

SFPSWCD San Cristobal Drainage Project 15.21

10-yr Post Treatment Monitoring Report – 2025

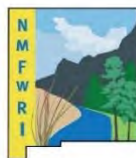


Prepared by:

Abigail Han, Monitoring & GIS Specialist; Patrick Goetsch, Riparian Crew Lead; Vincent Vispo, Assistant Crew Lead; Jax Gaglianese-Woody, Monitoring Technician

New Mexico Forest and Watershed Restoration Institute

for the Greater Rio Grande Watershed Alliance and the Santa Fe-Pojoaque SWCD



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Acronyms and Abbreviations

Acronym, Abbreviation, or Term	Explanation or Definition as used by NMFWRI
CSE	Common Stand Exam
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
PC	Plot center
SFPSWCD	Santa Fe-Pojoaque SWCD
SWCD	Soil and Water Conservation District
USDA	United States Department of Agriculture

1 Purpose of Report

This report covers low- and high-intensity **post-treatment** vegetation monitoring assessments performed on a **non-native phreatophyte removal project** submitted **on behalf of the private landowner by the Santa Fe-Pojoaque SWCD (SFPSWCD)** to the Greater Rio Grande Watershed Alliance in **2015**. 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 – Adapted NMRAM

Low intensity pre-treatment vegetation monitoring was conducted using an adapted version of the biotic portion of the New Mexico Rapid Assessment Method (NMRAM), v 2.1, updating recommendations made in the Field Manual for Greater Rio Grande Watershed Alliance (GRGWA) Riparian Restoration Effectiveness Monitoring and the GRGWA Monitoring Plan, developed by Lightfoot & Stropki of SWCA Environmental Consultants in 2012.

NMRAM was developed by the New Mexico Environment Department Surface Water Quality Bureau Wetlands Program and Natural Heritage New Mexico as a “cost effective, yet consistent and meaningful tool” (Muldavin E. B., 2011) for wetland ecological condition assessment in terms of anthropogenic disturbance as negatively correlated with quality and functionality. The portions of NMRAM we utilized are Level 2 “semi-quantitative” field measurements taken at less detail than plot level (Muldavin E. B., 2011).

Measurements taken included relative native plant community composition, vegetation horizontal patch structure, vegetation vertical structure, native riparian tree regeneration, and invasive exotic plant species cover. The underlying method for these biotic assessments was a version of the 1984 Hink and Ohmart vertical structure classification system, modified for use in the NMRAM for Montane Riverine Wetlands version 2.0 (see Appendix I). First, vegetation communities were mapped out by patch (polygon) according to the Hink and Ohmart system. Next, the presence of invasives, wetland species, and the two dominant species in each vertical stratum (“tree” >15 ft, “shrub” 4.5-15 ft, and “herbaceous” <4.5 ft) were recorded for each plant community. The native/exotic ratio in each of the patches was scored and weighted based on the percent of the project area each patch comprised. These scores were then combined with the additional biotic metrics of vertical and horizontal diversity, native tree regeneration, and overall (listed) invasive presence. The NMRAM rating system is based, at all levels, on a scale of 1 to 4, where 4 is considered excellent condition, 3 good, 2 fair, and 1 poor.

We also assessed soil surface condition, which is a metric typically included in the abiotic section of the NMRAM, as well as the presence of surface fuels, which is not part of the NMRAM. Unlike the other 6 metrics we used, surface fuels were recorded on a rating scale from 0 to 1.0 where 1.0 is a continuous fuel matrix.

Prior to entering the field, we created maps with the project boundaries as provided by GRGWA. We combined these polygons with recent aerial imagery and identified relevant roads and other landscape features. Once on the ground, the vegetation community polygons (as determined by the modified Hink and Ohmart classification system) were hand-drawn onto this map and served as the basis for other biotic metric assessments. Upon returning to the

office, this polygon map and the photo points were digitized by the monitoring technician and/or specialist. All of the adapted NMRAM methods were collected for both pre- and post-treatment.

3.2 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 (Lightfoot, 2014). Photo points were collected for both pre- and post-treatment.

3.3 High-intensity Field Methods – CSE Plots

For post-treatment monitoring, we added additional riparian-adapted Common Stand Exams (CSE). CSE plot locations are synonymous with pre-treatment photo point locations where possible; in some cases, additional plots are established to reach the target sampling density. Once the plot location was determined, 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. 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.

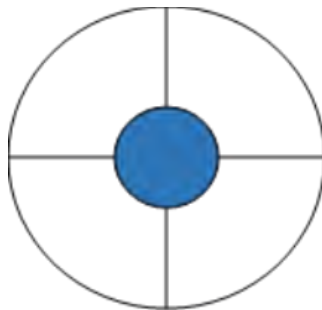


Figure 1: Example of CSE plot layout. The outer circle represents the 1/10-acre plot and the blue circle is the 1/100-acre plot.

3.4 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.

3.5 Personnel Involved

2015 New Mexico Forest and Watershed Restoration Institute Monitoring Team:

- Kathryn R Mahan, Ecological Monitoring Specialist

2015 New Mexico Forest and Watershed Restoration Institute GIS Team:

- Adrienne Miller, GIS Specialist
- Patti Dappen, GIS Specialist

2021 New Mexico Forest and Watershed Restoration Institute Monitoring Team:

- Kathryn R Mahan, Monitoring Program Manager
- Carmen Briones, Crew Logistics Support/ Assistant Manager
- Raymundo Melendez, Ecological Monitoring Technician
- Alex Makowicki, Ecological monitoring Technician

2021 New Mexico Forest and Watershed Restoration Institute GIS Team:

- Patti Dappen, GIS Program Manager
- Katie Withnall, GIS Specialist

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

- Abigail Han, Monitoring & GIS Specialist
- Patrick Goetsch, Riparian Crew Lead
- Vincent Vispo, Assistant Crew Lead
- Andrew Persante, Student Technician
- Emily Yannayon, Monitoring Specialist
- Jax Gaglianese-Woody, Monitoring Technician
- Kathryn Mahan, Monitoring Program Manager
- Corey Beinhart, Data Manager

Other persons contacted:

- Fred Rossbach, Field Coordinator, Greater Rio Grande Watershed Alliance
- Dierdre Tarr, District Manager for Claunch-Pinto SWCD, Greater Rio Grande Watershed Alliance
- Todd Haines, Field Coordinator, Greater Rio Grande Watershed Alliance

4 Site Description and Ecological Context: 15.21 San Cristobal

Project 15.21 is located on the San Cristobal Ranch near the community of Lamy, NM. Lamy receives an average of 15.6 inches of rain annually. Temperatures range from an average high of 86 in July, average low of 19 in January (City Stats, 2015). According to the NRCS Web Soil Survey, the project is 85% Jaralosa-Chupe-Riverwash Complex and 11% Zia-Gullied Land complex. The ecological sites present on this site are predominantly Sandy R035XA113NM, followed by Loamy R035XA112NM, Salt Flats R035XA126NM, and Gravelly R035XG114NM (USDA NRCS, 2013). The Sandy ecological site typically supports plant communities composed of fourwing saltbush, winterfat, and sagebrush at the shrub layer, and at the herbaceous layer, Rocky Mountain beeplant, blue grama, western wheatgrass, threeawns, galleta, dropseed, Indian ricegrass, needle-and-thread, squirreltail, and New Mexico feathergrass. This may also support a shrub-dominated state (dominated by sagebrush, rabbitbrush with a blue-grama/threeawn/dropseed/muhly understory), as well as a juniper-dominated state (with a patchy grass understory of blue grama, dropseeds, galleta, Indian ricegrass and threeawn) (USDA NRCS). The Loamy ecological site typically is in a grassland state dominated by blue grama, Western wheatgrass, galleta, ring muhly, dropseed and/or threeawn, but can also be found in piñon-juniper invaded state (piñon, juniper, and blue grama), grass/succulent-mix state (blue grama, cholla-prickly pear), shrub-dominated state (rabbitbrush/horsebrush and blue grama), and bare state (bare/sparse grass) (USDA NRCS, n.d.).

