

Final Habitat Improvement Plan *revised*

Teton County Trash and Transfer Station Horsethief Canyon

January 7, 2019
December 21, 2018 (original)



Prepared for:

Teton County Integrated Solid Waste and Recycling
Attn: Heather Overholser
Superintendent of Solid Waste and Recycling
3270 S. Adams Canyon Rd.
Jackson, WY 83001

Prepared by:

EcoConnect Consulting LLC
Connecting Ecology and Community
PO Box 13259, Jackson, WY 83002
www.ecoconnectjh.com

TABLE OF CONTENTS

Introduction	1
Background	1
Project Area.....	2
Goals and Objectives	2
Impacts To Natural Resources	3
Mixed Tall Shrubs	3
Sagebrush/ Mixed Sagebrush.....	3
Grassland	4
Proposed Enhancements	4
Project Implementation.....	5
Planting and Seeding	5
Weed Control	5
Monitoring Plan.....	6
Success Criteria	6
Maintenance Plan	6
Cost Estimate	7
Proposed Timeline.....	7
References	7
Photographs.....	8
Figures	14

INTRODUCTION

The following is a Final Habitat Improvement Plan for the Teton County Trash and Transfer Station Horsethief Canyon property (PIDN: 22-40-16-27-2-00-001). This habitat improvement plan applies directly to work done at the Horsethief Canyon property to cap the landfill, improve stormwater runoff, remove the dead animal pit and redesign the site for both transfer of waste materials as well as composting facilities. This final habitat improvement plan is a requirement of Teton County Planning and Development Department to provide accurate impact calculations and mitigation requirements (EVA2014-0009 Review Memo dated March 30, 2015). EcoConnect Consulting LLC was contracted by Inside Out Landscape Architecture, LLC to prepare this final habitat improvement plan. This habitat improvement plan is submitted in support of the final site improvement landscaping plan (Inside Out Landscape Architecture, LLC, 2018) and as an update to the 2017 Habitat Improvement Plan submitted by Pioneer Environmental Services, Inc.

Prior environmental documentation that inform this final habitat improvement plan include:

- 2013 Environmental Assessment Horsethief Canyon Landfill Closure** (Golder Associates Inc) prepared for the Bridger-Teton National Forest
- 2014 Horsethief Canyon Project Environmental Analysis** (Pioneer Environmental Services, Inc) (December 4, 2014) Prepared for Teton County Planning and Development Department
- 2015 Teton County Horsethief Canyon Project Environmental Analysis/ Development Impact Assessment** (Pioneer Environmental Services, Inc) (March 17, 2015) Prepared for Teton County Planning and Development Department
- 2017 Habitat Improvement Plan (HIP) for the Teton County Trash and Transfer Station Horsethief Canyon** (Pioneer Environmental Services, Inc) (June 30, 2017) Prepared for Teton County Planning and Development Department

Per Teton County Land Development Regulations Section 5.2.1.E.2.b, *Habitat Enhancement Plan*, this final habitat improvement plan “shall contain, at a minimum, the project’s goals and objectives, methods, maps of existing vegetation and proposed enhancements, a maintenance plan, a weed control plan, a monitoring plan and surety bond requirement” (Teton County, 2018).

BACKGROUND

Through a collaborative project with the US Forest Service (USFS), the Horsethief Canyon landfill has been re-shaped and re-capped for the benefit of groundwater and air quality. The Development Impact Analysis (DIA) produced by Pioneer Environmental in 2015 concluded that the project would result in a loss of two high-ranking vegetative cover types: sagebrush (ordinal ranking of 3) and mixed tall shrubs (ordinal ranking of 8) based on Teton County Land Development Regulations (Section 5.2.1.F, *Vegetative Cover Type Standards*) (Teton County, 2018). Since the 2015 DIA was produced, the actual loss to vegetative cover types has increased in quantity based on the need to reshape slopes through stabilization and grading activities. Nonetheless, no other vegetative cover types were impacted. However, the quantity of sagebrush and mixed tall shrubs vegetative cover impacted has increased since the 2015 DIA report (Pioneer, 2015) and the associated 2017 Habitat Improvement Plan (Pioneer, 2017).

