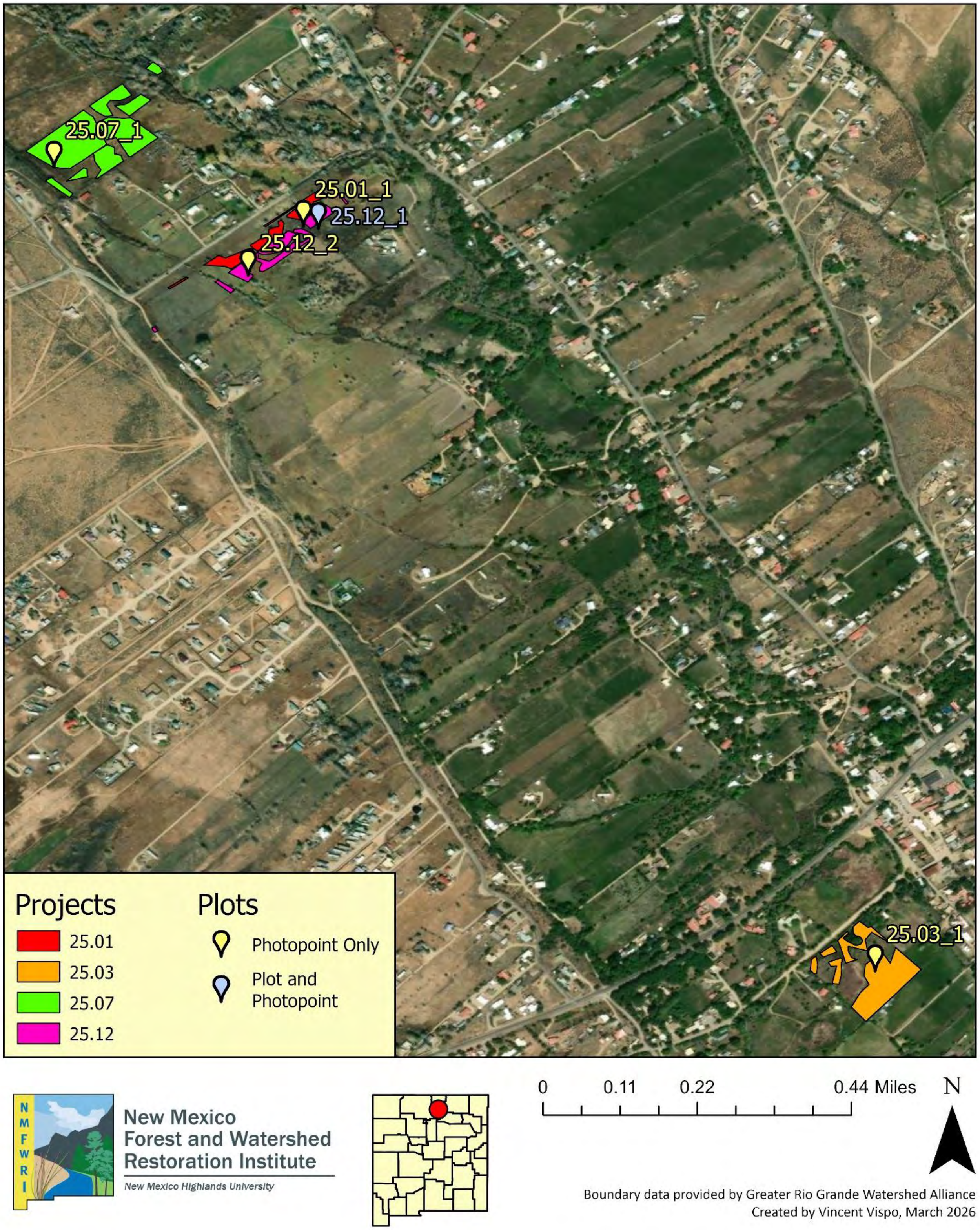
Map 1: 25.01-25.12 Taos project locations.