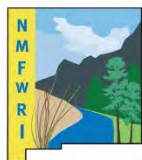
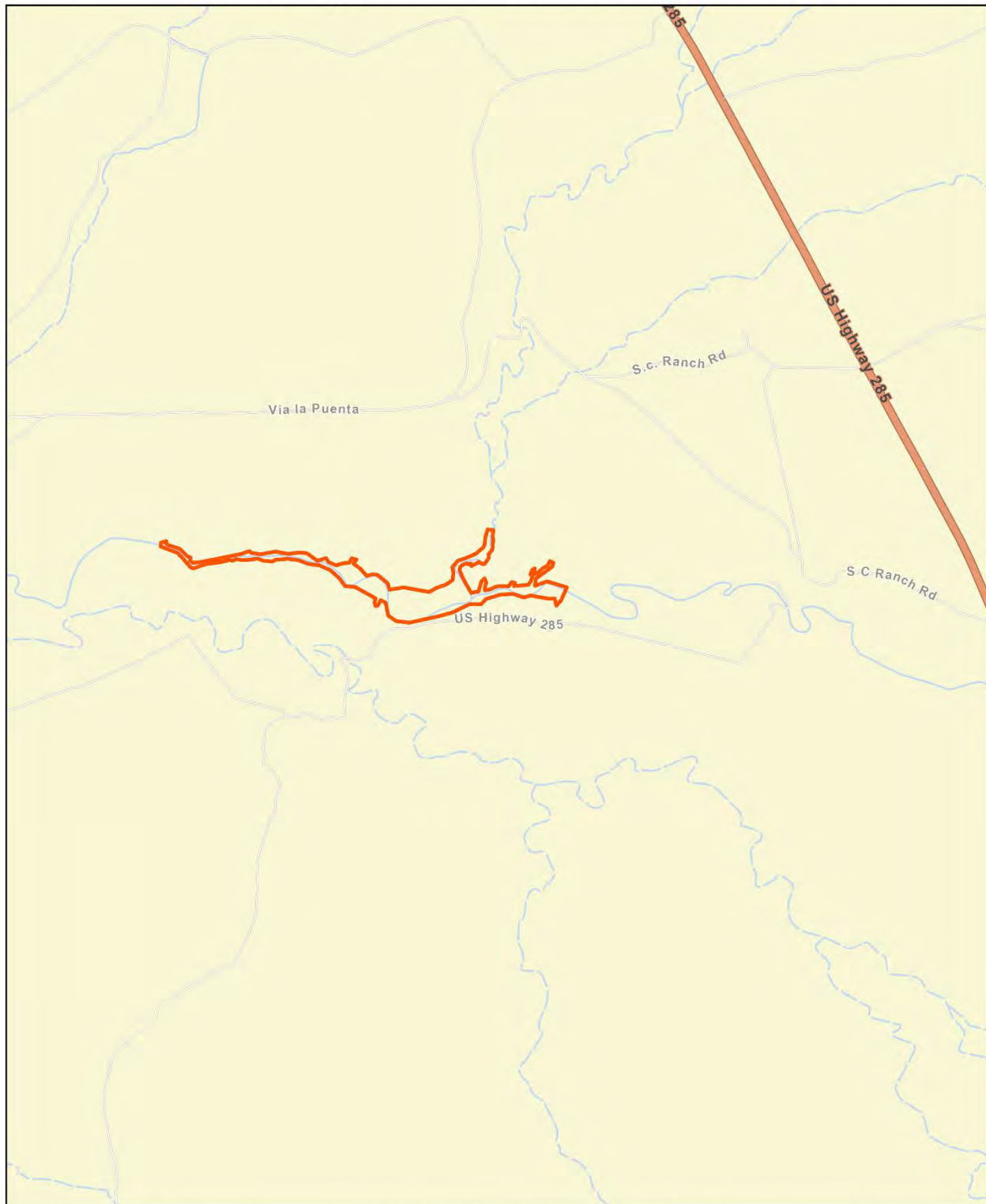
5 Project History: 15.21 San Cristobal

Monitoring was conducted at this 35.8 –acre project site on November 19th, 2015, as part of a restoration project targeting non-native phreatophytes scheduled for 2015-2016. Post-treatment monitoring occurred on November 17th, 2021, and November 24th, 2025. The project is located on the San Cristobal Ranch off NM Hwy 41 near Lamy and Galisteo, NM in Santa Fe County (see Figure 1 below). The project was sponsored by the Santa Fe- Pojoaque SWCD. Planned treatment includes removal of varying density salt cedar as well as Russian olive and Siberian elm along the San Cristobal perennial drainage. Restoration goals are to increase wildlife and livestock forage and increase hydrologic function including an increase in overland flow (presence of water near springs) and a reduction in erosion and channelization) leading to an overall increase in ecosystem health and function.

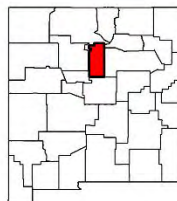
Map 1 shows the 15.21 project area in its geographic context. This site is part of the working San Cristobal Ranch, which is managed by Singleton Ranches. The predominant land use on the property is as pasture for both horses and cattle. This is the second GRGWA project to be done in the San Cristobal Drainage (in 2014, project 14.15 was outlined near this area). The site's elevation is approximately 6200 feet. San Cristobal Drainage, referred to in most literature NMFWR encountered as the San Cristóbal Arroyo, drains from Glorieta and Rowe Mesa, which

becomes the east fork of the Galisteo River. According to the Galisteo Basin Archaeological Sites Protection Act, the San Cristóbal Arroyo is a permanent (perennial) water source (New Mexico Department of Cultural Affairs Office of Archaeological Studies, 2014). There is limited stream data available beginning in 1955 collected by the USGS from stream site “08317600 San Cristobal Arroyo NR Galisteo, NM” (USGS, 2015). There are some access concerns to site due to the soil type, which, in the project area, is predominantly Jaralosa-Chupe-Riverwash complex and is not passable when wet. At the time of the 2015 site visit there was plentiful tamarisk, as well as some Russian olive and Russian thistle within the project area. There was also an abundance of native species including cottonwood, coyote willow, juniper, marehail, chamisa, snakeweed, sagewort, helianthus, 4-wing saltbush, cocklebur, sedges, blue grama, ring muhly, saltgrass, and other native grasses. Map 2 shows the locations of photopoints where pictures were taken across all three years of monitoring, as well as the sites of the CSE plots taken in 2025.