Project Area

The Horsethief Canyon property is located approximately 4.5 miles south of the Town of Jackson east of Highway 89 South (Figure 1). The property is 40.6± acres, zoned Public/Semi-Public and is entirely within the Natural Resource Overlay (NRO) (Greenwood Mapping, Inc, 2018). USFS Bridger-Teton National Forest lands border the property to the north and east and a Wyoming Department of Transportation (WYDOT) property borders the site to the west. The property encompasses Highway 89 South and a small amount of land to the west of the highway. The western property boundary south of the highway is bordered by a property owned by Melody Ranch Investments I, LLC. The southern boundary includes a highway corridor for US 89 and is bordered by the Wyoming Game and Fish Department's (WGFD) South Park Wildlife Management Area (SPWMA). WGFD's SPWMA property includes a shooting range located east of Highway 89. The WGFD shooting range extends onto Teton County's Horsethief Canyon property.

GOALS AND OBJECTIVES

Section 5.2.1.E, *Impacting the NRO*, requires that "mitigation and habitat enhancement [be provided] for the land impacted, either on-site or off-site, on a basis of 2 acres of mitigation/ habitat enhancement for every one acre of land impacted" (Teton County, 2018). For this project, the restoration and update of a landfill site, a primary component of minimizing impacts was to retain the trash and transfer activities at this site rather than impacting an alternative, undeveloped site elsewhere in the County. Through the process of restoring this landfill site and updating the facilities to provide for better management of waste materials, the majority of the site was redesigned. One benefit to retaining the facilities on this site was that 69% of the property was classified as developed/ disturbed, planted grasses or landscaping prior to project implementation (Figure 2). This redevelopment project has impacted 24.3 acres, 60% of the property, containing both developed areas as well as natural vegetation. The goals and objectives of this final mitigation plan are to detail proposed habitat enhancement and mitigation requirements for impacts to higher ranked vegetative cover types. Habitat enhancement activities proposed employ an on-site, in-kind strategy planting sagebrush and mixed tall shrubs at a rate of 2:1 for areas impacted. The enhancement project's goal is to recreate functional sagebrush and mixed tall shrub communities that blend with nearby, naturally occurring cover types.

IMPACTS TO NATURAL RESOURCES

Impacts to natural resources and, specifically, vegetative cover types are displayed in Figure 3, summarized in Table 1 and described below.

Table 1. Impacts to Vegetative Cover Types

VEGETATION COVER TYPE	ORDINAL RANKING	ACRES	PERCENT OF TOTAL IMPACT
Mixed Tall Shrub	8	0.5	2%
Mixed Sagebrush	3	2.9	12%
Sagebrush	3	0.1	<1%
Grassland (planted)	n/a	8.7	36%
Landscaping	n/a	1.4	6%
Developed/ Disturbed	n/a	10.7	44%
	TOTAL	24.3	100%

The redevelopment of the property has impacted 24.3 acres. Of this 24.3 acres of impact, 86% was located in areas that were previously developed/ disturbed, landscaping or planted grass species, all lower ranking, or no rank, vegetative cover types. The remaining 3.5 acres, or 14% of the impacted area, were located in higher ranking vegetative cover types, specifically sagebrush, mixed sagebrush and mixed tall shrubs. The majority of these impacts resulted from the need to regrade slopes for stability purposes.

Mixed Tall Shrubs

Based on previous environmental documentation (Pioneer, 2015) species found in the mixed tall shrub areas were likely chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier* spp.) and mountain snowberry (*Symphoricarpos oreophilus*). Mixed tall shrub cover type has an ordinal ranking of 8 (Teton County, 2018) based on its importance to wildlife as nesting and foraging habitat for avian species and forage for ungulate species. The mixed tall shrubs found on the property were primarily found on northwest facing slopes in the northeastern portion of the property (Pioneer, 2015) (Figure 2). Tall shrubs remaining in this area (Photo 11) exhibit intensive browse characteristics thereby supporting the importance of this cover type to ungulate species. Teton County land development regulations characterize mixed tall shrub cover types as “stands dominated (greater than or equal to 25% canopy coverage) by ... tall shrubs with less than 10% tree canopy coverage present” (Section 5.2.1.F, *Vegetative Cover Type Standards*).