NE Project Group



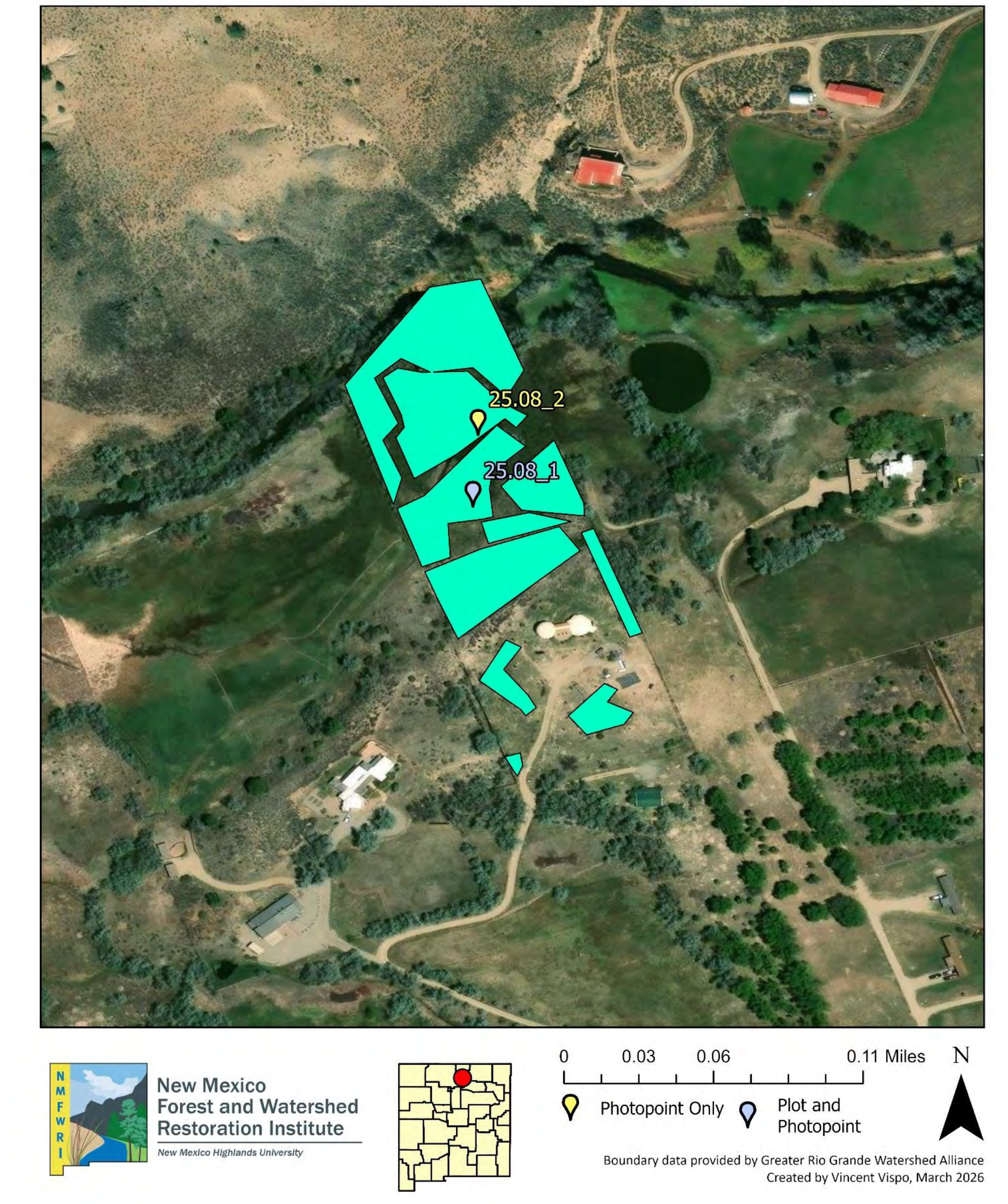
Map 2: Photopoint and CSE plot locations in the NE project group.

SE Project Group



Map 3: Photopoint and CSE plot locations in the SE project group.

W Project, 25.08



Map 4: Photopoint and CSE plot locations in project 25.08.

6 Monitoring Results

6.1 Overstory Tree Species Composition

		Poles			Mature trees							Total
	Diameter class (in)	*6-8*	*8-10*	*10-12*	*12-14*	*14-16*	*16-18*	*18-20*	*20-22*	*22-24*	*24-26*	
ELAN	**Count**	1	0	1	2	1	0	1	1	0	1	8
	TPA	0.63	0.00	0.63	1.25	0.63	0.00	0.63	0.63	0.00	0.63	5
	BA/AC	0.12	0.00	0.30	0.94	0.65	0.00	1.09	1.49	0.00	1.87	6.45
	Avg Ht	22	0.00	40	41	54	0.00	49	48	0.00	49	
Summary by Class	***TPA***	*1.25*			*3.75*							*5.00*
	TPA %	*25.00%*			*75.00%*							*100.00%*
	BA/AC	*0.42*			*6.03*							*6.45*
	BA/AC %	*6.51%*			*93.49%*							*100.00%*
	QMD	*7.85*			*17.18*							*15.38*
	Avg Ht	*35*			*48*							*47*

Table 1: Stand table for projects 25.01 through 25.12.

The only mature trees on plots in these project areas were Russian olive (*Eleagnus angustifolia*). All but one tree was found on the 25.08 site, although other locations had trees that did not fall within the boundaries of the randomly selected monitoring plots. The average TPA of 5 is low and reflects the fact that these sites are predominately open farmland. The trees that were present were not uniformly distributed across the project areas but rather clumped together in patches.