Project 15.21 Boundary



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0 0.25 0.5 1 Miles

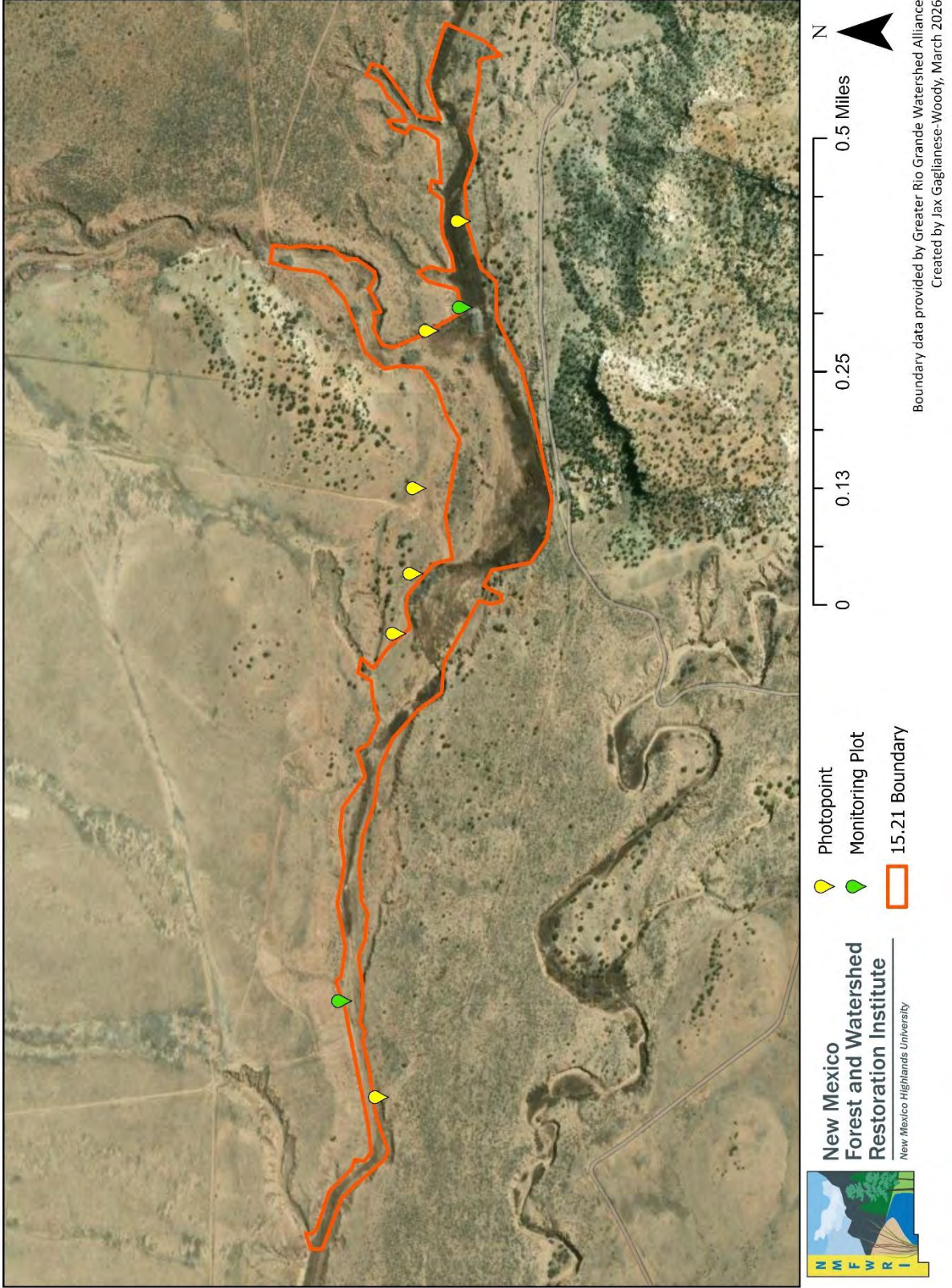
 15.21 Boundary



Boundary data provided by Greater Rio Grande Watershed Alliance
Created by Jax Gaglianese-Woody, March 2026

Map 1: 15.21 San Cristobal project location.

Project 15.21 Monitoring Locations



Map 2: 15.21 photopoints and monitoring plots.

6 Monitoring Results

6.1 Low-intensity Adapted NMRAM

As described above, the NMRAM uses a series of assessments of assign a score between 1-4 (where 1= Poor and 4 = Excellent) for the following metrics:

Metrics 15.21	Pre-treatment 11-19-2015	5-year Post- treatment 11- 17-2021	10-year Post- treatment 11- 24-2025
Relative Native Plant Community Composition	2	2	4
Vegetation Horizontal Patch Structure	4	3	4
Vegetation Vertical Structure	2	1	1
Native Riparian Tree Regeneration	3	1	3 or 4
Exotic Invasive Plant Species Cover	1	3	1
Project Biotic Score (based on above ratings)	2.6	2.1	2.7
Project Biotic Rating	C / Fair	C / Fair	B / Good
Soil Surface Condition	2 or 3	4	2
Surface Fuels	0.5	0.35	0.7

Table 1. NMRAM Scores for 15-15.

The project’s biotic score, a weighted average of the scores for the five biotic categories, decreased between the pretreatment monitoring visit and the visit five years post-treatment by 0.5 points. By the time of the visit in 2025, it had recovered slightly past its initial level. This improvement pushed the project’s rating, which had been “Fair” pre- and five years post-treatment, over the cutoff to “Good”. Although the following discussion will touch on all previous monitoring visits, it should be noted that the scores can be subjective to the crew conducting the monitoring. The greatest value from these numbers is the trend they suggest for the project’s biotic characteristics: the project has maintained a relatively steady condition right around the “Fair” to “Good” cutoff.

The Relative Native Plant Community score improved from “Fair” to “Excellent” from 2021 to 2025. This change does reflect a real difference in species composition, but it is unlikely that such a dramatic shift happened so late after treatment. This score did in fact improve from 2015 to 2021, but not quite enough to push it into the “Good” category. The change is also obscured by differences in how plant communities were mapped. In sum, the amount of invasive species in the project area, particularly Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix ramosissima*), decreased significantly after treatment, and there had not been significant regrowth at the time of the 2025 monitoring visit.