Sagebrush/ Mixed Sagebrush

Sagebrush and mixed sagebrush cover type areas likely contained Wyoming big sagebrush (*Artemesia tridentata*), rabbitbrush (*Chrysothamnus viscidiflorus*) and antelope bitterbrush (*Purshia tridentate*) species (Pioneer, 2015 & field observations). Sagebrush/ mixed sagebrush (categorized as xeric shrubs) cover type has an ordinal ranking of 3 (Teton County, 2018) based on its importance to wildlife. These areas are likely used by sagebrush steppe avian species for nesting and foraging as well as by ungulate species for summer habitat. Sagebrush and mixed sagebrush cover types were primarily found on the eastern portion of the property (Figure 2) and 75% of this cover type remains unimpacted post redevelopment. Teton County land development regulations characterize xeric shrub cover types as a mix of low productivity sites dominated by “widely-spaced, low shrubs and subshrubs, such as *Artemesia* spp., *Eurotia*, and grasses” (Section 5.2.1.F, *Vegetative Cover Type Standards*). Historic aerial

imagery (Greenwood Mapping, Inc, 2018) indicates that areas mapped as sagebrush and mixed sagebrush in 2015 (2013 Teton County Aerial Imagery) contained a mix of grasses and a pattern of clustered shrubs likely in areas that retained moisture and snow. This pattern of grasses and shrubs is typical throughout the arid west as well as on the hillsides adjacent to the property (Photos 5 & 9).

Grassland

The portion of the property identified as grasslands by Pioneer in 2015 includes natural (ordinal ranking of 3) and previously disturbed (ordinal ranking of n/a) grasslands. The previously disturbed areas have been replaced with grasses (Pioneer, 2015). No impacts were made to areas of natural grass cover types (ordinal ranking of 3).

PROPOSED ENHANCEMENTS

The proposed enhancements of vegetative cover types to meet Teton County's mitigation requirements of 2 acres planted for every one acre impacted are described here and summarized in Table 2 below.

Table 2. Proposed Enhancements

VEGETATION COVER TYPE	ORDINAL RANKING	ACRES IMPACTED	ACRES MITIGATION PROPOSED	USE
Mixed Tall Shrubs	8	0.5	1.0	Enhancements
Mixed Sagebrush	3	2.9	6.3	Enhancements
Sagebrush	3	0.1		
Grasses and forbs (planted)	3	8.7	2.6	Revegetation
Landscaping	n/a	1.4	0	
Developed/ Disturbed	n/a	10.7	0	
	TOTAL ENHANCEMENTS		7.3	
	TOTAL REVEGETATION		2.6	

This final habitat improvement plan proposes 7.3 acres of enhancements (mixed tall shrubs and sagebrush combined) which exceeds the required amount by 0.3 acres. This additional 0.3 acres is included to ensure that the mitigation requirements and associated success criteria are achieved. The proposed enhancement locations are on-site and displayed in Figure 4. Revegetation using grass species is proposed for slope stabilization, overall revegetation of the site and in coordination with revegetation efforts planned for the neighboring USFS property. Revegetation areas are shown with the habitat enhancements included above and in Figure 4 for informational purposes but do not contribute to fulfillment of Teton County's mitigation requirements.

Enhancement and revegetation locations were determined based on aspect and potential use of the property by ungulates. No permanent exterior fencing is proposed for the property therefore, mixed tall shrub enhancement areas are proposed on the exterior of the facilities areas. Mixed tall shrub species provide excellent forage to ungulate species and can serve as an attractant to ungulates. Ungulates likely pass through the property following north-south ridgelines on both the eastern and western edges of the property. Therefore, mixed tall shrub enhancements have been placed on the exterior of the operations area, along a ridgeline, in an effort to avoid attracting ungulates into the property's operational areas. Sagebrush and grass areas were placed to align with adjacent sagebrush areas, revegetation of the USFS project area, to aid with slope stabilization efforts and along a berm constructed to protect the upper most operational pad (Pad 3) from the WGFD shooting range activities.

PROJECT IMPLEMENTATION

Planting and Seeding

All mitigation/ enhancement and revegetation areas have been created through project site grading and excavation. Some areas have been temporarily seeded with grass species to support slope stabilization. Where possible, and successful, this seeding of grass species should be incorporated into the proposed planting and seeding of enhancement and revegetation areas. The seed mix employed for slope stabilization was recommended by the USFS and will be used for revegetation efforts to the north (USFS property).