6.2 Regeneration: Trees & Shrubs

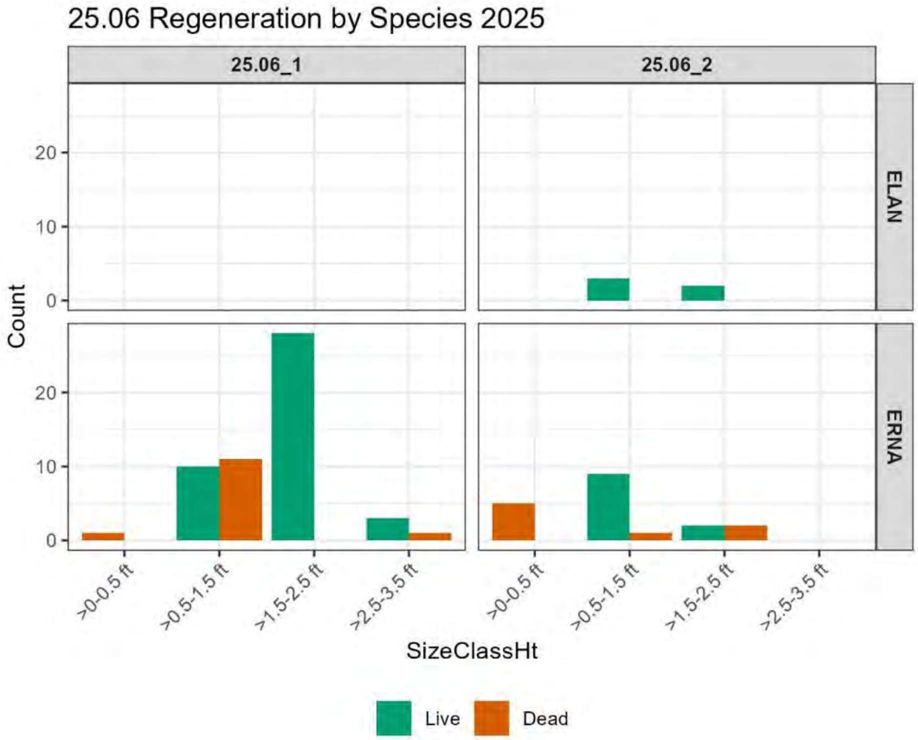


Figure 2: 25.06 seedlings by species.

Regeneration Data Summary 2025				
Plot ID	**Species**	**Height Class**	**Status**	**Count**
25.02_1	ELAN	>2.5-3.5 ft	L	1
25.06_1	ERNA	>0-0.5 ft	D	1
		>0.5-1.5 ft	D	11
		>0.5-1.5 ft	L	10
		>1.5-2.5 ft	L	28
		>2.5-3.5 ft	D	1
		>2.5-3.5 ft	L	3
25.06_2	ELAN	>0.5-1.5 ft	L	3
		>1.5-2.5 ft	L	2
	ERNA	>0-0.5 ft	D	5
		>0.5-1.5 ft	D	1
		>0.5-1.5 ft	L	9
		>1.5-2.5 ft	D	2
		>1.5-2.5 ft	L	2
25.08_1	ELAN	>1.5-2.5 ft	L	3
		>2.5-3.5 ft	L	3
25.12_1		>3.5-4.5 ft	L	1

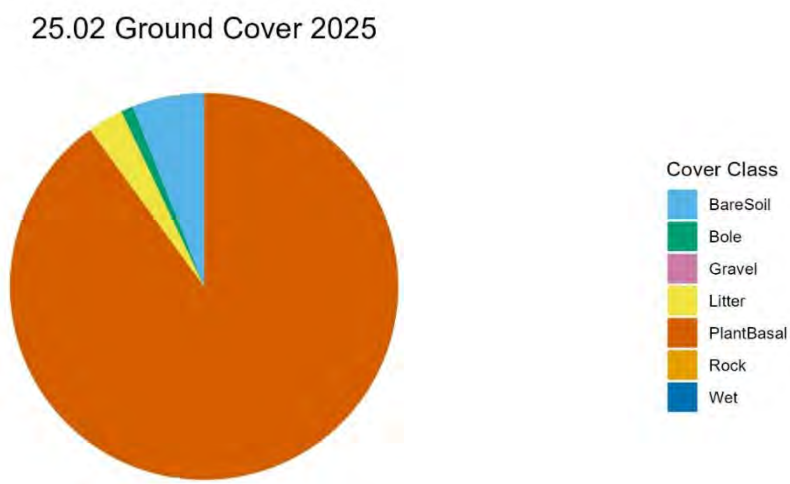
Table 2: Seedling data for all 2025 Taos area projects.

Plot	Size Class	Species	Status	Count
25.08	>0 - 1”	ELAN	L	2
25.12	>2 - 3”	ELAN	L	2
25.12	>3 - 4”	ELAN	L	1

Table 3: Sapling data for all 2025 Taos area projects.

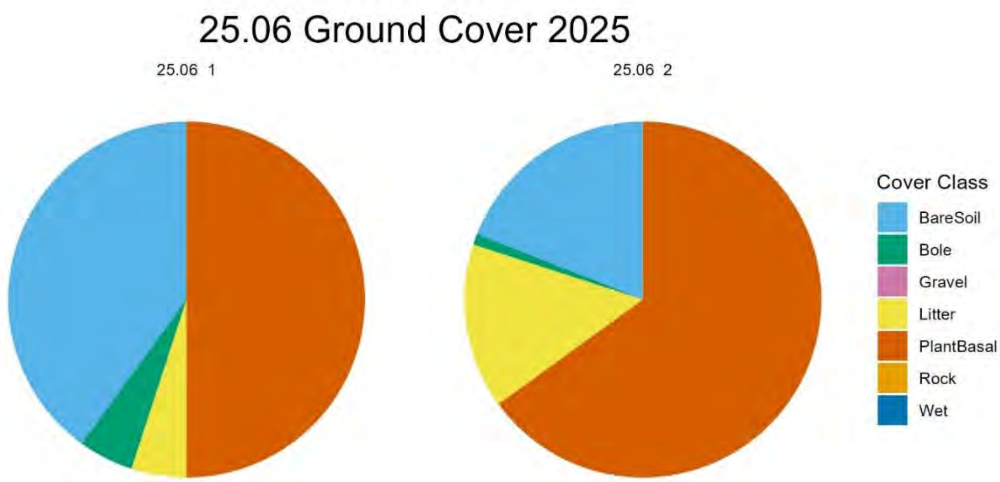
The only project site with significant amounts of seedlings (any woody stem <4.5 feet in height and <5 inches in diameter) was 25.06. The most common shrub was rabbitbrush (*Ericameria nauseosa*). On project sites 25.02, 25.06, 25.08, and 25.12 there were small numbers of Russian olive (*Eleagnus angustifolia*) seedlings. There were only five saplings (stems >4.5 feet in height and <5 inches in diameter) on the monitoring plots, all of which were Russian olive (*Eleagnus angustifolia*). Although seedling and sapling density was low, it is worth noting that Russian olive was present across all size classes.