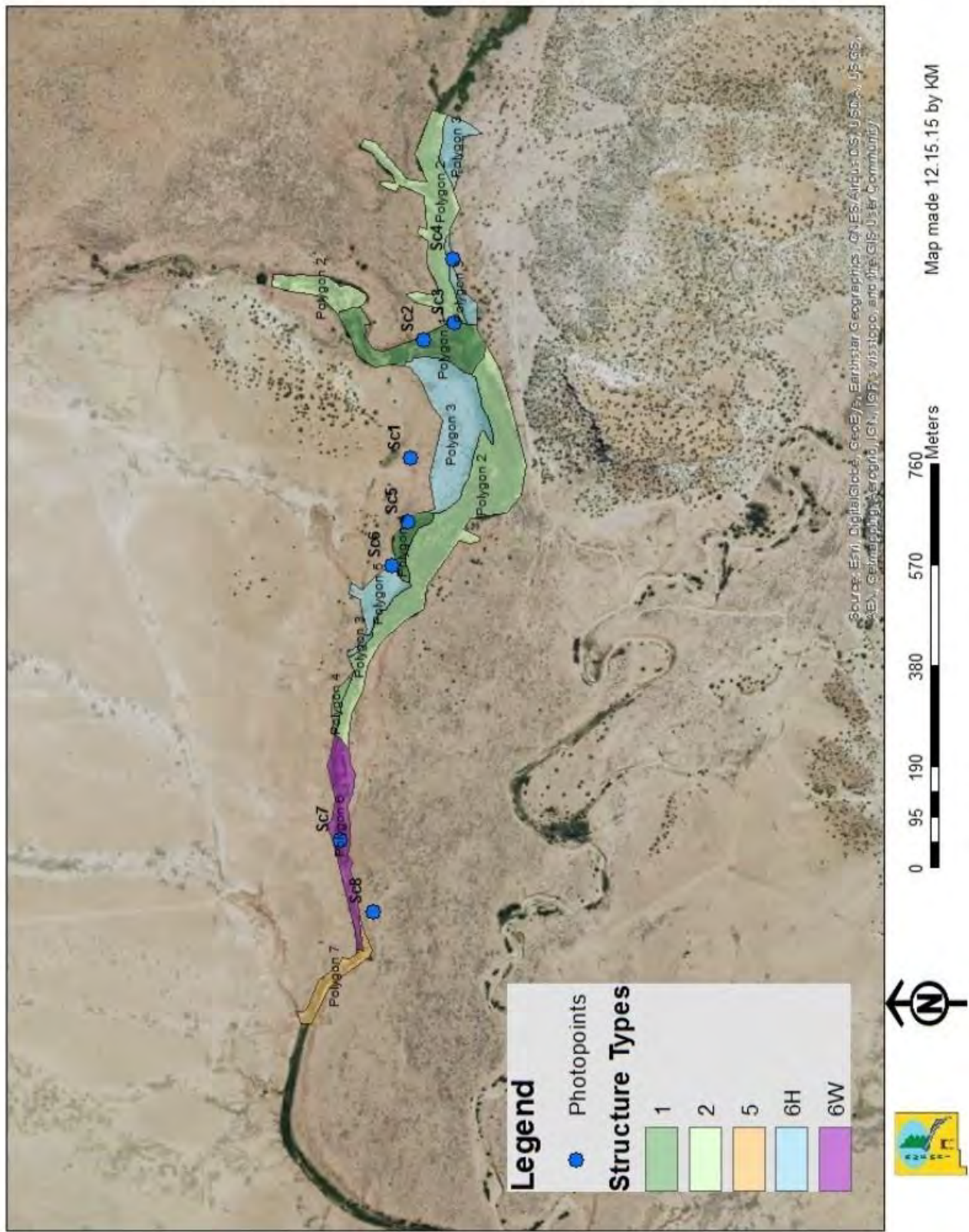
Vegetation Horizontal Patch Structure scored well across all years, while Vertical Structure decreased from “Fair” pretreatment to “Poor” post-treatment. This is likely because non-natives occupied a substantial portion of the tall- and short-woody strata, and native plants have not yet filled the gap left by their removal. Encouragingly, the 2025 monitoring visit revealed substantial native riparian tree regeneration. This suggests that vertical structure could improve in the future as these trees mature into the higher strata previously occupied by Russian olive (*Elaeagnus angustifolia*) and saltcedar (*Tamarix ramosissima*).

Unfortunately, non-natives are still present in significant numbers in the project area as shown by the “Poor” score for Exotic Invasive Plant Species cover. Despite some indication from the 2021 monitoring visit that non-natives had successfully been controlled, key “noxious weeds” (as designated by the New Mexico Department of Agriculture) again constituted >10% of plant cover by 2025.

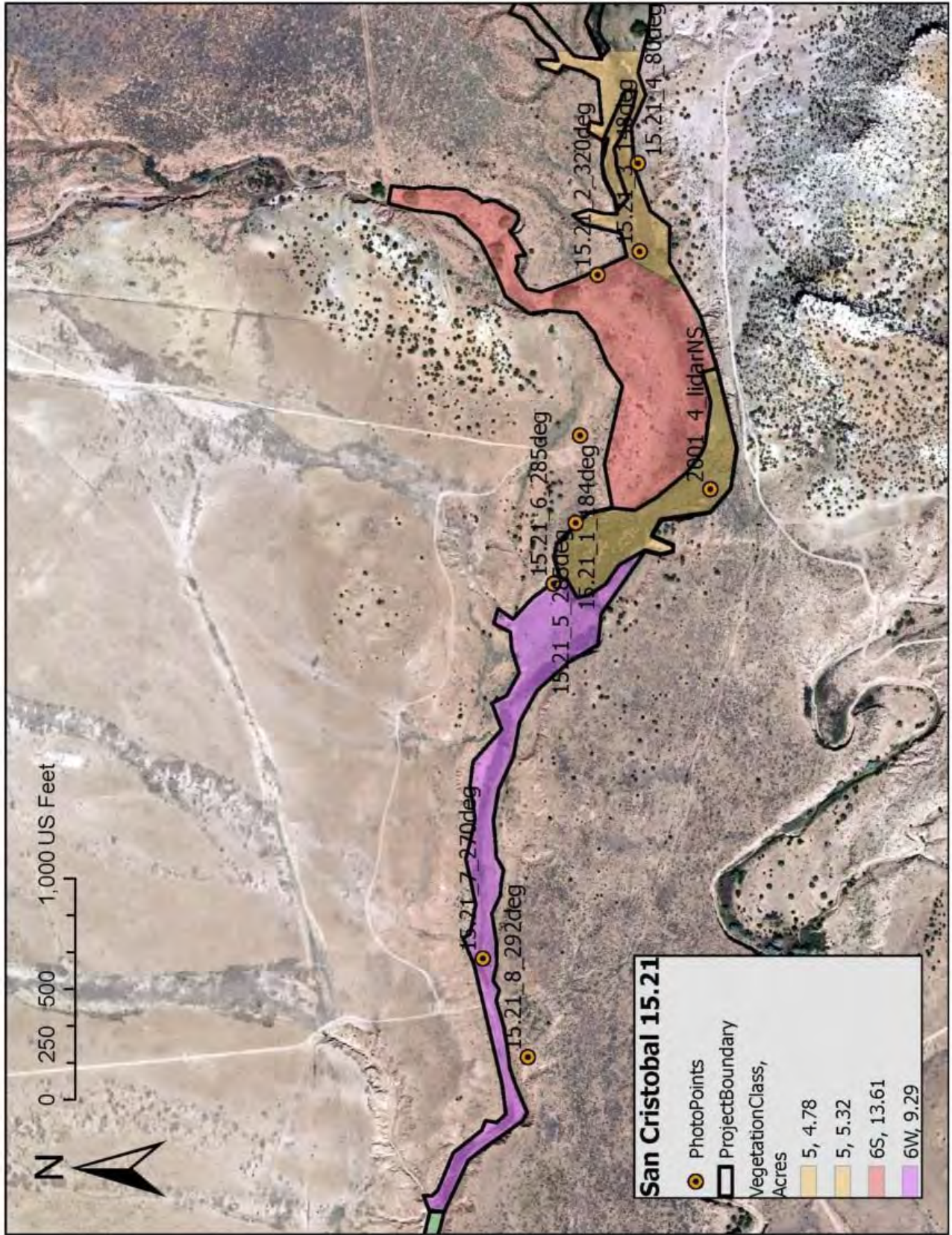
In 2025, the soil surface was significantly disturbed by two-tracks crossing the project area, dense livestock trails, and the effects of intensive grazing. The potential for surface fuels to carry fire was also assessed as relatively high because of the dense brush covering much of the project area.