Mixed tall shrub enhancement areas will be planted with a mix of serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*) and common white snowberry (*Symphoricarpos albus*) of varying sizes and age classes. The use of various size and age classes will provide for a diversity of age classes once plantings have established to better mirror natural shrub establishment. These shrubs will be planted to replicate neighboring tall shrub patterns on the landscape and will generally be spaced 10 feet on center. An understory of grasses and forbs will accompany these mixed tall shrub plantings. This enhancement area will be fenced to protect the plantings from ungulate browse for a minimum of three years or until the shrubs have established to withstand browse pressure. Plantings may occur in either early spring or late fall.

Sagebrush enhancement areas will be planted with big sagebrush (*Artemisia tridentate*) of varying sizes and age classes. The use of various size and age classes will provide for a diversity of age classes once plantings have established to better mirror natural sagebrush establishment. These shrubs will be planted to replicate neighboring tall shrub patterns on the landscape and will generally be spaced 15 feet on center. An understory of grasses will accompany sagebrush plantings. It is not expected that fencing will be needed around sagebrush plantings. If annual monitoring indicates otherwise, fencing of the sagebrush enhancement areas can be added as a component of the maintenance plan. Plantings may occur in either early spring or late fall.

An appropriate mix of soil and mulch will be used for shrub plantings. The amount of soil and mulch required will be dependent on the slope of the enhancement area, the size of the planting material and the depth of the existing soil regime. Given the location of a soil processing facility on site, it is likely that all necessary soil materials will be immediately available.

Irrigation will likely be required for mixed tall shrub plantings but not necessarily for all sagebrush plantings. Irrigation should be employed where possible and advantageous. Both sagebrush and mixed tall shrub species are adapted to grow in low moisture regime locations. The presence of irrigation for some plantings may expedite the project's establishment and success. If sagebrush is planted in the spring, watering during the first year can be conducted using a watering truck. If sagebrush is planted in the fall, no watering should be required.

Weed Control

Teton County recommends that State listed noxious and invasive weeds be controlled through mechanical and chemical methods prior to enhancement activities and for 1-3 years following plantings. Weed control may take place twice during the summer months. Teton County Weed and Pest will be contacted to conduct annual inspections subsequent to the first three growing seasons. A certification of suitability of weed control efforts from Teton County Weed and Pest will accompany the first and third year monitoring reports.

MONITORING PLAN

Project monitoring should begin at the conclusion of the first growing season after plantings and continue until project success criteria have been met or for a minimum of three years, whichever is longer. The enhancements will be monitored annually by a qualified environmental consultant to ensure that the plantings are established and success criteria are achieved.

Monitoring visits will employ a mix of both ocular estimations and point-intercept transects to evaluate the habitat enhancement sites. Monitoring reports will be submitted to Teton County after each annual monitoring visit for a minimum of three years or until project success is achieved. Monitoring reports will contain measurements of percentage vegetative cover of target species, photographs and measurements of shrub height establishment as compared with browse height. Per Teton County Planning's requirement, if areas of shrub plantings differ in irrigation or non-irrigation techniques used, monitoring reports will differentiate survivability results between the differing technique areas (Teton County Planning Department, 2019). Information produced by Teton County Weed and Pest annual weed inspections will be attached to annual monitoring reports.

SUCCESS CRITERIA

Successful project completion of habitat enhancement areas will be measured based on the following methods and associated criteria:

Point-intercept transects measure quantity of shrubs present by species. Success will be achieved when 75% of the point-intercept transects determine that the preferred species of shrubs (those planted) are established and growing in excess of browse pressures. Overall transect data should indicate a canopy cover of at least 25% target shrub species for shrub enhancement success.

Ocular estimations measure the overall canopy cover of a site. Ocular estimations are useful over large areas where point-intercept transects are overly burdensome. The Horsethief Canyon site is appropriate for the use of ocular estimations as the enhancement areas are readily visible and some slopes are steep. Ocular estimations should indicate a canopy cover of at least 25% shrub cover for shrub enhancement success.