6.3 Ground Cover



Project	Cover Class	% Cover
25.02	PlantBasal	90
25.02	Bole	1
25.02	Litter	3
25.02	BareSoil	6
25.02	Rock	0
25.02	Gravel	0
25.02	Wet	0

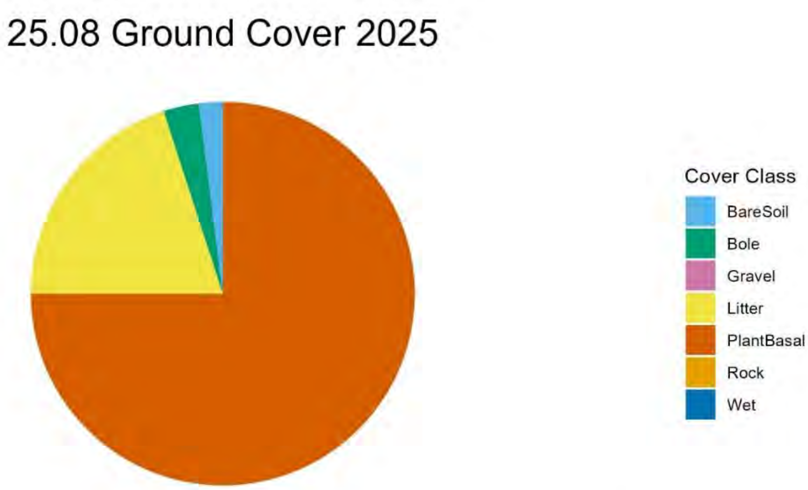
Figure 3: Ground cover of the 25.02 project area.



Project	Plot	Cover Class	% Cover
25.06	1	PlantBasal	50
25.06	1	Bole	5
25.06	1	Litter	5
25.06	1	BareSoil	40
25.06	1	Rock	0
25.06	1	Gravel	0
25.06	1	Wet	0

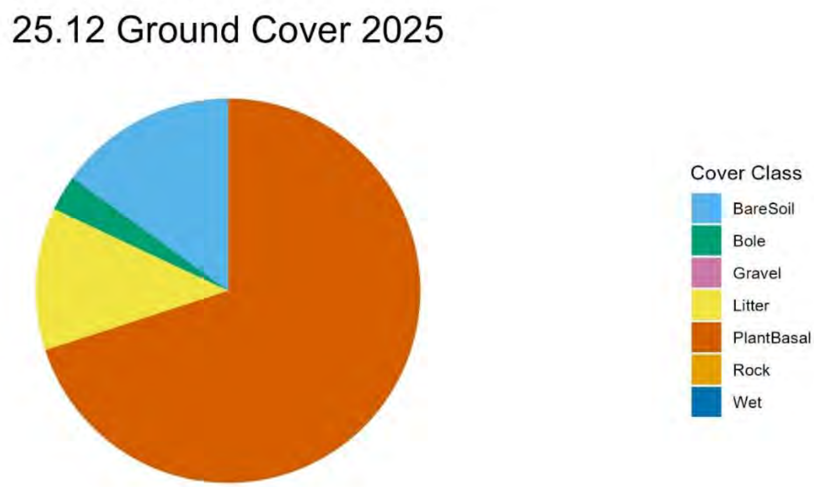
Project	Plot	Cover Class	% Cover
25.06	2	PlantBasal	65
25.06	2	Bole	1
25.06	2	Litter	15
25.06	2	BareSoil	19
25.06	2	Rock	0
25.06	2	Gravel	0
25.06	2	Wet	0

Figure 4: Ground cover of the 25.06 project area.



Project	Cover Class	% Cover
25.08	PlantBasal	75
25.08	Bole	3
25.08	Litter	20
25.08	BareSoil	2
25.08	Rock	0
25.08	Gravel	0
25.08	Wet	0

Figure 5: Ground cover of the 25.08 project area.



Project	Cover Class	% Cover
25.12	PlantBasal	70
25.12	Bole	3
25.12	Litter	12
25.12	BareSoil	15
25.12	Rock	0
25.12	Gravel	0
25.12	Wet	0

Figure 6: Ground cover of the 25.12 project area.

Across all project sites, plant basal area was most of the ground cover, ranging from a high of 90% in the 25.02 project area to a low of 50% on plot 1 in the 25.06 area. On most sites bare soil made up the largest part of the remaining fraction, followed by litter and bole. These results highlight certain structural similarities between the sampled projects: they are all relatively dense with herbaceous plants, and where plants do not cover the ground, it is left bare or covered with litter. Woody boles were a small presence at all sites, but rocks, gravel, and water were not seen on any plot. The 25.06 project area was noticeably barer than the other sites.