The NMRAM community vegetation maps for 2015, 2021, and 2025 are on the subsequent pages.

15-21 San Cristobal Drainage Pre-Treatment Vegetation Polygons, 11.19.15

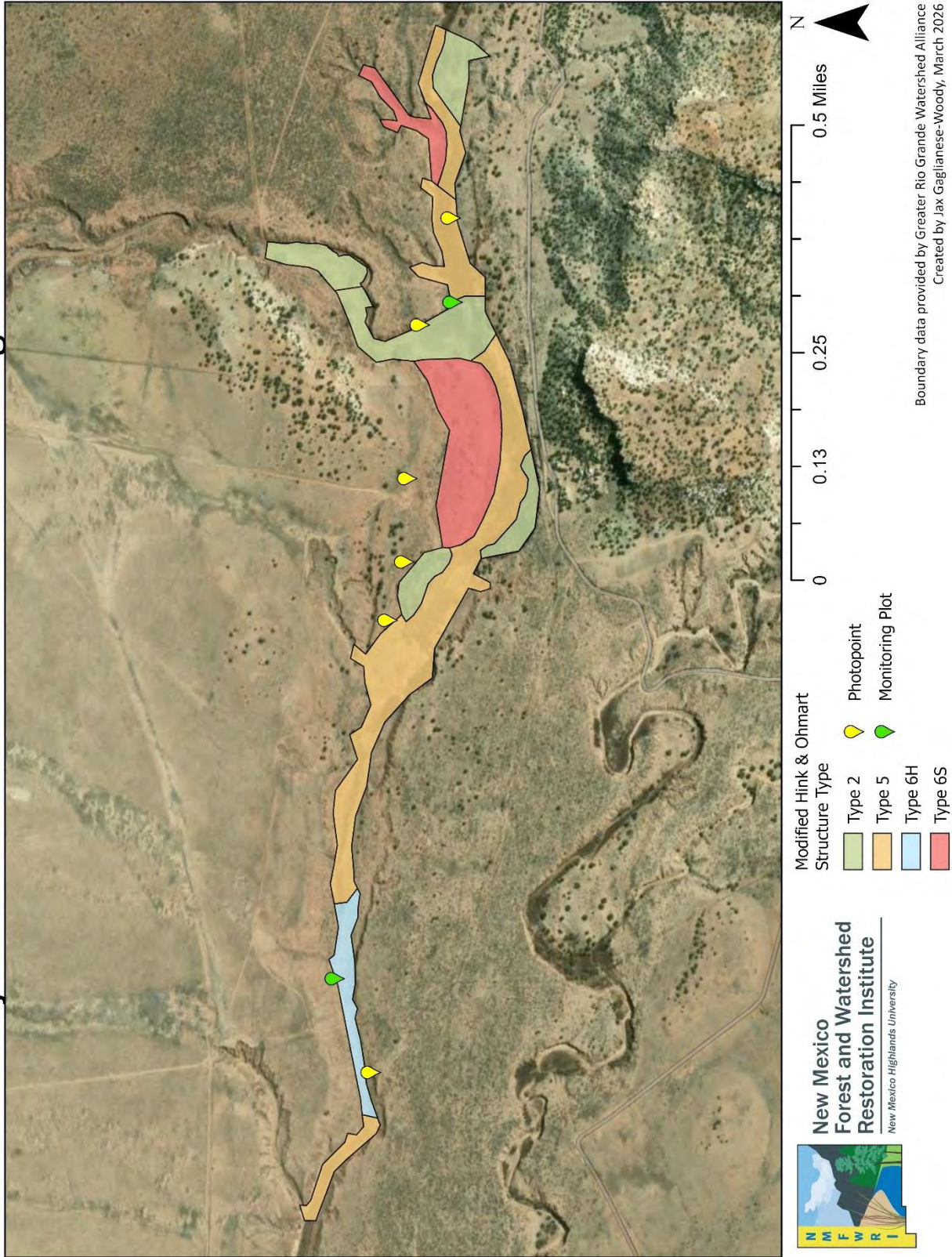


Map 3: 15.21 NMRAM plant community polygons from 2015.



Map 4: 15.21 NMRAM plant community polygons from 2021.

Project 15.21 2025 Post-Treatment Vegetation



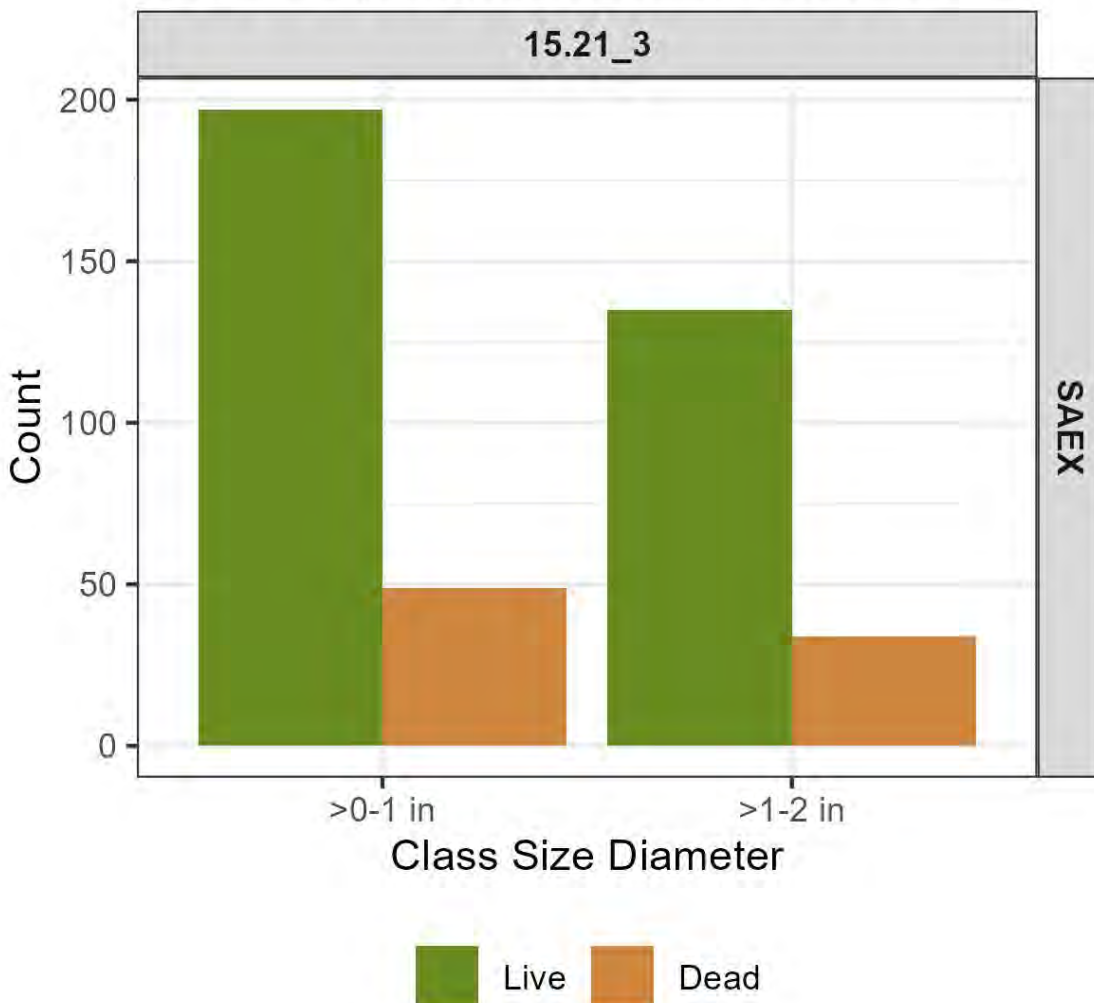
Map 5: 15.21 NMRAM plant community polygons from 2025.