Project success criteria will be achieved when 75% or more of the annual point-intercept transects determine that the target shrub species are established and have either exceeded the height of browse pressures (approximately 5-6 ft tall for deer and elk) or are thriving based on growth form AND ocular estimates indicate at least 25% shrub canopy cover in shrub enhancement areas. The project's goal is to re-establish functional shrub communities on the property.

MAINTENANCE PLAN

Maintenance of enhancement areas to ensure success will employ an adaptive management strategy. Adaptive management strategies may include replanting of shrubs, reseeding of grass mixtures, addressing deficiencies in soils or hydrology and protecting plantings from browse and/ or pests. If during annual monitoring it is apparent that the enhancement sites need greater protection from browse then protective fencing will be established around the affected enhancement area's perimeter.

COST ESTIMATE

The cost estimate for these habitat enhancement and revegetation activities includes:

Table 3. Cost Estimate*

ENHANCEMENT ACTIVITY	COST
Sagebrush & mixed tall shrub plantings (5 & 10 gal shrub containers)	\$83,870
Shrub, grass and forb seed mix (\$336/ acres x 4.1 acres)	\$1,378
Supplemental Top Soil (\$45/acre x 100 acres)	\$4,500
Irrigation for tall shrub plantings	\$30,600
Supplemental irrigation for sagebrush plantings (possible)	\$10,000
Fencing	\$25,000
Monitoring Visits (three annual visits and two reports) (3x\$1,500/ year)	\$4,500
TOTAL COST ESTIMATE	\$159,848
125% SURETY BOND	\$199,810

**Cost estimate does not include restoration of grassland areas as they are not an enhancement activity.*

Cost estimates are based on project estimate by Inside Out Landscape Architecture, LLC. Prices include labor, plantings and supplies.

PROPOSED TIMELINE

Fall 2019 – Landfill closure complete, TCWP treat for weed species and enhancement areas planted

Fall 2020 – Monitoring visit #1 with report to Teton County Planning including TCWP report

Fall 2021 – Monitoring visit #2 with report to Teton County Planning; Weed treatment activity at the discretion of TCWP

Fall 2022 – Monitoring visit #3 with report to Teton County Planning. Report will determine if project is successful or if adaptive management and/ or more time is needed to achieve project success. TCWP report will be attached to monitoring report.

REFERENCES

Greenwood Mapping, Inc. (2018). *Teton County MapServer*. Retrieved from <https://maps.greenwoodmap.com/tetonwy/mapserver/>

Pioneer. (2015). *Pioneer Environmental Services, Inc. Teton County Horsethief Canyon Project Environmental Analysis/ Development Impact Assessment (March 17, 2015)*.

Pioneer. (2017). *Pioneer Environmental Services, Inc. Habitat Improvement Plan for the Teton County Trash and Transfer Station Horsethief Canyon (June 30, 2017)*.

Teton County. (2018). *Land Development Regulations (updated 8/7/18)*.

Teton County Planning Department. (2019). *Transfer Station Final Habitat Enhancement Plan Review (1/4/19 Email from R Hurley, Principal Planner)*.

PHOTOGRAPHS



Photo 1. Enhancement area between Pad 1 and 3.



Photo 2. Enhancement area between Pad 2 and 3.



Photo 3. Road to Pad 3, WYDOT property to the west (left).



Photo 4. Enhancement areas between Pads 1 and 3 (below power lines) and Pads 1 and 2 (to the left).



Photo 5. Slope displaying seeding for slope stabilization (left), natural sagebrush patterns (right top) and recent grading (bottom).



Photo 6. Pad 3 organic material processing



Photo 7. USFS/ Teton County property line (approximate)



Photo 8. Pad 3, Pad 2 and road between from ridgeline



Photo 9. Example adjacent mixed tall shrub, sagebrush and grassland cover type matrix



Photo 10. Pad 3 berm stockpiles where it will blend into hillside



Photo 1.



Photo 1.