6.4 Aerial Cover

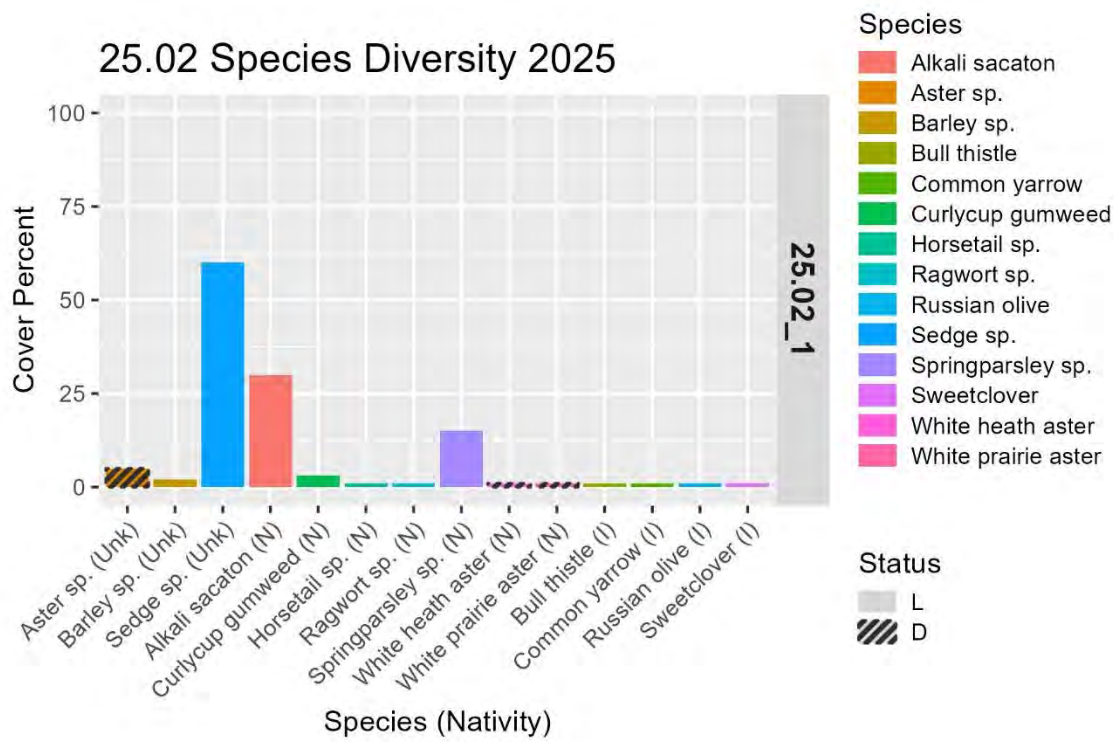


Figure 7: Aerial cover of the 25.02 project area.

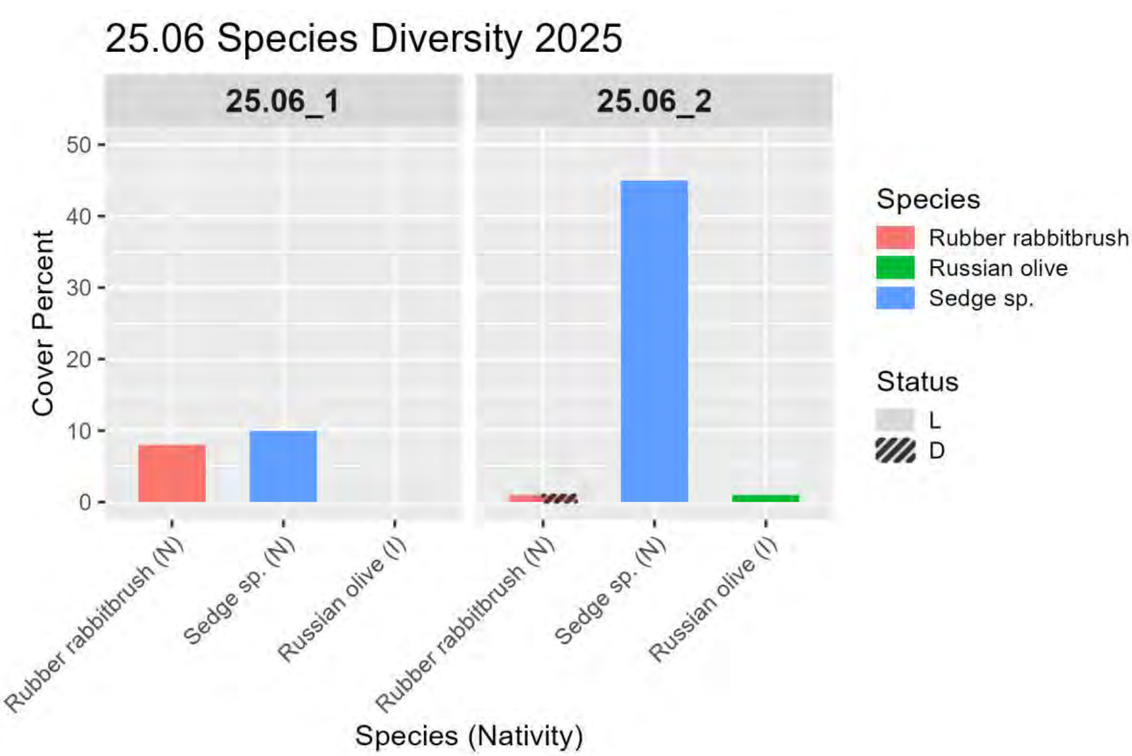


Figure 8: Aerial cover of the 25.06 project area.