6.2 High-Intensity CSE Plots

This site has 2 CSE plots. These CSE plots reflect 10-yr post-treatment conditions because CSE plot protocol was not in place in 2021. Although mature cottonwoods were present on site, there were no trees within the boundaries of the randomly chosen plots.

Regeneration: Trees & Shrubs

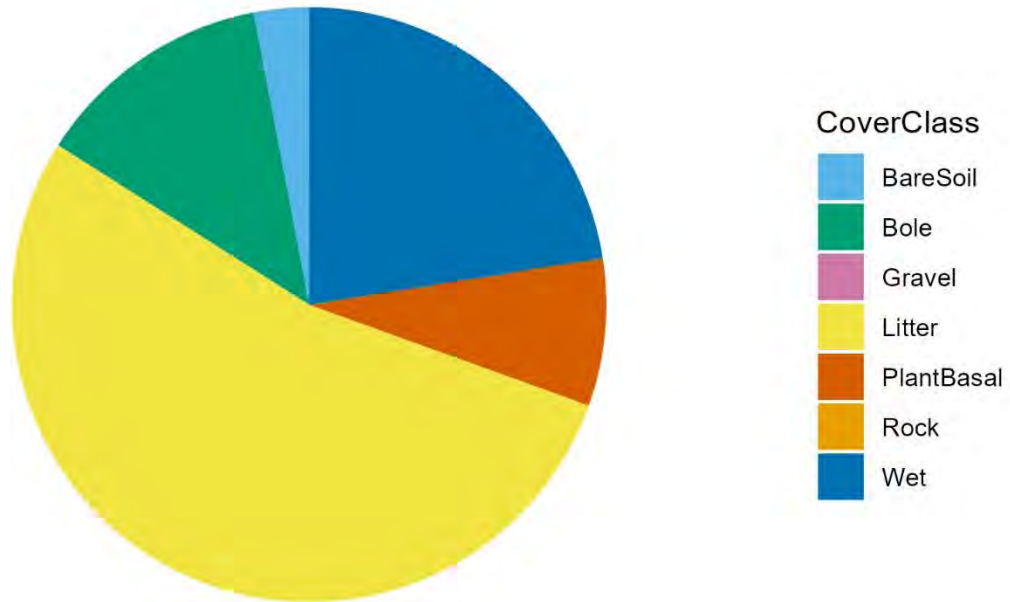
15.21 Sapling Regeneration 2025



The eastern monitoring plot was dense with small-diameter coyote willow (*Salix exigua*) saplings. In total there were 329 live stems between 0 and 2 inches in diameter and 83 dead. In the protocols employed for this project a “sapling” is a woody stem greater than 4.5 feet in height but below the diameter cutoff to be considered a tree. A woody plant below 4.5 feet is recorded as a “seedling,” of which there were only 6 in this project (not shown).

Ground Cover

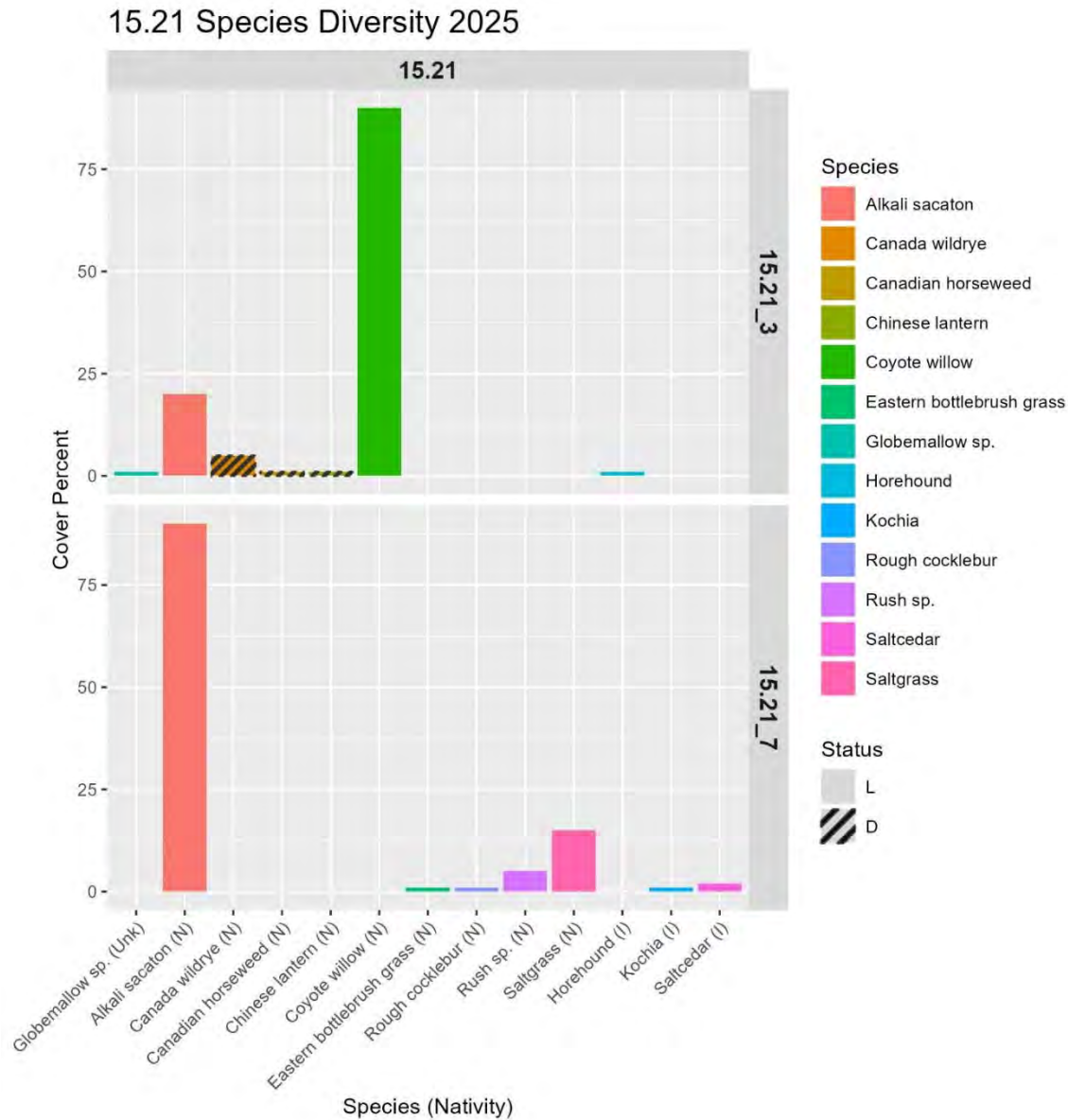
15.21 Ground Cover 2025



Project	Cover Class	% Cover
15.21	BareSoil	3.0
15.21	Bole	13.0
15.21	Gravel	0.0
15.21	Litter	53.5
15.21	PlantBasal	8.0
15.21	Rock	0.0
15.21	Wet	22.5

Ground cover in the project was predominantly litter at 53.5% – deciduous tree leaves on the plot on the east side of the project amongst dense willows and cottonwoods, and dead grass on the open plot on the western side. Litter was followed by water at 22.5%, highlighting the riparian nature of the site. Bole came in at 13% which attributed to the willows on the eastern plot.