FIGURES

Figure 1 Vicinity

Figure 2. Vegetative Cover Types (2015)

Figure 3. Vegetation Impacts

Figure 4. Habitat Enhancements

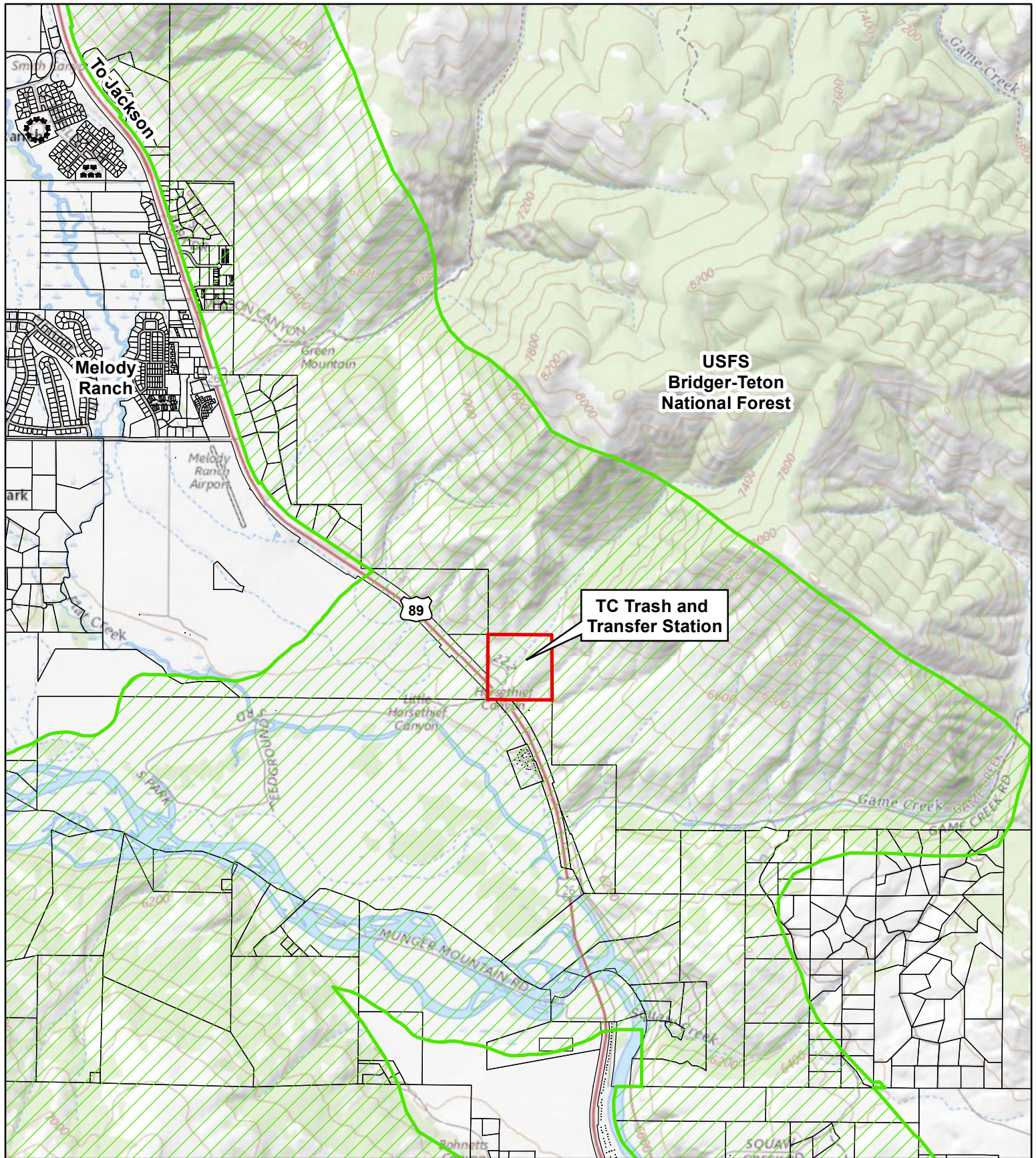


Figure 1:
Vicinity

**Habitat Improvement
Plan**

December 21, 2018

Legend

- Property Boundary
- Parcels
- NRO

Sources:

- Teton County
- Ownership
- USGS
- Topographic Map

1 in = 0.5 miles
0 0.5
Miles

EcoConnect Consulting LLC
Connecting Ecology and Community

N

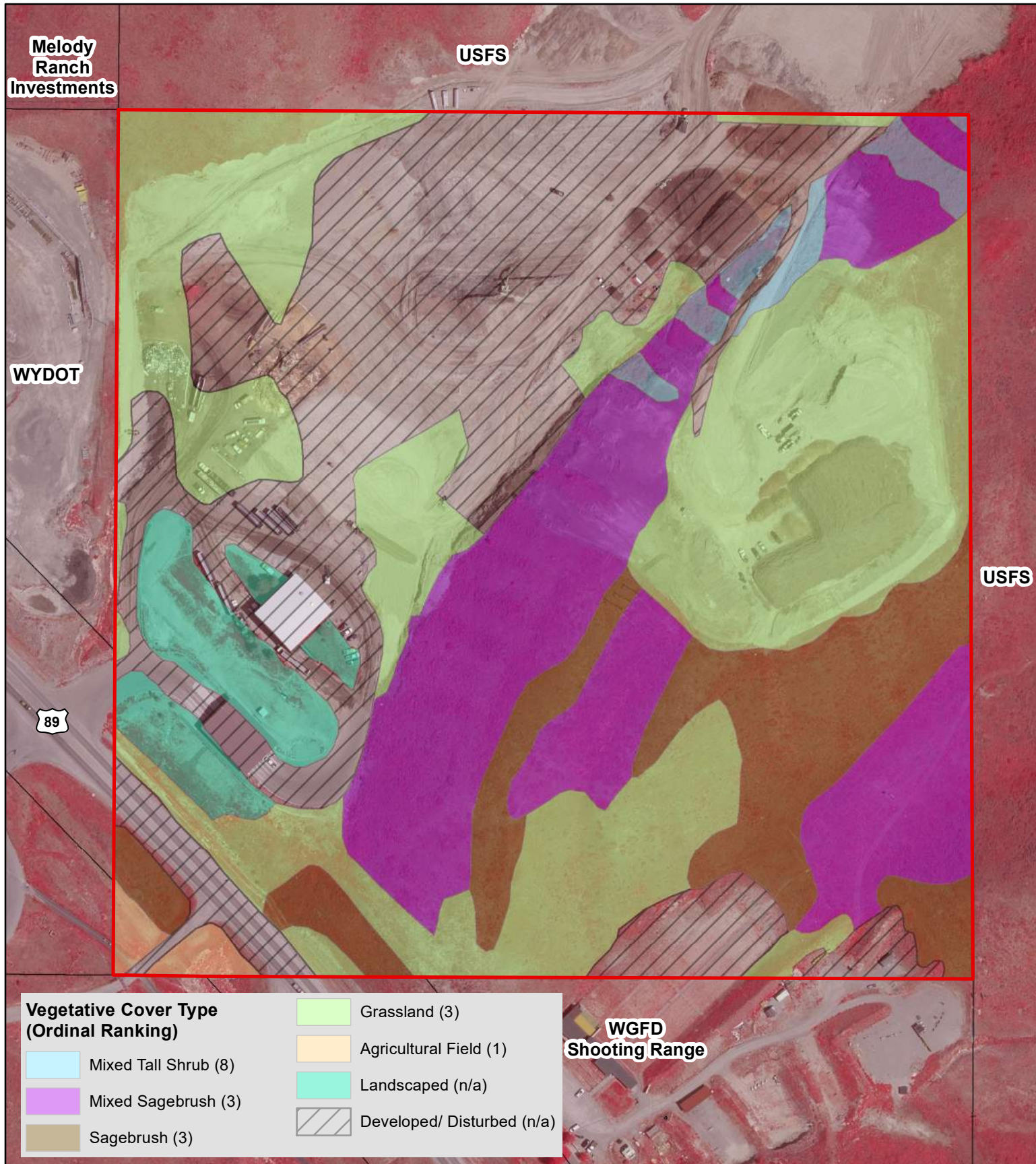


Figure 2:
Vegetation Cover
Types (2015)

**Habitat Improvement
Plan**

December 21, 2018

Legend

- Property Boundary
- Parcels

Sources:

- Teton County
- Ownership
- 2017 1-ft Aerial Photography
- Pioneer Environmental (2015)
- Vegetative Covertypes from
- Development Impacts Analysis