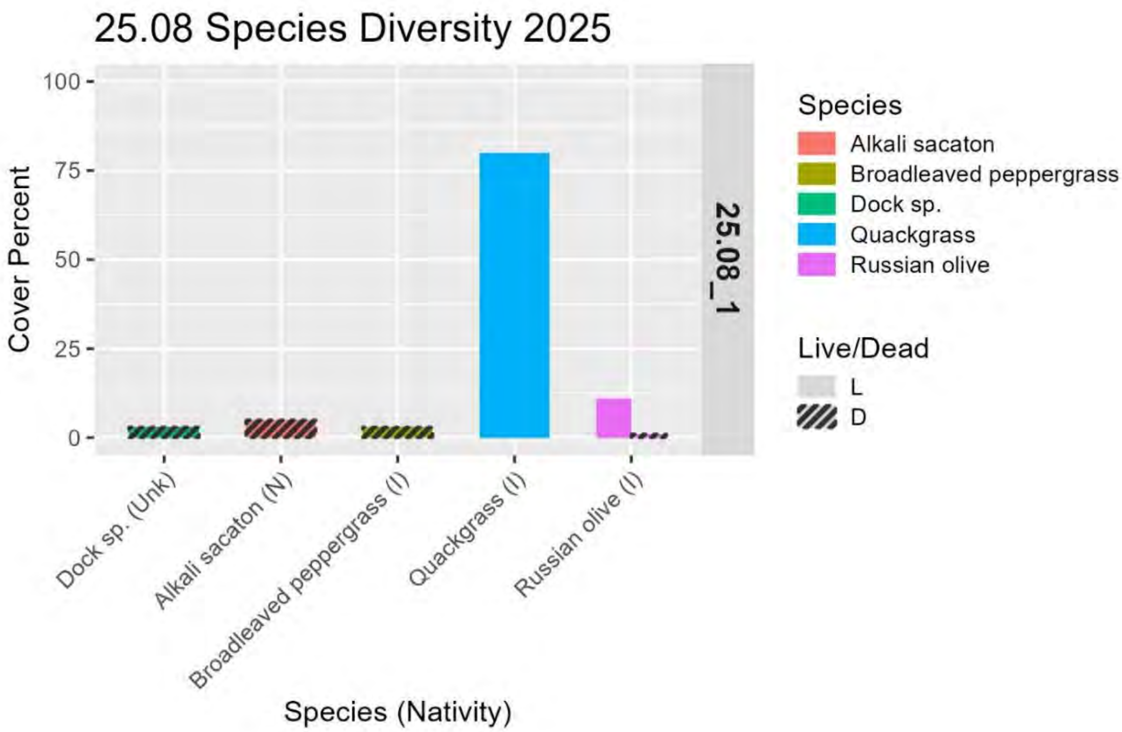


Figure 9: Aerial cover of the 25.08 project area.

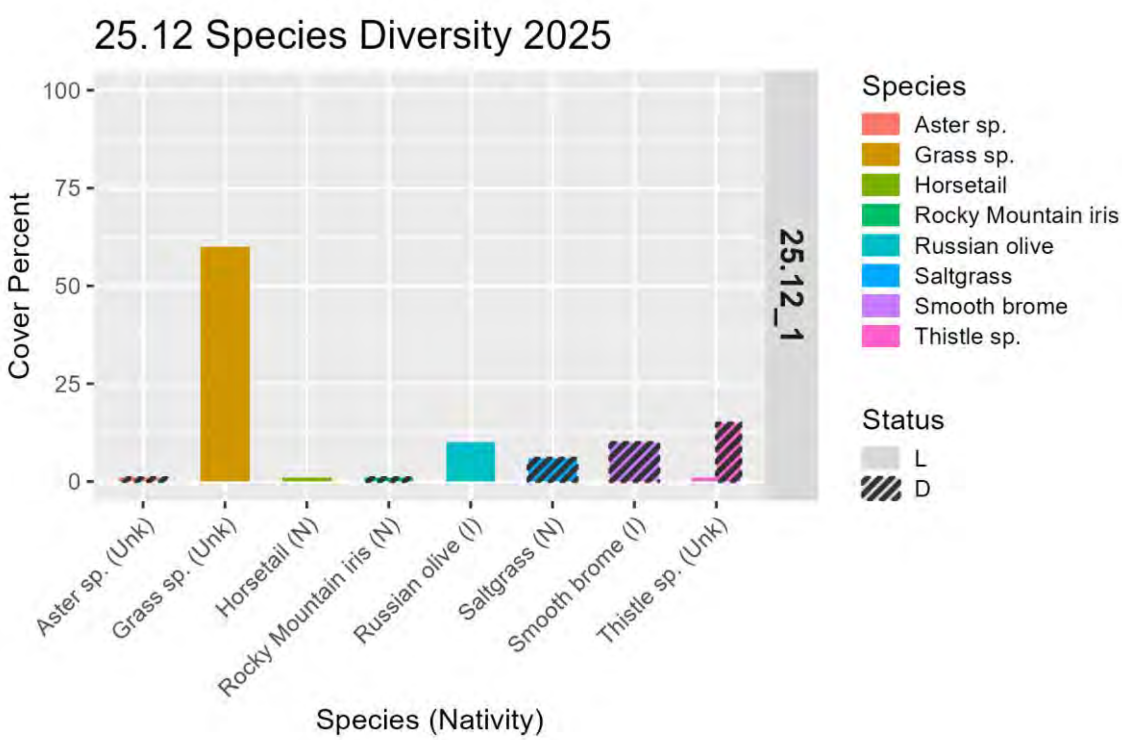


Figure 10: Aerial cover of the 25.12 project area.

Aerial cover is an estimate of the total portion of a plot covered by the foliage of each species found there (that accounts for at least 1% of the plot area). It does not necessarily add up to 100%, since there may be bare soil left unshaded or foliage from different species may be layered and add up to more than 100%.