Aerial Cover

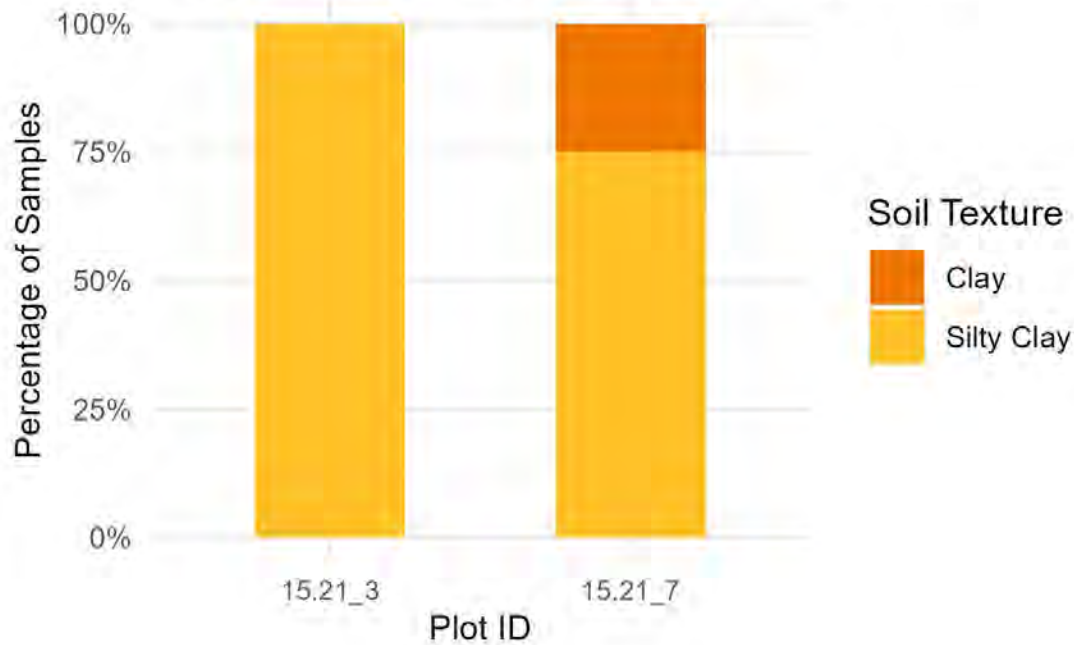


Conveniently, the randomly chosen plot locations represent two ends of the spectrum in terms of the plant communities present on the project site. 15.21_3 was located alongside the creek in a dense stand of coyote willow (*Salix exigua*). The quarter of the plot that was more open was dominated by alkali sacaton (*Sporobolus airoides*) intermixed with small numbers of Canada wildrye (*Elymus canadensis*), Canadian horseweed (*Conyza canadensis*), and Chinese lantern (*Quincula lobata*). The only non-natives on plot were horehound (*Marrubium vulgare*) and potentially a globemallow (*Sphaeralcea sp.*; this specimen was not possible to identify to species-level, meaning its nativity status is uncertain). These were only present in small amounts.

In comparison, plot 15.21_7 is located on the western end of the project in a heavily grazed area with few established woody plants. The dominant species here was alkali sacaton (*Sporobolus airoides*). Other natives included saltgrass (*Distichlis spicata*), eastern bottlebrush grass (*Elymus hystrix*), rough cocklebur (*Xanthium strumarium*), and rushes (*Juncus sp.*). The non-natives saltceder (*Tamarix ramosissima*) and kochia (*Bassia scoparia*) were present but uncommon.

Soils

15.21 Soil Texture Composition by Plot 2025

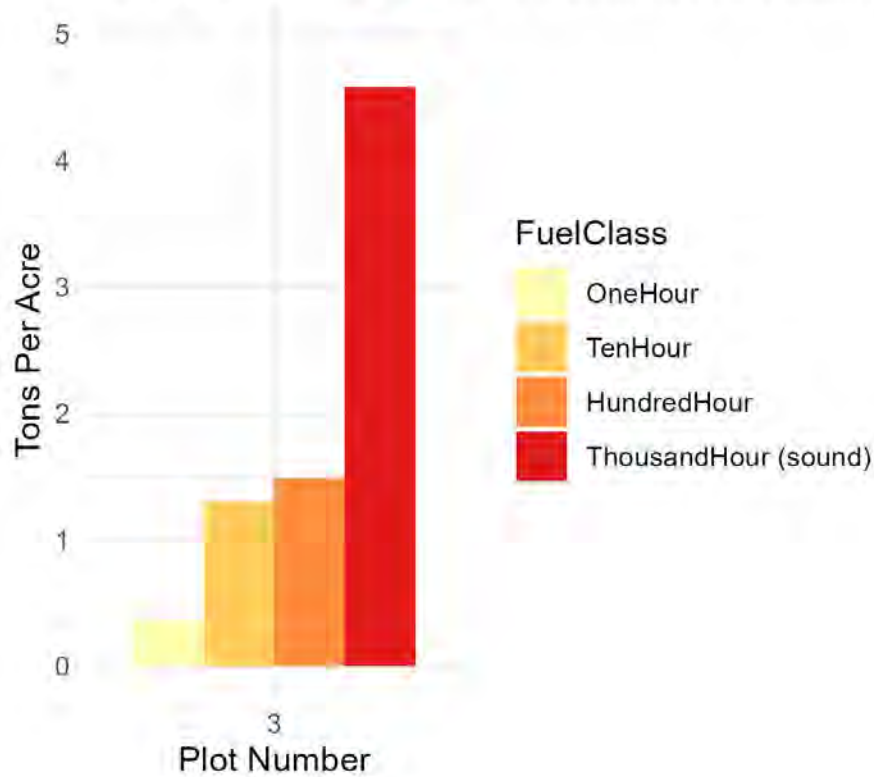


Soil Texture Frequency		
Plot ID	Soil Texture	Frequency
15.21_3	Silty Clay	4
15.21_7	Clay	1
	Silty Clay	3

The project was dominated by silty clay soils. Silt refers to particles 0.002-0.05mm in diameter, while clay particles are <0.002mm (Berry et al., 2007). Clay soils are generally considered to hold nutrients well, but they can easily become compacted which makes them too dense for water, air, and roots to penetrate. Driving and allowing animals to graze on it heavily can exacerbate these issues.