1 in = 200 feet

0 100 200
Feet

EcoConnect Consulting LLC
Connecting Ecology and Community

N

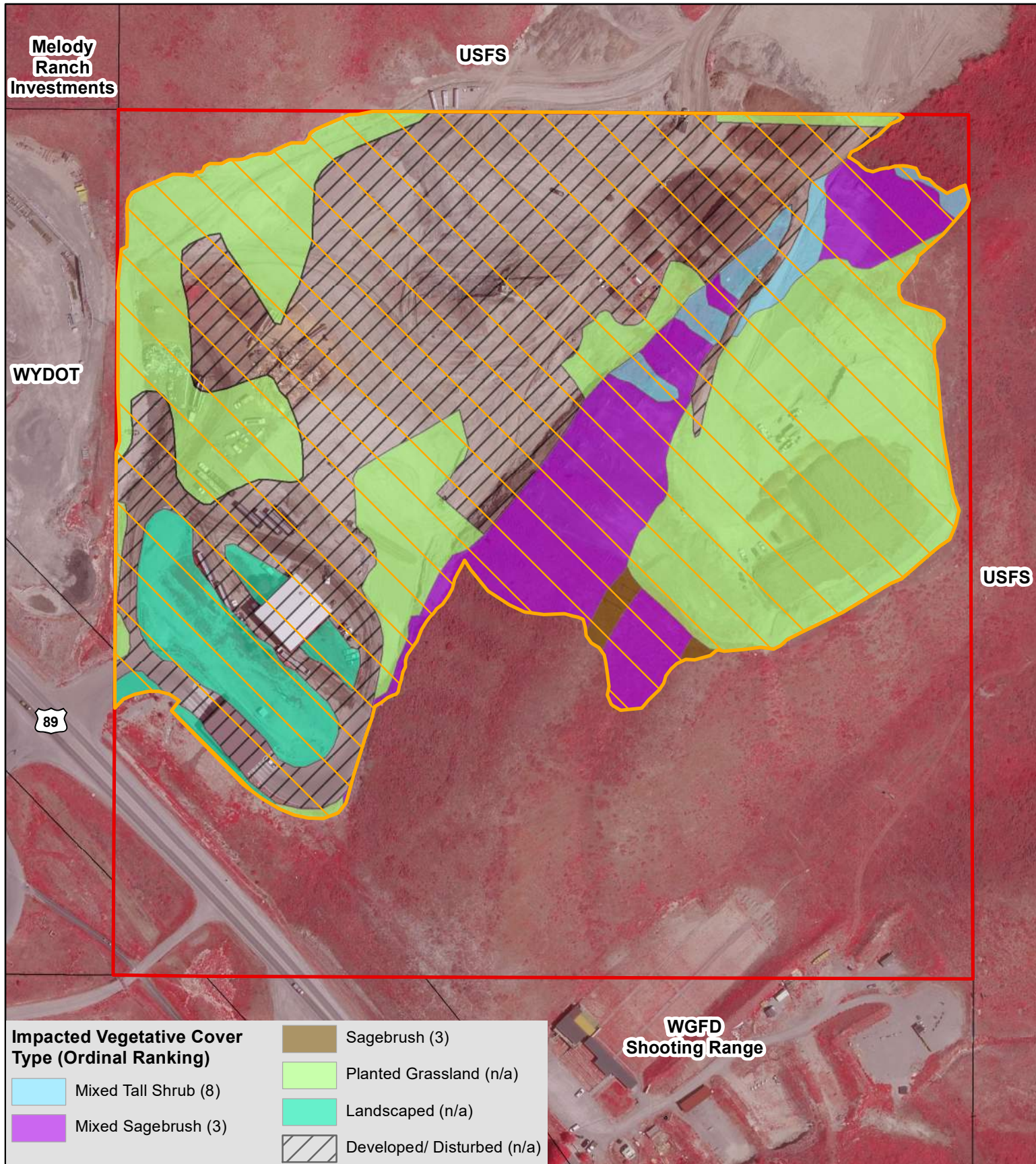


Figure 3:
Vegetation Impacts
Habitat Improvement Plan
December 21, 2018

Legend

Redevelopment Area

Property Boundary

Parcels

Sources:
Teton County
- Ownership
- 2017 1-ft Aerial Photography
Pioneer Environmental (2015)
- Vegetative Covertypes from
Development Impacts Analysis

1 in = 200 feet

0 100 200 Feet

EcoConnect Consulting LLC
Connecting Ecology and Community

N