Across monitoring sites, the largest portions of aerial cover came from graminoid species: sedges (*Carex sp.*) in areas 25.02 and 25.06; non-native quackgrass (*Elymus repens*) in 25.08; and an unidentified grass in 25.12. Other native species present included alkali sacaton (*Sporobolus airoides*), springparsley (*Cymopterus sp.*), and rubber rabbitbrush (*Ericameria nauseosa*). The most common non-natives after quackgrass were Russian olive (*Eleagnus angustifolia*), present on all project sites, and smooth brome (*Bromus inermis*), on the 25.12 site.

6.5 Soils

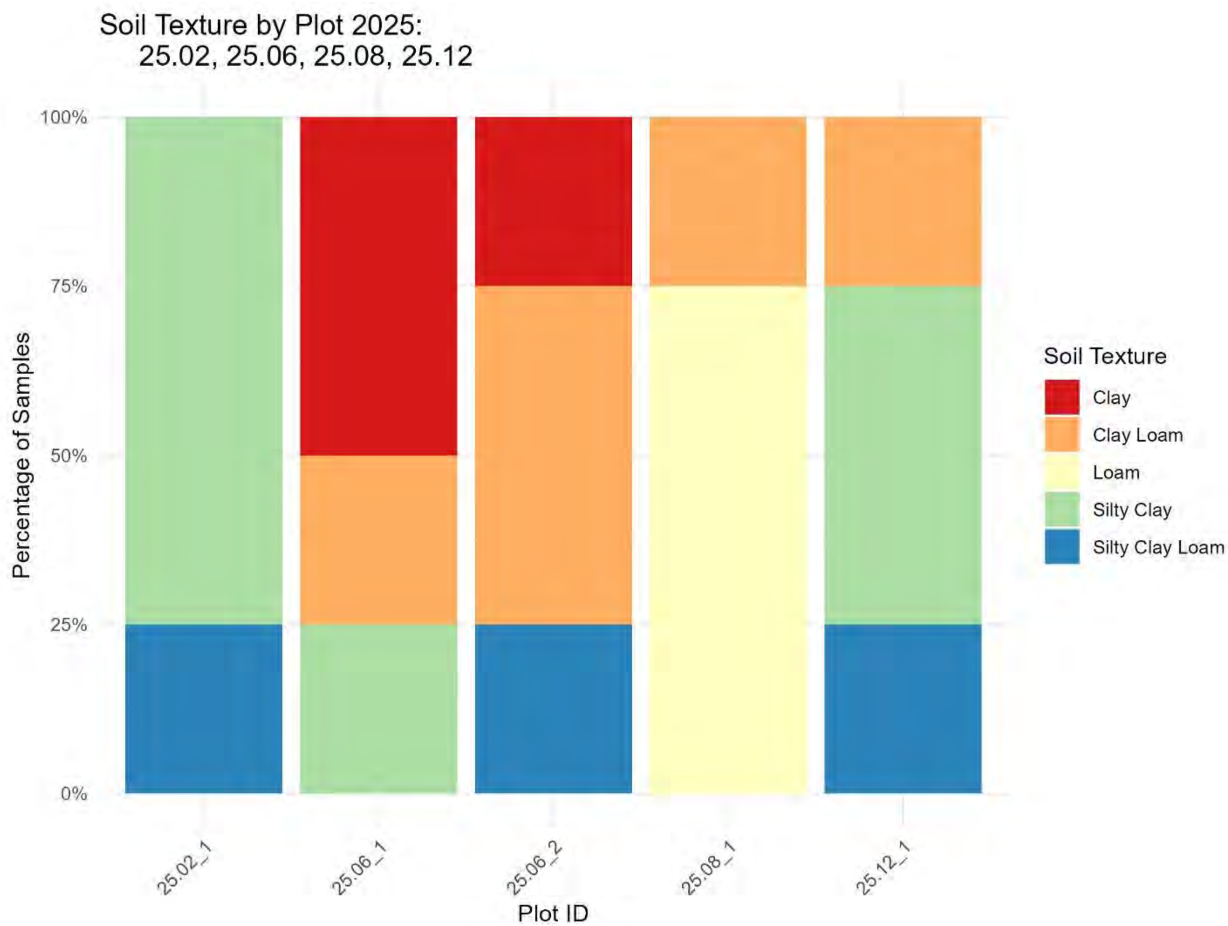


Figure 11: Soil texture by plot across all Taos projects in 2025.

Soil Texture Frequency:		
Plot ID	**Soil Texture**	**Frequency**
25.02_1	Silty Clay	3
	Silty Clay Loam	1
25.06_1	Clay	2
	Clay Loam	1
	Silty Clay	1
25.06_2	Clay	1
	Clay Loam	2
	Silty Clay Loam	1
25.08_1	Clay Loam	1
	Loam	3
25.12_1	Clay Loam	1
	Silty Clay	2
	Silty Clay Loam	1

Table 4: Soil texture frequency across all Taos projects in 2025.

Soils on the monitoring plots were predominately composed of fine silt (0.002-0.05mm) and clay (<0.002mm) particles, although all these soil types may include some portion of sand as well (0.05-2.0mm). Soils with majority small particles may have high nutrient content, but are susceptible to compaction and wind erosion (Berry et al., 2007).