15.21 Fuels 2025

1-Hr, 10-Hr, 100-Hr, and 1000-Hr Estimated Fuel Density



Unsurprisingly, the plot with significant willow coverage also had significant amounts of fine fuels, as well as a couple of 1000-hour cottonwood logs. These logs were in decay class 2, meaning that they were still hard and intact, and while they might take a while to ignite when exposed to fire, they could also be expected to burn well because of their low moisture content.

There were no fuels on the plot on the western side of the project. ☐

7 Management Implications

Project 15.21 San Cristobal successfully achieved its primary objective of invasive phreatophyte removal. Initial treatments effectively reduced the presence of Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix ramosissima* Ledeb.) after 10 years, as evidenced by the current absence of mature invasive trees or invasive re-sprouts within the established monitoring plots. Non-woody invasives are still present.

Due to the presence of many fine fuels (and a few 1,000 hour fuels) found in the wetter, denser plot on the project site, the threat of fire is high in this part of the site. Many of the drier areas have fewer fuels.

Coyote willow (*Salix exigua*) was dense on the project site in places. This species often grows in association with cottonwoods (while not on plot, were also on site), and its growth form means that it can potentially occupy the same height niche as Russian olive (*Elaeagnus angustifolia*) and saltceder (*Tamarix ramosissima*). It is also considered to be both drought resistant and tolerant of flooding. While this may make coyote willow a natural native competitor to undesirable species, it is limited by its shade-intolerance and may be unable to survive as a secondary canopy beneath cottonwoods in the same way that Russian olive can. It is also highly susceptible to grazing particularly in the first few years after establishment. Nonetheless, its rapid growth, ability to claim disturbed sites, and capacity to anchor stream beds and banks makes it a beneficial ally for restoration efforts (Anderson, 2006).

Limiting grazing in areas adjacent to Coyote willow stands could allow this species to expand its coverage and to preemptively occupy space before non-natives have a chance to reestablish. This combined with selectively removing invasive phreatophytes may allow the current plant community to persist. Further monitoring of the site in whatever capacity possible is necessary to guide future management decisions and inform if and when removal is necessary. Subsequent visits could show if the system is recovering or if it is destabilizing and needs another intervention to maintain the progress gained so far.

References

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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 NMFWR.

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 - 15.21 Photo Comparison



15.21_1_184DEG 2015



15.21_1_184DEG 2021



15.21_1_184DEG 2025



15.21_2_148DEG 2015



15.21_2_148DEG 2025

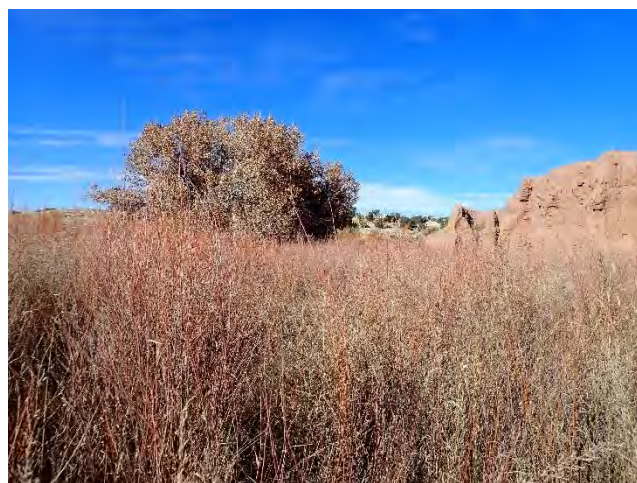
Note: There was no photo taken at this bearing in 2021.



15.21_2_320DEG 2015



15.21_2_320DEG 2021



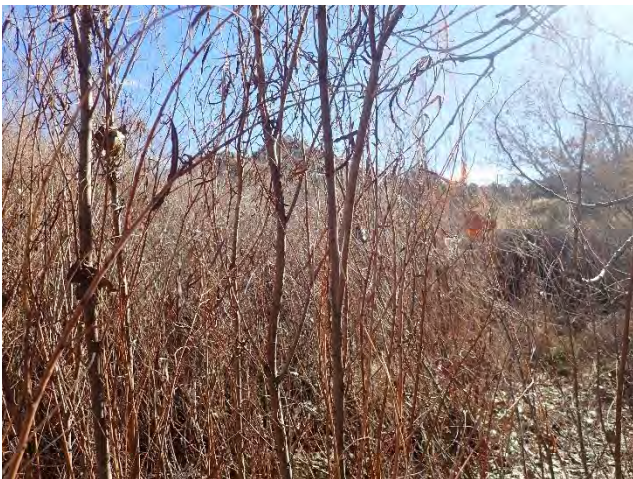
15.21_2_320DEG 2025



15.21_3_140DEG 2015



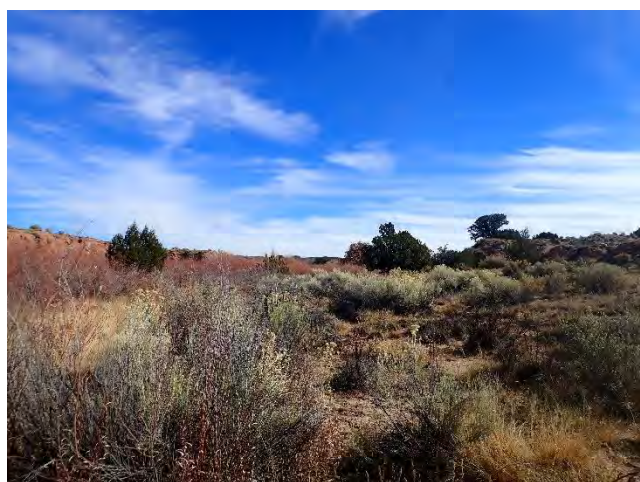
15.21_3_148DEG 2021



15.21_3_140DEG 2025



15.21_4_80DEG 2015



15.21_4_80DEG 2021



15.21_4_80DEG 2025



15.21_5_285DEG 2015



15.21_5_285DEG 2021



15.21_5_285DEG 2025



15.21_6_285DEG 2015



15.21_6_285DEG 2021



15.21_6_285DEG 2025



15.21_7_270DEG 2015



15.21_7_270DEG 2021



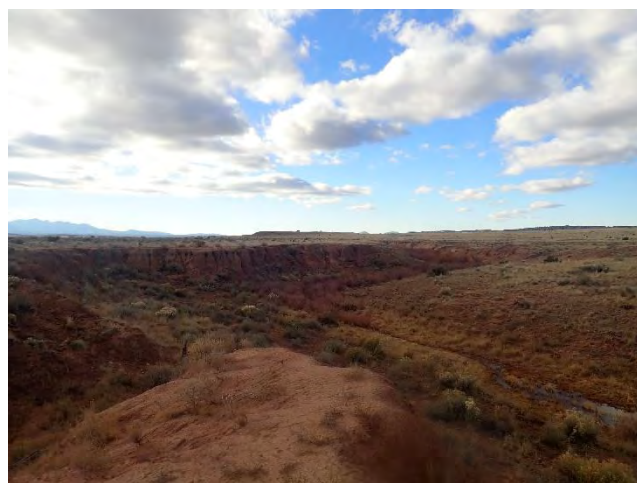
15.21_7_270DEG 2025



15.21_8_292DEG 2015



15.21_8_292DEG 2021



15.21_8_292DEG 2025