6.6 Fuels

Fuel Density by Project and Plot 2025

Summary of Estimated Downed Woody Debris in Tons Per Acre

		Tons Per Acre			
		FWD			CWD
Project ID	Plot ID	1-hr	10-hr	100-hr	1000-hr
25.02	25.02_1	0.00	0.00	0.00	0.00
25.06	25.06_1	0.09	0.00	0.00	0.00
25.06	25.06_2	0.27	0.00	0.00	0.00
25.08	25.08_1	0.17	0.13	0.00	0.00
25.12	25.12_1	0.07	0.00	0.00	0.00

Note: FWD = Fine Woody Debris; CWD = Coarse Woody Debris.

Table 5: Fuels on monitoring plots for Taos in 2025.

There were minimal amounts of fuels in the Taos projects with no course woody debris or 100-hr fuels and only a single piece of 10-hr fuels in project area 25.08. While the count of 1-hr fuels was higher (53 pieces for project 25.06 for example), these do not translate to a large fuel load in terms of tons per acre. As would be expected from largely open grazing land, fire risk comes almost entirely from dead dry grass and fine fuels. These can carry fire quickly under the right conditions, but the lack of heavier fuels means that the risk is mainly forming a fast-moving flame front and there is little possibility for a sustained fire.

7 Summary

The Taos project areas are characterized by their predominant land use: grazing farmland. While Russian olive presence and regeneration was only collected on four projects, it is worth noting that the randomly selected plots often fell within open-pasture sections of the treatment area. Despite being largely open farmland with a low average density of five trees per acre, the sites show persistent invasive pressure from clumped patches of mature Russian olives, particularly in project 25.08, and active native regeneration of rubber rabbitbrush in project 25.06. Groves of Russian olive often were found around perimeters of treatment sites (along fence lines or ditches) and not captured within the 1/10th acre plots. In addition to the common stand exam plot data, the photos collected in more locations may provide additional information on the efficacy of treatment of Russian olive.

Project data reflected minimal fuel loads, consisting almost entirely of fine 1-hour fuels and no 10, 100, or 1000-hour fuels. The soil texture across projects are predominantly fine silts and clays, while ground cover is mostly comprised of high plant basal area with the remaining surface left as bare soil or litter. Vegetation is dominated by graminoids such as sedges and alkali sacaton, though invasive species like quackgrass and Russian olive are present across all sites.

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Appendix I - Modified Hink and Ohmart categories

The following are examples of the modified Hink & Ohmart Vegetation Vertical Structure Type Definitions categories with text from (Muldavin E. , 2021). All photos credit NMFWRI.

Multiple-Story Communities (Woodlands/Forests)

Type 1- High Structure Forest with a well-developed understory. Trees (>6 m) with a canopy covering >25% of the area of the community polygon and woody understory layer of tall shrubs or short trees (1.5-6 m) covering >25% of the area of the community (polygon). Substantial foliage is in all height layers.

Type 2 -Low Structure Forest with little or no understory. Trees (>6 m) with canopy covering >25% of the area of the community polygon and minimal woody understory layer (1.5-6 m) covering <25% of the area of the community (polygon). Majority of foliage is over 7 m above the ground.

Single-story Communities (Shrublands, Herbaceous and Bare Ground)

Type 5 -Tall Shrubland. Young tree and shrub layer (1.5-6 m) covering >25% of the area of the community polygon. Stands dominated by tall shrubs and young trees, may include herbaceous vegetation underneath the woody vegetation.

Type 6S- Short Shrubland. Short stature shrubs or very young trees (>1.5 m) covering >25% of the area of the community (polygon). Stands dominated by short woody vegetation, may include herbaceous vegetation among the woody vegetation.

Type 6W- Herbaceous Wetland. Herbaceous wetland vegetation covering >10% of the area of the community polygon. Stands dominated by obligate wetland herbaceous species. Woody species absent, or <25% cover.

Type 6H- Herbaceous vegetation. Herbaceous vegetation covering >10% of the area of the community polygon. Stands dominated by herbaceous vegetation of any type except obligate wetland species. Woody species absent or <25% cover.

Type 7-Sparse Vegetation, Bare Ground. Bare ground, may include sparse woody or herbaceous vegetation, but total vegetation cover <10%. May be natural disturbance in origin (e.g., cobble bars) or anthropogenic (e.g., roads).

Appendix II: Taos project photopoints

25.01_1

25.01_1_N

25.01_1_E

25.01_1_S

25.01_1_W

25.02_2

25.02_2_N

25.02_2_E

25.02_2_S

25.02_2_W

25.03_1

25.03_1_N

25.03_1_E

25.03_1_S

25.03_1_W

25.04_1

25.04_1_N

25.04_1_E

25.04_1_S

25.04_1_W

25.06_3

25.06_3_N

25.06_3_E

25.06_3_S

25.06_3_W

25.07_1

25.07_1_N

25.07_1_E

25.07_1_S

25.07_1_W

25.08_2

25.08_2_N

25.08_2_E

25.08_2_S

25.08_2_W

25.09_1

25.09_1_N

25.09_1_E

25.09_1_S

25.09_1_W

25.10_1

25.10_1_N

25.10_1_E

25.10_1_S

25.10_1_W

25.11_1

25.11_1_N

25.11_1_E

25.11_1_S

25.11_1_W

Note: 25.11_1 was originally in project 25.02 and this point was 25.02_1. The whiteboard in these photos has the old number but these are the correct photos for 25.11_1

25.12_2

25.12_2_N

25.12_2_E

25.12_2_S

25.12_2_W